This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

https://books.google.com

UNIVERSITY OF CALIFORNIA, SAN DIEGO
3 1822 00062 9469

H. O. No. 214

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Latitudes 50° to 59°, inclusive

⚓

Vol. VI

UNITED STATES NAVY DEPARTMENT
HYDROGRAPHIC OFFICE

Digitized by Google

CORRECTIONS TO BE APPLIED TO THE OBSERVED ALTITUDE OF

Sun Star **Moon**

Obs. Alt.	☉	☆
° ′	′	′
6 30	+ 8.2	−7.9
6 40	8.4	7.7
6 50	8.6	7.6
7 0	8.7	7.4
7 10	8.9	7.2
7 20	+ 9.0	−7.1
7 30	9.2	7.0
7 40	9.3	6.8
7 50	9.5	6.7
8 0	9.6	6.6
8 10	+ 9.7	−6.4
8 20	9.8	6.3
8 30	10.0	6.2
8 40	10.1	6.1
8 50	10.2	6.0
9 0	+10.3	−5.9
9 20	10.5	5.7
9 40	10.6	5.5
10 0	10.8	5.3
10 20	11.0	5.2
10 40	+11.2	−5.0
11 0	11.3	4.9
11 30	11.5	4.7
12 0	11.7	4.5
12 30	11.9	4.3
13 0	+12.0	−4.1
13 30	12.2	4.0
14 0	12.3	3.8
15 0	12.6	3.6
16 0	12.8	3.4
17 0	+13.0	−3.2
18 0	13.2	3.0
19 0	13.3	2.8
20 0	13.5	2.6
22 0	13.7	2.4
24 0	+14.0	−2.2
26 0	14.1	2.0
28 0	14.3	1.8
30 0	14.4	1.7
32 0	14.6	1.6
34 0	+14.7	−1.4
36 0	14.8	1.3
38 0	14.9	1.3
40 0	15.0	1.2
45 0	15.1	1.0
50 0	+15.3	−0.8
55 0	15.4	0.7
60 0	15.5	0.6
65 0	15.6	0.5
70 0	15.7	0.4
75 0	+15.8	−0.3
80 0	15.8	0.2
85 0	15.9	−0.1
90 0	+16.0	0.0

Date	Additional Sun's Corr.
	′
Jan. 1	+0.3
Feb. 1	+0.3
Mar. 1	+0.2
Apr. 1	0.0
May 1	−0.1
June 1	−0.2
July 1	−0.2
Aug. 1	−0.2
Sept. 1	−0.1
Oct. 1	0.0
Nov. 1	+0.2
Dec. 1	+0.3

Obs. Alt. Lower Limb	HORIZONTAL PARALLAX 54′	55′	56′	57′	58′	59′	60′	61′
°	′	′	′	′	′	′	′	′
5.5	+59.6	+60.9	+62.1	+63.4	+64.7	+66.0	+67.3	+68.5
6.0	60.2	61.4	62.7	64.0	65.3	66.5	67.8	69.1
6.5	60.7	61.9	63.2	64.5	65.8	67.0	68.3	69.6
7.0	61.1	62.4	63.6	64.9	66.2	67.4	68.7	70.0
7.5	61.5	62.7	64.0	65.3	66.5	67.8	69.1	70.4
8.0	+61.8	+63.1	+64.3	+65.6	+66.9	+68.1	+69.4	+70.7
8.5	62.1	63.3	64.6	65.9	67.1	68.4	69.7	70.9
9.0	62.3	63.6	64.8	66.1	67.4	68.6	69.9	71.1
9.5	62.5	63.8	65.0	66.3	67.6	68.8	70.1	71.3
10.0	62.7	64.0	65.2	66.5	67.7	69.0	70.3	71.5
11	+63.0	+64.2	+65.5	+66.7	+68.0	+69.3	+70.5	+71.8
12	63.2	64.4	65.7	66.9	68.2	69.5	70.7	72.0
13	63.3	64.6	65.8	67.0	68.3	69.6	70.8	72.1
14	63.4	64.6	65.9	67.1	68.4	69.6	70.9	72.1
15	63.4	64.6	65.9	67.1	68.4	69.6	70.9	72.1
16	+63.4	+64.6	+65.8	+67.1	+68.3	+69.6	+70.8	+72.0
17	63.3	64.5	65.8	67.0	68.2	69.5	70.7	71.9
18	63.2	64.4	65.6	66.9	68.1	69.3	70.6	71.8
19	63.1	64.3	65.5	66.7	67.9	69.2	70.4	71.6
20	62.9	64.1	65.3	66.5	67.8	69.0	70.2	71.4
21	+62.7	+63.9	+65.1	+66.3	+67.5	+68.7	+70.0	+71.2
22	62.5	63.7	64.9	66.1	67.3	68.5	69.7	70.9
23	62.2	63.4	64.6	65.9	67.0	68.2	69.4	70.6
24	62.0	63.1	64.3	65.5	66.7	67.9	69.1	70.3
25	61.7	62.9	64.0	65.2	66.4	67.6	68.8	69.9
26	+61.3	+62.5	+63.7	+64.9	+66.0	+67.2	+68.4	+69.6
27	61.0	62.2	63.3	64.5	65.7	66.8	68.0	69.2
28	60.7	61.8	63.0	64.1	65.3	66.4	67.6	68.8
29	60.3	61.4	62.6	63.7	64.9	66.0	67.2	68.4
30	59.9	61.0	62.2	63.3	64.4	65.6	66.7	67.9
31	+59.5	+60.6	+61.7	+62.9	+64.0	+65.1	+66.3	+67.4
32	59.0	60.2	61.3	62.4	63.5	64.7	65.8	66.9
33	58.6	59.7	60.8	61.9	63.1	64.2	65.3	66.4
34	58.1	59.2	60.3	61.4	62.5	63.6	64.8	65.9
35	57.7	58.7	59.8	60.9	62.0	63.1	64.2	65.3
36	+57.2	+58.2	+59.3	+60.4	+61.5	+62.6	+63.7	+64.7
37	56.7	57.7	58.8	59.8	60.9	62.0	63.1	64.2
38	56.1	57.2	58.2	59.3	60.4	61.4	62.5	63.6
39	55.6	56.6	57.7	58.7	59.8	60.8	61.9	62.9
40	55.0	56.1	57.1	58.1	59.2	60.2	61.3	62.3
41	+54.4	+55.5	+56.5	+57.5	+58.6	+59.6	+60.6	+61.6
42	53.9	54.9	55.9	56.9	57.9	59.0	60.0	61.0
43	53.3	54.3	55.3	56.3	57.3	58.3	59.3	60.3
44	52.7	53.7	54.6	55.6	56.6	57.6	58.6	59.6
45	52.0	53.0	54.0	55.0	56.0	56.9	57.9	58.9
46	+51.4	+52.4	+53.3	+54.3	+55.3	+56.2	+57.2	+58.2
47	50.7	51.7	52.6	53.6	54.6	55.5	56.5	57.4
48	50.1	51.0	52.0	52.9	53.9	54.8	55.7	56.7
49	49.4	50.3	51.3	52.2	53.1	54.1	55.0	55.9
50	48.7	49.6	50.5	51.5	52.4	53.3	54.2	55.1
51	+48.0	+48.9	+49.8	+50.7	+51.6	+52.5	+53.4	+54.3
52	47.3	48.2	49.1	50.0	50.9	51.8	52.7	53.5
53	46.6	47.5	48.3	49.2	50.1	51.0	51.8	52.7
54	45.8	46.7	47.6	48.4	49.3	50.2	51.0	51.9
55	45.1	46.0	46.8	47.6	48.5	49.3	50.2	51.0
56	+44.4	+45.2	+46.0	+46.8	+47.7	+48.5	+49.4	+50.2
57	43.6	44.4	45.2	46.0	46.9	47.7	48.5	49.3
58	42.8	43.6	44.4	45.2	46.0	46.9	47.7	48.5
59	42.1	42.9	43.6	44.4	45.2	46.0	46.8	47.6
60	41.3	42.1	42.8	43.6	44.4	45.1	45.9	46.7
61	+40.5	+41.2	+42.0	+42.7	+43.5	+44.3	+45.0	+45.8
62	39.6	40.4	41.1	41.9	42.6	43.4	44.1	44.9
63	38.8	39.6	40.3	41.0	41.8	42.5	43.2	43.9
64	38.0	38.7	39.4	40.2	40.9	41.6	42.3	43.0
65	37.2	37.9	38.6	39.3	40.0	40.7	41.4	42.1
66	+36.4	+37.0	+37.7	+38.4	+39.1	+39.8	+40.4	+41.1
67	35.5	36.2	36.8	37.5	38.2	38.8	39.5	40.2
68	34.7	35.3	36.0	36.6	37.3	37.9	38.6	39.2
69	33.8	34.4	35.1	35.7	36.3	37.0	37.6	38.2
70	32.9	33.6	34.2	34.8	35.4	36.0	36.7	37.3
71	+32.1	+32.7	+33.3	+33.9	+34.5	+35.1	+35.7	+36.3
72	31.2	31.8	32.3	32.9	33.5	34.1	34.7	35.3
73	30.3	30.9	31.4	32.0	32.6	33.2	33.7	34.3
74	29.4	30.0	30.5	31.1	31.6	32.2	32.7	33.3
75	28.5	29.1	29.6	30.1	30.7	31.2	31.8	32.3
76	+27.7	+28.2	+28.7	+29.2	+29.7	+30.2	+30.8	+31.3
77	26.8	27.3	27.7	28.2	28.8	29.3	29.8	30.2
78	25.8	26.3	26.8	27.3	27.8	28.3	28.7	29.2
79	24.9	25.4	25.9	26.3	26.8	27.3	27.7	28.2
80	24.0	24.5	24.9	25.4	25.8	26.3	26.7	27.2
81	+23.1	+23.6	+24.0	+24.4	+24.8	+25.3	+25.7	+26.2
82	22.2	22.6	23.0	23.4	23.9	24.3	24.7	25.1
83	21.3	21.7	22.1	22.5	22.9	23.3	23.7	24.1
84	20.4	20.8	21.1	21.5	21.9	22.3	22.6	23.0
85	19.4	19.8	20.2	20.5	20.9	21.3	21.6	22.0
86	+18.5	+18.9	+19.2	+19.6	+19.9	+20.3	+20.6	+20.9
87	17.6	17.9	18.2	18.6	18.9	19.2	19.6	19.9
88	16.7	17.0	17.3	17.6	17.9	18.2	18.5	18.8
89	15.7	16.0	16.3	16.6	16.9	17.2	17.5	17.8
90	+14.7	+15.0	+15.3	+15.6	+15.8	+16.1	+16.4	+16.7

Obs. Alt. Upper Limb	HORIZONTAL PARALLAX 54′	55′	56′	57′	58′	59′	60′	61′
°	′	′	′	′	′	′	′	′
5.5	+29.4	+30.2	+30.9	+31.6	+32.3	+33.0	+33.7	+34.4
6.0	30.1	30.8	31.5	32.3	33.0	33.7	34.4	35.1
6.5	30.7	31.4	32.1	32.8	33.5	34.3	35.0	35.7
7.0	31.2	31.9	32.6	33.3	34.0	34.8	35.5	36.2
7.5	31.6	32.3	33.0	33.7	34.5	35.2	35.9	36.6
8.0	+32.0	+32.7	+33.4	+34.1	+34.8	+35.5	+36.3	+37.0
8.5	32.3	33.0	33.7	34.4	35.1	35.9	36.6	37.3
9.0	32.6	33.3	34.0	34.7	35.4	36.1	36.8	37.5
9.5	32.8	33.5	34.2	34.9	35.6	36.3	37.1	37.8
10.0	33.0	33.7	34.4	35.1	35.8	36.5	37.3	38.0
11	+33.3	+34.0	+34.7	+35.4	+36.2	+36.9	+37.6	+38.3
12	33.6	34.3	35.0	35.7	36.4	37.1	37.8	38.5
13	33.7	34.4	35.1	35.8	36.5	37.2	37.9	38.6
14	33.8	34.5	35.2	35.9	36.6	37.3	38.0	38.7
15	33.8	34.5	35.2	35.9	36.6	37.3	38.0	38.7
16	+33.8	+34.5	+35.2	+35.9	+36.6	+37.3	+38.0	+38.6
17	33.8	34.5	35.1	35.8	36.5	37.2	37.9	38.6
18	33.7	34.3	35.0	35.7	36.4	37.1	37.7	38.4
19	33.5	34.2	34.9	35.6	36.2	36.9	37.6	38.2
20	33.4	34.0	34.7	35.4	36.0	36.7	37.4	38.1
21	+33.2	+33.9	+34.5	+35.2	+35.8	+36.5	+37.2	+37.8
22	33.0	33.6	34.3	34.9	35.6	36.3	36.9	37.6
23	32.7	33.4	34.0	34.7	35.3	36.0	36.6	37.3
24	32.5	33.1	33.7	34.4	35.0	35.7	36.3	37.0
25	32.2	32.8	33.4	34.1	34.7	35.4	36.0	36.6
26	+31.9	+32.5	+33.1	+33.7	+34.4	+35.0	+35.6	+36.2
27	31.5	32.1	32.8	33.4	34.0	34.6	35.2	35.9
28	31.2	31.8	32.4	33.0	33.6	34.2	34.9	35.5
29	30.8	31.4	32.0	32.6	33.2	33.8	34.4	35.0
30	30.4	31.0	31.6	32.2	32.8	33.4	34.0	34.6
31	+30.0	+30.6	+31.2	+31.8	+32.3	+32.9	+33.5	+34.1
32	29.6	30.1	30.7	31.3	31.9	32.5	33.0	33.6
33	29.1	29.7	30.3	30.8	31.4	32.0	32.5	33.1
34	28.7	29.2	29.8	30.3	30.9	31.5	32.0	32.6
35	28.2	28.7	29.3	29.8	30.4	30.9	31.5	32.0
36	+27.7	+28.2	+28.8	+29.3	+29.8	+30.4	+30.9	+31.5
37	27.2	27.7	28.2	28.8	29.3	29.8	30.3	30.9
38	26.7	27.2	27.7	28.2	28.7	29.2	29.7	30.3
39	26.1	26.6	27.1	27.6	28.1	28.6	29.1	29.6
40	25.6	26.1	26.6	27.1	27.6	28.0	28.5	29.0
41	+25.0	+25.5	+26.0	+26.4	+26.9	+27.4	+27.9	+28.4
42	24.4	24.9	25.4	25.8	26.3	26.8	27.2	27.7
43	23.8	24.3	24.7	25.2	25.6	26.1	26.6	27.0
44	23.2	23.6	24.1	24.6	25.0	25.4	25.9	26.3
45	22.6	23.0	23.4	23.9	24.3	24.7	25.2	25.6
46	+21.9	+22.4	+22.8	+23.2	+23.6	+24.0	+24.5	+24.9
47	21.3	21.7	22.1	22.5	22.9	23.3	23.8	24.2
48	20.6	21.0	21.4	21.8	22.2	22.6	23.0	23.4
49	19.9	20.3	20.7	21.1	21.5	21.9	22.3	22.6
50	19.2	19.6	20.0	20.4	20.7	21.1	21.5	21.9
51	+18.5	+18.9	+19.3	+19.6	+20.0	+20.3	+20.7	+21.1
52	17.8	18.2	18.5	18.9	19.2	19.6	19.9	20.3
53	17.1	17.5	17.8	18.1	18.4	18.8	19.1	19.4
54	16.4	16.7	17.0	17.3	17.7	18.0	18.3	18.6
55	15.7	16.0	16.3	16.6	16.9	17.2	17.5	17.8
56	+14.9	+15.2	+15.5	+15.8	+16.1	+16.3	+16.6	+16.9
57	14.2	14.4	14.7	15.0	15.2	15.5	15.8	16.1
58	13.4	13.6	13.9	14.2	14.4	14.7	14.9	15.2
59	12.6	12.8	13.1	13.3	13.6	13.8	14.1	14.3
60	11.8	12.0	12.3	12.5	12.7	13.0	13.2	13.4
61	+11.0	+11.2	+11.4	+11.6	+11.9	+12.1	+12.3	+12.5
62	10.2	10.4	10.6	10.8	11.0	11.2	11.4	11.6
63	9.4	9.6	9.8	9.9	10.1	10.3	10.5	10.7
64	8.6	8.7	8.9	9.1	9.2	9.4	9.6	9.7
65	7.7	7.9	8.0	8.2	8.3	8.5	8.7	8.8
66	+ 6.9	+ 7.0	+ 7.2	+ 7.3	+ 7.5	+ 7.6	+ 7.7	+ 7.9
67	6.1	6.2	6.3	6.4	6.5	6.7	6.8	6.9
68	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
69	4.3	4.4	4.5	4.6	4.7	4.8	4.8	4.9
70	3.5	3.5	3.6	3.7	3.8	3.8	3.9	4.0
71	+ 2.6	+ 2.7	+ 2.7	+ 2.8	+ 2.8	+ 2.9	+ 2.9	+ 3.0
72	1.7	1.8	1.8	1.9	1.9	1.9	2.0	2.0
73	+ 0.9	+ 0.9	+ 0.9	+ 0.9	+ 0.9	+ 0.9	+ 1.0	+ 1.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	− 0.9	− 0.9	− 0.9	− 1.0	− 1.0	− 1.0	− 1.0	− 1.0
76	− 1.8	− 1.9	− 1.9	− 1.9	− 1.9	− 2.0	− 2.0	− 2.0
77	2.7	2.8	2.8	2.9	2.9	2.9	3.0	3.0
78	3.6	3.7	3.8	3.8	3.9	3.9	4.0	4.1
79	4.5	4.6	4.7	4.8	4.8	4.9	5.0	5.1
80	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1
81	− 6.3	− 6.5	− 6.6	− 6.7	− 6.8	− 6.9	− 7.0	− 7.2
82	7.3	7.4	7.5	7.7	7.8	7.9	8.1	8.2
83	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2
84	9.1	9.3	9.4	9.6	9.8	9.9	10.1	10.3
85	10.0	10.2	10.4	10.6	10.8	10.9	11.1	11.3
86	−10.9	−11.2	−11.4	−11.5	−11.7	−12.0	−12.2	−12.3
87	11.9	12.1	12.3	12.5	12.7	13.0	13.2	13.4
88	12.8	13.0	13.2	13.4	13.7	13.9	14.1	14.3
89	13.7	14.0	14.2	14.4	14.7	14.9	15.1	15.3
90	14.5	14.8	15.0	15.3	15.5	15.7	15.9	16.2

Additional Correction for Height of Eye

Ht. Eye	Corr.	Ht. Eye	Corr.
(ft.)	′	(ft.)	′
0	0.0	100	− 9.8
1	−1.0	150	12.0
2	1.4	200	13.9
3	1.7	250	15.5
4	2.0	300	17.0
5	−2.2	350	−18.3
6	2.4	400	19.6
7	2.6	450	20.8
8	2.8	500	21.9
9	2.9	550	23.0
10	−3.1	600	−24.0
11	3.2	650	25.0
12	3.4	700	25.9
13	3.5	750	26.8
14	3.7	800	27.7
15	−3.8	850	−28.6
16	3.9	900	29.4
17	4.0	950	30.2
18	4.1	1000	31.0
19	4.3	1050	31.8
20	−4.4	1100	−32.5
21	4.5	1150	33.2
22	4.6	1200	34.0
23	4.7	1250	34.6
24	4.8	1300	35.3
25	−4.9	1350	−36.0
26	5.0	1400	36.7
27	5.1	1450	37.3
28	5.2	1500	38.0
29	5.3	1550	38.6
30	−5.4	1600	−39.2
31	5.4	1650	39.8
32	5.5	1700	40.5
33	5.6	1800	41.6
34	5.7	1900	42.7
35	−5.8	2000	−43.8
37	6.0	2100	44.9
39	6.1	2200	46.0
41	6.3	2300	47.0
43	6.4	2400	47.9
45	−6.6	2500	−49.0
47	6.7	2600	50.0
49	6.9	2700	50.9
51	7.0	2800	51.9
53	7.1	2900	52.8
55	−7.3	3000	−53.7
60	7.6	3100	54.6
65	7.9	3200	55.4
70	8.2	3300	56.3
75	8.5	3400	57.1
80	−8.8	3500	−58.0
85	9.0	3600	58.8
90	9.3	3700	59.6
95	9.6	3800	60.4
100	−9.8	4000	−62.0

Google

UNIVERSITY OF CALIFORNIA SAN DIEGO
3 1822 00062 9469

To be used **t only**

BUBBLE SEXTANT CORRECTION TO OBSERVED ALTITUDE OF SUN OR STAR

FOR REFRACTION AND PARALLAX

Observed Altitude	Sun's Correction	Star's Correction
° ′	′	′
6 30	−7.8	−7.9
6 40	7.6	7.7
6 50	7.4	7.6
7 0	7.3	7.4
7 10	7.1	7.2
7 20	−7.0	−7.1
7 30	6.8	7.0
7 40	6.7	6.8
7 50	6.5	6.7
8 0	6.4	6.6
8 10	−6.3	−6.4
8 20	6.2	6.3
8 30	6.1	6.2
8 40	5.9	6.1
8 50	5.8	6.0
9 0	−5.7	−5.9
9 20	5.5	5.7
9 40	5.3	5.5
10 0	−5.2	−5.3
10 20	5.0	5.2
10 40	−4.9	−5.0
11 0	4.7	4.9
11 30	4.5	4.7
12 0	4.3	4.5
12 30	4.1	4.3
13 0	−4.0	−4.1
13 30	3.8	4.0
14 0	3.7	3.8
15 0	3.4	3.6
16 0	3.2	3.3
17 0	−3.0	−3.1
18 0	2.8	3.0
19 0	2.7	2.8
20 0	2.5	2.6
21 0	2.4	2.5
22 0	−2.3	−2.4
24 0	2.0	2.2
26 0	1.9	2.0
28 0	1.7	1.8
30 0	1.6	1.7
32 0	−1.4	−1.6
34 0	1.3	1.4
36 0	1.2	1.3
38 0	1.1	1.2
40 0	1.0	1.2
45 0	−0.9	−1.0
50 0	0.7	0.8
55 0	0.6	0.7
60 0	0.5	0.6
65 0	0.4	0.5
70 0	−0.3	−0.4
75 0	0.2	0.3
80 0	0.1	0.2
85 0	−0.1	−0.1
90 0	0.0	0.0

BUBBLE SEXTANT CORRECTION TO OBSERVED ALTITUDE OF MOON

FOR REFRACTION AND PARALLAX

Obs. Altitude	Horizontal Parallax							
	54′	55′	56′	57′	58′	59′	60′	61′
°	′	′	′	′	′	′	′	′
5.5	+44.6	+45.6	+46.6	+47.6	+48.6	+49.6	+50.6	+51.6
6.0	45.2	46.2	47.2	48.2	49.2	50.2	51.2	52.2
6.5	45.8	46.8	47.8	48.8	49.7	50.7	51.7	52.7
7.0	46.2	47.2	48.2	49.2	50.2	51.2	52.2	53.2
7.5	46.6	47.6	48.6	49.6	50.6	51.6	52.6	53.6
8.0	+46.9	+47.9	+48.9	+49.9	+50.9	+51.9	+52.9	+53.9
8.5	47.2	48.2	49.2	50.2	51.2	52.2	53.2	54.2
9.0	47.5	48.5	49.4	50.4	51.4	52.4	53.4	54.4
9.5	47.7	48.7	49.7	50.6	51.6	52.6	53.6	54.6
10.0	47.9	48.9	49.9	50.8	51.8	52.8	53.8	54.8
11	+48.2	+49.2	+50.1	+51.1	+52.1	+53.1	+54.1	+55.1
12	48.4	49.4	50.3	51.3	52.3	53.3	54.2	55.2
13	48.5	49.5	50.4	51.4	52.4	53.4	54.4	55.3
14	48.6	49.6	50.5	51.5	52.5	53.4	54.4	55.4
15	48.6	49.6	50.5	51.5	52.5	53.4	54.4	55.4
16	+48.6	+49.5	+50.5	+51.5	+52.4	+53.4	+54.3	+55.3
17	48.5	49.5	50.4	51.4	52.3	53.3	54.3	55.2
18	48.4	49.4	50.3	51.3	52.2	53.2	54.1	55.1
19	48.3	49.2	50.2	51.1	52.1	53.0	54.0	54.9
20	48.1	49.0	50.0	50.9	51.9	52.8	53.8	54.7
21	+47.9	+48.8	+49.8	+50.7	+51.7	+52.6	+53.5	+54.5
22	47.7	48.6	49.6	50.5	51.4	52.3	53.3	54.2
23	47.5	48.4	49.3	50.2	51.1	52.0	53.0	53.9
24	47.2	48.1	49.0	49.9	50.8	51.7	52.7	53.6
25	46.9	47.8	48.7	49.6	50.5	51.4	52.3	53.2
26	+46.6	+47.5	+48.4	+49.3	+50.2	+51.1	+52.0	+52.9
27	46.2	47.1	48.0	48.9	49.8	50.7	51.6	52.5
28	45.9	46.8	47.6	48.5	49.4	50.3	51.2	52.1
29	45.5	46.4	47.2	48.1	49.0	49.9	50.8	51.6
30	45.1	46.0	46.8	47.7	48.6	49.4	50.3	51.2
31	+44.7	+45.6	+46.4	+47.3	+48.1	+49.0	+49.8	+50.7
32	44.3	45.1	46.0	46.8	47.7	48.5	49.4	50.2
33	43.8	44.7	45.5	46.3	47.2	48.0	48.8	49.7
34	43.4	44.2	45.0	45.8	46.7	47.5	48.3	49.2
35	42.9	43.7	44.5	45.3	46.2	47.0	47.8	48.6
36	+42.4	+43.2	+44.0	+44.8	+45.6	+46.4	+47.2	+48.0
37	41.9	42.7	43.5	44.3	45.1	45.9	46.6	47.4
38	41.3	42.1	42.9	43.7	44.5	45.3	46.0	46.8
39	40.8	41.6	42.3	43.1	43.9	44.7	45.4	46.2
40	40.2	41.0	41.8	42.5	43.3	44.1	44.8	45.6
41	+39.7	+40.4	+41.2	+41.9	+42.7	+43.4	+44.2	+44.9
42	39.1	39.8	40.6	41.3	42.0	42.8	43.5	44.3
43	38.5	39.2	39.9	40.7	41.4	42.1	42.9	43.6
44	37.9	38.6	39.3	40.0	40.7	41.5	42.2	42.9
45	+37.2	+37.9	+38.6	+39.4	+40.1	+40.8	+41.5	+42.2

Obs. Altitude	Horizontal Parallax							
	54′	55′	56′	57′	58′	59′	60′	61′
°	′	′	′	′	′	′	′	′
46	+36.6	+37.3	+38.0	+38.7	+39.4	+40.1	+40.8	+41.
47	35.9	36.6	37.3	38.0	38.7	39.4	40.0	40.
48	35.3	35.9	36.6	37.3	37.9	38.6	39.3	40.
49	34.6	35.2	35.9	36.6	37.2	37.9	38.5	39.
50	33.9	34.5	35.2	35.8	36.5	37.1	37.8	38.
51	+33.2	+33.8	+34.5	+35.1	+35.7	+36.4	+37.0	+37.
52	32.5	33.1	33.7	34.3	35.0	35.6	36.2	36.
53	31.8	32.4	33.0	33.6	34.2	34.8	35.4	36.
54	31.1	31.6	32.2	32.8	33.4	34.0	34.6	35.
55	30.3	30.9	31.5	32.0	32.6	33.2	33.8	34.
56	+29.6	+30.1	+30.7	+31.2	+31.8	+32.4	+32.9	+33.5
57	28.8	29.3	29.9	30.4	31.0	31.5	32.1	32.6
58	28.0	28.5	29.1	29.6	30.2	30.7	31.2	31.7
59	27.2	27.7	28.3	28.8	29.3	29.8	30.3	30.8
60	26.4	26.9	27.5	28.0	28.5	29.0	29.5	29.9
61	+25.6	+26.1	+26.6	+27.1	+27.6	+28.1	+28.6	+29.0
62	24.8	25.3	25.8	26.3	26.7	27.2	27.7	28.1
63	24.0	24.5	24.9	25.4	25.9	26.3	26.8	27.2
64	23.2	23.7	24.1	24.5	25.0	25.4	25.8	26.3
65	22.4	22.8	23.2	23.7	24.1	24.5	24.9	25.4
66	+21.5	+22.0	+22.4	+22.8	+23.2	+23.6	+24.0	+24.4
67	20.7	21.1	21.5	21.9	22.3	22.7	23.0	23.4
68	19.8	20.2	20.6	21.0	21.4	21.7	22.1	22.5
69	19.0	19.4	19.7	20.1	20.4	20.8	21.1	21.5
70	18.1	18.5	18.8	19.2	19.5	19.8	20.2	20.5
71	+17.3	+17.6	+17.9	+18.2	+18.6	+18.9	+19.2	+19.5
72	16.4	16.7	17.0	17.3	17.6	17.9	18.2	18.5
73	15.5	15.8	16.1	16.4	16.7	17.0	17.3	17.5
74	14.6	14.9	15.2	15.4	15.7	16.0	16.3	16.5
75	13.7	14.0	14.2	14.5	14.8	15.0	15.3	15.5
76	+12.8	+13.1	+13.3	+13.5	+13.8	+14.0	+14.3	+14.5
77	11.9	12.2	12.4	12.6	12.8	13.1	13.3	13.5
78	11.0	11.2	11.4	11.6	11.9	12.1	12.3	12.5
79	10.1	10.3	10.5	10.7	10.9	11.1	11.3	11.5
80	9.2	9.4	9.6	9.7	9.9	10.1	10.2	10.4
81	+ 8.3	+ 8.5	+ 8.6	+ 8.8	+ 8.9	+ 9.1	+ 9.2	+ 9.4
82	7.4	7.5	7.6	7.8	8.0	8.1	8.2	8.4
83	6.5	6.6	6.7	6.8	7.0	7.1	7.2	7.3
84	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3
85	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.2
86	+ 3.7	+ 3.8	+ 3.8	+ 3.9	+ 4.0	+ 4.0	+ 4.1	+ 4.2
87	2.8	2.8	2.9	2.9	3.0	3.0	3.1	3.1
88	1.8	1.9	1.9	2.0	2.0	2.0	2.1	2.1
89	+ 0.9	+ 0.9	+ 1.0	+ 1.0	+ 1.0	+ 1.0	+ 1.0	+ 1.0
90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Digitized by Google

FOR CONVERSION OF ARC TO TIME

°	h m	°	h m	°	h m	°	h m	°	h m	°	h m
0	0 0	60	4 0	120	8 0	180	12 0	240	16 0	300	20 0
1	0 4	61	4 4	121	8 4	181	12 4	241	16 4	301	20 4
2	0 8	62	4 8	122	8 8	182	12 8	242	16 8	302	20 8
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16
5	0 20	65	4 20	125	8 20	185	12 20	245	16 20	305	20 20
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36
10	0 40	70	4 40	130	8 40	190	12 40	250	16 40	310	20 40
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56
15	1 0	75	5 0	135	9 0	195	13 0	255	17 0	315	21 0
16	1 4	76	5 4	136	9 4	196	13 4	256	17 4	316	21 4
17	1 8	77	5 8	137	9 8	197	13 8	257	17 8	317	21 8
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16
20	1 20	80	5 20	140	9 20	200	13 20	260	17 20	320	21 20
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36
25	1 40	85	5 40	145	9 40	205	13 40	265	17 40	325	21 40
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56
30	2 0	90	6 0	150	10 0	210	14 0	270	18 0	330	22 0
31	2 4	91	6 4	151	10 4	211	14 4	271	18 4	331	22 4
32	2 8	92	6 8	152	10 8	212	14 8	272	18 8	332	22 8
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16
35	2 20	95	6 20	155	10 20	215	14 20	275	18 20	335	22 20
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36
40	2 40	100	6 40	160	10 40	220	14 40	280	18 40	340	22 40
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56
45	3 0	105	7 0	165	11 0	225	15 0	285	19 0	345	23 0
46	3 4	106	7 4	166	11 4	226	15 4	286	19 4	346	23 4
47	3 8	107	7 8	167	11 8	227	15 8	287	19 8	347	23 8
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16
50	3 20	110	7 20	170	11 20	230	15 20	290	19 20	350	23 20
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36
55	3 40	115	7 40	175	11 40	235	15 40	295	19 40	355	23 40
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56
60	4 0	120	8 0	180	12 0	240	16 0	300	20 0	360	24 0

′	m s
0	0 0
1	0 4
2	0 8
3	0 12
4	0 16
5	0 20
6	0 24
7	0 28
8	0 32
9	0 36
10	0 40
11	0 44
12	0 48
13	0 52
14	0 56
15	1 0
16	1 4
17	1 8
18	1 12
19	1 16
20	1 20
21	1 24
22	1 28
23	1 32
24	1 36
25	1 40
26	1 44
27	1 48
28	1 52
29	1 56
30	2 0
31	2 4
32	2 8
33	2 12
34	2 16
35	2 20
36	2 24
37	2 28
38	2 32
39	2 36
40	2 40
41	2 44
42	2 48
43	2 52
44	2 56
45	3 0
46	3 4
47	3 8
48	3 12
49	3 16
50	3 20
51	3 24
52	3 28
53	3 32
54	3 36
55	3 40
56	3 44
57	3 48
58	3 52
59	3 56
60	4 0

″	s
0	0.00
1	0.07
2	0.13
3	0.20
4	0.27
5	0.33
6	0.40
7	0.47
8	0.53
9	0.60
10	0.67
11	0.73
12	0.80
13	0.87
14	0.93
15	1.00
16	1.07
17	1.13
18	1.20
19	1.27
20	1.33
21	1.40
22	1.47
23	1.53
24	1.60
25	1.67
26	1.73
27	1.80
28	1.87
29	1.93
30	2.00
31	2.07
32	2.13
33	2.20
34	2.27
35	2.33
36	2.40
37	2.47
38	2.53
39	2.60
40	2.67
41	2.73
42	2.80
43	2.87
44	2.93
45	3.00
46	3.07
47	3.13
48	3.20
49	3.27
50	3.33
51	3.40
52	3.47
53	3.53
54	3.60
55	3.67
56	3.73
57	3.80
58	3.87
59	3.93
60	4.00

Digitized by Google

H. O. Publication No. 214

U.S Hydrographic Office

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Latitudes 50° to 59°, inclusive

Vol. VI

UNITED STATES NAVY DEPARTMENT
HYDROGRAPHIC OFFICE

Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Project, Philadelphia Project No. 20983

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON: 1940

For sale by the Hydrographic Office, Washington, D. C., also by the Superintendent of Documents, Government Printing Office, Washington, D. C. ..... Price $3.00

16—15936

Digitized by Google

LIBRARY
SCRIPPS INSTITUTION
OF OCEANOGRAPHY
UNIVERSITY OF CALIFORNIA
LA JOLLA CALIFORNIA
26224

STATUTES OF AUTHORIZATION

There shall be a Hydrographic Office attached to the Bureau of Navigation in the Navy Department for the improvement of the means for navigating safely the vessels of the Navy and of the mercantile marine by providing, under the authority of the Secretary of the Navy, accurate and cheap nautical charts, sailing directions, navigators, and manuals of instructions for the use of all vessels of the United States, and for the benefit and use of navigators generally. (R. S. 431.)

The Secretary of the Navy is authorized to cause to be prepared, at the Hydrographic Office attached to the Bureau of Navigation in the Navy Department, maps, charts, and nautical books relating to and required in navigation, and to publish and furnish them to navigators at the cost of printing and paper, and to purchase the plates and copyrights of such existing maps, charts, navigators, sailing directions, and instructions as he may consider necessary, and when he may deem it expedient to do so, and under such regulations and instructions as he may prescribe. (R. S. 432.)

16—15988

Digitized by Google

VK
563
U572
v.6

PREFACE

These tables consist essentially of tabulated solutions of the astronomical triangle, so arranged as to yield the mariner his computed altitude and azimuth by inspection.

The scheme of precomputing such values for ready use is a long established one. It is in the scope, arrangement, and convenience of interpolation, developed in the Division of Research of the Hydrographic Office, that these tables are unique.

The tables are applicable equally to sights of the sun, moon, planets, and navigational stars; and inasmuch as they are designed for use in connection with celestial bodies of declinations both of same name as, and contrary name to the latitude, they apply to both northern and southern hemispheres.

For greater convenience in use, the values for only 10 degrees of latitude are included in each volume of the publication.

GEORGE S. BRYAN,
Captain, U. S. Navy,
Hydrographer.

16—15936

Digitized by Google

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Description of the Tables

The tables are equally applicable to sights of the sun, moon, planets, and navigational stars.

The arrangement is on a basis of whole degrees of latitude, the data for each degree comprising a section of 24 pages, with 2 additional pages for star identification.

Declination arguments in whole and half degrees head the main columns of each page, while hour angle arguments in whole degrees appear at the sides. Within the limits of each declination column are four groups of figures representing, from left to right—the altitude (Alt.); the multiplier (Δd) for declination difference; the multiplier (Δt) for hour angle difference; and the azimuth (Az.). The declination arguments for celestial bodies not used in practical navigation are omitted.

The altitudes have been computed to an accuracy of one-tenth of a minute of arc by seven place logarithms.

The azimuth has been computed to an accuracy of one-tenth of a degree.

Δd represents the change in altitude due to a change of 1′ of arc of declination.

Δt represents the change in altitude due to a change of 1′ of arc of hour angle.

ΔL represents the change in altitude due to a change of 1′ of arc of latitude. A special table on pages 262–3 gives the corrections for minutes of latitude.

There are three principal processes used for finding line of position with these tables, namely—

(1) Assuming both latitude and longitude, using only the Δd correction.

(2) Assuming latitude with the D. R. longitude, using the Δd and Δt corrections.

(3) Working from the D. R. position, using the Δd, Δt, and ΔL corrections.

(1) SOLUTION FOR LINE OF POSITION, USING Δd CORRECTION

This is the primary method for which the tables were originally designed. The solution is short and simple.

The tables are entered with arguments of nearest whole degree of latitude, nearest whole or half degree of declination, and nearest whole degree of hour angle. Alt., Δd, and Az. are taken from the body of the tables.

The azimuth obtained from the tables is correct for the values with which the tables are entered and, for plotting lines of position generally needs no correction. If extreme accuracy is desired, the azimuth may be interpolated by inspection. The tabulated azimuth is reckoned from the elevated pole of the observer, to the east when the body is rising or east of the meridian; and to the west when the body is setting or west of the meridian.

The altitude (Alt.) obtained from the tables is correct for the values with which the tables are entered; but since the exact declination of the body will usually differ from the tabulated declination, a correction to the altitude must be made for this difference. For example, if the exact declination of a star is 57° 33′.1 and the table is entered with a declination of 57° 30′, the declination difference is 3′.1. Since Δd represents the change in altitude due to a change of 1′ of arc of declination, if Δd is multiplied by the declination difference, the correction to the altitude for declination difference is obtained. When this correction is applied to the tabulated altitude (Alt.) the altitude thus obtained is the correct calculated altitude for arguments of whole degree of latitude, whole degree of hour angle, and the exact declination of the body.

In order to obviate the necessity of multiplying Δd by the declination difference to obtain the correction, a multiplication table on the back cover pages automatically indicates by inspection this entire operation. The multiplication table is entered with arguments, Δd at the side, and the declination difference at the top. The correction to the altitude for declination difference is taken from the body of the table. The multiplication table is so arranged that it may be entered at the top with both whole numbers and tenths. For example, using Δd, 65, and declination difference 6′.4, the multiplication table is entered with 65 at the side and 6′ at the top, the correction is 3′.9; with 65 at the side and 0′.4 at the top the correction is 0′.3; the total correction to the altitude for declination difference being 3′.9+0′.3=4′.2.

By glancing at the values of altitude for adjoining tabulated declinations between which the exact declination lies, it may be determined whether the altitude is increasing or decreasing as the tabulated declination approaches the exact declination. The correction is applied to the tabulated altitude, plus if the altitude is increasing, and minus if the altitude is decreasing. *Watch the plus or minus signs for Δd, and apply correctly. The multiplier Δd must never be interpolated.*

When the Δd correction is made to the tabulated altitude the sight must be plotted from an assumed position as follows:

Latitude.—The whole degree with which the tables were entered.

Longitude.—The longitude which was assumed in finding the local hour angle in whole degrees.

16—15936

Digitized by Google

Example 1.—At sea, September 27, 1940, in dead reckoning position, Lat. 49° 50′.0 N., Long. 20° 18′.0 W., the navigator of the U. S. S. *Tennessee* observed the lower limb of the sun for line of position as follows: Sextant altitude, 28° 28′.4; I. C., −1′.0; watch, 2h 27m 12s; C–W, 1h 21m 00s; chronometer, fast 0m 12s; height of eye, 40 feet.

Watch	14h	27m	12s
C–W	1	21	00
Chronometer	15	48	12
C. C			−12
G. C. T	15	48	00
G. H. A. for 14h	32°	15′.6	
Corr. 1h 48m	27	00.0	
G. H. A	59	15.6	W.
Longitude	20	15.6	W.
L. H. A	39		W.
Latitude	50		N.
Declination	1	44.4	S.

Hs	28° 28′.4
Corr	+7.1
Ho	28 35.5

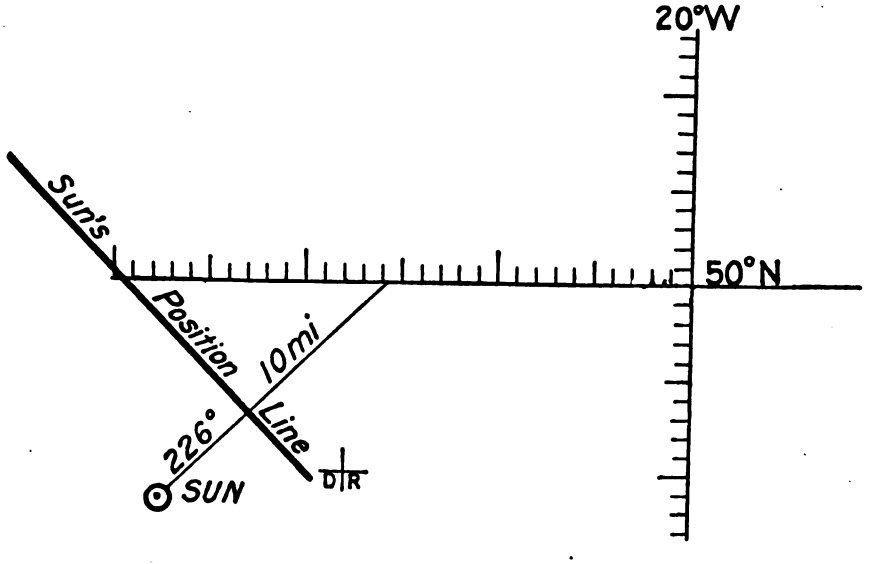
I. C	−1′.0
Alt. C	+14.3
Ht. eye C	−6.2
Corr	+7.1

Declination 1° 44′.4 S. (from Nautical Almanac).

(Assumed to give whole degree of L. H. A.)

(Assumed nearest whole degree of latitude.)
(Enter table with Lat. 50°, L. H. A. 39°, and declination 1° 30′ contrary name to latitude.)

	Alt.	*Δd*	*Az.*
	28° 38′.4	−89	134°.2
Δd correction for 14′.4 dec.	−12.9		(Zn) 226°
Hc	28 25.5		
Ho	28 35.5		
Alt. Int.	10.0 miles toward N. 134° W. (226°).		



NOTE.—Minus 89 is obtained from the Δd column abreast Alt. in the tables. The value 12′.9 (corr. for 14′.4 dec.) is obtained at a glance from the multiplication table on back cover pages, using 14′.4 declination difference at top of page and 89 at side of page as arguments.

The value 12.9 is subtractive because, as the tabulated declination (1° 30′) approaches the exact declination of the body (1° 44′.4) the altitude is decreasing.

The tabulated azimuth is reckoned from the elevated pole of the observer toward the west when the body is setting or west of the meridian, and requires no correction.

The sight is plotted from the nearest whole degree of latitude (50° N.), and the assumed longitude (20° 15′.6 W.).

16—16936

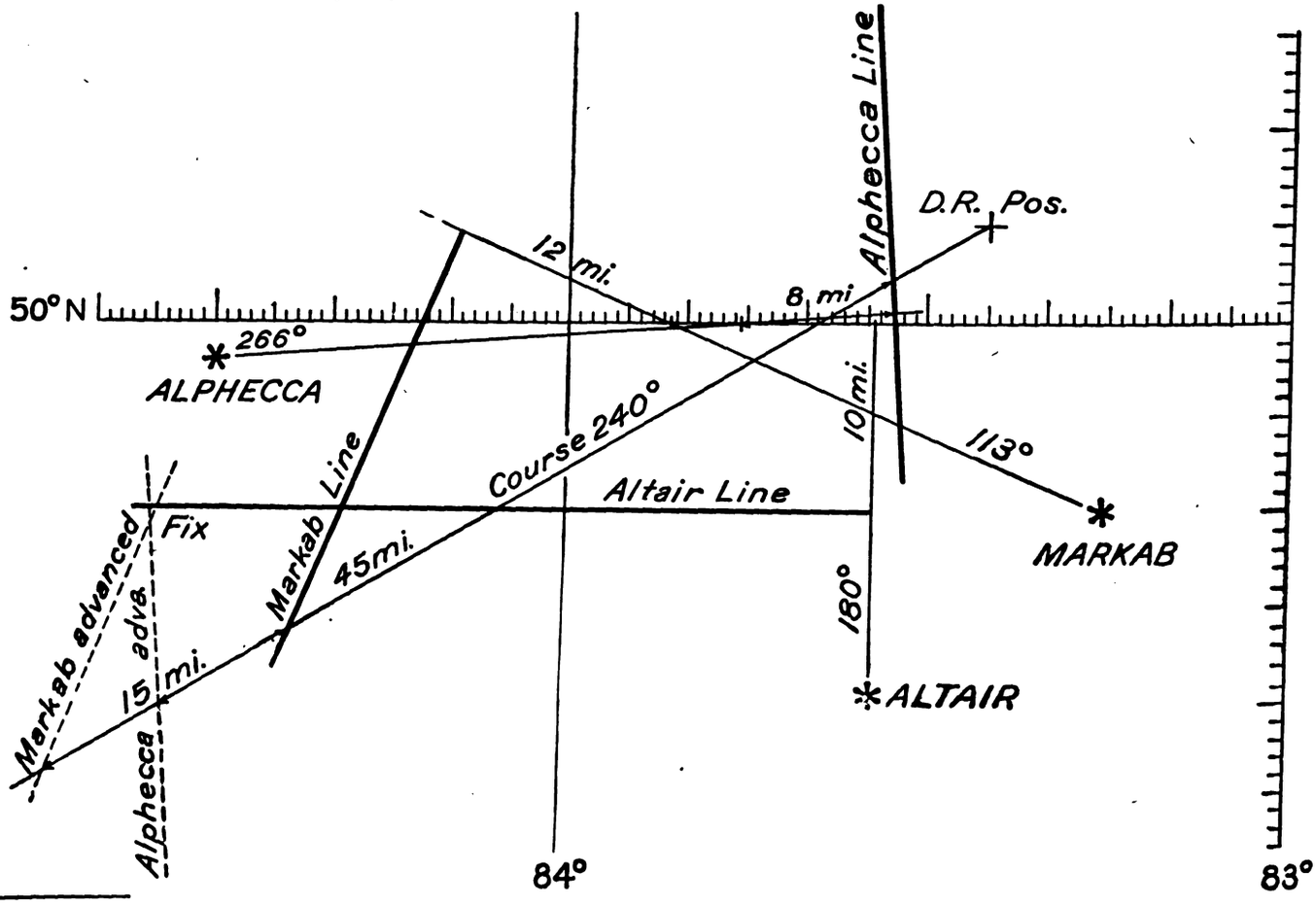
Digitized by Google

Example 2.—October 18, 1940, during evening twilight, a plane was in dead reckoning position, Lat. 50° 05′.0 N., Long. 83° 25′.0 W., true course 240°, ground speed 180 knots, when the navigator observed, with a bubble octant (I. C. 0′.0), the following stars for lines of position:

Star	*G. C. T.*	*Declination*	*Obs. alt. (Hs)*
Alphecca	23h 18m 03s	26° 55′.0 N.	39° 11′.1
Markab	23 28 05	14 53.4 N.	36 25.0
Altair	23 33 02	8 42.9 N.	48 53.7

Required the fix at the observation of star Altair.

	ALPHECCA			MARKAB			ALTAIR		
G. C. T.	23h 18m 03s			23h 28m 05s			23h 33m 02s		
G. H. A. for 0h G. C. T.	153° 17′.4			40° 52′.3			89° 21′.3		
Corr. for 23h 18m 03s	350 28.2			Corr. for 23h 28m 05s	352 59.1		Corr. for 23h 33m 02s	354 13.5	
G. H. A.	143 45.6 W.			33 51.4 W.			83 34.8 W.		
Longitude	83 45.6 W.			83 51.4 W.			83 34.8 W.		
L. H. A.	60 W.			50 E.			0		
Latitude	50 N.			50 N.			50 N.		
Declination	26 55.0 N.			14 53.4 N.			8 42.9 N.		
	Alt.	*Δd*	*Az.*	*Alt.*	*Δd*	*Az.*	*Alt.*	*Δd*	*Az.*
	39° 21′.4	−69	93°.7	36° 40.9	−79	112°.7	48° 30′.0	+1.0	180°
Δd corr. 5′.0	−3.5			Δd corr. 6′.6	−5.2		Δd corr. 12′.9	+12.9	
Hc	39 17.9			Hc	36 35.7		Hc	48 42.9	
Ho	39 09.9			Ho	36 23.7		Ho	48 52.9	
Alt. Int.	8.0 miles away from N. 94° W. (266°).			Alt. Int.	12.0 miles away from 113°.		Alt. Int.	10.0 miles toward 180°.	



Plot Alphecca from Lat. 50° N., Long. 83° 45′.6 W.
Plot Markab from Lat. 50° N., Long. 83° 51′.4 W.
Plot Altair from Lat. 50° N., Long. 83° 34′.8 W.
The time elapsed between Alphecca and Altair sights is 15m, at ground speed equals 45 miles.
The time elapsed between Markab and Altair sights is 5m, at ground speed equals 15 miles.
The position or fix of plane is Lat. 49° 50′ N., Long. 84° 35′ W.
The observation of star Altair is a meridian altitude.

10—15986

Digitized by Google

(2) SOLUTION FOR LINE OF POSITION, USING BOTH Δd AND Δt CORRECTIONS

If the navigator desires to plot the sight from his dead reckoning longitude (and the nearest whole degree of latitude to his dead reckoning latitude) it may be done by applying an additional correction to the altitude for hour angle difference, as follows:

Since the exact local hour angle of the body will usually differ from the tabulated whole degree of hour angle found in the tables, a correction to the altitude for this difference may be made, thus allowing the sight to be plotted from the dead reckoning longitude, and the nearest whole degree of latitude. For example, if the exact hour angle of a star is 20° 10′.2 and the tables are entered with an hour angle of 20°, the hour angle difference is 10′.2.

Since Δt represents the change in altitude due to a change of 1′ of arc of hour angle, if Δt is multiplied by the hour angle difference the correction for hour angle difference is obtained. When this correction, together with the Δd correction, is applied to the tabulated altitude, the value thus obtained is the correct computed altitude for arguments of whole degree of latitude, the exact hour angle, and the exact declination of the body.

When successive Δt values have large differences in numerical value always interpolate forward from the lower entering hour angle, but never interpolate backward from the nearest entering hour angle.

The Δt correction is obtained from the multiplication table in exactly the same manner as the Δd correction, i. e., entering the multiplication table with Δt at the side and the hour angle difference at the top of the page, the Δt correction is taken from the body of the table by inspection.

By glancing at the values of altitude for tabulated hour angles between which the exact hour angle lies, it may be determined whether the altitude is increasing or decreasing as the tabulated hour angle approaches the exact hour angle. The correction is applied to the tabulated altitude, plus if the altitude is increasing, and minus if the altitude is decreasing.

The use of Δt is not in general recommended when the altitude of the observed body is greater than 80°.

When both the Δd and the Δt corrections have been made to the tabulated altitude, the sight is plotted from the following position:

Latitude.—The whole degree with which the tables were entered.

Longitude.—The dead reckoning longitude.

Example 3.—At sea, July 2, 1940, during evening twilight in dead reckoning position, Lat. 50° 05′.3 S., Long. 20° 30′.0 W., the navigator of the U. S. S. *Pennsylvania* observed the star Regulus, bearing northward, for line of position as follows: Sextant altitude, 26° 46′.1; I. C., +1′.5; watch, 4h 19m 52s; C–W, 1h 22m 05s; chronometer, slow 03s; height of eye, 44 feet.

Watch	16h	19m	52s	Hs	26°	46′.1	I. C.	+1′.5
C–W	1	22	05	Corr		−6.9	Alt. Corr.	−1.9
							Ht. Eye C.	−6.5
Chronometer	17	41	57	Ho	26°	39′.2		
C. C			+03				Corr	−6.9
G. C. T	17	42	00					
R. A. M. S.+12h	18	39	31.3					
Correction for G. C. T		2	54.5					
G. S. T	12	24	25.8					
R. A. Regulus	10	05	11.7					
G. H. A	2	19	14.1 W.					
G. H. A. (arc)		34°	48′.5 W.					
Longitude		20	30.0 W.					
L. H. A		14	18.5 W.					
Latitude		50°	S.	(Assume nearest whole degree.)				
Declination		12	15.5 N.	(Enter table with lat. 50°, dec. 12°, contra *y* name to latitude.)				

		Alt.	*Δd*	*Δt*	*Az.*
		26° 47.7	−98	−18	64°.6
Δd correction for 15′.5	−15′.2				
Δt correction for 18′.5	−3.3				
Total correction	−18.5	−18.5			
Hc		26 29.2			
Ho		26 39.2			
Alt. Int		10.0 miles toward S. 165° W. (345°).			

Digitized by Google

Example 4.—At sea, September 21, 1940, during evening twilight, in dead reckoning position, Lat. 50° 56′.0 N., Long. 20° 18′.0 W., the navigator of a steamship obtained nearly simultaneous observations of three stars for a fix of position as follows:

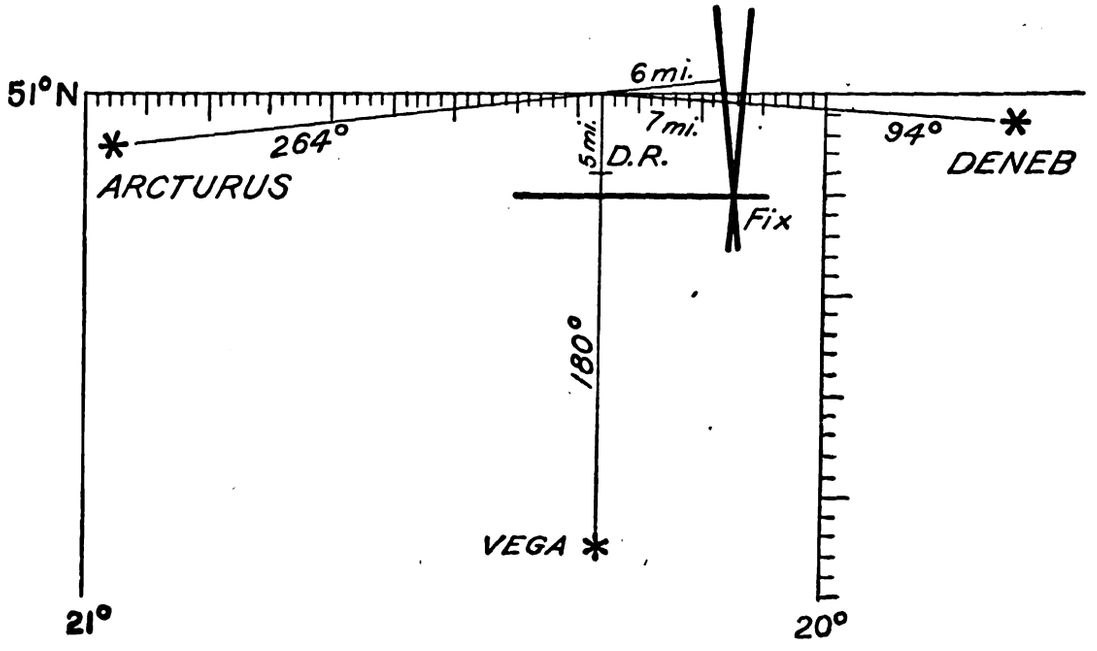
Star	*G. C. T.*	*Declination*	*True alt. (Ho.)*
Vega	19h 54m 00s	38° 44′.1 N.	77° 49′.1
Arcturus	19 55 02	19 29.6 N.	30 05.6
Deneb	19 55 55	45 04.5 N.	68 57.6

VEGA		ARCTURUS		DENEB	
G. H. A. for 0h G. C. T.	80° 59′.0		146° 29′.0		49° 51′.5
Corr. for 19h 54m 00s	299 19.0	Corr. for 19h 55m 02s	299 34.6	Corr. for 19h 55m 55s	299 47.9
G. H. A.	20 18.0 W.		86 03.6 W.		349 39.4 W.
D. R. Longitude	20 18.0 W.		20 18.0 W.		20 18.0 W.
					329 21.4 W.
L. H. A.	0		65 45.6 W.		30 38.6 E.
Latitude	51 N.		51 N.		51 N.
Declination	38 44.1 N.		19 29.6 N.		45 04.5 N.

	Alt.	*Δd*	*Az.*
	77° 30′.0	+1.0	180°
Δd corr. for 14′.1	+14.1		
Hc	77 44.1		
Ho	77 49.1		
Alt. Int.	5.0 miles toward 180°.		

	Alt.	*Δd*	*Δt*	*Az.*
	30° 02′.8	−75	+63	95°.8
Δd corr. for 0′.4	−0.3			
Δt corr. for 14′.4	+9.1			
Hc	30 11.6			
Ho	30 05.6			
Alt. Int.	6.0 miles away from N. 96° W. (264°).			

	Alt.	*Δd*	*Δt*	*Az.*
	68° 35′.1	+46	+63	94°.1
Δd corr. for 4′.5	+2.0			
Δt corr. for 21′.4	+13.5			
Hc	68 50.6			
Ho	68 57.6			
Alt. Int.	7.0 miles toward 94°.			



16—15936

Digitized by Google

(3) SOLUTION FOR POSITION LINE FROM THE DEAD RECKONING POSITION USING Δd, Δt, AND ΔL

If the navigator desires to plot the sight from the dead reckoning position, in addition to the Δd and Δt corrections, a correction to the altitude for latitude (called the ΔL correction) must be made. It will be necessary to correct either backward or forward for as much as 30′ difference in latitude between the integral degree of latitude with which the table is entered and the dead reckoning latitude. At the end of this book will be found a ΔL multiplication table from which corrections for odd minutes of latitude may be taken directly by inspection. The values in this table are the product of the ΔL value times the odd minutes of latitude. The value ΔL is the natural cosine of the azimuth, so that it is only necessary to know the azimuth of observation and the difference of latitude between dead reckoning position and integral latitude of table, as arguments for entry. In working from the dead reckoning position, corrections are made for Δd and Δt exactly as shown in the previous examples.

The L. H. A. for the dead reckoning longitude is found by applying the dead reckoning longitude to the G. H. A. Choose the integral tabular degree of latitude nearest to the dead reckoning latitude.

With selected integral degree of latitude, the L. H. A., and declination as arguments, take from the main table Alt., Δd, Δt, and Az. With the arguments azimuth and the difference of latitude between the dead reckoning position and the tabulated latitude of table, take the correction for latitude directly by inspection from the ΔL multiplication table at the back of the book.

When the dead reckoning latitude is greater than the selected tabulated latitude, and the azimuth found is over 90°, then the correction from the ΔL multiplication table is *minus*, but when the dead reckoning latitude is less than the tabulated latitude, the correction is *plus*. Opposite corrections from the above are made when the azimuth is less than 90°.

Example 5.—At sea, July 1, 1940, in dead reckoning position, Lat. 50° 10′.5 N., Long. 165° 15′.0 E., simultaneous evening observations were taken of the star Vega bearing eastward; sextant altitude, 51° 05′.8; and of the star Spica bearing westward; sextant altitude, 25° 20′.7; I. C., +1′.5; watch, 8h 23m 10s; C–W, 0h 59m 05s; chronometer, fast 0m 10s; height of eye, 36 feet. Find the position lines.

Watch	20h 23m 10s	
C–W	0 59 05	
Chronometer	9 22 15	
C. C	−0 10	
G. C. T	9 22 05	

Vega, declination	38° 43′.8 N.
Spica, declination	10 51.1 S.

VEGA

G. H. A. for 0h	0° 09′.3	
Correction for 9h 22m 05s	140 54.4	
G. H. A.	141 03.7	W.
or	218 56.3	E.
Longitude	165 15.0	E.
L. H. A.	53 41.3	E.
Latitude	50 10.5	N.
Declination	38 43.8	N.

	Alt.	*Δd*	*Δt*	*Az.*
	50° 35′.1	+57	+64	85°.7
Δd corr. for 13′.8	+7′.9			
Δt corr. for 18′.7	+11.9			
ΔL corr. for 10′.5	+0.7			
Total correction	+20.5	+20.5		
Hc	50 55.6			
Ho	51 00.6			

Alt. Int. 5.0 miles toward 85°.7.

SPICA

G. H. A. for 0h	78° 22′.7	
Correction for 9h 22m 05s	140 54.4	
G. H. A.	219 17.1	W.
or	140 42.9	E.
Longitude	165 15.0	E.
L. H. A.	24 32.1	W.
Latitude	50 10.5	N.
Declination	10 51.1	S.

	Alt.	*Δd*	*Δt*	*Az.*
	25° 29′.0	+96	−29	153°.7
Δd corr. for 8′.9	+8′.6			
Δt corr. for 32′.1	−9.3			
ΔL corr. for 10′.5	−9.4			
Total correction	−10.1	−10.1		
Hc	25 18.9			
Ho	25 14.2			

Alt. Int. 4.7 miles away from N. 153°.7 W. (206°).

From dead reckoning position, Lat. 50° 10′.5 N., Long. 165° 15′.0 E., lay down bearing of star Vega 86°, and the bearing of Spica 206°. From the dead reckoning position plot 5 miles toward Vega and 4.7 miles away from Spica and draw both position lines perpendicular to their respective azimuths.

Digitized by Google

Example 6.—At sea, April 15, 1940, during evening twilight, a vessel was in dead reckoning position, Lat. 51° 25′.5 S., Long. 56° 12′.7 E., when the navigator observed nearly simultaneous observations of the following stars:

Star	*G. C. T.*	*Declination*	*True altitude (Ho.)*
Sirius	13h 23m 28s	16° 38′.3 S.	55° 19′.6
Acamar	13 23 58	40 32.8 S.	50 25.1
Regulus	13 24 28	12 15.4 N.	12 42.2

SIRIUS

G. H. A. for 0h G. C. T.	102°	22′.3
Corr. for 13h 23m 28s	201	25.0
G. H. A.	303	47.3 W.
or	56	12.7 E.
D. R. Longitude	56	12.7 E.
L. H. A.	0	
Latitude	51	25.5 S.
Declination	16	38.3 S.

Alt.	*Δd*	*Az.*
55° 30′.0	+1.0	180°

Δd corr. for 8′.3	+8.3
ΔL corr. for 25′.5	−25.5
Hc	55 12.8
Ho	55 19.6

Alt. Int. — 6.8 miles toward S. 180° E. or 0°

ACAMAR

Corr. for 13h 23m 58s	159°	00′.5
	201	32.5
	0	33.0 W.
	56	12.7 E.
	56	45.7 W.
	51	25.5 S.
	40	32.8 S.

Alt.	*Δd*	*Δt*	*Az.*
49° 39′.0	+58	+62	82°.9

Δd corr. for 32′.8	+19.1
Δt corr. for 14′.3	+8.9
ΔL corr. for 25′.5	+3.1
Total corr.	+31.1
Hc	50 10.1
Ho	50 25.1

Alt. Int. — 15.0 miles toward S. 83° W. (263°).

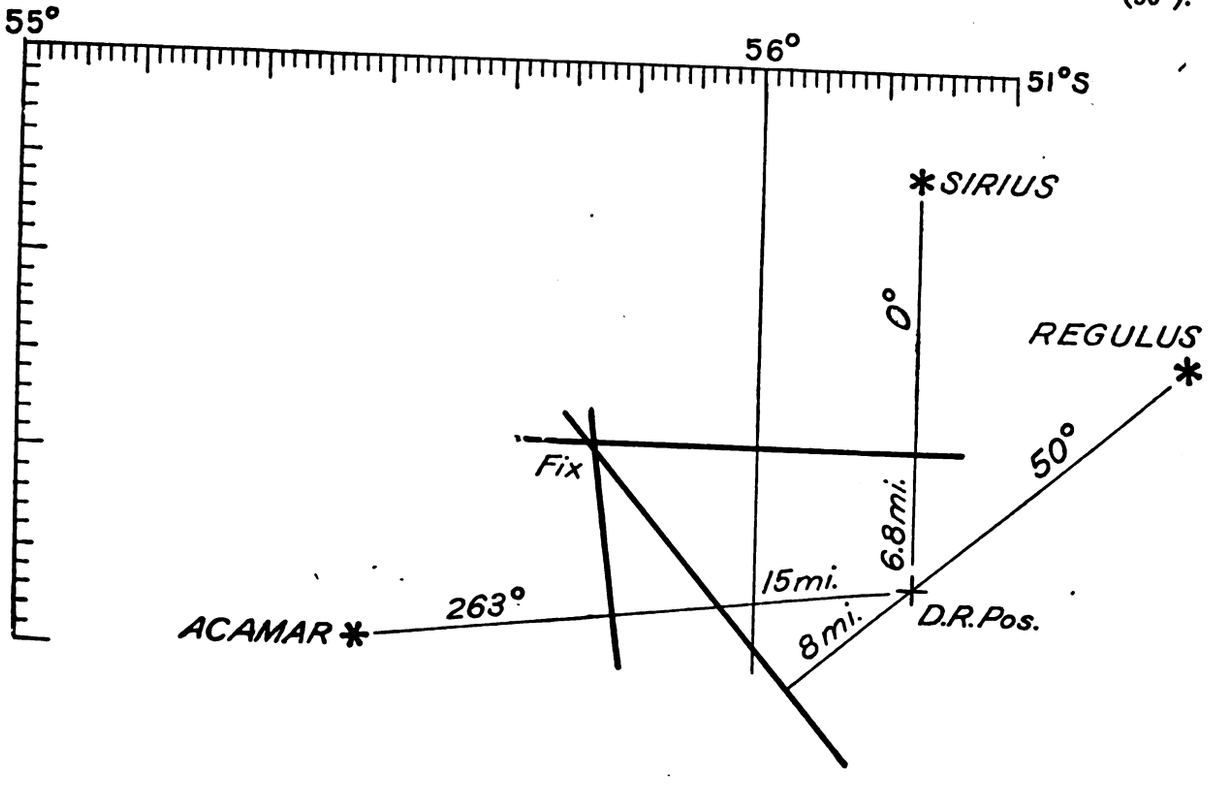
REGULUS

Corr. for 13h 24m 28s	51°	41′.9
	201	40.0
	253	21.9 W.
	106	38.1 E.
	56	12.7 E.
	50	25.4 E.
	51	25.5 S.
	12	15.4 N.

Alt.	*Δd*	*Δt*	*Az.*
13° 32′.3	−87	−49	129°.6

Δd corr. for 15′.4	−13.4
Δt corr. for 25′.4	−12.5
ΔL corr. for 25′.5	−16.2
Total corr.	−42.1
Hc	12 50.2
Ho	12 42.2

Alt. Int. — 8.0 miles away from S. 129°.6 E. (50°).



16—15936

Digitized by Google

STAR IDENTIFICATION

With the observed altitude and azimuth enter the double-page Star Identification Table immediately following the proper latitude section and extract the tabulated values of declination and hour angle. Eye interpolation will suffice for accuracy.

Combine the H. A. with the longitude to determine the G. H. A. of the star, or with the L. S. T. to obtain its R. A. Enter the Nautical Almanac with the declination and G. H. A., or the declination and R. A., and identify the star.

Example 7.—At sea, September 21, 1940, in dead reckoning position, Lat. 50° 12′.0 N., Long. 160° 10′.5 W., an unknown star was observed bearing N. 109° W. (true): Sextant altitude, 49° 59′.4; I. C., 0; height of eye, 30 feet; G. C. T., $5^h\ 03^m\ 52^s$ (Sept. 22). Identify the star.

SOLUTION

Enter star identification table with approximate value of arguments Az. 108°, and by inspection between altitude 48° and 52° take out:

Dec.	*H. A.*
28° N.	44° W.

To obtain G. H. A.				*To obtain R. A.*		
Longitude	160°	10′.5 W.		G. C. T.	5^h	04^m
L. H. A.	44		W.	(R. A. M. S.+12^h)	0	03
G. H. A.	204	10.5 W.	(for G. C. T. $5^h\ 03^m\ 52^s$).	G. S. T.	5	07
	76	10.4 W.	(Naut. Alm. corr. for $5^h\ 03^m\ 52^s$).	Longitude W.	10	41
G. H. A.	128	00.1 W.	(for 0^h G. C. T., Sept. 22).	L. S. T.	18	26
				L. H. A.	2	56 W.
				R. A.	15	30

Enter the Nautical Almanac with the approximate declination 28° N., and G. H. A. 128° 00′.1 W. (Sept. 22) or with the R. A. $15^h\ 30^m$, and the star sought is Alphecca.

GREAT CIRCLE SAILING

Enter that section of the tables corresponding to the latitude of departure and find that declination column which is headed by a value nearest to the latitude of destination. From this column, and opposite that H. A. argument nearest the difference in longitude between the departure and the destination, extract the tabulated values of altitude (alt.), Δd, Δt, and azimuth (az.), and solve for Hc.

Subtract the value of altitude (Hc) from 90° and convert the resultant into minutes of arc to obtain the Great Circle Distance in miles. The azimuth becomes the Great Circle Course and is measured from the elevated pole, east or west, to the destination.

Example 8.—Find the initial course and distance between Entrance I Lighthouse, Vancouver Island, and Kobe, Japan.

Departure		*Destination*	
Lat.	50° 26′.0 N.	Lat.	34° 40′.0 N.
Long.	128° 02′.0 W.	Long.	135° 12′.0 E.

SOLUTION

Diff. long. 96° 46′; latitude of departure 50° 26′ N.; latitude of destination 34° 40′ N.
Enter tables with latitude 50°; H. A. 97°; declination 34° 30′ (same name as latitude).

		Alt.	*Δd*	*Δt*	*Az.*
		21° 40′.5	+73	+56	61°.7
Corr. for 10′ dec. × 73=	+7′.3				
Corr. for 14′ H. A. × 56=	+7.8				
Corr. for 26′ Lat=	+12.3				
Total correction	+27.4	+27.4			
Hc		22 07.9			
(Subtract)		90			
Zenith distance		67 52.1			

=4,072.1 nautical miles, Great Circle Distance.

Initial Great Circle Course N. 61°.7 W.

In those cases where the various arguments used cannot be found within these tables, then resort must be had to other means without the tables, for finding a solution.

16—15936

Digitized by Google

Lat. 50°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	
00	40 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	41 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	42 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	00
1	39 59.6	1.0 02	178.7	40 29.6	1.0 02	178.7	40 59.6	1.0 02	178.7	41 29.6	1.0 02	178.7	41 59.5	1.0 02	178.7	42 29.5	1.0 02	178.6	42 59.5	1.0 02	178.6	43 29.5	1.0 02	178.6	1
2	39 58.2	1.0 04	177.4	40 28.2	1.0 04	177.4	40 58.2	1.0 04	177.4	41 28.2	1.0 04	177.3	41 58.2	1.0 04	177.3	42 28.2	1.0 04	177.3	42 58.2	1.0 04	177.3	43 28.1	1.0 04	177.2	2
3	39 56.0	1.0 05	176.1	40 26.0	1.0 05	176.1	40 56.0	1.0 05	176.0	41 26.0	1.0 05	176.0	41 55.9	1.0 05	176.0	42 25.9	1.0 05	175.9	42 55.9	1.0 05	175.9	43 25.8	1.0 05	175.9	3
4	39 53.0	1.0 07	174.8	40 22.9	1.0 07	174.7	40 52.9	1.0 07	174.7	41 22.8	1.0 07	174.7	41 52.8	1.0 07	174.6	42 22.7	1.0 07	174.6	42 52.7	1.0 07	174.5	43 22.6	1.0 07	174.5	4
05	39 49.0	1.0 08	173.5	40 19.0	1.0 08	173.4	40 48.9	1.0 08	173.4	41 18.8	1.0 08	173.3	41 48.7	1.0 08	173.3	42 18.6	1.0 08	173.2	42 48.5	1.0 08	173.2	43 18.4	1.0 08	173.1	05
6	39 44.2	1.0 09	172.2	40 14.1	1.0 10	172.1	40 44.0	1.0 10	172.1	41 13.9	1.0 10	172.0	41 43.8	1.0 10	172.0	42 13.6	1.0 10	171.9	42 43.5	1.0 10	171.8	43 13.4	1.0 10	171.8	6
7	39 38.6	99 11	170.9	40 08.4	99 11	170.8	40 38.2	99 11	170.8	41 08.1	99 11	170.7	41 37.9	99 11	170.6	42 07.7	99 11	170.6	42 37.6	99 11	170.5	43 07.4	99 11	170.4	7
8	39 32.0	99 12	169.6	40 01.8	99 12	169.5	40 31.6	99 12	169.5	41 01.4	99 13	169.4	41 31.2	99 13	169.3	42 01.0	99 13	169.2	42 30.8	99 13	169.1	43 00.5	99 13	169.0	8
9	39 24.6	99 14	168.3	39 54.4	99 14	168.2	40 24.1	99 14	168.1	40 53.9	99 14	168.1	41 23.6	99 14	168.0	41 53.3	99 14	167.9	42 23.0	99 14	167.8	42 52.8	99 14	167.7	9
10	39 16.4	99 15	167.0	39 46.1	99 15	166.9	40 15.8	99 15	166.8	40 45.4	99 15	166.8	41 15.1	99 16	166.7	41 44.8	99 16	166.6	42 14.4	99 16	166.5	42 44.1	99 16	166.4	10
1	39 07.3	99 16	165.8	39 37.0	99 17	165.7	40 06.6	99 17	165.6	40 36.2	99 17	165.4	41 05.8	99 17	165.3	41 35.4	99 17	165.2	42 05.0	99 17	165.1	42 34.6	99 17	165.0	1
2	38 57.4	99 18	164.5	39 27.0	98 18	164.4	39 56.5	98 18	164.3	40 26.1	98 18	164.2	40 55.6	98 18	164.0	41 25.1	98 18	163.9	41 54.6	98 19	163.8	42 24.1	98 19	163.7	2
3	38 46.7	98 19	163.2	39 16.2	98 19	163.1	39 45.7	98 20	163.0	40 15.1	98 20	162.9	40 44.6	98 20	162.7	41 14.0	98 20	162.6	41 43.5	98 20	162.5	42 12.9	98 20	162.4	3
4	38 35.2	98 21	162.0	39 04.6	98 21	161.8	39 34.0	98 21	161.7	40 03.3	98 21	161.6	40 32.7	98 21	161.4	41 02.1	98 21	161.3	41 31.4	98 21	161.2	42 00.8	98 22	161.0	4
15	38 22.8	98 22	160.7	38 52.2	98 22	160.6	39 21.5	98 22	160.4	39 50.8	98 22	160.3	40 20.0	98 22	160.2	40 49.3	98 23	160.0	41 18.6	98 23	159.9	41 47.8	97 23	159.7	15
6	38 09.7	97 23	159.5	38 38.9	97 23	159.3	39 08.2	97 23	159.2	39 37.4	97 24	159.0	40 06.5	97 24	158.9	40 35.7	97 24	158.7	41 04.9	97 24	158.6	41 34.0	97 24	158.4	6
7	37 55.8	97 24	158.2	38 24.9	97 25	158.1	38 54.1	97 25	157.9	39 23.2	97 25	157.8	39 52.3	97 25	157.6	40 21.3	97 25	157.5	40 50.4	97 25	157.3	41 19.5	97 26	157.1	7
8	37 41.1	97 26	157.0	38 10.2	97 26	156.9	38 39.2	97 26	156.7	39 08.2	97 26	156.5	39 37.2	97 26	156.4	40 06.2	97 27	156.2	40 35.1	97 27	156.0	41 04.1	96 27	155.9	8
9	37 25.7	96 27	155.8	37 54.6	96 27	155.6	38 23.5	96 27	155.5	38 52.5	96 28	155.3	39 21.3	96 28	155.1	39 50.2	96 28	154.9	40 19.1	96 28	154.8	40 47.9	96 28	154.6	9
20	37 09.5	96 28	154.6	37 38.3	96 28	154.4	38 07.2	96 29	154.2	38 36.0	96 29	154.1	39 04.7	96 29	153.9	39 33.5	96 29	153.7	40 02.2	96 29	153.5	40 31.0	96 30	153.3	20
1	36 52.6	96 29	153.4	37 21.3	96 30	153.2	37 50.0	96 30	153.0	38 18.7	96 30	152.8	38 47.4	96 30	152.6	39 16.0	96 30	152.5	39 44.7	95 31	152.3	40 13.3	95 31	152.1	1
2	36 35.0	95 31	152.2	37 03.6	95 31	152.0	37 32.2	95 31	151.8	38 00.7	95 31	151.6	38 29.3	95 31	151.4	38 57.8	95 32	151.2	39 26.3	95 32	151.0	39 54.8	95 32	150.8	2
3	36 16.6	95 32	151.0	36 45.1	95 32	150.8	37 13.6	95 32	150.6	37 42.1	95 32	150.4	38 10.5	95 32	150.2	38 38.9	95 33	150.0	39 07.3	95 33	149.8	39 35.7	95 33	149.6	3
4	35 57.6	95 33	149.8	36 26.0	95 33	149.6	36 54.3	95 33	149.4	37 22.7	94 33	149.2	37 51.0	94 34	149.0	38 19.3	94 34	148.8	38 47.6	94 34	148.6	39 15.8	94 34	148.4	4
25	35 37.9	94 34	148.7	36 06.1	94 34	148.5	36 34.4	94 34	148.3	37 02.6	94 35	148.0	37 30.8	94 35	147.8	37 59.0	94 35	147.6	38 27.1	94 35	147.4	38 55.2	94 35	147.2	25
6	35 17.5	94 35	147.5	35 45.6	94 35	147.3	36 13.7	94 35	147.1	36 41.8	94 36	146.9	37 09.9	94 36	146.7	37 38.0	93 36	146.4	38 06.0	93 36	146.2	38 34.0	93 36	146.0	6
7	34 56.4	93 36	146.4	35 24.5	93 36	146.2	35 52.5	93 37	145.9	36 20.4	93 37	145.7	36 48.4	93 37	145.5	37 16.3	93 37	145.3	37 44.2	93 37	145.0	38 12.1	93 38	144.8	7
8	34 34.8	93 37	145.2	35 02.7	93 37	145.0	35 30.5	93 38	144.8	35 58.4	93 38	144.6	36 26.2	93 38	144.3	36 54.0	93 38	144.1	37 21.8	93 38	143.9	37 49.5	92 39	143.6	8
9	34 12.5	93 38	144.1	34 40.2	93 38	143.9	35 08.0	92 39	143.6	35 35.7	92 39	143.4	36 03.4	92 39	143.2	36 31.1	92 39	142.9	36 58.7	92 39	142.7	37 26.3	92 40	142.5	9
30	33 49.6	92 39	143.0	34 17.2	92 39	142.8	34 44.8	92 40	142.5	35 12.4	92 40	142.3	35 40.0	92 40	142.0	36 07.5	92 40	141.8	36 35.0	92 40	141.6	37 02.5	92 41	141.3	30
1	33 26.0	92 40	141.9	33 53.6	92 40	141.7	34 21.1	92 41	141.4	34 48.5	92 41	141.2	35 16.0	91 41	140.9	35 43.4	91 41	140.7	36 10.8	91 41	140.4	36 38.1	91 42	140.2	1
2	33 02.0	91 41	140.8	33 29.3	91 41	140.6	33 56.7	91 42	140.3	34 24.1	91 42	140.1	34 51.4	91 42	139.8	35 18.6	91 42	139.6	35 45.9	91 42	139.3	36 13.1	91 43	139.0	2
3	32 37.3	91 42	139.7	33 04.6	91 42	139.5	33 31.8	91 42	139.2	33 59.0	91 43	139.0	34 26.2	91 43	138.7	34 53.3	90 43	138.4	35 20.5	90 43	138.2	35 47.5	90 44	137.9	3
4	32 12.1	91 43	138.6	32 39.2	90 43	138.4	33 06.3	90 43	138.1	33 33.4	90 44	137.9	34 00.5	90 44	137.6	34 27.5	90 44	137.3	34 54.5	90 44	137.1	35 21.4	90 44	136.8	4
35	31 46.3	90 44	137.6	32 13.3	90 44	137.3	32 40.3	90 44	137.1	33 07.3	90 44	136.8	33 34.2	90 45	136.5	34 01.1	90 45	136.3	34 27.9	89 45	136.0	34 54.7	89 45	135.7	35
6	31 29.0	90 45	136.5	31 46.9	90 45	136.3	32 13.8	89 45	136.0	32 40.6	89 45	135.7	33 07.4	89 46	135.5	33 34.2	89 46	135.2	34 00.9	89 46	134.9	34 27.6	89 46	134.6	6
7	30 53.2	89 46	135.5	31 20.0	89 46	135.2	31 46.7	89 46	134.9	32 13.4	89 46	134.7	32 40.1	89 46	134.4	33 06.7	89 47	134.1	33 33.3	89 47	133.8	33 59.9	88 47	133.6	7
8	30 26.0	89 46	134.4	30 52.6	89 46	134.2	31 19.2	89 47	133.9	31 45.8	89 47	133.6	32 12.3	88 47	133.4	32 38.8	88 47	133.1	33 05.3	88 48	132.8	33 31.7	88 48	132.5	8
9	29 58.2	88 47	133.4	30 24.7	88 47	133.1	30 51.2	88 48	132.9	31 17.6	88 48	132.6	31 44.0	88 48	132.3	32 10.4	88 48	132.0	32 36.7	88 48	131.7	33 03.0	88 49	131.5	9
40	29 29.9	88 48	132.4	29 56.3	88 48	132.1	30 22.7	88 48	131.8	30 49.0	88 48	131.6	31 15.3	88 49	131.3	31 41.5	87 49	131.0	32 07.7	87 49	130.7	32 33.9	87 49	130.4	40
1	29 01.2	88 49	131.4	29 27.5	87 49	131.1	29 53.7	87 49	130.8	30 19.9	87 49	130.5	30 46.1	87 49	130.3	31 12.2	87 50	130.0	31 38.3	87 50	129.7	32 04.3	87 50	129.4	1
2	28 32.1	87 49	130.4	28 58.2	87 50	130.1	29 24.3	87 50	129.8	29 50.4	87 50	129.5	30 16.4	87 50	129.3	30 42.4	87 50	129.0	31 08.4	86 51	128.7	31 34.3	86 51	128.4	2
3	28 02.5	87 50	129.4	28 28.5	87 50	129.1	28 54.5	87 50	128.8	29 20.4	86 51	128.5	29 46.3	86 51	128.3	30 12.2	86 51	128.0	30 38.0	86 51	127.7	31 03.8	86 51	127.4	3
4	27 32.5	86 51	128.4	27 58.4	86 51	128.1	28 24.2	86 51	127.9	28 50.1	86 51	127.6	29 15.8	86 52	127.3	29 41.6	86 52	127.0	30 07.3	86 52	126.7	30 33.0	86 53	126.4	4
45	27 02.9	86 51	127.5	27 27.8	86 52	127.2	27 53.6	86 52	126.9	28 19.3	86 52	126.6	28 45.0	86 52	126.3	29 10.6	85 52	126.0	29 36.2	85 53	125.7	30 01.7	85 53	125.4	45
6	26 31.2	86 52	126.5	26 56.9	85 52	126.2	27 22.5	85 52	125.9	27 48.1	85 53	125.6	28 13.7	85 53	125.3	28 39.2	85 53	125.0	29 04.7	85 53	124.7	29 30.1	85 53	124.4	6
7	26 00.0	85 53	125.5	26 25.6	85 53	125.2	26 51.1	85 53	125.0	27 16.6	85 53	124.7	27 42.0	85 53	124.4	28 07.4	85 54	124.1	28 32.8	84 54	123.8	28 58.1	84 54	123.4	7
8	25 28.5	85 53	124.6	25 53.9	85 53	124.3	26 19.3	85 54	124.0	26 44.7	84 54	123.7	27 10.0	84 54	123.4	27 35.3	84 54	123.1	28 00.5	84 54	122.8	28 25.8	84 54	122.5	8
9	24 56.5	84 54	123.7	25 21.9	84 54	123.4	25 47.2	84 54	123.1	26 12.4	84 54	122.8	26 37.6	84 54	122.5	27 02.8	84 55	122.2	27 28.0	84 55	121.9	27 53.1	84 55	121.5	9
50	24 24.3	84 54	122.7	24 49.5	84 55	122.4	25 14.7	84 55	122.1	25 39.8	84 55	121.8	26 04.9	84 55	121.5	26 30.0	84 55	121.2	26 55.0	83 55	120.9	27 20.0	83 56	120.6	50
1	23 51.7	84 55	121.8	24 16.8	84 55	121.5	24 41.8	84 55	121.2	25 06.9	83 55	120.9	25 31.9	83 56	120.6	25 56.9	83 56	120.3	26 21.8	83 56	120.0	26 46.7	83 56	119.7	1
2	23 18.7	83 55	120.9	23 43.7	83 56	120.6	24 08.7	83 56	120.3	24 33.6	83 56	120.0	24 58.5	83 56	119.7	25 23.4	83 56	119.4	25 48.2	83 56	119.1	26 13.0	83 57	118.8	2
3	22 45.5	83 56	120.0	23 10.4	83 56	119.7	23 35.3	83 56	119.4	24 00.1	83 56	119.1	24 24.9	83 57	118.8	24 49.6	82 57	118.5	25 14.4	82 57	118.2	25 39.0	82 57	117.8	3
4	22 11.9	83 56	119.1	22 36.7	83 57	118.8	23 01.5	83 57	118.5	23 26.2	82 57	118.2	23 50.9	82 57	117.9	24 15.6	82 57	117.6	24 40.2	82 57	117.2	25 04.8	82 58	116.9	4
55	21 38.1	82 57	118.2	22 02.8	82 57	117.9	22 27.5	82 57	117.6	22 52.1	82 57	117.3	23 16.7	82 58	117.0	23 41.3	82 58	116.7	24 05.8	82 58	116.3	24 30.3	82 58	116.0	55
6	21 04.0	82 57	117.3	21 28.6	82 57	117.0	21 53.1	82 58	116.7	22 17.7	82 58	116.4	22 42.2	82 58	116.1	23 06.7	82 58	115.8	23 31.1	81 58	115.5	23 55.5	81 58	115.1	6
7	20 29.6	82 58	116.4	20 54.1	82 58	116.1	21 18.6	82 58	115.8	21 43.0	81 58	115.5	22 07.4	81 58	115.2	22 31.8	81 58	114.9	22 56.1	81 59	114.6	23 20.5	81 59	114.3	7
8	19 54.9	81 58	115.6	20 19.3	81 58	115.3	20 43.7	81 58	115.0	21 08.1	81 59	114.6	21 32.4	81 59	114.3	21 56.7	81 59	114.0	22 21.0	81 59	113.7	22 45.2	81 59	113.4	8
9	19 20.0	81 59	114.7	19 44.3	81 59	114.4	20 08.6	81 59	114.1	20 32.9	81 59	113.8	20 57.1	81 59	113.5	21 21.4	81 59	113.1	21 45.5	81 59	112.8	22 09.7	80 60	112.5	9
60	18 44.8	81 59	113.9	19 09.1	81 59	113.5	19 33.3	81 59	113.2	19 57.5	81 59	112.9	20 21.7	80 60	112.6	20 45.8	80 60	112.3	21 09.9	80 60	112.0	21 33.9	80 60	111.6	60
1	18 09.4	81 59	113.0	18 33.6	81 59	112.7	18 57.8	80 60	112.4	19 21.9	80 60	112.1	19 45.9	80 60	111.8	20 10.0	80 60	111.4	20 34.0	80 60	111.1	20 58.0	80 60	110.8	1
2	17 33.8	80 60	112.2	17 57.9	80 60	111.8	18 22.0	80 60	111.5	18 46.0	80 60	111.2	19 10.0	80 60	110.9	19 34.0	80 60	110.6	19 57.9	80 60	110.3	20 21.8	80 61	109.9	2
3	16 58.0	80 60	111.3	17 22.0	80 60	111.0	17 46.0	80 60	110.7	18 10.0	80 60	110.4	18 33.9	80 61	110.1	18 57.8	80 61	109.7	19 21.6	79 61	109.4	19 45.5	79 61	109.1	3
4	16 22.0	80 60	110.5	16 45.9	80 60	110.2	17 09.8	80 61	109.9	17 33.7	80 61	109.5	17 57.6	79 61	109.2	18 21.4	79 61	108.9	18 45.2	79 61	108.6	19 08.9	79 61	108.3	4
65	15 45.8	80 61	109.7	16 09.6	80 61	109.3	16 33.5	79 61	109.0	16 57.3	79 61	108.7	17 21.1	79 61	108.4	17 44.8	79 61	108.1	18 08.5	79 61	107.7	18 32.2	79 61	107.4	65
6	15 09.4	79 61	108.8	15 33.1	79 61	108.5	15 56.9	79 61	108.2	16 20.7	79 61	107.9	16 44.4	79 61	107.6	17 08.1	79 62	107.2	17 31.7	79 62	106.9	17 55.3	79 62	106.6	6
7	14 32.8	79 61	108.0	14 56.5	79 61	107.7	15 20.2	79 62	107.4	15 43.9	79 62	107.1	16 07.5	79 62	106.7	16 31.1	79 62	106.4	16 54.7	79 62	106.1	17 18.3	78 62	105.8	7
8	13 56.0	79 62	107.2	14 19.7	79 62	106.9	14 43.3	79 62	106.6	15 06.9	79 62	106.2	15 30.5	79 62	105.9	15 54.1	78 62	105.6	16 17.6	78 62	105.3	16 41.1	78 62	105.0	8
9	13 19.1	79 63	106.4	13 42.7	79 62	106.1	14 06.3	79 62	105.8	14 29.8	78 62	105.4	14 53.3	78 62	105.1	15 16.8	78 62	104.8	15 40.3	78 62	104.5	16 03.8	78 62	104.1	9
70	12 42.0	79 62	105.6	13 05.5	78 62	105.3	13 29.1	78 62	104.9	13 52.6	78 62	104.6	14 16.0	78 62	104.3	14 39.5	78 62	104.0	15 02.9	78 63	103.7	15 26.3	78 63	103.3	70
1	12 04.8	78 62	104.8	12 28.3	78 62	104.5	12 51.7	78 62	104.1	13 15.2	78 63	103.8	13 38.6	78 63	103.5	14 02.0	78 63	103.2	14 25.4	78 63	102.9	14 48.7	78 63	102.5	1
2	11 27.4	78 62	104.0	11 50.9	78 63	103.7	12 14.3	78 63	103.3	12 37.7	78 63	103.0	13 01.0	78 63	102.7	13 24.4	78 63	102.4	13 47.7	78 63	102.1	14 11.0	78 63	101.7	2
3	10 49.9	78 63	103.2	11 13.3	78 63	102.9	11 36.7	78 63	102.5	12 00.0	78 63	102.2	12 23.4	78 63	101.9	12 46.7	78 63	101.6	13 09.9	78 63	101.3	13 33.2	77 63	100.9	3
4	10 12.3	78 63	102.4	10 35.7	78 63	102.1	10 59.0	78 63	101.7	11 22.3	78 63	101.4	11 45.6	78 63	101.1	12 08.8	77 63	100.8	12 32.1	77 63	100.5	12 55.3	77 63	100.1	4
75	9 34.6	78 63	101.6	9 57.9	78 63	101.3	10 21.2	78 63	101.0	10 44.4	78 63	100.6	11 07.7	77 63	100.3	11 30.9	77 63	100.0	11 54.1	77 63	99.7	12 17.3	77 64	99.3	75
6	8 56.8	78 63	100.8	9 20.0	77 63	100.5	9 43.3	77 63	100.2	10 06.5	77 63	99.9	10 29.7	77 63	99.5	10 52.9	77 64	99.2	11 16.0	77 64	98.9	11 39.2	77 64	98.6	6
7	8 18.8	77 63	100.0	8 42.0	77 63	99.7	9 05.3	77 63	99.4	9 28.4	77 64	99.1	9 51.6	77 64	98.7	10 14.8	77 64	98.4	10 37.9	77 64	98.1	11 01.0	77 64	97.8	7
8	7 40.8	77 64	99.2	8 04.0	77 64	98.9	8 27.2	77 64	98.6	8 50.3	77 64	98.3	9 13.4	77 64	98.0	9 36.6	77 64	97.6	9 59.7	77 64	97.3	10 22.7	77 64	97.0	8
9	7 02.7	77 64	98.5	7 25.9	77 64	98.1	7 49.0	77 64	97.8	8 12.1	77 64	97.5	8 35.2	77 64	97.2	8 58.3	77 64	96.9	9 21.4	77 64	96.5	9 44.4	77 64	96.2	9
80	6 24.5	77 64	97.7	6 47.6	77 64	97.4	7 10.7	77 64	97.1	7 33.8	77 64	96.7	7 56.9	77 64	96.4	8 20.0	77 64	96.1	8 43.0	77 64	95.8	9 06.1	77 64	95.4	80
1	5 46.3	77 64	96.9	6 09.4	77 64	96.6	6 32.4	77 64	96.3	6 55.5	77 64	96.0	7 18.6	77 64	95.6	7 41.6	77 64	95.3	8 04.6	77 64	95.0	8 27.6	77 64	94.7	1
2	5 07.9	77 64	96.1	5 31.0	77 64	95.8	5 54.1	77 64	95.5	6 17.1	77 64	95.2	6 40.2	77 64	94.9	7 03.2	77 64	94.5	7 26.2	77 64	94.2	7 49.2	77 64	93.9	2
3							5 15.7	77 64	94.7	5 38.7	77 64	94.4	6 01.7	77 64	94.1	6 24.7	77 64	93.8	6 47.7	77 64	93.4	7 10.7	77 64	93.1	3
4										5 00.2	77 64	93.6	5 23.2	77 64	93.3	5 46.2	77 64	93.0	6 09.2	77 64	92.7	6 32.2	77 64	92.3	4
85																5 07.7	77 64	92.2	5 30.7	77 64	91.9	5 53.6	77 64	91.6	85
6																						5 15.1	77 64	90.8	6

Digitized by Google

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	40 00.0	1.0 01	180.0	39 30.0	1.0 01	180.0	39 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	38 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	37 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	00
1	39 59.6	1.0 02	178.7	39 29.6	1.0 02	178.7	38 59.6	1.0 02	178.7	38 29.6	1.0 02	178.7	37 59.6	1.0 02	178.7	37 29.6	1.0 02	178.7	36 59.6	1.0 02	178.7	36 29.6	1.0 02	178.8	1
2	39 58.2	1.0 04	177.4	39 28.3	1.0 04	177.4	38 58.3	1.0 04	177.4	38 28.3	1.0 04	177.4	37 58.3	1.0 04	177.5	37 28.3	1.0 04	177.5	36 58.3	1.0 04	177.5	36 28.3	1.0 04	177.5	2
3	39 56.0	1.0 05	176.1	39 26.1	1.0 05	176.1	38 56.1	1.0 05	176.1	38 26.1	1.0 05	176.2	37 56.2	1.0 05	176.2	37 26.2	1.0 05	176.2	36 56.2	1.0 06	176.3	36 26.2	1.0 05	176.3	3
4	39 53.0	1.0 07	174.8	39 23.0	1.0 07	174.8	38 53.1	1.0 06	174.9	38 23.1	1.0 06	174.9	37 53.2	1.0 06	174.9	37 23.2	1.0 06	175.0	36 53.3	1.0 06	175.0	36 23.3	1.0 06	175.0	4
05	39 49.0	1.0 08	173.5	39 19.1	1.0 08	173.5	38 49.2	1.0 08	173.6	38 19.3	1.0 08	173.6	37 49.3	1.0 08	173.7	37 19.4	1.0 08	173.7	36 49.5	1.0 08	173.8	36 19.6	1.0 08	173.8	05
6	39 44.2	1.0 09	172.2	39 14.3	1.0 09	172.2	38 44.5	1.0 09	172.3	38 14.6	1.0 09	172.4	37 44.7	1.0 09	172.4	37 14.8	1.0 09	172.5	36 44.9	1.0 09	172.5	36 15.0	1.0 09	172.6	6
7	39 38.6	99 11	170.9	39 08.7	99 11	171.0	38 38.9	99 11	171.0	38 09.0	1.0 11	171.1	37 39.2	1.0 11	171.2	37 09.3	1.0 10	171.2	36 39.5	1.0 10	171.3	36 09.6	1.0 10	171.3	7
8	39 32.0	99 12	169.6	39 02.2	99 12	169.7	38 32.4	99 12	169.8	38 02.6	99 12	169.8	37 32.8	99 12	169.9	37 03.0	99 12	170.0	36 33.2	99 12	170.0	36 03.4	99 12	170.1	8
9	39 24.6	99 14	168.3	38 54.9	99 14	168.4	38 25.1	99 14	168.5	37 55.4	99 13	168.6	37 25.6	99 13	168.6	36 55.9	99 13	168.7	36 26.1	99 13	168.8	35 56.3	99 13	168.9	9
10	39 16.4	99 15	167.0	38 46.7	99 15	167.1	38 17.0	99 15	167.2	37 47.3	99 15	167.3	37 17.6	99 15	167.4	36 47.9	99 15	167.5	36 18.2	99 14	167.6	35 48.5	99 14	167.7	10
1	39 07.3	99 16	165.8	38 37.7	99 16	165.9	38 08.1	99 16	166.0	37 38.4	99 16	166.1	37 08.8	99 16	166.2	36 39.2	99 16	166.3	36 09.5	99 16	166.3	35 39.9	99 16	166.4	1
2	38 57.4	99 18	164.5	38 27.9	99 18	164.6	37 58.3	99 18	164.7	37 28.8	99 18	164.8	36 59.2	99 17	164.9	36 29.6	99 17	165.0	36 00.0	99 17	165.1	35 30.4	99 17	165.2	2
3	38 46.7	98 19	163.2	38 17.2	98 19	163.3	37 47.7	98 19	163.5	37 18.2	98 19	163.6	36 48.7	98 19	163.7	36 19.2	98 19	163.8	35 49.7	98 18	163.9	35 20.2	98 18	164.0	3
4	38 35.2	98 21	162.0	38 05.8	98 20	162.1	37 36.4	98 20	162.2	37 06.9	98 20	162.3	36 37.5	98 20	162.5	36 08.1	98 20	162.6	35 38.6	98 20	162.7	35 09.2	98 20	162.8	4
15	38 22.8	98 22	160.7	37 53.5	98 22	160.9	37 24.2	98 22	161.0	36 54.9	98 21	161.1	36 25.5	98 21	161.2	35 56.2	98 21	161.4	35 26.8	98 21	161.5	34 57.4	98 21	161.6	15
6	38 09.7	97 23	159.5	37 40.5	97 23	159.6	37 11.2	97 23	159.8	36 42.0	98 23	159.9	36 12.7	98 23	160.0	35 43.5	98 22	160.2	35 14.2	98 22	160.3	34 44.9	98 22	160.4	6
7	37 55.8	97 24	158.2	37 26.7	97 24	158.4	36 57.5	97 24	158.5	36 28.4	97 24	158.7	35 59.2	97 24	158.8	35 30.0	97 24	159.0	35 00.8	97 24	159.1	34 31.6	97 23	159.3	7
8	37 41.1	97 26	157.0	37 12.1	97 26	157.2	36 43.0	97 25	157.3	36 14.0	97 25	157.5	35 44.9	97 25	157.6	35 15.8	97 25	157.8	34 46.7	97 25	157.9	34 17.6	97 25	158.1	8
9	37 25.7	96 27	155.8	36 56.8	97 27	156.0	36 27.8	97 27	156.1	35 58.8	97 26	156.3	35 29.8	97 26	156.4	35 00.8	97 26	156.6	34 31.8	97 26	156.8	34 02.8	97 26	156.9	9
20	37 09.5	96 28	154.6	36 40.7	96 28	154.8	36 11.8	96 28	154.9	35 42.9	96 28	155.1	35 14.1	96 28	155.3	34 45.2	96 27	155.4	34 16.2	96 27	155.6	33 47.3	96 27	155.7	20
1	36 52.6	96 29	153.4	36 23.9	96 29	153.6	35 55.1	96 29	153.7	35 26.3	96 29	153.9	34 57.6	96 29	154.1	34 28.8	96 28	154.3	33 59.9	96 28	154.4	33 31.1	96 28	154.6	1
2	36 35.0	95 31	152.2	36 06.3	95 30	152.4	35 37.7	96 30	152.6	35 09.0	96 30	152.7	34 40.3	96 30	152.9	34 11.7	96 30	153.1	33 42.9	96 29	153.3	33 14.2	96 29	153.4	2
3	36 16.6	95 32	151.0	35 48.1	95 32	151.2	35 19.6	96 31	151.4	34 51.0	95 31	151.6	34 22.4	95 31	151.8	33 53.9	95 31	151.9	33 25.3	95 31	152.1	32 56.6	95 30	152.3	3
4	35 57.6	95 33	149.8	35 29.2	95 33	150.0	35 00.8	95 32	150.2	34 32.3	95 32	150.4	34 03.9	95 32	150.6	33 35.4	95 32	150.8	33 06.9	95 32	151.0	32 38.4	95 32	151.2	4
25	35 37.9	94 34	148.7	35 09.6	94 34	148.9	34 41.3	94 34	149.1	34 12.9	94 33	149.3	33 44.6	95 33	149.5	33 16.2	95 33	149.7	32 47.9	95 33	149.9	32 19.5	95 33	150.1	25
6	35 17.5	94 35	147.5	34 49.3	94 35	147.7	34 21.1	94 35	147.9	33 52.9	94 34	148.1	33 24.7	94 34	148.3	32 56.4	94 34	148.5	32 28.2	94 34	148.7	31 59.9	94 34	148.9	6
7	34 56.4	93 36	146.4	34 28.4	94 36	146.6	34 00.3	94 36	146.8	33 32.2	94 36	147.0	33 04.1	94 35	147.2	32 36.0	94 35	147.4	32 07.8	94 35	147.6	31 39.7	94 35	147.8	7
8	34 34.8	93 37	145.2	34 06.8	93 37	145.5	33 38.9	93 37	145.7	33 10.9	93 37	145.9	32 42.9	93 36	146.1	32 14.9	93 36	146.3	31 46.9	93 36	146.5	31 18.8	94 36	146.7	8
9	34 12.5	93 38	144.1	33 44.7	93 38	144.3	33 16.8	93 38	144.6	32 49.0	93 38	144.8	32 21.1	93 37	145.0	31 53.2	93 37	145.2	31 25.3	93 37	145.4	30 57.4	93 37	145.6	9
30	33 49.6	92 39	143.0	33 21.9	92 39	143.2	32 54.2	92 39	143.5	32 26.4	92 39	143.7	31 58.7	93 38	143.9	31 30.9	93 38	144.1	31 03.1	93 38	144.4	30 35.3	93 38	144.6	30
1	33 26.0	92 40	141.9	32 58.5	92 40	142.1	32 30.9	92 40	142.4	32 03.3	92 40	142.6	31 35.7	92 39	142.8	31 08.0	92 39	143.0	30 40.3	92 39	143.3	30 12.6	92 39	143.5	1
2	33 02.0	91 41	140.8	32 34.5	91 41	141.0	32 07.1	92 41	141.3	31 39.6	92 40	141.5	31 12.1	92 40	141.7	30 44.6	92 40	142.0	30 17.0	92 40	142.2	29 49.4	92 40	142.4	2
3	32 37.3	91 42	139.7	32 10.0	91 42	140.0	31 42.7	91 42	140.2	31 15.3	91 41	140.4	30 47.9	91 41	140.7	30 20.5	91 41	140.9	29 53.1	91 41	141.1	29 25.6	92 41	141.4	3
4	32 12.1	91 43	138.6	31 44.9	91 43	138.9	31 17.7	91 42	139.1	30 50.5	91 42	139.4	30 23.2	91 42	139.6	29 55.9	91 42	139.9	29 28.6	91 42	140.1	29 01.3	91 41	140.3	4
35	31 46.3	90 44	137.6	31 19.3	90 44	137.8	30 52.2	90 43	138.1	30 25.1	90 43	138.3	29 58.0	90 43	138.6	29 30.8	91 43	138.8	29 03.6	91 43	139.1	28 36.4	91 42	139.3	35
6	31 20.0	90 45	136.5	30 53.1	90 44	136.8	30 26.2	90 44	137.0	29 59.2	90 44	137.3	29 32.2	90 44	137.5	29 05.1	90 44	137.8	28 38.1	90 43	138.0	28 11.0	90 43	138.3	6
7	30 53.2	89 46	135.5	30 26.5	89 45	135.7	29 59.6	89 45	136.0	29 32.8	90 45	136.2	29 05.9	90 45	136.5	28 39.0	90 44	136.8	28 12.0	90 44	137.0	27 45.1	90 44	137.3	7
8	30 26.0	89 46	134.4	29 59.3	89 46	134.7	29 32.6	89 46	135.0	29 05.8	89 46	135.2	28 39.1	89 45	135.5	28 12.3	89 45	135.7	27 45.5	89 45	136.0	27 18.6	90 45	136.2	8
9	29 58.2	88 47	133.4	29 31.6	89 47	133.7	29 05.1	89 47	133.9	28 38.4	89 46	134.2	28 11.8	89 46	134.5	27 45.1	89 46	134.7	27 18.4	89 46	135.0	26 51.7	89 46	135.2	9
40	29 29.9	88 48	132.4	29 03.5	88 48	132.7	28 37.0	88 47	132.9	28 10.6	88 47	133.2	27 44.0	88 47	133.5	27 17.5	89 47	133.7	26 50.9	89 47	134.0	26 24.3	89 46	134.2	40
1	29 01.2	88 49	131.4	28 34.9	88 48	131.7	28 08.6	88 48	131.9	27 42.2	88 48	132.2	27 15.8	88 48	132.5	26 49.4	88 48	132.7	26 22.9	88 47	133.0	25 56.5	88 47	133.3	1
2	28 32.1	87 49	130.4	28 05.9	87 49	130.7	27 39.7	87 49	130.9	27 13.4	88 49	131.2	26 47.2	88 48	131.5	26 20.9	88 48	131.8	25 54.5	88 48	132.0	25 28.2	88 48	132.3	2
3	28 02.5	87 50	129.4	27 36.4	87 50	129.7	27 10.3	87 50	130.0	26 44.2	87 49	130.2	26 18.0	87 49	130.5	25 51.9	87 49	130.8	25 25.7	87 49	131.1	24 59.4	88 49	131.3	3
4	27 32.5	86 51	128.4	27 06.5	87 50	128.7	26 40.6	87 50	129.0	26 14.6	87 50	129.3	25 48.5	87 50	129.5	25 22.5	87 50	129.8	24 56.4	87 50	130.1	24 30.2	87 49	130.4	4
45	27 02.0	86 51	127.5	26 36.2	86 51	127.7	26 10.4	86 51	128.0	25 44.5	86 51	128.3	25 18.6	86 51	128.6	24 52.6	87 50	128.9	24 26.6	87 50	129.1	24 00.6	87 50	129.4	45
6	26 31.2	86 52	126.5	26 05.5	86 52	126.8	25 39.8	86 52	127.1	25 14.0	86 51	127.3	24 48.2	86 51	127.6	24 22.4	86 51	127.9	23 56.5	86 51	128.2	23 30.6	86 51	128.5	6
7	26 00.0	85 53	125.5	25 34.4	85 52	125.8	25 08.8	85 52	126.1	24 43.2	86 52	126.4	24 17.5	86 52	126.7	23 51.8	86 52	127.0	23 26.0	86 51	127.2	23 00.2	86 51	127.5	7
8	25 28.5	85 53	124.6	25 03.0	85 53	124.9	24 37.5	85 53	125.2	24 11.9	85 53	125.5	23 46.4	85 52	125.8	23 20.8	85 52	126.0	22 55.1	86 52	126.3	22 29.5	86 52	126.6	8
9	24 56.5	84 54	123.7	24 31.2	85 54	124.0	24 05.8	85 53	124.2	23 40.4	85 53	124.5	23 14.9	85 53	124.8	22 49.4	85 53	125.1	22 23.9	85 53	125.4	21 58.3	85 52	125.7	9
50	24 24.3	84 54	122.7	23 59.0	84 54	123.0	23 33.7	84 54	123.3	23 08.4	84 54	123.6	22 43.1	85 54	123.9	22 17.7	85 53	124.2	21 52.3	85 53	124.5	21 26.8	85 53	124.8	50
1	23 51.7	84 55	121.8	23 26.5	84 55	122.1	23 01.3	84 55	122.4	22 36.1	84 54	122.7	22 10.9	84 54	123.0	21 45.6	84 54	123.3	21 20.3	84 54	123.6	20 55.0	84 54	123.9	1
2	23 18.7	83 55	120.9	22 53.7	84 55	121.2	22 28.6	84 55	121.5	22 03.5	84 55	121.8	21 38.4	84 55	122.1	21 13.2	84 55	122.4	20 48.0	84 54	122.7	20 22.8	84 54	123.0	2
3	22 45.5	83 56	120.0	22 20.5	83 56	120.3	21 55.6	83 56	120.6	21 30.6	83 55	120.9	21 05.5	84 55	121.2	20 40.5	84 55	121.5	20 15.4	84 55	121.8	19 50.2	84 55	122.1	3
4	22 11.9	83 56	119.1	21 47.1	83 56	119.4	21 22.2	83 56	119.7	20 57.3	83 56	120.0	20 32.4	83 56	120.3	20 07.4	83 56	120.6	19 42.4	83 55	120.9	19 17.4	83 55	121.2	4
55	21 38.1	82 57	118.2	21 13.3	83 57	118.5	20 48.6	83 57	118.8	20 23.8	83 56	119.1	19 58.9	83 56	119.4	19 34.1	83 56	119.7	19 09.2	83 56	120.0	18 44.3	83 56	120.3	55
6	21 04.0	82 57	117.3	20 39.3	82 57	117.6	20 14.6	82 57	117.9	19 49.9	82 57	118.2	19 25.2	83 57	118.5	19 00.4	83 57	118.8	18 35.6	83 56	119.1	18 10.8	83 56	119.4	6
7	20 29.6	82 58	116.4	20 05.0	82 58	116.8	19 40.4	82 57	117.1	19 15.8	82 57	117.4	18 51.2	82 57	117.7	18 26.5	82 57	118.0	18 01.8	82 57	118.3	17 37.1	82 57	118.6	7
8	19 54.9	81 58	115.6	19 30.4	82 58	115.9	19 06.0	82 58	116.2	18 41.4	82 58	116.5	18 16.9	82 58	116.8	17 52.3	82 57	117.1	17 27.7	82 57	117.4	17 03.1	82 57	117.7	8
9	19 20.0	81 59	114.7	18 55.6	81 58	115.0	18 31.2	81 58	115.3	18 06.8	81 58	115.6	17 42.3	82 58	115.9	17 17.8	82 58	116.2	16 53.3	82 58	116.5	16 28.8	82 58	116.8	9
60	18 44.8	81 59	113.9	18 20.5	81 59	114.2	17 56.2	81 59	114.5	17 31.9	81 59	114.8	17 07.5	81 58	115.1	16 43.1	81 58	115.4	16 18.7	81 58	115.7	15 54.2	82 58	116.0	60
1	18 09.4	81 59	113.0	17 45.2	81 59	113.3	17 21.0	81 59	113.6	16 56.8	81 59	113.9	16 32.5	81 59	114.2	16 08.2	81 59	114.5	15 43.8	81 58	114.9	15 19.5	81 58	115.2	1
2	17 33.8	80 60	112.2	17 09.7	80 60	112.5	16 45.6	81 59	112.8	16 21.4	81 59	113.1	15 57.2	81 59	113.4	15 33.0	81 59	113.7	15 08.7	81 59	114.0	14 44.4	81 59	114.3	2
3	16 58.0	80 60	111.3	16 34.0	80 60	111.6	16 09.9	80 60	111.9	15 45.8	80 60	112.3	15 21.7	80 60	112.6	14 57.5	81 59	112.9	14 33.4	81 59	113.2	14 09.2	81 59	113.5	3
4	16 22.0	80 60	110.5	15 58.0	80 60	110.8	15 34.0	80 60	111.1	15 10.0	80 60	111.4	14 46.0	80 60	111.7	14 21.9	80 60	112.0	13 57.8	80 60	112.3	13 33.7	80 60	112.7	4
65	15 45.8	80 61	109.7	15 21.9	80 61	110.0	14 58.0	80 60	110.3	14 34.0	80 60	110.6	14 10.0	80 60	110.9	13 46.0	80 60	111.2	13 22.0	80 60	111.5	12 58.0	80 60	111.8	65
6	15 09.4	79 61	108.8	14 45.5	79 61	109.1	14 21.7	80 61	109.5	13 57.8	80 61	109.8	13 33.9	80 61	110.1	13 10.0	80 60	110.4	12 46.0	80 60	110.7	12 22.1	80 60	111.0	6
7	14 32.8	79 61	108.0	14 09.0	79 61	108.3	13 45.2	79 61	108.6	13 21.4	79 61	109.0	12 57.6	79 61	109.3	12 33.7	80 61	109.6	12 09.9	80 61	109.9	11 46.0	80 60	110.2	7
8	13 56.0	79 62	107.2	13 32.3	79 61	107.5	13 08.6	79 61	107.8	12 44.9	79 61	108.1	12 21.1	79 61	108.5	11 57.3	79 61	108.8	11 33.5	79 61	109.1	11 09.7	79 61	109.4	8
9	13 19.1	79 62	106.4	12 55.4	79 62	106.7	12 31.8	79 62	107.0	12 08.1	79 61	107.3	11 44.4	79 61	107.6	11 20.7	79 61	108.0	10 57.0	79 61	108.3	10 33.2	79 61	108.6	9
70	12 42.0	79 62	105.6	12 18.4	79 62	105.9	11 54.8	79 62	106.2	11 31.2	79 62	106.5	11 07.6	79 62	106.8	10 43.9	79 62	107.2	10 20.3	79 61	107.5	9 56.6	79 61	107.8	70
1	12 04.8	78 62	104.8	11 41.3	78 62	105.1	11 17.7	78 62	105.4	10 54.2	79 62	105.7	10 30.6	79 62	106.0	10 07.0	79 62	106.4	9 43.4	79 62	106.7	9 19.8	79 62	107.0	1
2	11 27.4	78 62	104.0	11 04.0	78 62	104.3	10 40.5	78 62	104.6	10 17.0	78 62	104.9	9 53.5	78 62	105.2	9 29.9	78 62	105.6	9 06.4	79 62	105.9	8 42.8	79 62	106.2	2
3	10 49.9	78 63	103.2	10 26.5	78 63	103.5	10 03.1	78 63	103.8	9 39.7	78 62	104.1	9 16.2	78 62	104.4	8 52.7	78 62	104.8	8 29.2	78 62	105.1	8 05.7	78 62	105.4	3
4	10 12.3	78 63	102.4	9 49.0	78 63	102.7	9 25.6	78 63	103.0	9 02.2	78 63	103.3	8 38.8	78 63	103.7	8 15.3	78 62	104.0	7 51.9	78 62	104.3	7 28.5	78 62	104.6	4
75	9 34.6	78 63	101.6	9 11.3	78 63	101.9	8 47.9	78 63	102.2	8 24.6	78 63	102.6	8 01.2	78 63	102.9	7 37.9	78 63	103.2	7 14.5	78 63	103.5	6 51.1	78 63	103.8	75
6	8 56.8	78 63	100.8	8 33.5	78 63	101.1	8 10.2	78 63	101.5	7 46.9	78 63	101.8	7 23.6	78 63	102.1	7 00.3	78 63	102.4	6 36.9	78 63	102.7	6 13.6	78 63	103.0	6
7	8 18.8	77 63	100.0	7 55.6	77 63	100.3	7 32.4	78 63	100.7	7 09.1	78 63	101.0	6 45.8	78 63	101.3	6 22.5	78 63	101.6	5 59.2	78 63	101.9	5 35.9	78 63	102.3	7
8	7 40.8	77 64	99.2	7 17.6	77 63	99.6	6 54.4	77 63	99.9	6 31.2	77 63	100.2	6 07.9	77 63	100.5	5 44.7	78 63	100.8	5 21.4	78 63	101.2				8
9	7 02.7	77 64	98.5	6 39.5	77 64	98.8	6 16.4	77 64	99.1	5 53.2	77 64	99.4	5 30.0	77 63	99.7	5 06.8	77 63	100.1							9
80	6 24.5	77 64	97.7	6 01.4	77 64	98.0	5 38.2	77 64	98.3	5 15.1	77 64	98.7													80
1	5 46.3	77 64	96.9	5 23.2	77 64	97.2	5 00.0	77 64	97.6																1
2	5 07.9	77 64	96.1																						2

Digitized by Google

Lat. 50°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	44 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	46 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0	47 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	00
1	43 59.5	1.0 02	178.6	44 29.5	1.0 02	178.6	44 59.5	1.0 02	178.6	45 29.5	1.0 02	178.6	45 59.5	1.0 02	178.6	46 29.5	1.0 02	178.5	46 59.5	1.0 02	178.5	47 29.5	1.0 02	178.5	1
2	43 58.1	1.0 04	177.2	44 28.1	1.0 04	177.2	44 58.1	1.0 04	177.2	45 28.1	1.0 04	177.2	45 58.1	1.0 04	177.1	46 28.1	1.0 04	177.1	46 58.0	1.0 04	177.1	47 28.0	1.0 04	177.1	2
3	43 55.8	1.0 05	175.8	44 25.8	1.0 05	175.8	44 55.7	1.0 06	175.8	45 25.7	1.0 06	175.7	45 55.7	1.0 06	175.7	46 25.6	1.0 06	175.7	46 55.6	1.0 06	175.6	47 25.6	1.0 06	175.6	3
4	43 52.5	1.0 07	174.5	44 22.5	1.0 07	174.4	44 52.4	1.0 07	174.4	45 22.4	1.0 07	174.3	45 52.3	1.0 07	174.3	46 22.2	1.0 07	174.2	46 52.2	1.0 07	174.2	47 22.1	1.0 07	174.1	4
05	43 48.4	1.0 08	173.1	44 18.3	1.0 09	173.0	44 48.2	1.0 09	173.0	45 18.1	1.0 09	172.9	45 48.0	1.0 09	172.9	46 17.9	1.0 09	172.8	46 47.8	1.0 09	172.7	47 17.7	1.0 09	172.7	05
6	43 43.3	1.0 10	171.7	44 13.1	1.0 10	171.6	44 43.0	1.0 10	171.6	45 12.9	1.0 10	171.5	45 42.7	1.0 10	171.4	46 12.6	1.0 10	171.4	46 42.4	1.0 11	171.3	47 12.3	1.0 11	171.2	6
7	43 37.2	99 12	170.3	44 07.1	99 12	170.3	44 36.9	99 12	170.2	45 06.7	99 12	170.1	45 36.5	99 12	170.0	46 06.3	99 12	169.9	46 36.1	99 12	169.9	47 05.9	99 12	169.8	7
8	43 30.3	99 13	169.0	44 00.1	99 13	168.9	44 29.8	99 13	168.8	44 59.6	99 13	168.7	45 29.4	99 13	168.6	45 59.1	99 14	168.5	46 28.9	99 14	168.4	46 58.6	99 14	168.3	8
9	43 22.5	99 15	167.6	43 52.2	99 15	167.5	44 21.9	99 15	167.4	44 51.6	99 15	167.3	45 21.3	99 15	167.2	45 51.0	99 15	167.1	46 20.6	99 15	167.0	46 50.3	99 15	166.9	9
10	43 13.7	99 16	166.2	43 43.4	99 16	166.1	44 13.0	99 16	166.0	44 42.7	99 16	165.9	45 12.3	99 17	165.8	45 41.9	99 17	165.7	46 11.5	99 17	165.6	46 41.1	99 17	165.5	10
1	43 04.1	99 17	164.9	43 33.7	99 18	164.8	44 03.3	99 18	164.7	44 32.8	99 18	164.5	45 02.4	98 18	164.4	45 31.9	98 18	164.3	46 01.4	98 18	164.2	46 31.0	98 18	164.0	1
2	42 53.6	98 19	163.6	43 23.1	98 19	163.4	43 52.6	98 19	163.3	44 22.1	98 19	163.2	44 51.6	98 19	163.0	45 21.0	98 20	162.9	45 50.5	98 20	162.8	46 19.9	98 20	162.6	2
3	42 42.3	98 20	162.2	43 11.7	98 20	162.1	43 41.1	98 21	161.9	44 10.5	98 21	161.8	44 39.9	98 21	161.7	45 09.2	98 21	161.5	45 38.6	98 21	161.4	46 07.9	98 21	161.2	3
4	42 30.1	98 22	160.9	42 59.4	98 22	160.7	43 28.7	98 22	160.6	43 58.0	98 22	160.5	44 27.3	98 22	160.3	44 56.6	98 23	160.1	45 25.8	98 23	160.0	45 55.1	97 23	159.8	4
15	42 17.1	97 23	159.6	42 46.3	97 23	159.4	43 15.5	97 23	159.3	43 44.7	97 24	159.1	44 13.9	97 24	158.9	44 43.1	97 24	158.8	45 12.2	97 24	158.6	45 41.4	97 24	158.4	15
6	42 03.2	97 24	158.3	42 32.3	97 25	158.1	43 01.4	97 25	157.9	43 30.5	97 25	157.8	43 59.6	97 25	157.6	44 28.7	97 25	157.4	44 57.7	97 26	157.3	45 26.8	97 26	157.1	6
7	41 48.5	97 26	157.0	42 17.5	97 26	156.8	42 46.5	97 26	156.6	43 15.5	97 26	156.4	43 44.5	97 27	156.3	44 13.5	96 27	156.1	44 42.4	96 27	155.9	45 11.3	96 27	155.7	7
8	41 33.0	96 27	155.7	42 01.9	96 27	155.5	42 30.8	96 28	155.3	42 59.7	96 28	155.1	43 28.6	96 28	154.9	43 57.4	96 28	154.8	44 26.2	96 28	154.6	44 55.0	96 28	154.4	8
9	41 16.7	96 28	154.4	41 45.5	96 29	154.2	42 14.3	96 29	154.0	42 43.1	96 29	153.8	43 11.8	96 29	153.6	43 40.6	96 29	153.4	44 09.3	96 30	153.2	44 38.0	96 30	153.0	9
20	40 59.7	96 30	153.1	41 28.4	96 30	152.9	41 57.0	96 30	152.7	42 25.7	95 30	152.5	42 54.3	95 30	152.3	43 22.9	95 31	152.1	43 51.5	95 31	151.9	44 20.1	95 31	151.7	20
1	40 41.9	95 31	151.9	41 10.4	95 31	151.7	41 39.0	95 31	151.5	42 07.5	95 32	151.3	42 36.0	95 32	151.0	43 04.5	95 32	150.8	43 33.0	95 32	150.6	44 01.4	95 32	150.4	1
2	40 23.3	95 32	150.6	40 51.8	95 32	150.4	41 20.2	95 33	150.2	41 48.6	95 33	150.0	42 17.0	95 33	149.8	42 45.3	94 33	149.5	43 13.7	94 33	149.3	43 42.0	94 34	149.1	2
3	40 04.0	94 33	149.4	40 32.4	94 34	149.2	41 00.7	94 34	148.9	41 28.9	94 34	148.7	41 57.2	94 34	148.5	42 25.4	94 35	148.3	42 53.6	94 35	148.0	43 21.8	94 35	147.8	3
4	39 44.0	94 34	148.2	40 12.2	94 35	147.9	40 40.4	94 35	147.7	41 08.6	94 35	147.5	41 36.7	94 35	147.2	42 04.8	94 36	147.0	42 32.8	93 36	146.8	43 00.9	93 36	146.5	4
25	39 23.3	94 36	146.9	39 51.4	94 36	146.7	40 19.5	93 36	146.5	40 47.5	93 36	146.2	41 15.5	93 36	146.0	41 43.4	93 37	145.8	42 11.3	93 37	145.5	42 39.2	93 37	145.3	25
6	39 02.0	93 37	145.7	39 29.9	93 37	145.5	39 57.8	93 37	145.3	40 25.7	93 37	145.0	40 53.6	93 38	144.8	41 21.4	93 38	144.5	41 49.2	93 38	144.3	42 16.9	92 38	144:0	6
7	38 39.9	93 38	144.5	39 07.7	93 38	144.3	39 35.5	93 38	144.1	40 03.3	92 38	143.8	40 31.0	92 39	143.6	40 58.7	92 39	143.3	41 26.3	92 39	143.1	41 53.9	92 39	142.8	7
8	38 17.2	92 39	143.4	38 44.9	92 39	143.1	39 12.6	92 39	142.9	39 40.2	92 40	142.6	40 07.7	92 40	142.4	40 35.3	92 40	142.1	41 02.8	92 40	141.8	41 30.3	92 40	141.6	8
9	37 53.9	92 40	142.2	38 21.4	92 40	142.0	38 49.0	92 40	141.7	39 16.4	92 41	141.4	39 43.9	91 41	141.2	40 11.3	91 41	140.9	40 38.7	91 41	140.6	41 06.0	91 42	140.4	9
30	37 30.0	91 41	141.0	37 57.4	91 41	140.8	38 24.7	91 41	140.5	38 52.1	91 42	140.3	39 19.4	91 42	140.0	39 46.7	91 42	139.7	40 13.9	91 42	139.5	40 41.1	91 42	139.2	30
1	37 05.4	91 42	139.9	37 32.7	91 42	139.6	37 59.9	91 42	139.4	38 27.1	91 43	139.1	38 54.3	90 43	138.8	39 21.4	90 43	138.6	39 48.5	90 43	138.3	40 15.6	90 44	138.0	1
2	36 40.3	91 43	138.8	37 07.4	90 43	138.5	37 34.5	90 43	138.2	38 01.6	90 44	138.0	38 28.6	90 44	137.7	38 55.6	90 44	137.4	39 22.6	90 44	137.1	39 49.5	90 44	136.8	2
3	36 14.6	90 44	137.7	36 41.6	90 44	137.4	37 08.6	90 44	137.1	37 35.5	90 44	136.8	38 02.4	90 45	136.5	38 29.2	89 45	136.3	38 56.0	89 45	136.0	39 22.8	89 45	135.7	3
4	35 48.3	90 45	136.5	36 15.2	90 45	136.3	36 42.0	89 45	136.0	37 08.8	89 45	135.7	37 35.6	89 46	135.4	38 02.3	89 46	135.1	38 29.0	89 46	134.8	38 55.6	89 46	134.5	4
35	35 21.5	89 46	135.4	35 48.3	89 46	135.2	36 15.0	89 46	134.9	36 41.6	89 46	134.6	37 08.2	89 46	134.3	37 34.8	89 47	134.0	38 01.4	88 47	133.7	38 27.8	88 47	133.4	35
6	34 54.2	89 46	134.4	35 20.8	89 47	134.1	35 47.4	88 47	133.8	36 13.9	88 47	133.5	36 40.4	88 47	133.2	37 06.8	88 47	132.9	37 33.2	88 48	132.6	37 59.6	88 48	132.3	6
7	34 26.4	88 47	133.3	34 52.9	88 47	133.0	35 19.3	88 48	132.7	35 45.7	88 48	132.4	36 12.0	88 48	132.1	36 38.3	88 48	131.8	37 04.6	87 49	131.5	37 30.8	87 49	131.2	7
8	33 58.1	88 48	132.2	34 24.4	88 48	131.9	34 50.7	88 48	131.6	35 17.0	87 49	131.3	35 43.2	87 49	131.0	36 09.4	87 49	130.7	36 35.5	87 49	130.4	37 01.6	87 50	130.1	8
9	33 29.3	87 49	131.2	33 55.5	87 49	130.9	34 21.7	87 49	130.6	34 47.8	87 49	130.3	35 13.9	87 50	130.0	35 39.9	87 50	129.7	36 05.9	87 50	129.4	36 31.8	86 50	129.1	9
40	33 00.0	87 50	130.1	33 26.1	87 50	129.8	33 52.1	87 50	129.5	34 18.1	87 50	129.2	34 44.1	86 50	128.9	35 10.0	86 51	128.6	35 35.9	86 51	128.3	36 01.7	86 51	128.0	40
1	32 30.3	87 50	129.1	32 56.3	86 50	128.8	33 22.2	86 51	128.5	33 48.0	86 51	128.2	34 13.9	86 51	127.9	34 39.7	86 51	127.6	35 05.4	86 52	127.3	35 31.1	86 52	127.0	1
2	32 00.2	86 51	128.1	32 26.0	86 51	127.8	32 51.8	86 51	127.5	33 17.5	86 52	127.2	33 43.2	86 52	126.9	34 08.9	85 52	126.6	34 34.5	85 52	126.2	35 00.0	85 52	125.9	2
3	31 29.6	86 52	127.1	31 55.3	86 52	126.8	32 21.0	85 52	126.5	32 46.6	85 52	126.2	33 12.2	85 52	125.8	33 37.7	85 53	125.5	34 03.2	85 53	125.2	34 28.6	85 53	124.9	3
4	30 58.6	85 52	126.1	31 24.2	85 52	125.8	31 49.8	85 53	125.5	32 15.2	85 53	125.2	32 40.7	85 53	124.8	33 06.1	85 53	124.5	33 31.5	84 53	124.2	33 56.8	84 54	123.9	4
45	30 27.2	85 53	125.1	30 52.7	85 53	124.8	31 18.1	85 53	124.5	31 43.5	85 54	124.2	32 08.9	84 54	123.8	32 34.1	84 54	123.5	32 59.4	84 54	123.2	33 24.6	84 54	122.9	45
6	29 55.5	85 54	124.1	30 20.9	84 54	123.8	30 46.2	84 54	123.5	31 11.4	84 54	123.2	31 36.6	84 54	122.9	32 01.8	84 54	122.5	32 26.9	84 55	122.2	32 52.0	83 55	121.9	6
7	29 23.4	84 54	123.1	29 48.6	84 54	122.8	30 13.8	84 54	122.5	30 39.0	84 55	122.2	31 04.1	84 55	121.9	31 29.1	83 55	121.6	31 54.1	83 55	121.2	32 19.1	83 55	120.9	7
8	28 50.9	84 55	122.2	29 16.0	84 55	121.9	29 41.1	84 55	121.6	30 06.2	83 55	121.2	30 31.1	83 55	120.9	30 56.1	83 56	120.6	31 21.0	83 56	120.3	31 45.8	83 56	119.9	8
9	28 18.1	83 55	121.2	28 43.1	83 55	120.9	29 08.1	83 56	120.6	29 33.0	83 56	120.3	29 57.9	83 56	120.0	30 22.7	83 56	119.6	30 47.5	83 56	119.3	31 12.2	82 56	119.0	9
50	27 45.0	83 56	120.3	28 09.9	83 56	120.0	28 34.7	83 56	119.7	28 59.6	83 56	119.3	29 24.3	82 56	119.0	29 49.0	82 57	118.7	30 13.7	82 57	118.4	30 38.4	82 57	118.0	50
1	27 11.5	83 56	119.4	27 36.3	83 56	119.0	28 01.1	82 57	118.7	28 25.8	82 57	118.4	28 50.4	82 57	118.1	29 15.1	82 57	117.7	29 39.6	82 57	117.4	30 04.2	82 57	117.1	1
2	26 37.7	82 57	118.4	27 02.4	82 57	118.1	27 27.1	82 57	117.8	27 51.7	82 57	117.5	28 16.3	82 57	117.1	28 40.8	82 58	116.8	29 05.3	81 58	116.5	29 29.7	81 58	116.2	2
3	26 03.7	82 57	117.5	26 28.3	82 57	117.2	26 52.8	82 58	116.9	27 17.3	82 58	116.6	27 41.8	81 58	116.2	28 06.2	81 58	115.9	28 30.6	81 58	115.6	28 54.9	81 58	115.2	3
4	25 29.3	82 58	116.6	25 53.8	82 58	116.3	26 18.3	81 58	116.0	26 42.7	81 58	115.6	27 07.1	81 58	115.3	27 31.4	81 58	115.0	27 55.7	81 59	114.7	28 19.9	81 59	114.3	4
55	24 54.7	81 58	115.7	25 19.1	81 58	115.4	25 43.5	81 58	115.1	26 07.8	81 59	114.7	26 32.1	81 59	114.4	26 56.3	81 59	114.1	27 20.5	81 59	113.8	27 44.6	80 59	113.4	55
6	24 19.8	81 59	114.8	24 44.2	81 59	114.5	25 08.4	81 59	114.2	25 32.7	81 59	113.8	25 56.8	81 59	113.5	26 21.0	80 59	113.2	26 45.1	80 59	112.9	27 09.1	80 60	112.5	6
7	23 44.7	81 59	113.9	24 08.9	81 59	113.6	24 33.1	81 59	113.3	24 57.3	80 59	113.0	25 21.4	80 60	112.6	25 45.4	80 60	112.3	26 09.4	80 60	112.0	26 33.4	80 60	111.6	7
8	23 09.3	81 59	113.1	23 33.5	80 59	112.7	23 57.6	80 60	112.4	24 21.6	80 60	112.1	24 45.7	80 60	111.8	25 09.6	80 60	111.4	25 33.6	80 60	111.1	25 57.4	80 60	110.8	8
9	22 33.7	80 60	112.2	22 57.8	80 60	111.9	23 21.8	80 60	111.5	23 45.8	80 60	111.2	24 09.7	80 60	110.9	24 33.6	80 60	110.5	24 57.5	79 60	110.2	25 21.3	79 61	109.9	9
60	21 57.9	80 60	111.3	22 21.9	80 60	111.0	22 45.8	80 60	110.7	23 09.7	80 60	110.3	23 33.6	79 61	110.0	23 57.4	79 61	109.7	24 21.2	79 61	109.3	24 44.9	79 61	109.0	60
1	21 21.9	80 60	110.5	21 45.8	80 61	110.1	22 09.7	79 61	109.8	22 33.5	79 61	109.5	22 57.3	79 61	109.2	23 21.0	79 61	108.8	23 44.7	79 61	108.5	24 08.3	79 61	108.2	1
2	20 45.7	79 61	109.6	21 09.5	79 61	109.3	21 33.3	79 61	109.0	21 57.0	79 61	108.6	22 20.7	79 61	108.3	22 44.4	79 61	108.0	23 08.0	79 61	107.6	23 31.6	79 62	107.3	2
3	20 09.2	79 61	108.8	20 33.0	79 61	108.4	20 56.7	79 61	108.1	21 20.4	79 61	107.8	21 44.0	79 61	107.5	22 07.6	79 62	107.1	22 31.2	78 62	106.8	22 54.7	78 62	106.5	3
4	19 32.6	79 61	107.9	19 56.3	79 61	107.6	20 20.0	79 62	107.3	20 43.6	79 62	106.9	21 07.2	79 62	106.6	21 30.7	78 62	106.3	21 54.2	78 62	106.0	22 17.6	78 62	105.6	4
65	18 55.9	79 62	107.1	19 19.5	79 62	106.8	19 43.1	79 62	106.4	20 06.6	78 62	106.1	20 30.1	78 62	105.8	20 53.6	78 62	105.5	21 17.0	78 62	105.1	21 40.4	78 62	104.8	65
6	18 18.9	79 62	106.3	18 42.5	78 62	105.9	19 06.0	78 62	105.6	19 29.5	78 62	105.3	19 52.9	78 62	105.0	20 16.3	78 62	104.6	20 39.7	78 62	104.3	21 03.1	78 62	104.0	6
7	17 41.8	78 62	105.4	18 05.3	78 62	105.1	18 28.8	78 62	104.8	18 52.2	78 62	104.5	19 15.6	78 62	104.1	19 39.0	78 63	103.8	20 02.3	78 63	103.5	20 25.6	78 63	103.1	7
8	17 04.6	78 62	104.6	17 28.0	78 62	104.3	17 51.4	78 62	104.0	18 14.8	78 63	103.6	18 38.1	78 63	103.3	19 01.4	78 63	103.0	19 24.7	78 63	102.6	19 47.9	77 63	102.3	8
9	16 27.2	78 63	103.8	16 50.6	78 63	103.5	17 13.9	78 63	103.2	17 37.2	78 63	102.8	18 00.5	78 63	102.5	18 23.8	77 63	102.2	18 47.0	77 63	101.8	19 10.2	77 63	101.5	9
70	15 49.7	78 63	103.0	16 13.0	78 63	102.7	16 36.3	78 63	102.4	16 59.6	78 63	102.0	17 22.8	77 63	101.7	17 46.0	77 63	101.4	18 09.2	77 63	101.0	18 32.4	77 63	100.7	70
1	15 12.0	78 63	102.2	15 35.3	78 63	101.9	15 58.6	77 63	101.5	16 21.8	77 63	101.2	16 45.0	77 63	100.9	17 08.2	77 63	100.6	17 31.3	77 63	100.2	17 54.4	77 63	99.9	1
2	14 34.3	78 63	101.4	14 57.5	77 63	101.1	15 20.7	77 63	100.7	15 43.9	77 63	100.4	16 07.1	77 63	100.1	16 30.2	77 63	99.8	16 53.3	77 63	99.4	17 16.4	77 64	99.1	2
3	13 56.4	77 63	100.6	14 19.6	77 63	100.3	14 42.8	77 63	99.9	15 05.9	77 63	99.6	15 29.1	77 64	99.3	15 52.2	77 64	99.0	16 15.2	77 64	98.6	16 38.2	77 64	98.3	3
4	13 18.5	77 63	99.8	13 41.6	77 63	99.5	14 04.8	77 64	99.2	14 27.9	77 64	98.8	14 51.0	77 64	98.5	15 14.0	77 64	98.2	15 37.0	77 64	97.8	16 00.0	77 64	97.5	4
75	12 40.4	77 64	99.0	13 03.5	77 64	98.7	13 26.7	77 64	98.4	13 49.7	77 64	98.0	14 12.8	77 64	97.7	14 35.8	77 64	97.4	14 58.8	77 64	97.0	15 21.8	77 64	96.7	75
6	12 02.3	77 64	98.2	12 25.4	77 64	97.9	12 48.5	77 64	97.6	13 11.5	77 64	97.2	13 34.5	77 64	96.9	13 57.5	77 64	96.6	14 20.5	77 64	96.3	14 43.4	76 64	95.9	6
7	11 24.1	77 64	97.4	11 47.1	77 64	97.1	12 10.2	77 64	96.8	12 33.2	77 64	96.5	12 56.2	77 64	96.1	13 19.2	77 64	95.8	13 42.1	76 64	95.5	14 05.1	76 64	95.1	7
8	10 45.8	77 64	96.7	11 08.8	77 64	96.3	11 31.9	77 64	96.0	11 54.9	77 64	95.7	12 17.8	77 64	95.4	12 40.8	76 64	95.0	13 03.7	76 64	94.7	13 26.6	76 64	94.4	8
9	10 07.5	77 64	95.9	10 30.5	77 64	95.6	10 53.5	77 64	95.2	11 16.5	77 64	94.9	11 39.4	76 64	94.6	12 02.3	76 64	94.3	12 25.3	76 64	93.9	12 48.1	76 64	93.6	9
80	9 29.1	77 64	95.1	9 52.1	77 64	94.8	10 15.1	77 64	94.5	10 38.0	76 64	94.1	11 01.0	76 64	93.8	11 23.9	76 64	93.5	11 46.8	76 64	93.1	12 09.6	76 64	92.8	80
1	8 50.6	77 64	94.3	9 13.6	77 64	94.0	9 36.6	77 64	93.7	9 59.5	76 64	93.4	10 22.5	76 64	93.0	10 45.4	76 64	92.7	11 08.2	76 64	92.4	11 31.1	76 64	92.0	1
2	8 12.2	77 64	93.6	8 35.1	77 64	93.2	8 58.1	76 64	92.9	9 21.0	76 64	92.6	9 43.9	76 64	92.3	10 06.8	76 64	91.9	10 29.7	76 64	91.6	10 52.6	76 64	91.3	2
3	7 33.7	77 64	92.8	7 56.6	76 64	92.5	8 19.6	76 64	92.1	8 42.5	76 64	91.8	9 05.4	76 64	91.5	9 28.3	76 64	91.2	9 51.1	76 64	90.8	10 14.0	76 64	90.5	3
4	6 55.1	77 64	92.0	7 18.1	76 64	91.7	7 41.0	76 64	91.4	8 03.9	76 64	91.0	8 26.8	76 64	90.7	8 49.7	76 64	90.4	9 12.6	76 64	90.1	9 35.4	76 64	89.7	4
85	6 16.6	76 64	91.3	6 39.5	76 64	90.9	7 02.4	76 64	90.6	7 25.4	76 64	90.3	7 48.3	76 64	90.0	8 11.1	76 64	89.6	8 34.0	76 64	89.3	8 56.9	76 64	89.0	85
6	5 38.0	76 64	90.5	6 01.0	76 64	90.2	6 23.9	76 64	89.8	6 46.8	76 64	89.5	7 09.7	76 64	89.2	7 32.6	76 64	88.9	7 55.4	76 64	88.5	8 18.3	76 64	88.2	6
7				5 22.4	76 64	89.4	5 45.3	76 64	89.1	6 08.2	76 64	88.7	6 31.1	76 64	88.4	6 54.0	76 64	88.1	7 16.9	76 64	87.8	7 39.8	76 64	87.4	7
8							5 06.8	76 64	88.3	5 29.7	76 64	88.0	5 52.6	76 64	87.7	6 15.5	76 64	87.3	6 38.4	76 64	87.0	7 01.2	76 64	86.7	8
9													5 14.1	76 64	86.9	5 37.0	76 64	86.6	5 59.9	76 64	86.2	6 22.8	76 64	85.9	9
90																			5 21.4	76 64	85.5	5 44.3	76 64	85.2	90.

Digitized by Google

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	36 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	35 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	34 00.0	1.0 01	180.0	33 30.0	1.0 01	180.0	33 00.0	1.0 01	180.0	32 30.0	1.0 01	180.0	00
1	35 59.6	1.0 02	178.8	35 29.6	1.0 02	178.8	34 59.6	1.0 02	178.8	34 29.6	1.0 02	178.8	33 59.6	1.0 02	178.8	33 29.6	1.0 02	178.8	32 59.6	1.0 02	178.8	32 29.6	1.0 02	178.8	1
2	35 58.3	1.0 03	177.5	35 28.4	1.0 03	177.6	34 58.4	1.0 03	177.6	34 28.4	1.0 03	177.6	33 58.4	1.0 03	177.6	33 28.4	1.0 03	177.6	32 58.4	1.0 03	177.6	32 28.4	1.0 03	177.6	2
3	35 56.3	1.0 05	176.3	35 26.3	1.0 05	176.3	34 56.3	1.0 05	176.4	34 26.3	1.0 05	176.4	33 56.4	1.0 05	176.4	33 26.4	1.0 05	176.4	32 56.4	1.0 05	176.5	32 26.4	1.0 05	176.5	3
4	35 53.4	1.0 06	175.1	35 23.4	1.0 06	175.1	34 53.5	1.0 06	175.1	34 23.5	1.0 06	175.2	33 53.5	1.0 06	175.2	33 23.6	1.0 06	175.2	32 53.6	1.0 06	175.3	32 23.7	1.0 06	175.3	4
05	35 49.6	1.0 08	173.8	35 19.7	1.0 08	173.9	34 49.8	1.0 07	173.9	34 19.9	1.0 07	174.0	33 49.9	1.0 07	174.0	33 20.0	1.0 07	174.1	32 50.1	1.0 07	174.1	32 20.1	1.0 07	174.1	05
6	35 45.1	1.0 09	172.6	35 15.2	1.0 09	172.7	34 45.3	1.0 09	172.7	34 15.4	1.0 09	172.8	33 45.5	1.0 09	172.8	33 15.6	1.0 09	172.9	32 45.7	1.0 09	172.9	32 15.8	1.0 09	173.0	6
7	35 39.7	1.0 10	171.4	35 09.9	1.0 10	171.5	34 40.0	1.0 10	171.5	34 10.1	1.0 10	171.6	33 40.3	1.0 10	171.6	33 10.4	1.0 10	171.7	32 40.5	1.0 10	171.7	32 10.7	1.0 10	171.8	7
8	35 33.6	99 12	170.2	35 03.7	99 12	170.2	34 33.9	99 11	170.3	34 04.1	99 11	170.4	33 34.3	99 11	170.4	33 04.4	99 11	170.5	32 34.6	99 11	170.6	32 04.8	99 11	170.6	8
9	35 26.6	99 13	169.0	34 56.8	99 13	169.0	34 27.0	99 13	169.1	33 57.2	99 13	169.2	33 27.5	99 13	169.3	32 57.7	99 13	169.3	32 27.9	99 12	169.4	31 58.1	99 12	169.5	9
10	35 18.8	99 14	167.7	34 49.1	99 14	167.8	34 19.3	99 14	167.9	33 49.6	99 14	168.0	33 19.9	99 14	168.1	32 50.2	99 14	168.2	32 20.4	99 14	168.2	31 50.7	99 14	168.3	10
1	35 10.2	99 16	166.5	34 40.5	99 16	166.6	34 10.9	99 15	166.7	33 41.2	99 15	166.8	33 11.5	99 15	166.9	32 41.8	99 15	167.0	32 12.2	99 15	167.1	31 42.5	99 15	167.2	1
2	35 00.8	99 17	165.3	34 31.2	99 17	165.4	34 01.6	99 17	165.5	33 32.0	99 17	165.6	33 02.4	99 16	165.7	32 32.8	99 16	165.8	32 03.2	99 16	165.9	31 33.5	99 16	166.0	2
3	34 50.7	98 18	164.1	34 21.1	98 18	164.2	33 51.6	98 18	164.3	33 22.1	98 18	164.4	32 52.5	99 18	164.6	32 22.9	99 18	164.7	31 53.4	99 18	164.8	31 23.8	99 17	164.9	3
4	34 39.7	98 20	162.9	34 10.3	98 19	163.1	33 40.8	98 19	163.2	33 11.3	98 19	163.3	32 41.9	98 19	163.4	32 12.4	98 19	163.5	31 42.9	98 19	163.6	31 13.4	98 19	163.7	4
15	34 28.0	98 21	161.7	33 58.7	98 21	161.9	33 29.3	98 20	162.0	32 59.9	98 20	162.1	32 30.5	98 20	162.2	32 01.0	98 20	162.3	31 31.6	98 20	162.5	31 02.2	98 20	162.6	15
6	34 15.6	98 22	160.6	33 46.3	98 22	160.7	33 17.0	98 22	160.8	32 47.6	98 22	161.0	32 18.3	98 21	161.1	31 49.0	98 21	161.2	31 19.6	98 21	161.3	30 50.3	98 21	161.4	6
7	34 02.4	97 23	159.4	33 33.2	97 23	159.5	33 03.9	97 23	159.7	32 34.7	97 23	159.8	32 05.4	98 23	159.9	31 36.2	98 23	160.1	31 06.9	98 22	160.2	30 37.6	98 22	160.3	7
8	33 48.4	97 24	158.2	33 19.3	97 24	158.4	32 50.2	97 24	158.5	32 21.0	97 24	158.6	31 51.8	97 24	158.8	31 22.7	97 24	158.9	30 53.5	97 24	159.1	30 24.3	97 23	159.2	8
9	33 33.8	97 26	157.1	33 04.7	97 25	157.2	32 35.7	97 25	157.4	32 06.6	97 25	157.5	31 37.5	97 25	157.7	31 08.4	97 25	157.8	30 39.4	97 25	157.9	30 10.2	97 25	158.1	9
20	33 18.4	96 27	155.9	32 49.4	97 27	156.1	32 20.5	97 26	156.2	31 51.5	97 26	156.4	31 22.5	97 26	156.5	30 53.5	97 26	156.7	30 24.5	97 26	156.8	29 55.5	97 26	157.0	20
1	33 02.3	96 28	154.8	32 33.4	96 28	154.9	32 04.6	96 28	155.1	31 35.7	96 27	155.2	31 06.8	96 27	155.4	30 37.9	96 27	155.6	30 09.0	96 27	155.7	29 40.1	96 27	155.9	1
2	32 45.5	96 29	153.6	32 16.7	96 29	153.8	31 48.0	96 29	154.0	31 19.2	96 29	154.1	30 50.4	96 28	154.3	30 21.6	96 28	154.4	29 52.8	96 28	154.6	29 24.0	96 28	154.8	2
3	32 28.0	95 30	152.5	31 59.4	96 30	152.7	31 30.7	96 30	152.8	31 02.0	96 30	153.0	30 33.3	96 30	153.2	30 04.6	96 29	153.3	29 35.9	96 29	153.5	29 07.2	96 29	153.7	3
4	32 09.9	95 31	151.4	31 41.3	95 31	151.5	31 12.8	95 31	151.7	30 44.2	95 31	151.9	30 15.6	95 31	152.1	29 47.0	95 30	152.2	29 18.4	95 30	152.4	28 49.8	95 30	152.6	4
25	31 51.0	95 32	150.2	31 22.6	95 32	150.4	30 54.2	95 32	150.6	30 25.7	95 32	150.8	29 57.2	95 32	151.0	29 28.7	95 32	151.2	29 00.2	95 31	151.3	28 31.7	95 31	151.5	25
6	31 31.6	94 34	149.1	31 03.3	94 33	149.3	30 34.9	94 33	149.5	30 06.6	95 33	149.7	29 38.2	95 33	149.9	29 09.8	95 33	150.1	28 41.4	95 32	150.3	28 13.0	95 32	150.4	6
7	31 11.5	94 35	148.0	30 43.3	94 34	148.2	30 15.0	94 34	148.4	29 46.8	94 34	148.6	29 18.5	94 34	148.8	28 50.3	94 34	149.0	28 22.0	94 33	149.2	27 53.6	94 33	149.4	7
8	30 50.7	94 36	146.9	30 22.7	94 35	147.1	29 54.5	94 35	147.3	29 26.4	94 35	147.5	28 58.3	94 35	147.7	28 30.1	94 35	147.9	28 01.9	94 34	148.1	27 33.7	94 34	148.3	8
9	30 29.4	93 37	145.9	30 01.4	93 36	146.1	29 33.4	93 36	146.3	29 05.4	93 36	146.5	28 37.4	93 36	146.7	28 09.3	94 36	146.9	27 41.2	94 35	147.1	27 13.2	94 35	147.3	9
30	30 07.5	93 38	144.8	29 39.6	93 37	145.0	29 11.7	93 37	145.2	28 43.8	93 37	145.4	28 15.9	93 37	145.6	27 47.9	93 37	145.8	27 20.0	93 36	146.0	26 52.0	93 36	146.2	30
1	29 44.9	92 39	143.7	29 17.2	93 38	143.9	28 49.4	93 38	144.2	28 21.6	93 38	144.4	27 53.8	93 38	144.6	27 26.0	93 38	144.8	26 58.2	93 37	145.0	26 30.3	93 37	145.2	1
2	29 21.8	92 39	142.7	28 54.2	92 39	142.9	28 26.5	92 39	143.1	27 58.9	92 39	143.3	27 31.2	92 39	143.5	27 03.5	92 38	143.8	26 35.8	92 38	144.0	26 08.0	93 38	144.2	2
3	28 58.1	92 40	141.6	28 30.6	92 40	141.8	28 03.1	92 40	142.1	27 35.6	92 40	142.3	27 08.0	92 40	142.5	26 40.4	92 39	142.7	26 12.8	92 39	142.9	25 45.2	92 39	143.2	3
4	28 33.9	91 41	140.6	28 06.5	91 41	140.8	27 39.1	91 41	141.0	27 11.7	91 41	141.3	26 44.2	92 40	141.5	26 16.8	92 40	141.7	25 49.3	92 40	141.9	25 21.8	92 40	142.2	4
35	28 09.2	91 42	139.5	27 41.9	91 42	139.8	27 14.6	91 42	140.0	26 47.3	91 42	140.2	26 20.0	91 41	140.5	25 52.6	91 41	140.7	25 25.2	91 41	140.9	24 57.8	91 41	141.2	35
6	27 43.9	90 43	138.5	27 16.7	91 43	138.8	26 49.6	91 43	139.0	26 22.4	91 42	139.2	25 55.2	91 42	139.5	25 27.9	91 42	139.7	25 00.7	91 42	139.9	24 33.4	91 42	140.2	6
7	27 18.1	90 44	137.5	26 51.0	90 44	137.7	26 24.0	90 43	138.0	25 56.9	90 43	138.2	25 29.8	90 43	138.5	25 02.7	90 43	138.7	24 35.6	90 43	138.9	24 08.4	91 42	139.2	7
8	26 51.8	90 45	136.5	26 24.9	90 44	136.7	25 57.9	90 44	137.0	25 31.0	90 44	137.2	25 04.0	90 44	137.5	24 37.0	90 44	137.7	24 10.0	90 43	138.0	23 43.0	90 43	138.2	8
9	26 25.0	89 45	135.5	25 58.2	89 45	135.7	25 31.4	89 45	136.0	25 04.6	89 45	136.2	24 37.7	90 45	136.5	24 10.8	90 44	136.7	23 43.9	90 44	137.0	23 17.0	90 44	137.2	9
40	25 57.7	89 46	134.5	25 31.0	89 46	134.8	25 04.4	89 46	135.0	24 37.6	89 46	135.3	24 10.9	89 45	135.5	23 44.1	89 45	135.8	23 17.4	89 45	136.0	22 50.6	89 45	136.2	40
1	25 30.0	88 47	133.5	25 03.4	89 47	133.8	24 36.9	89 47	134.0	24 10.3	89 46	134.3	23 43.6	89 46	134.5	23 17.0	89 46	134.8	22 50.3	89 46	135.0	22 23.7	89 46	135.3	1
2	25 01.8	88 48	132.6	24 35.3	88 48	132.8	24 08.9	88 47	133.1	23 42.4	88 47	133.3	23 15.9	88 47	133.6	22 49.4	88 47	133.8	22 22.9	89 47	134.1	21 56.3	89 46	134.3	2
3	24 33.1	88 48	131.6	24 06.8	88 48	131.8	23 40.5	88 48	132.1	23 14.2	88 48	132.4	22 47.8	88 48	132.6	22 21.4	88 47	132.9	21 54.9	88 47	133.1	21 28.5	88 47	133.4	3
4	24 04.1	87 49	130.6	23 37.9	87 49	130.9	23 11.7	87 49	131.2	22 45.5	87 49	131.4	22 19.2	88 48	131.7	21 52.9	88 48	131.9	21 26.6	88 48	132.2	21 00.3	88 48	132.5	4
45	23 34.6	87 50	129.7	23 08.5	87 50	129.9	22 42.4	87 49	130.2	22 16.3	87 49	130.5	21 50.2	87 49	130.7	21 24.0	87 49	131.0	20 57.8	87 49	131.3	20 31.6	87 48	131.5	45
6	23 04.7	86 50	128.7	22 38.8	87 50	129.0	22 12.8	87 50	129.3	21 46.8	87 50	129.6	21 20.8	87 50	129.8	20 54.7	87 50	130.1	20 28.6	87 49	130.3	20 02.5	87 49	130.6	6
7	22 34.4	86 51	127.8	22 08.6	86 51	128.1	21 42.7	86 51	128.4	21 16.9	86 51	128.6	20 50.9	86 50	128.9	20 25.0	87 50	129.2	19 59.0	87 50	129.4	19 33.0	87 50	129.7	7
8	22 03.8	86 52	126.9	21 38.1	86 52	127.2	21 12.3	86 51	127.4	20 46.5	86 51	127.7	20 20.7	86 51	128.0	19 54.9	86 51	128.2	19 29.0	86 51	128.5	19 03.2	86 50	128.8	8
9	21 32.7	85 52	126.0	21 07.1	85 52	126.2	20 41.5	86 52	126.5	20 15.8	86 52	126.8	19 50.1	86 52	127.1	19 24.4	86 51	127.3	18 58.7	86 51	127.6	18 32.9	86 51	127.9	9
50	21 01.3	85 53	125.0	20 35.8	85 53	125.3	20 10.3	85 53	125.6	19 44.8	85 52	125.9	19 19.2	85 52	126.2	18 53.6	85 52	126.4	18 27.9	85 52	126.7	18 02.3	86 52	127.0	50
1	20 29.6	85 53	124.1	20 04.2	85 53	124.4	19 38.8	85 53	124.7	19 13.3	85 53	125.0	18 47.9	85 53	125.3	18 22.4	85 53	125.5	17 56.9	85 52	125.8	17 31.3	85 52	126.1	1
2	19 57.5	84 54	123.2	19 32.2	84 54	123.5	19 06.9	84 54	123.8	18 41.6	85 54	124.1	18 16.2	85 53	124.4	17 50.8	85 53	124.7	17 25.4	85 53	124.9	17 00.0	85 53	125.2	2
3	19 25.1	84 55	122.4	18 59.9	84 54	122.6	18 34.7	84 54	122.9	18 09.5	84 54	123.2	17 44.2	84 54	123.5	17 18.9	84 54	123.8	16 53.6	84 54	124.1	16 28.3	84 53	124.3	3
4	18 52.4	84 55	121.5	18 27.3	84 55	121.8	18 02.2	84 55	122.0	17 37.0	84 55	122.3	17 11.9	84 54	122.6	16 46.7	84 54	122.9	16 21.5	84 54	123.2	15 56.3	84 54	123.5	4
55	18 19.3	83 56	120.6	17 54.3	83 55	120.9	17 29.3	83 55	121.2	17 04.3	83 55	121.5	16 39.3	84 55	121.8	16 14.2	84 55	122.0	15 49.1	84 55	122.3	15 24.0	84 54	122.6	55
6	17 46.0	83 56	119.7	17 21.1	83 56	120.0	16 56.2	83 56	120.3	16 31.3	83 56	120.6	16 06.3	83 55	120.9	15 41.3	83 55	121.2	15 16.3	83 55	121.5	14 51.3	83 55	121.7	6
7	17 12.3	83 57	118.9	16 47.5	83 56	119.2	16 22.7	83 56	119.4	15 57.9	83 56	119.7	15 33.1	83 56	120.0	15 08.2	83 56	120.3	14 43.3	83 56	120.6	14 18.4	83 55	120.9	7
8	16 38.4	82 57	118.0	16 13.7	82 57	118.3	15 49.0	82 57	118.6	15 24.3	82 56	118.9	14 59.5	83 56	119.2	14 34.7	83 56	119.5	14 09.9	83 56	119.8	13 45.1	83 56	120.0	8
9	16 04.2	82 57	117.1	15 39.6	82 57	117.4	15 15.0	82 57	117.7	14 50.4	82 57	118.0	14 25.7	82 57	118.3	14 01.0	82 57	118.6	13 36.3	82 56	118.9	13 11.6	82 56	119.2	9
60	15 29.8	82 58	116.3	15 05.3	82 58	116.6	14 40.7	82 58	116.9	14 16.2	82 57	117.2	13 51.6	82 57	117.5	13 27.0	82 57	117.8	13 02.4	82 57	118.1	12 37.8	82 57	118.4	60
1	14 55.1	81 58	115.5	14 30.7	81 58	115.8	14 06.2	81 58	116.1	13 41.8	82 58	116.4	13 17.3	82 58	116.6	12 52.8	82 58	116.9	12 28.3	82 57	117.2	12 03.7	82 57	117.5	1
2	14 20.1	81 59	114.6	13 55.8	81 58	114.9	13 31.5	81 58	115.2	13 07.1	81 58	115.5	12 42.7	81 58	115.8	12 18.3	81 58	116.1	11 53.9	81 58	116.4	11 29.4	82 58	116.7	2
3	13 45.0	81 59	113.8	13 20.7	81 59	114.1	12 56.4	81 59	114.4	12 32.2	81 59	114.7	12 07.9	81 58	115.0	11 43.5	81 58	115.3	11 19.2	81 58	115.6	10 54.8	81 58	115.9	3
4	13 09.5	80 59	113.0	12 45.4	81 59	113.3	12 21.2	81 59	113.6	11 57.0	81 59	113.9	11 32.8	81 59	114.2	11 08.5	81 59	114.5	10 44.3	81 59	114.8	10 20.0	81 58	115.1	4
65	12 33.9	80 60	112.1	12 09.8	80 60	112.4	11 45.7	80 59	112.7	11 21.6	80 59	113.0	10 57.5	80 59	113.4	10 33.3	81 59	113.7	10 09.2	81 59	114.0	9 45.0	81 59	114.3	65
6	11 58.1	80 60	111.3	11 34.1	80 60	111.6	11 10.1	80 60	111.9	10 46.0	80 60	112.2	10 22.0	80 60	112.5	9 57.9	80 59	112.8	9 33.8	80 59	113.1	9 09.7	80 59	113.4	6
7	11 22.1	80 60	110.5	10 58.1	80 60	110.8	10 34.2	80 60	111.1	10 10.2	80 60	111.4	9 46.2	80 60	111.7	9 22.3	80 60	112.0	8 58.2	80 60	112.3	8 34.2	80 59	112.6	7
8	10 45.9	79 61	109.7	10 22.0	80 61	110.0	9 58.1	80 60	110.3	9 34.2	80 60	110.6	9 10.3	80 60	110.9	8 46.4	80 60	111.2	8 22.5	80 60	111.5	7 58.5	80 60	111.8	8
9	10 09.5	79 61	108.9	9 45.7	79 61	109.2	9 21.9	79 61	109.5	8 58.0	79 61	109.8	8 34.2	79 60	110.1	8 10.4	80 60	110.4	7 46.5	80 60	110.7	7 22.6	80 60	111.0	9
70	9 32.9	79 61	108.1	9 09.2	79 61	108.4	8 45.4	79 61	108.7	8 21.7	79 61	109.0	7 57.9	79 61	109.3	7 34.1	79 61	109.6	7 10.3	79 61	109.9	6 46.5	79 60	110.2	70
1	8 56.1	79 62	107.3	8 32.5	79 61	107.6	8 08.8	79 61	107.9	7 45.1	79 61	108.2	7 21.4	79 61	108.5	6 57.7	79 61	108.8	6 34.0	79 61	109.1	6 10.2	79 61	109.5	1
2	8 19.2	79 62	106.5	7 55.6	79 62	106.8	7 32.0	79 62	107.1	7 08.4	79 61	107.4	6 44.8	79 61	107.7	6 21.1	79 61	108.1	5 57.5	79 61	108.4	5 33.8	79 61	108.7	2
3	7 42.2	78 62	105.7	7 18.6	78 62	106.0	6 55.1	79 62	106.3	6 31.5	79 62	106.6	6 08.0	79 62	107.0	5 44.4	79 62	107.3	5 20.8	79 61	107.6				3
4	7 05.0	78 62	104.9	6 41.5	78 62	105.2	6 18.0	78 62	105.5	5 54.5	78 62	105.9	5 31.0	78 62	106.2	5 07.5	78 62	106.5							4
75	6 27.6	78 62	104.1	6 04.2	78 62	104.4	5 40.8	78 62	104.8	5 17.3	78 62	105.1													75
6	5 50.2	78 63	103.4	5 26.8	78 62	103.7	5 03.4	78 62	104.0																6
7	5 12.6	78 63	102.6																						7

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91																						5 05.9	76 64	84.4	91

Digitized by Google

Lat. 50°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	48 00.0	1.0	01	180.0	48 30.0	1.0	01	180.0	49 00.0	1.0	01	180.0	49 30.0	1.0	01	180.0	50 00.0	1.0	01	180.0	50 30.0	1.0	01	180.0	51 00.0	1.0	01	180.0	00
1	47 59.5	1.0	02	178.5	48 29.5	1.0	03	178.5	48 59.5	1.0	03	178.5	49 29.5	1.0	03	178.5	49 59.5	1.0	03	178.5	50 29.5	1.0	03	178.5	50 59.5	1.0	03	178.4	1
2	47 58.9	1.0	04	177.0	48 28.0	1.0	04	177.0	48 58.0	1.0	04	177.0	49 28.0	1.0	04	177.0	49 57.9	1.0	04	176.9	50 27.9	1.0	04	176.9	50 57.9	1.0	04	176.9	2
3	47 55.5	1.0	06	175.6	48 25.5	1.0	06	175.5	48 55.4	1.0	06	175.5	49 25.4	1.0	06	175.4	49 55.4	1.0	06	175.4	50 25.3	1.0	06	175.4	50 55.3	1.0	06	175.3	3
4	47 52.0	1.0	07	174.1	48 22.0	1.0	08	174.0	48 51.9	1.0	08	174.0	49 21.8	1.0	08	173.9	49 51.8	1.0	08	173.9	50 21.7	1.0	08	173.8	50 51.6	1.0	08	173.8	4
05	47 47.6	1.0	09	172.6	48 17.5	1.0	09	172.6	48 47.4	1.0	09	172.5	49 17.3	1.0	09	172.4	49 47.1	1.0	09	172.4	50 17.0	1.0	09	172.3	50 46.9	1.0	10	172.2	05
6	47 42.1	1.0	11	171.2	48 12.0	99	11	171.1	48 41.8	99	11	171.0	49 11.7	99	11	170.9	49 41.5	99	11	170.8	50 11.4	99	11	170.8	50 41.2	99	11	170.7	6
7	47 35.7	99	12	169.7	48 05.5	99	12	169.6	48 35.3	99	12	169.5	49 05.1	99	13	169.4	49 34.9	99	13	169.3	50 04.7	99	13	169.2	50 34.4	99	13	169.1	7
8	47 28.3	99	14	168.2	47 58.1	99	14	168.1	48 27.8	99	14	168.0	48 57.5	99	14	167.9	49 27.2	99	14	167.8	49 56.9	99	14	167.7	50 26.7	99	15	167.6	8
9	47 20.0	99	15	166.8	47 49.7	99	16	166.7	48 19.3	99	16	166.6	48 49.0	99	16	166.4	49 18.6	99	16	166.3	49 48.3	99	16	166.1	50 17.9	99	16	166.1	9
10	47 10.7	99	17	165.3	47 40.3	99	17	165.2	48 09.9	99	17	165.1	48 39.5	99	17	165.0	49 09.0	99	18	164.8	49 38.6	99	18	164.7	50 08.1	98	18	164.6	10
1	47 00.5	98	19	163.9	47 30.0	98	19	163.8	47 59.5	98	19	163.6	48 29.0	98	19	163.5	48 58.5	98	19	163.4	49 27.9	98	19	163.2	49 57.4	98	20	163.1	1
2	46 49.3	98	20	162.5	47 18.8	98	20	162.3	47 48.2	98	20	162.2	48 17.6	98	21	162.0	48 46.9	98	21	161.9	49 16.3	98	21	161.7	49 45.7	98	21	161.6	2
3	46 37.3	98	22	161.1	47 06.6	98	22	160.9	47 35.9	98	22	160.8	48 05.2	98	22	160.6	48 34.5	98	22	160.4	49 03.8	98	22	160.3	49 33.0	97	23	160.1	3
4	46 24.3	97	23	159.7	46 53.5	97	23	159.5	47 22.8	97	23	159.3	47 51.9	97	24	159.2	48 21.1	97	24	159.0	48 50.3	97	24	158.8	49 19.4	97	24	158.6	4
15	46 10.5	97	24	158.3	46 39.6	97	25	158.1	47 08.7	97	25	157.9	47 37.8	97	25	157.7	48 06.8	97	25	157.6	48 35.9	97	25	157.4	49 04.9	97	26	157.2	15
6	45 55.8	97	26	156.9	46 24.8	97	26	156.7	46 53.8	97	26	156.5	47 22.7	97	27	156.3	47 51.7	96	27	156.1	48 20.6	96	27	155.9	48 49.5	96	27	155.7	6
7	45 40.2	96	27	155.5	46 09.1	96	28	155.3	46 38.0	96	28	155.1	47 06.8	96	28	154.9	47 35.6	96	28	154.7	48 04.4	96	28	154.5	48 33.2	96	29	154.3	7
8	45 23.8	96	29	154.2	45 52.6	96	29	154.0	46 21.3	96	29	153.8	46 50.1	96	29	153.5	47 18.7	96	30	153.3	47 47.4	96	30	153.1	48 16.1	95	30	152.9	8
9	45 06.6	96	30	152.8	45 35.3	96	30	152.6	46 03.9	96	30	152.4	46 32.5	95	31	152.2	47 01.0	95	31	151.9	47 29.6	95	31	151.7	47 58.1	95	31	151.5	9
20	44 48.6	95	31	151.5	45 17.1	95	32	151.3	45 45.6	95	32	151.0	46 14.0	95	32	150.8	46 42.5	95	32	150.6	47 10.9	95	32	150.3	47 39.3	95	33	150.1	20
1	44 29.8	95	33	150.2	44 58.2	95	33	149.9	45 26.5	94	33	149.7	45 54.8	94	33	149.5	46 23.1	94	34	149.2	46 51.4	94	34	149.0	47 19.6	94	34	148.7	1
2	44 10.2	94	34	148.9	44 38.5	94	34	148.6	45 06.7	94	34	148.4	45 34.9	94	35	148.1	46 03.0	94	35	147.9	46 31.1	94	35	147.6	46 59.2	94	35	147.4	2
3	43 49.9	94	35	147.6	44 18.0	94	35	147.3	44 46.1	94	36	147.1	45 14.1	93	36	146.8	45 42.1	93	36	146.6	46 10.1	93	36	146.3	46 38.1	93	37	146.0	3
4	43 28.9	93	36	146.3	43 56.8	93	36	146.0	44 24.8	93	37	145.8	44 52.7	93	37	145.5	45 20.5	93	37	145.3	45 48.4	93	37	145.0	46 16.1	93	38	144.7	4
25	43 07.1	93	37	145.0	43 34.9	93	38	144.8	44 02.7	93	38	144.5	44 30.5	92	38	144.2	44 58.2	92	38	144.0	45 25.9	92	39	143.7	45 53.5	92	39	143.4	25
6	42 44.6	92	39	143.8	43 12.3	92	39	143.5	43 40.0	92	39	143.2	44 07.6	92	39	143.0	44 35.2	92	40	142.7	45 02.7	92	40	142.4	45 30.2	92	40	142.1	6
7	42 21.5	92	40	142.5	42 49.1	92	40	142.3	43 16.6	92	40	142.0	43 44.0	91	40	141.7	44 11.4	91	41	141.4	44 38.8	91	41	141.1	45 06.2	91	41	140.8	7
8	41 57.7	91	41	141.3	42 25.1	91	41	141.0	42 52.5	91	41	140.7	43 19.8	91	41	140.5	43 47.1	91	42	140.2	44 14.3	91	42	139.9	44 41.5	91	42	139.6	8
9	41 33.3	91	42	140.1	42 00.5	91	42	139.8	42 27.8	91	42	139.5	42 54.9	90	42	139.2	43 22.1	90	43	138.9	43 49.1	90	43	138.6	44 16.2	90	43	138.3	9
30	41 08.2	90	43	138.9	41 35.3	90	43	138.6	42 02.4	90	43	138.3	42 29.4	90	43	138.0	42 56.4	90	44	137.7	43 23.3	90	44	137.4	43 50.2	90	44	137.1	30
1	40 42.6	90	44	137.7	41 09.6	90	44	137.4	41 36.5	90	44	137.1	42 03.3	90	44	136.8	42 30.2	89	45	136.5	42 57.0	89	45	136.2	43 23.7	89	45	135.9	1
2	40 16.3	89	45	136.5	40 43.2	89	45	136.3	41 09.9	89	45	136.0	41 36.7	89	45	135.6	42 03.4	89	46	135.3	42 30.0	89	46	135.0	42 56.6	89	46	134.7	2
3	39 49.5	89	46	135.4	40 16.2	89	46	135.1	40 42.9	89	46	134.8	41 09.4	89	46	134.5	41 36.0	88	47	134.2	42 02.5	88	47	133.9	42 28.9	88	47	133.5	3
4	39 22.2	89	46	134.3	39 48.7	88	47	133.9	40 15.2	88	47	133.6	40 41.6	88	47	133.3	41 08.0	88	47	133.0	41 34.4	88	48	132.7	42 00.7	88	48	132.4	4
35	38 54.3	88	47	133.1	39 20.7	88	48	132.8	39 47.0	88	48	132.5	40 13.3	88	48	132.2	40 39.6	87	48	131.9	41 05.8	87	49	131.6	41 31.9	87	49	131.2	35
6	38 25.9	88	48	132.0	38 52.1	87	48	131.7	39 18.3	87	49	131.4	39 44.5	87	49	131.1	40 10.6	87	49	130.7	40 36.7	87	49	130.4	41 02.6	87	50	130.1	6
7	37 57.0	87	49	130.9	38 23.1	87	49	130.6	38 49.2	87	49	130.3	39 15.2	87	50	130.0	39 41.1	86	50	129.6	40 07.1	86	50	129.3	40 32.9	86	50	129.0	7
8	37 27.6	87	50	129.8	37 53.6	87	50	129.5	38 19.5	86	50	129.2	38 45.4	86	50	128.9	39 11.2	86	51	128.5	39 37.0	86	51	128.2	40 02.7	86	51	127.9	8
9	36 57.7	86	50	128.7	37 23.6	86	51	128.4	37 49.4	86	51	128.1	38 15.1	86	51	127.8	38 40.8	86	51	127.4	39 06.4	85	52	127.1	39 32.0	85	52	126.8	9
40	36 27.4	86	51	127.7	36 53.2	86	51	127.4	37 18.8	85	52	127.0	37 44.4	85	52	126.7	38 10.0	85	52	126.4	38 35.5	85	52	126.0	39 00.9	85	53	125.7	40
1	35 56.7	85	52	126.6	36 22.3	85	53	126.3	36 47.8	85	53	126.0	37 13.3	85	53	125.7	37 38.7	85	53	125.3	38 04.1	84	53	125.0	38 29.4	84	53	124.6	1
2	35 25.5	85	53	125.6	35 51.0	85	53	125.3	36 16.4	85	53	124.9	36 41.8	84	53	124.6	37 07.0	84	53	124.3	37 32.3	84	54	123.9	37 57.4	84	54	123.6	2
3	34 54.0	85	53	124.6	35 19.3	84	53	124.2	35 44.6	84	54	123.9	36 09.8	84	54	123.6	36 35.0	84	54	123.2	37 00.1	84	54	122.9	37 25.1	83	54	122.5	3
4	34 22.0	84	54	123.6	34 47.2	84	54	123.2	35 12.4	84	54	122.9	35 37.5	84	54	122.6	36 02.5	83	55	122.2	36 27.5	83	55	121.9	36 52.4	83	55	121.5	4
45	33 49.7	84	54	122.6	34 14.8	84	55	122.2	34 39.8	83	55	121.9	35 04.8	83	55	121.5	35 29.7	83	55	121.2	35 54.6	83	55	120.9	36 19.4	83	56	120.5	45
6	33 17.0	83	55	121.6	33 42.0	83	55	121.2	34 06.9	83	55	120.9	34 31.8	83	56	120.6	34 56.6	83	56	120.2	35 21.3	82	56	119.9	35 46.0	82	56	119.5	6
7	32 44.0	83	56	120.6	33 08.8	83	56	120.2	33 33.6	83	56	119.9	33 58.4	82	56	119.6	34 23.1	82	56	119.2	34 47.7	82	57	118.9	35 12.3	82	57	118.5	7
8	32 10.6	83	56	119.6	32 35.4	82	56	119.3	33 00.0	82	57	118.9	33 24.7	82	57	118.6	33 49.2	82	57	118.2	34 13.8	82	57	117.9	34 38.2	81	57	117.5	8
9	31 36.9	82	57	118.6	32 01.6	82	57	118.3	32 26.1	82	57	118.0	32 50.7	82	57	117.6	33 15.1	81	57	117.3	33 39.5	81	58	116.9	34 03.9	81	58	116.6	9
50	31 02.9	82	57	117.7	31 27.5	82	57	117.4	31 51.9	81	58	117.0	32 16.3	81	58	116.7	32 40.7	81	58	116.3	33 05.0	81	58	116.0	33 29.2	81	58	115.6	50
1	30 28.6	81	58	116.8	30 53.1	81	58	116.4	31 17.4	81	58	116.1	31 41.7	81	58	115.7	32 06.0	81	58	115.4	32 30.2	81	58	115.0	32 54.3	80	59	114.7	1
2	29 54.1	81	58	115.8	30 18.4	81	58	115.5	30 42.6	81	58	115.1	31 06.9	81	59	114.8	31 31.0	80	59	114.5	31 55.1	80	59	114.1	32 19.2	80	59	113.7	2
3	29 19.2	81	59	114.9	29 43.4	81	59	114.6	30 07.6	80	59	114.2	30 31.7	80	59	113.9	30 55.8	80	59	113.5	31 19.8	80	59	113.2	31 43.7	80	59	112.8	3
4	28 44.1	81	59	114.0	29 08.2	80	59	113.6	29 32.3	80	59	113.3	29 56.3	80	59	113.0	30 20.3	80	60	112.6	30 44.2	80	60	112.3	31 08.1	79	60	111.9	4
55	28 08.7	80	59	113.1	28 32.8	80	59	112.7	28 56.8	80	60	112.4	29 20.7	80	60	112.1	29 44.6	80	60	111.7	30 08.4	79	60	111.4	30 32.2	79	60	111.0	55
6	27 33.1	80	60	112.2	27 57.1	80	60	111.8	28 21.0	80	60	111.5	28 44.8	79	60	111.2	29 08.6	79	60	110.8	29 32.4	79	60	110.5	29 56.1	79	61	110.1	6
7	26 57.3	80	60	111.3	27 21.2	79	60	111.0	27 45.0	79	60	110.6	28 08.8	79	60	110.3	28 32.5	79	61	109.9	28 56.1	79	61	109.6	29 19.7	79	61	109.2	7
8	26 21.3	79	60	110.4	26 45.1	79	61	110.1	27 08.8	79	61	109.7	27 32.5	79	61	109.4	27 56.1	79	61	109.0	28 19.7	79	61	108.7	28 43.2	78	61	108.3	8
9	25 45.0	79	61	109.5	26 08.7	79	61	109.2	26 32.4	79	61	108.9	26 56.0	79	61	108.5	27 19.6	78	61	108.2	27 43.1	78	61	107.8	28 06.5	78	61	107.5	9
60	25 08.6	79	61	108.7	25 32.2	79	61	108.3	25 55.8	79	61	108.0	26 19.3	78	61	107.6	26 42.8	78	62	107.3	27 06.3	78	62	106.9	27 29.6	78	62	106.6	60
1	24 32.0	79	61	107.8	24 55.5	78	61	107.5	25 19.0	78	62	107.1	25 42.5	78	62	106.8	26 05.9	78	62	106.4	26 29.3	78	62	106.1	26 52.6	78	62	105.7	1
2	23 55.1	78	62	107.0	24 18.6	78	62	106.6	24 42.1	78	62	106.3	25 05.5	78	62	105.9	25 28.8	78	62	105.6	25 52.2	78	62	105.2	26 15.4	77	62	104.9	2
3	23 18.2	78	62	106.1	23 41.6	78	62	105.8	24 05.0	78	62	105.4	24 28.3	78	62	105.1	24 51.6	78	62	104.7	25 14.9	77	62	104.4	25 38.1	77	62	104.0	3
4	22 41.0	78	62	105.3	23 04.4	78	62	104.9	23 27.7	78	62	104.6	23 51.0	78	62	104.2	24 14.3	77	62	103.9	24 37.4	77	63	103.6	25 00.6	77	63	103.2	4
65	22 03.8	78	62	104.4	22 27.1	78	62	104.1	22 50.3	77	63	103.8	23 13.6	77	63	103.4	23 36.8	77	63	103.1	23 59.9	77	63	102.7	24 23.0	77	63	102.4	65
6	21 26.4	78	63	103.6	21 49.6	77	63	103.3	22 12.8	77	63	102.9	22 36.0	77	63	102.6	22 59.1	77	63	102.2	23 22.2	77	63	101.9	23 45.2	77	63	101.5	6
7	20 48.8	77	63	102.8	21 12.0	77	63	102.5	21 35.2	77	63	102.1	21 58.3	77	63	101.8	22 21.4	77	63	101.4	22 44.4	77	63	101.1	23 07.4	77	63	100.7	7
8	20 11.1	77	63	102.0	20 34.3	77	63	101.6	20 57.4	77	63	101.3	21 20.5	77	63	101.0	21 43.5	77	63	100.6	22 06.5	77	63	100.3	22 29.5	76	63	99.9	8
9	19 33.4	77	63	101.2	19 56.5	77	63	100.8	20 19.5	77	63	100.5	20 42.6	77	63	100.1	21 05.6	77	63	99.8	21 28.5	76	64	99.5	21 51.4	76	64	99.1	9
70	18 55.5	77	63	100.4	19 18.5	77	63	100.0	19 41.6	77	63	99.7	20 04.6	77	64	99.3	20 27.5	76	64	99.0	20 50.4	76	64	98.6	21 13.3	76	64	98.3	70
1	18 17.5	77	63	99.5	18 40.5	77	64	99.2	19 03.5	77	64	98.9	19 26.5	76	64	98.5	19 49.4	76	64	98.2	20 12.3	76	64	97.8	20 35.1	76	64	97.5	1
2	17 39.4	77	64	98.8	18 02.4	77	64	98.4	18 25.4	76	64	98.1	18 48.3	76	64	97.7	19 11.2	76	64	97.4	19 34.0	76	64	97.0	19 56.8	76	64	96.7	2
3	17 01.2	77	64	98.0	17 24.2	76	64	97.6	17 47.1	76	64	97.3	18 10.0	76	64	96.9	18 32.9	76	64	96.6	18 55.7	76	64	96.3	19 18.5	76	64	95.9	3
4	16 23.0	76	64	97.2	16 45.9	76	64	96.8	17 08.8	76	64	96.5	17 31.7	76	64	96.2	17 54.5	76	64	95.8	18 17.3	76	64	95.5	18 40.1	76	64	95.1	4
75	15 44.7	76	64	96.4	16 07.6	76	64	96.0	16 30.5	76	64	95.7	16 53.3	76	64	95.4	17 16.1	76	64	95.0	17 38.9	76	64	94.7	18 01.7	76	64	94.3	75
6	15 06.4	76	64	95.6	15 29.2	76	64	95.3	15 52.1	76	64	94.9	16 14.9	76	64	94.6	16 37.7	76	64	94.2	17 00.5	76	64	93.9	17 23.2	76	64	93.6	6
7	14 27.9	76	64	94.8	14 50.8	76	64	94.5	15 13.6	76	64	94.1	15 36.5	76	64	93.8	15 59.2	76	64	93.5	16 22.0	76	64	93.1	16 44.7	76	64	92.8	7
8	13 49.5	76	64	94.0	14 12.3	76	64	93.7	14 35.2	76	64	93.4	14 58.0	76	64	93.0	15 20.7	76	64	92.7	15 43.4	76	64	92.3	16 06.1	76	64	92.0	8
9	13 11.0	76	64	93.3	13 33.8	76	64	92.9	13 56.6	76	64	92.6	14 19.4	76	64	92.3	14 42.2	76	64	91.9	15 04.9	76	64	91.6	15 27.6	76	64	91.2	9
80	12 32.5	76	64	92.5	12 55.3	76	64	92.1	13 18.1	76	64	91.8	13 40.9	76	64	91.5	14 03.6	76	64	91.1	14 26.3	76	64	90.8	14 49.0	76	64	90.5	80
1	11 53.9	76	64	91.7	12 16.8	76	64	91.4	12 39.6	76	64	91.0	13 02.3	76	64	90.7	13 25.1	76	64	90.4	13 47.8	76	64	90.0	14 10.5	76	64	89.7	1
2	11 15.4	76	64	90.9	11 38.2	76	64	90.6	12 01.0	76	64	90.3	12 23.8	76	64	89.9	12 46.5	76	64	89.6	13 09.2	76	64	89.3	13 31.9	76	64	88.9	2
3	10 36.8	76	64	90.2	10 59.6	76	64	89.8	11 22.4	76	64	89.5	11 45.2	76	64	89.2	12 07.9	76	64	88.8	12 30.7	76	64	88.5	12 53.3	76	64	88.2	3
4	9 58.3	76	64	89.4	10 21.1	76	64	89.1	10 43.9	76	64	88.7	11 06.6	76	64	88.4	11 29.4	76	64	88.1	11 52.1	76	64	87.8	12 14.8	76	64	87.4	4
85	9 19.7	76	64	88.6	9 42.5	76	64	88.3	10 05.3	76	64	88.0	10 28.1	76	64	87.7	10 50.8	76	64	87.3	11 13.6	76	64	87.0	11 36.3	76	64	86.7	85
6	8 41.1	76	64	87.9	9 04.0	76	64	87.6	9 26.8	76	64	87.2	9 49.6	76	64	86.9	10 12.3	76	64	86.6	10 35.1	76	64	86.2	10 57.8	76	64	85.9	6
7	8 02.6	76	64	87.1	8 25.4	76	64	86.8	8 48.3	76	64	86.5	9 11.1	76	64	86.1	9 33.8	76	64	85.8	9 56.6	76	64	85.5	10 19.4	76	64	85.1	7
8	7 24.1	76	64	86.4	7 47.0	76	64	86.0	8 09.8	76	64	85.7	8 32.6	76	64	85.4	8 55.4	76	64	85.0	9 18.2	76	64	84.7	9 41.0	76	64	84.4	8
9	6 45.6	76	64	85.6	7 08.5	76	64	85.3	7 31.4	76	64	84.9	7 54.2	76	64	84.6	8 17.0	76	64	84.3	8 39.8	76	64	84.0	9 02.6	76	64	83.6	9
90	6 07.2	76	64	84.8	6 30.1	76	64	84.5	6 53.0	76	64	84.2	7 15.8	76	64	83.9	7 38.7	76	64	83.5	8 01.5	76	64	83.2	8 24.3	76	64	82.9	90

Digitized by Google

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	32 00.0	1.0 01	180.0	31 30.0	1.0 01	180.0	31 00.0	1.0 01	180.0	30 30.0	1.0 01	180.0	30 00.0	1.0 01	180.0	29 30.0	1.0 01	180.0	29 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	00
1	31 59.6	1.0 02	178.8	31 29.6	1.0 02	178.8	30 59.6	1.0 02	178.8	30 29.6	1.0 02	178.9	29 59.6	1.0 02	178.9	29 29.6	1.0 02	178.9	28 59.6	1.0 02	178.9	28 29.6	1.0 02	178.9	1
2	31 58.4	1.0 03	177.7	31 28.4	1.0 03	177.7	30 58.4	1.0 03	177.7	30 28.5	1.0 03	177.7	29 58.5	1.0 03	177.7	29 28.5	1.0 03	177.7	28 58.5	1.0 03	177.8	28 28.5	1.0 03	177.8	2
3	31 56.5	1.0 05	176.5	31 26.5	1.0 05	176.5	30 56.5	1.0 04	176.6	30 26.5	1.0 04	176.6	29 56.6	1.0 04	176.6	29 26.6	1.0 04	176.6	28 56.6	1.0 04	176.6	28 26.6	1.0 04	176.7	3
4	31 53.7	1.0 06	175.3	31 23.8	1.0 06	175.4	30 53.8	1.0 06	175.4	30 23.8	1.0 06	175.4	29 53.9	1.0 06	175.5	29 23.9	1.0 06	175.5	28 54.0	1.0 06	175.5	28 24.0	1.0 06	175.5	4
05	31 50.2	1.0 07	174.2	31 20.3	1.0 07	174.2	30 50.3	1.0 07	174.2	30 20.4	1.0 07	174.3	29 50.4	1.0 07	174.3	29 20.5	1.0 07	174.4	28 50.6	1.0 07	174.4	28 20.6	1.0 07	174.4	05
6	31 45.9	1.0 08	173.0	31 16.0	1.0 08	173.1	30 46.1	1.0 08	173.1	30 16.2	1.0 08	173.1	29 46.3	1.0 08	173.2	29 16.3	1.0 08	173.2	28 46.4	1.0 08	173.3	28 16.5	1.0 08	173.3	6
7	31 40.8	1.0 10	171.8	31 10.9	1.0 10	171.9	30 41.1	1.0 10	172.0	30 11.2	1.0 10	172.0	29 41.3	1.0 10	172.1	29 11.4	1.0 09	172.1	28 41.5	1.0 09	172.2	28 11.7	1.0 09	172.2	7
8	31 34.9	99 11	170.7	31 05.1	99 11	170.8	30 35.3	99 11	170.8	30 05.4	99 11	170.9	29 35.6	99 11	170.9	29 05.8	99 11	171.0	28 35.9	99 11	171.0	28 06.1	99 11	171.1	8
9	31 28.3	99 12	169.5	30 58.5	99 12	169.6	30 28.7	99 12	169.7	29 58.9	99 12	169.7	29 29.1	99 12	169.8	28 59.3	99 12	169.9	28 29.5	99 12	169.9	27 59.7	99 12	170.0	9
10	31 28.9	99 14	168.4	30 51.2	99 14	168.5	30 21.4	99 13	168.5	29 51.7	99 13	168.6	29 21.9	99 13	168.7	28 52.2	99 13	168.8	28 22.4	99 13	168.8	27 52.7	99 13	168.9	10
1	31 12.8	99 15	167.2	30 43.1	99 15	167.3	30 13.4	99 15	167.4	29 43.7	99 15	167.5	29 14.0	99 14	167.6	28 44.3	99 14	167.6	28 14.6	99 14	167.7	27 44.9	99 14	167.8	1
2	31 03.9	99 16	166.1	30 34.3	99 16	166.2	30 04.6	99 16	166.3	29 35.0	99 16	166.4	29 05.3	99 16	166.4	28 35.7	99 16	166.5	28 06.0	99 15	166.6	27 36.4	99 15	166.7	2
3	30 54.3	99 17	165.0	30 24.7	99 17	165.1	29 55.1	99 17	165.1	29 25.5	99 17	165.2	28 55.9	99 17	165.3	28 26.3	99 17	165.4	27 56.8	99 17	165.5	27 27.2	99 17	165.6	3
4	30 43.9	98 18	163.8	30 14.4	98 18	163.9	29 44.9	98 18	164.0	29 15.3	98 18	164.1	28 45.8	98 18	164.2	28 16.3	98 18	164.3	27 46.8	98 18	164.4	27 17.2	98 18	164.5	4
15	30 32.8	98 20	162.7	30 03.3	98 20	162.8	29 33.9	98 20	162.9	29 04.4	98 19	163.0	28 35.0	98 19	163.1	28 05.5	98 19	163.2	27 36.1	98 19	163.3	27 06.6	98 19	163.4	15
6	30 20.9	98 21	161.6	29 51.6	98 21	161.7	29 22.2	98 21	161.8	28 52.8	98 21	161.9	28 23.4	98 20	162.0	27 54.0	98 20	162.1	27 24.6	98 20	162.3	26 55.2	98 20	162.4	6
7	30 08.4	98 22	160.4	29 39.1	98 22	160.6	29 09.8	98 22	160.7	28 40.5	98 22	160.8	28 11.2	98 22	160.9	27 41.9	98 21	161.1	27 12.5	98 21	161.2	26 43.2	98 21	161.3	7
8	29 55.1	97 23	159.3	29 25.9	97 23	159.5	28 56.7	97 23	159.6	28 27.5	97 23	159.7	27 58.2	97 23	159.8	27 29.0	97 23	160.0	26 59.8	97 22	160.1	26 30.5	98 22	160.2	8
9	29 41.1	97 24	158.2	29 12.0	97 24	158.4	28 42.9	97 24	158.5	28 13.7	97 24	158.6	27 44.6	97 24	158.8	27 15.4	97 24	158.9	26 46.3	97 24	159.0	26 17.1	97 23	159.2	9
20	29 26.5	97 26	157.1	28 57.4	97 25	157.3	28 28.4	97 25	157.4	27 59.4	97 25	157.5	27 30.3	97 25	157.7	27 01.2	97 25	157.8	26 32.1	97 25	158.0	26 03.1	97 25	158.1	20
1	29 11.1	96 27	156.0	28 42.2	96 27	156.2	28 13.2	97 26	156.3	27 44.3	97 26	156.5	27 15.3	97 26	156.6	26 46.3	97 26	156.8	26 17.3	97 26	156.9	25 48.3	97 26	157.0	1
2	28 55.1	96 28	154.9	28 26.3	96 28	155.1	27 57.4	96 27	155.2	27 28.6	96 27	155.4	26 59.7	96 27	155.5	26 30.8	96 27	155.7	26 01.9	96 27	155.8	25 33.0	96 27	156.0	2
3	28 38.5	96 29	153.8	28 09.7	96 29	154.0	27 40.9	96 29	154.2	27 12.2	96 28	154.3	26 43.4	96 28	154.5	26 14.6	96 28	154.6	25 45.8	96 28	154.8	25 17.0	96 28	154.9	3
4	28 21.1	95 30	152.8	27 52.5	96 30	152.9	27 23.8	96 30	153.1	26 55.1	96 29	153.3	26 26.4	96 29	153.4	25 57.7	96 29	153.6	25 29.0	96 29	153.7	25 00.3	96 29	153.9	4
25	28 03.2	95 31	151.7	27 34.6	95 31	151.9	27 06.0	95 31	152.0	26 37.5	95 30	152.2	26 08.9	95 30	152.4	25 40.3	95 30	152.5	25 11.7	95 30	152.7	24 43.0	95 30	152.9	25
6	27 44.5	95 32	150.6	27 16.1	95 32	150.8	26 47.6	95 32	151.0	26 19.2	95 32	151.2	25 50.7	95 31	151.3	25 22.2	95 31	151.5	24 53.7	95 31	151.7	24 25.2	95 31	151.9	6
7	27 25.3	94 33	149.6	26 57.0	94 33	149.8	26 28.6	95 33	149.9	26 00.3	95 33	150.1	25 31.9	95 32	150.3	25 03.5	95 32	150.5	24 35.1	95 32	150.7	24 06.7	95 32	150.8	7
8	27 05.5	94 34	148.5	26 37.3	94 34	148.7	26 09.0	94 34	148.9	25 40.7	94 34	149.1	25 12.5	94 33	149.3	24 44.2	94 33	149.5	24 15.9	94 33	149.6	23 47.6	94 33	149.8	8
9	26 45.0	94 35	147.5	26 16.9	94 35	147.7	25 48.8	94 35	147.9	25 20.6	94 34	148.1	24 52.5	94 34	148.2	24 24.3	94 34	148.4	23 56.1	94 34	148.6	23 27.9	94 34	148.8	9
30	26 24.0	93 36	146.4	25 56.0	93 36	146.6	25 28.0	93 36	146.8	24 59.9	94 35	147.0	24 31.9	94 35	147.2	24 03.8	94 35	147.4	23 35.7	94 35	147.6	23 07.6	94 35	147.8	30
1	26 02.4	93 37	145.4	25 34.5	93 37	145.6	25 06.6	93 37	145.8	24 38.7	93 36	146.0	24 10.7	93 36	146.2	23 42.8	93 36	146.4	23 14.8	93 36	146.6	22 46.8	93 36	146.8	1
2	25 40.2	93 38	144.4	25 12.5	93 38	144.6	24 44.7	93 38	144.8	24 16.8	93 37	145.0	23 49.0	93 37	145.2	23 21.1	93 37	145.4	22 53.3	93 37	145.6	22 25.4	93 37	145.8	2
3	25 17.5	92 39	143.4	24 49.8	92 39	143.6	24 22.2	92 38	143.8	23 54.4	92 38	144.0	23 26.7	92 38	144.2	22 59.0	92 38	144.4	22 31.2	93 38	144.6	22 03.5	93 37	144.8	3
4	24 54.2	92 40	142.4	24 26.7	92 40	142.6	23 59.1	92 39	142.8	23 31.5	92 39	143.0	23 03.9	92 39	143.2	22 36.3	92 39	143.4	22 08.6	92 39	143.7	21 41.0	92 38	143.9	4
35	24 30.4	91 41	141.4	24 03.0	91 40	141.6	23 35.5	92 40	141.8	23 08.1	92 40	142.0	22 40.6	92 40	142.3	22 13.0	92 40	142.5	21 45.5	92 39	142.7	21 18.0	92 39	142.9	35
6	24 06.1	91 41	140.4	23 38.8	91 41	140.6	23 11.4	91 41	140.8	22 44.1	91 41	141.1	22 16.7	91 41	141.3	21 49.3	91 40	141.5	21 21.9	91 40	141.7	20 54.5	91 40	141.9	6
7	23 41.2	91 42	139.4	23 14.0	91 42	139.6	22 46.8	91 42	139.9	22 19.6	91 42	140.1	21 52.3	91 41	140.3	21 25.0	91 41	140.5	20 57.7	91 41	140.8	20 30.4	91 41	141.0	7
8	23 15.9	90 43	138.4	22 48.8	90 43	138.7	22 21.7	90 43	138.9	21 54.6	90 42	139.1	21 27.4	91 42	139.3	21 00.3	91 42	139.6	20 33.1	91 42	139.8	20 05.9	91 42	140.0	8
9	22 50.1	90 44	137.5	22 23.1	90 44	137.7	21 56.1	90 43	137.9	21 29.1	90 43	138.2	21 02.1	90 43	138.4	20 35.0	90 43	138.6	20 08.0	90 43	138.9	19 40.9	90 42	139.1	9
40	22 23.7	89 45	136.5	21 56.9	90 44	136.7	21 30.0	90 44	137.0	21 03.1	90 44	137.2	20 36.2	90 44	137.4	20 09.3	90 44	137.7	19 42.3	90 43	137.9	19 15.4	90 43	138.1	40
1	21 57.0	89 45	135.5	21 30.2	89 45	135.8	21 03.5	89 45	136.0	20 36.7	89 45	136.3	20 09.9	89 45	136.5	19 43.1	89 44	136.7	19 16.3	89 44	137.0	18 49.4	90 44	137.2	1
2	21 29.7	89 46	134.6	21 03.1	89 46	134.8	20 36.5	89 46	135.1	20 09.8	89 46	135.3	19 43.1	89 45	135.6	19 16.4	89 45	135.8	18 49.7	89 45	136.1	18 23.0	89 45	136.3	2
3	21 02.0	88 47	133.6	20 35.5	88 47	133.9	20 09.0	88 46	134.1	19 42.5	88 46	134.4	19 15.9	89 46	134.6	18 49.3	89 46	134.9	18 22.7	89 46	135.1	17 56.1	89 46	135.4	3
4	20 33.9	88 48	132.7	20 07.5	88 47	133.0	19 41.1	88 47	133.2	19 14.7	88 47	133.5	18 48.3	88 47	133.7	18 21.8	88 47	134.0	17 55.3	88 46	134.2	17 28.8	88 46	134.5	4
45	20 05.4	88 48	131.8	19 39.1	88 48	132.0	19 12.8	88 48	132.3	18 46.5	88 48	132.6	18 20.2	88 48	132.8	17 53.8	88 47	133.1	17 27.5	88 47	133.3	17 01.1	88 47	133.6	45
6	19 36.4	87 49	130.9	19 10.2	87 49	131.1	18 44.1	87 49	131.4	18 17.9	87 48	131.6	17 51.7	87 48	131.9	17 25.4	87 48	132.2	16 59.2	88 48	132.4	16 32.9	88 48	132.7	6
7	19 07.0	87 50	130.0	18 41.0	87 49	130.2	18 14.9	87 49	130.5	17 48.9	87 49	130.7	17 22.8	87 49	131.0	16 56.6	87 49	131.3	16 30.5	87 48	131.5	16 04.4	87 48	131.8	7
8	18 37.3	86 50	129.1	18 11.4	86 50	129.3	17 45.4	87 50	129.6	17 19.4	87 50	129.8	16 53.5	87 50	130.1	16 27.5	87 49	130.4	16 01.4	87 49	130.6	15 35.4	87 49	130.9	8
9	18 07.1	86 51	128.2	17 41.3	86 51	128.4	17 15.5	86 50	128.7	16 49.6	86 50	129.0	16 23.8	86 50	129.2	15 57.9	86 50	129.5	15 32.0	86 50	129.7	15 06.0	86 50	130.0	9
50	17 36.6	86 51	127.3	17 10.9	86 51	127.5	16 45.2	86 51	127.8	16 19.5	86 51	128.1	15 53.7	86 51	128.3	15 27.9	86 51	128.6	15 02.1	86 50	128.9	14 36.3	86 50	129.1	50
1	17 05.7	85 52	126.4	16 40.2	85 52	126.6	16 14.7	85 52	126.9	15 48.9	85 52	127.2	15 23.3	86 51	127.5	14 57.6	86 51	127.7	14 31.9	86 51	128.0	14 06.2	86 51	128.3	1
2	16 34.5	85 53	125.5	16 09.0	85 52	125.8	15 43.5	85 52	126.0	15 18.0	85 52	126.3	14 52.5	85 52	126.6	14 26.9	85 52	126.9	14 01.3	85 52	127.1	13 35.7	85 51	127.4	2
3	16 02.9	85 53	124.6	15 37.6	85 53	124.9	15 12.2	85 53	125.2	14 46.8	85 53	125.4	14 21.3	85 52	125.7	13 55.9	85 52	126.0	13 30.4	85 52	126.3	13 04.9	85 52	126.5	3
4	15 31.0	84 54	123.8	15 05.8	84 54	124.0	14 40.5	84 53	124.3	14 15.2	84 53	124.6	13 49.9	84 53	124.9	13 24.5	85 53	125.1	12 59.2	85 53	125.4	12 33.8	85 52	125.7	4
55	14 58.8	84 54	122.9	14 33.7	84 54	123.2	14 08.5	84 54	123.5	13 43.3	84 54	123.7	13 18.1	84 54	124.0	12 52.8	84 53	124.3	12 27.6	84 53	124.6	12 02.3	84 53	124.8	55
6	14 26.3	83 55	122.0	14 01.2	84 55	122.3	13 36.1	84 54	122.6	13 11.0	84 54	122.9	12 45.9	84 54	123.2	12 20.8	84 54	123.4	11 55.6	84 54	123.7	11 30.5	84 54	124.0	6
7	13 53.4	83 55	121.2	13 28.5	83 55	121.5	13 03.5	83 55	121.8	12 38.5	83 55	122.0	12 13.5	83 55	122.3	11 48.5	83 54	122.6	11 23.4	84 54	122.9	10 58.3	84 54	123.2	7
8	13 20.3	83 56	120.3	12 55.4	83 56	120.6	12 30.6	83 55	120.9	12 05.7	83 55	121.2	11 40.7	83 55	121.5	11 15.8	83 55	121.8	10 50.9	83 55	122.0	10 25.9	83 55	122.3	8
9	12 46.9	83 56	119.5	12 22.1	83 56	119.8	11 57.3	83 56	120.1	11 32.5	83 56	120.4	11 07.7	83 56	120.6	10 42.9	83 55	120.9	10 18.0	83 55	121.2	9 53.2	83 55	121.5	9
60	12 13.2	82 57	118.7	11 48.5	82 56	119.0	11 23.8	82 56	119.2	10 59.1	82 56	119.5	10 34.4	82 56	119.8	10 09.6	82 56	120.1	9 44.9	83 56	120.4	9 20.1	83 56	120.7	60
1	11 39.2	82 57	117.8	11 14.6	82 57	118.1	10 50.0	82 57	118.4	10 25.4	82 57	118.7	10 00.8	82 56	119.0	9 36.1	82 56	119.3	9 11.5	82 56	119.6	8 46.8	82 56	119.9	1
2	11 04.9	82 57	117.0	10 40.5	82 57	117.3	10 16.0	82 57	117.6	9 51.4	82 57	117.9	9 26.9	82 57	118.2	9 02.4	82 57	118.5	8 37.8	82 57	118.8	8 13.2	82 56	119.0	2
3	10 30.5	81 58	116.2	10 06.1	81 58	116.5	9 41.7	81 58	116.8	9 17.2	81 57	117.1	8 52.8	81 57	117.4	8 28.3	82 57	117.7	8 03.9	82 57	117.9	7 39.4	82 57	118.2	3
4	9 55.7	81 58	115.4	9 31.4	81 58	115.7	9 07.1	81 58	116.0	8 42.8	81 58	116.3	8 18.4	81 58	116.6	7 54.1	81 58	116.8	7 29.7	81 57	117.1	7 05.3	81 57	117.4	4
65	9 20.8	81 59	114.6	8 56.5	81 59	114.9	8 32.3	81 58	115.2	8 08.1	81 58	115.4	7 43.8	81 58	115.7	7 19.5	81 58	116.0	6 55.2	81 58	116.3	6 30.9	81 58	116.6	65
6	8 45.6	80 59	113.7	8 21.4	80 59	114.0	7 57.3	81 59	114.3	7 33.1	81 59	114.6	7 08.9	81 58	114.9	6 44.8	81 58	115.2	6 20.6	81 58	115.5	5 56.3	81 58	115.8	6
7	8 10.2	80 59	112.9	7 46.1	80 59	113.2	7 22.0	80 59	113.5	6 58.0	80 59	113.8	6 33.9	80 59	114.1	6 09.8	80 59	114.4	5 45.6	80 59	114.7	5 21.5	80 58	115.0	7
8	7 34.5	80 60	112.1	7 10.6	80 60	112.4	6 46.6	80 59	112.7	6 22.6	80 59	113.1	5 58.6	80 59	113.4	5 34.5	80 59	113.7	5 10.5	80 59	114.0				8
9	6 58.7	80 60	111.3	6 34.8	80 60	111.7	6 10.9	80 60	112.0	5 47.0	80 60	112.3	5 23.0	80 60	112.6										9
70	6 22.7	79 60	110.6	5 58.9	79 60	110.9	5 35.0	79 60	111.2	5 11.2	80 60	111.5													70
1	5 46.5	79 61	109.8	5 22.7	79 60	110.1																			1
2	5 10.1	79 61	109.0																						2

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	5 28.8	76 64	84.1				6 14.6	76 64	83.4	6 37.5	76 64	83.1	7 00.4	76 64	82.8	7 23.2	76 64	82.5	7 46.1	76 64	82.1	8 08.9	76 64	81.8	91
2				5 51.7	76 64	83.8	5 36.3	76 64	82.7	5 59.2	76 64	82.3	6 22.1	76 64	82.0	6 45.0	76 64	81.7	7 07.9	76 63	81.4	7 30.7	76 63	81.0	2
3				5 13.4	76 64	83.0				5 21.1	76 64	81.6	5 44.0	76 63	81.3	6 06.9	76 63	80.9	6 29.8	76 63	80.6	6 52.7	76 63	80.3	3
4													5 05.9	77 63	80.5	5 28.8	76 63	80.2	5 51.8	76 63	79.9	6 14.7	76 63	79.5	4
95																			5 13.9	77 63	79.1	5 36.8	77 63	78.8	95

Lat. 50°

H.A.	12° 00′ Alt.	Δd Δt	Az.	12° 30′ Alt.	Δd Δt	Az.	13° 00′ Alt.	Δd Δt	Az.	13° 30′ Alt.	Δd Δt	Az.	14° 00′ Alt.	Δd Δt	Az.	14° 30′ Alt.	Δd Δt	Az.	15° 00′ Alt.	Δd Δt	Az.	15° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	52 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	54 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	00
1	51 59.5	1.0 03	178.4	52 29.5	1.0 03	178.4	52 59.5	1.0 03	178.4	53 29.4	1.0 03	178.4	53 59.4	1.0 03	178.3	54 29.4	1.0 03	178.3	54 59.4	1.0 03	178.3	55 29.4	1.0 03	178.3	1
2	51 57.9	1.0 04	176.8	52 27.8	1.0 04	176.8	52 57.8	1.0 05	176.8	53 27.8	1.0 05	176.7	53 57.8	1.0 05	176.7	54 27.8	1.0 05	176.7	54 57.7	1.0 05	176.6	55 27.7	1.0 05	176.6	2
3	51 55.2	1.0 06	175.2	52 25.1	1.0 06	175.2	52 55.1	1.0 06	175.1	53 25.1	1.0 06	175.1	53 55.0	1.0 06	175.1	54 25.0	1.0 07	175.0	54 54.9	1.0 07	175.0	55 24.9	1.0 07	174.9	3
4	51 51.5	1.0 08	173.7	52 21.4	1.0 08	173.6	52 51.3	1.0 08	173.5	53 21.2	1.0 08	173.5	53 51.1	1.0 08	173.4	54 21.0	1.0 08	173.3	54 51.0	1.0 08	173.3	55 20.9	1.0 09	173.2	4
05	51 46.7	1.0 10	172.1	52 16.5	1.0 10	172.0	52 46.4	1.0 10	171.9	53 16.3	1.0 10	171.9	53 46.2	1.0 10	171.8	54 16.0	1.0 10	171.7	54 45.9	1.0 10	171.6	55 15.7	1.0 10	171.5	05
6	51 40.8	99 11	170.5	52 10.7	99 12	170.4	52 40.5	99 12	170.3	53 10.3	99 12	170.2	53 40.1	99 12	170.1	54 09.9	99 12	170.0	54 39.7	99 12	169.9	55 09.5	99 12	169.8	6
7	51 34.0	99 13	168.9	52 03.7	99 13	168.8	52 33.5	99 13	168.7	53 03.2	99 14	168.6	53 33.0	99 14	168.5	54 02.7	99 14	168.4	54 32.4	99 14	168.3	55 02.1	99 14	168.2	7
8	51 26.0	99 15	167.4	51 55.7	99 15	167.3	52 25.4	99 15	167.2	52 55.1	99 15	167.0	53 24.7	99 15	166.9	53 54.4	99 16	166.8	54 24.1	99 16	166.6	54 53.7	99 16	166.5	8
9	51 17.1	99 17	165.8	51 46.7	99 17	165.7	52 16.3	99 17	165.6	52 45.9	99 17	165.4	53 15.5	99 17	165.3	53 45.1	99 17	165.2	54 14.6	99 18	165.0	54 44.2	98 18	164.0	9
10	51 07.2	98 18	164.3	51 36.7	98 18	164.2	52 06.2	98 19	164.0	52 35.7	98 19	163.9	53 05.2	98 19	163.7	53 34.7	98 19	163.6	54 04.1	98 19	163.4	54 33.6	98 19	163.2	10
1	50 56.2	98 20	162.8	51 25.7	98 20	162.6	51 55.1	98 20	162.5	52 24.5	98 20	162.3	52 53.9	98 21	162.1	53 23.2	98 21	162.0	53 52.6	98 21	161.8	54 21.9	98 21	161.6	1
2	50 44.3	98 21	161.3	51 13.7	98 22	161.1	51 43.0	98 22	160.9	52 12.2	98 22	160.7	52 41.5	98 22	160.6	53 10.8	97 22	160.4	53 40.0	97 23	160.2	54 09.2	97 23	160.0	2
3	50 31.5	97 23	159.8	51 00.7	97 23	159.6	51 29.9	97 23	159.4	51 59.0	97 24	159.2	52 28.2	97 24	159.0	52 57.3	97 24	158.8	53 26.4	97 24	158.6	53 55.5	97 24	158.4	3
4	50 17.6	97 25	158.3	50 46.7	97 25	158.1	51 15.8	97 25	157.9	51 44.9	97 25	157.7	52 13.9	97 25	157.5	52 42.9	97 26	157.3	53 11.9	97 26	157.0	53 40.8	96 26	156.8	4
15	50 02.9	97 26	156.8	50 31.9	97 26	156.6	51 00.8	96 27	156.4	51 29.7	96 27	156.2	51 58.6	96 27	155.9	52 27.5	96 27	155.7	52 56.3	96 27	155.5	53 25.2	96 28	155.3	15
6	49 47.2	96 28	155.3	50 16.1	96 28	155.1	50 44.9	96 28	154.9	51 13.7	96 28	154.7	51 42.4	96 28	154.4	52 11.2	96 29	154.2	52 39.9	96 29	154.0	53 08.6	96 29	153.7	6
7	49 30.7	96 29	153.9	49 59.4	96 29	153.6	50 28.1	96 30	153.4	50 56.7	95 30	153.2	51 25.3	95 30	152.9	51 53.9	95 30	152.7	52 22.5	95 30	152.4	52 51.0	95 31	152.2	7
8	49 13.3	95 30	152.4	49 41.8	95 31	152.2	50 10.4	95 31	152.0	50 38.9	95 31	151.7	51 07.4	95 31	151.5	51 35.8	95 32	151.2	52 04.2	95 32	150.9	52 32.6	95 32	150.7	8
9	48 55.0	95 32	151.0	49 23.4	95 32	150.8	49 51.8	95 32	150.5	50 20.2	94 33	150.3	50 48.5	94 33	150.0	51 16.8	94 33	149.7	51 45.0	94 33	149.5	52 13.3	94 34	149.2	9
20	48 35.9	94 33	149.6	49 04.2	94 33	149.4	49 32.4	94 34	149.1	50 00.6	94 34	148.8	50 28.8	94 34	148.6	50 56.9	94 34	148.3	51 25.0	94 35	148.0	51 53.1	93 35	147.7	20
1	48 16.0	94 34	148.2	48 44.1	94 35	148.0	49 12.2	94 35	147.7	49 40.3	93 35	147.4	50 08.3	93 36	147.1	50 36.3	93 36	146.9	51 04.2	93 36	146.6	51 32.1	93 36	146.3	1
2	47 55.3	93 36	146.9	48 23.3	93 36	146.6	48 51.2	93 36	146.3	49 19.1	93 37	146.0	49 47.0	93 37	145.7	50 14.8	93 37	145.4	50 42.6	92 27	145.2	51 10.3	92 38	144.8	2
3	47 33.8	93 37	145.5	48 01.7	93 37	145.2	48 29.4	93 38	144.9	48 57.2	92 38	144.6	49 24.9	92 38	144.4	49 52.5	92 38	144.1	50 20.1	92 39	143.8	50 47.7	92 39	143.4	3
4	47 11.6	92 38	144.2	47 39.3	92 38	143.9	48 06.9	92 39	143.6	48 34.5	92 39	143.3	49 02.0	92 39	143.0	49 29.5	92 40	142.7	49 56.9	91 40	142.4	50 24.3	91 40	142.1	4
25	46 48.7	92 39	142.8	47 16.2	92 40	142.6	47 43.7	91 40	142.3	48 11.1	91 40	141.9	48 38.4	91 40	141.6	49 05.8	91 41	141.3	49 33.0	91 41	141.0	50 00.3	91 41	140.7	25
6	46 25.0	91 41	141.5	46 52.4	91 41	141.2	47 19.7	91 41	140.9	47 47.0	91 41	140.6	48 14.2	91 42	140.3	48 41.3	90 42	140.0	49 08.4	90 42	139.7	49 35.5	90 42	139.3	6
7	46 00.7	91 42	140.3	46 27.9	91 42	139.9	46 55.1	90 42	139.6	47 22.2	90 42	139.3	47 49.2	90 43	139.0	48 16.2	90 43	138.7	48 43.1	90 43	138.3	49 10.0	89 44	138.0	7
8	45 35.7	90 43	139.0	46 02.8	90 43	138.7	46 29.7	90 43	138.4	46 56.7	90 44	138.0	47 23.6	90 44	137.7	47 50.4	89 44	137.4	48 17.2	89 44	137.0	48 43.9	89 45	136.7	8
9	45 10.1	90 44	137.7	45 37.0	90 44	137.4	46 03.8	89 44	137.1	46 30.6	89 45	136.8	46 57.3	89 45	136.4	47 24.0	89 45	136.1	47 50.6	89 45	135.8	48 17.1	88 46	135.4	9
30	44 43.8	89 45	136.5	45 10.6	89 45	136.2	45 37.2	89 45	135.8	46 03.9	89 46	135.5	46 30.4	88 46	135.2	46 56.9	88 46	134.8	47 23.4	88 46	134.5	47 49.7	88 47	134.1	30
1	44 17.0	89 46	135.3	44 43.6	88 46	134.9	45 10.1	88 46	134.6	45 36.5	88 46	134.3	46 02.9	88 47	133.9	46 29.3	88 47	133.6	46 55.5	87 47	133.2	47 21.8	87 48	132.9	1
2	43 49.6	88 47	134.1	44 16.0	88 47	133.7	44 42.3	88 47	133.4	45 08.6	88 47	133.1	45 34.9	87 48	132.7	46 01.1	87 48	132.4	46 27.2	87 48	132.0	46 53.2	87 48	131.7	2
3	43 21.6	88 48	132.9	43 47.8	87 48	132.6	44 14.1	87 48	132.2	44 40.2	87 48	131.9	45 06.3	87 49	131.5	45 32.3	87 49	131.2	45 58.2	86 49	130.8	46 24.1	86 49	130.4	3
4	42 53.1	87 48	131.7	43 19.2	87 49	131.4	43 45.2	87 49	131.0	44 11.2	87 49	130.7	44 37.1	86 49	130.3	45 03.0	86 50	130.0	45 28.8	86 50	129.6	45 54.5	86 50	129.2	4
35	42 24.0	87 49	130.6	42 50.0	86 49	130.2	43 15.9	86 50	129.9	43 41.7	86 50	129.5	44 07.5	86 50	129.2	44 33.2	86 50	128.8	44 58.8	85 51	128.4	45 24.4	85 51	128.1	35
6	41 54.5	86 50	129.4	42 20.3	86 50	129.1	42 46.0	86 51	128.7	43 11.7	86 51	128.4	43 37.3	85 51	128.0	44 02.9	85 51	127.7	44 28.4	85 52	127.3	44 53.8	85 52	126.9	6
7	41 24.4	86 51	128.3	41 50.1	85 51	127.9	42 15.7	85 51	127.6	42 41.2	85 52	127.2	43 06.7	85 52	126.9	43 32.1	85 52	126.5	43 57.5	84 52	126.1	44 22.7	84 53	125.8	7
8	40 53.9	85 52	127.2	41 19.5	85 52	126.8	41 44.9	85 52	126.5	42 10.3	85 52	126.1	42 35.6	84 53	125.8	43 00.9	84 53	125.4	43 26.1	84 53	125.0	43 51.2	84 53	124.6	8
9	40 23.0	85 52	126.1	40 48.4	85 53	125.7	41 13.7	84 53	125.4	41 38.9	84 53	125.0	42 04.1	84 53	124.7	42 29.3	84 53	124.3	42 54.3	83 54	123.9	43 19.3	83 54	123.5	9
40	39 51.6	84 53	125.0	40 16.8	84 53	124.7	40 42.0	84 53	124.3	41 07.2	84 54	123.9	41 32.2	83 54	123.6	41 57.2	83 54	123.2	42 22.1	83 54	122.8	42 46.9	83 55	122.4	40
1	39 19.8	84 54	123.9	39 44.9	84 54	123.6	40 10.0	83 54	123.2	40 35.0	83 54	122.9	40 59.9	83 55	122.5	41 24.7	83 55	122.1	41 49.5	82 55	121.7	42 14.2	82 55	121.4	1
2	38 47.6	83 54	122.9	39 12.6	83 54	122.5	39 37.5	83 55	122.2	40 02.4	83 55	121.8	40 27.2	82 55	121.4	40 51.9	82 55	121.1	41 16.5	82 56	120.7	41 41.1	82 56	120.3	2
3	38 15.0	83 55	121.8	38 39.9	83 55	121.5	39 04.7	83 55	121.1	39 29.4	82 56	120.8	39 54.1	82 56	120.4	40 18.6	82 56	120.0	40 43.2	82 56	119.6	41 07.6	81 56	119.3	3
4	37 42.1	83 55	120.8	38 06.8	82 56	120.5	38 31.5	82 56	120.1	38 56.1	82 56	119.7	39 20.6	82 56	119.4	39 45.1	81 56	119.0	40 09.5	81 57	118.6	40 33.8	81 57	118.2	4
45	37 08.8	82 56	119.8	37 33.4	82 56	119.4	37 58.0	82 56	119.1	38 22.4	81 57	118.7	38 46.8	81 57	118.3	39 11.2	81 57	118.0	39 35.4	81 57	117.6	39 59.6	80 57	117.2	45
6	36 35.2	82 57	118.8	36 59.7	82 57	118.4	37 24.1	81 57	118.1	37 48.4	81 57	117.7	38 12.7	81 57	117.3	38 37.0	81 58	117.0	39 01.1	80 58	116.6	39 25.2	80 58	116.2	6
7	36 01.2	81 57	117.8	36 25.6	81 57	117.5	36 49.9	81 57	117.1	37 14.2	81 58	116.7	37 38.3	80 58	116.3	28 02.4	80 58	116.0	38 26.5	80 58	115.6	38 50.4	80 58	115.2	7
8	35 26.9	81 58	116.8	35 51.2	81 58	116.5	36 15.4	81 58	116.1	36 39.6	80 58	115.7	37 03.6	80 58	115.4	37 27.6	80 58	115.0	37 51.5	80 59	114.6	38 15.4	79 59	114.2	8
9	34 52.4	81 58	115.9	35 16.5	80 58	115.5	35 40.6	80 58	115.1	36 04.7	80 59	114.8	36 28.6	80 59	114.4	36 52.5	80 59	114.0	37 16.3	79 59	113.6	37 40.1	79 59	113.3	9
50	34 17.5	80 59	114.9	34 41.6	80 59	114.5	35 05.6	80 59	114.2	35 29.5	80 59	113.8	35 53.4	79 59	113.4	36 17.2	79 59	113.1	36 40.9	79 60	112.7	37 04.5	79 60	112.3	50
1	33 42.4	80 59	114.0	34 06.4	80 59	113.6	34 30.3	80 59	113.2	34 54.1	79 59	112.9	35 17.9	79 60	112.5	35 41.6	79 60	112.1	36 05.2	79 60	111.7	36 28.7	78 60	111.4	1
2	33 07.1	80 59	113.0	33 30.9	79 60	112.7	33 54.7	79 60	112.3	34 18.5	79 60	111.9	34 42.1	79 60	111.6	35 05.7	79 60	111.2	35 29.2	78 60	110.8	35 52.7	78 60	110.4	2
3	32 31.5	79 60	112.1	32 55.2	79 60	111.7	33 18.9	79 60	111.4	33 42.6	79 60	111.0	34 06.1	78 60	110.6	34 29.6	78 60	110.3	34 53.1	78 61	109.9	35 16.4	78 61	109.5	3
4	31 55.6	79 60	111.2	32 19.3	79 60	110.8	32 42.9	79 60	110.5	33 06.4	78 61	110.1	33 29.9	78 61	109.7	33 53.4	78 61	109.3	34 16.7	78 61	109.0	34 40.0	77 61	108.6	4
55	31 19.5	79 60	110.3	31 43.1	79 61	109.9	32 06.7	78 61	109.6	32 30.1	78 61	109.2	32 53.5	78 61	108.8	33 16.9	78 61	108.4	33 40.1	77 61	108.1	34 03.3	77 61	107.7	55
6	30 43.3	78 61	109.4	31 06.8	78 61	109.0	31 30.2	78 61	108.7	31 53.6	78 61	108.3	32 16.9	78 61	107.9	32 40.2	77 61	107.5	33 03.4	77 62	107.2	33 26.5	77 62	106.8	6
7	30 06.8	78 61	108.5	30 30.2	78 61	108.1	30 53.6	78 61	107.8	31 16.9	78 62	107.4	31 40.1	77 62	107.0	32 03.3	77 62	106.7	32 26.4	77 62	106.3	32 49.5	77 62	105.9	7
8	29 30.1	78 61	107.6	29 53.5	78 62	107.3	30 16.8	78 62	106.9	30 40.0	77 62	106.5	31 03.2	77 62	106.2	31 26.3	77 62	105.8	31 49.3	77 62	105.4	32 12.3	76 62	105.0	8
9	28 53.3	78 62	106.7	29 16.6	78 62	106.4	29 39.8	77 62	106.0	30 02.9	77 62	105.7	30 26.1	77 62	105.3	30 49.1	77 62	104.9	31 12.1	76 62	104.5	31 35.0	76 62	104.2	9
60	28 16.3	77 62	105.9	28 39.5	77 62	105.5	29 02.6	77 62	105.2	29 25.7	77 62	104.8	29 43.8	77 62	104.4	30 11.8	76 62	104.1	30 34.7	76 63	103.7	30 57.5	76 63	103.3	60
1	27 39.1	77 62	105.0	28 02.2	77 62	104.7	28 25.3	77 62	104.3	28 48.4	77 62	103.9	29 11.4	77 63	103.6	29 34.3	76 63	103.2	29 57.1	76 63	102.8	30 19.9	76 63	102.5	1
2	27 01.8	77 62	104.2	27 24.9	77 63	103.8	27 47.9	77 63	103.5	28 10.9	77 63	103.1	28 33.8	76 63	102.7	28 56.7	76 63	102.4	29 19.5	76 63	102.0	29 42.2	76 63	101.6	2
3	26 24.3	77 63	103.3	26 47.3	77 63	103.0	27 10.3	77 63	102.6	27 33.2	76 63	102.2	27 56.1	76 63	101.9	28 18.9	76 63	101.5	28 41.7	76 63	101.1	29 04.4	76 63	100.8	3
4	25 46.7	77 63	102.5	26 09.7	77 63	102.1	26 32.6	76 63	101.8	26 55.5	76 63	101.4	27 18.3	76 63	101.1	27 41.1	76 63	100.7	28 03.8	76 63	100.3	28 26.4	75 63	99.9	4
65	25 09.0	77 63	101.7	25 31.9	76 63	101.3	25 54.8	76 63	100.9	26 17.6	76 63	100.6	26 40.4	76 63	100.2	27 03.1	76 63	99.9	27 25.8	75 63	99.5	27 48.4	75 64	99.1	65
6	24 31.2	76 63	100.8	24 54.1	76 63	100.5	25 16.9	76 63	100.1	25 39.7	76 63	99.8	26 02.4	76 64	99.4	26 25.1	76 64	99.0	26 47.7	75 64	98.7	27 10.3	75 64	98.3	6
7	23 53.2	76 63	100.0	24 16.1	76 63	99.7	24 38.9	76 64	99.3	25 01.6	76 64	99.0	25 24.3	76 64	98.6	25 47.0	75 64	98.2	26 09.5	75 64	97.9	26 32.1	75 64	97.5	7
8	23 15.2	76 64	99.2	23 38.0	76 64	98.9	24 00.8	76 64	98.5	24 23.5	76 64	98.1	24 46.1	75 64	97.8	25 08.8	75 64	97.4	25 31.3	75 64	97.1	25 53.8	75 64	96.7	8
9	22 37.1	76 64	98.4	22 59.9	76 64	98.0	23 22.6	76 64	97.7	23 45.3	76 64	97.3	24 07.9	75 64	97.0	24 30.5	75 64	96.6	24 53.0	75 64	96.3	25 15.5	75 64	95.9	9
70	21 58.9	76 64	97.6	22 21.6	76 64	97.2	22 44.3	76 64	96.9	23 07.0	75 64	96.5	23 29.6	75 64	96.2	23 52.1	75 64	95.8	24 14.6	75 64	95.5	24 37.1	75 64	95.1	70
1	21 20.6	76 64	96.8	21 43.4	76 64	96.5	22 06.0	75 64	96.1	22 28.6	75 64	95.7	22 51.2	75 64	95.4	23 13.7	75 64	95.0	23 36.2	75 64	94.7	23 58.6	75 64	94.3	1
2	20 42.3	76 64	96.0	21 05.0	76 64	95.7	21 27.6	75 64	95.3	21 50.2	75 64	95.0	22 12.8	75 64	94.6	22 35.3	75 64	94.2	22 57.8	75 64	93.9	23 20.2	75 64	93.5	2
3	20 03.9	76 64	95.2	20 26.6	75 64	94.9	20 49.2	75 64	94.5	21 11.8	75 64	94.2	21 34.3	75 64	93.8	21 56.8	75 64	93.5	22 19.3	75 64	93.1	22 41.7	75 64	92.7	3
4	19 25.5	76 64	94.4	19 48.1	75 64	94.1	20 10.8	75 64	93.7	20 33.3	75 64	93.4	20 55.8	75 64	93.0	21 18.3	75 64	92.7	21 40.7	75 64	92.3	22 03.1	75 64	92.0	4
75	18 47.0	75 64	93.7	19 09.7	75 64	93.3	19 32.3	75 64	93.0	19 54.8	75 64	92.6	20 17.3	75 64	92.3	20 39.8	75 64	91.9	21 02.2	75 64	91.5	21 24.6	75 64	91.2	75
6	18 08.5	75 64	92.9	18 31.1	75 64	92.5	18 53.7	75 64	92.2	19 16.3	75 64	91.8	19 38.8	75 64	91.5	20 01.2	75 64	91.1	20 23.6	75 64	90.8	20 46.0	75 64	90.4	6
7	17 30.0	75 64	92.1	17 52.6	75 64	91.8	18 15.2	75 64	91.4	18 37.7	75 64	91.1	19 00.2	75 64	90.7	19 22.7	75 64	90.4	19 45.1	75 64	90.0	20 07.4	75 64	89.7	7
8	16 51.4	75 64	91.3	17 14.0	75 64	91.0	17 36.6	75 64	90.6	17 59.1	75 64	90.3	18 21.6	75 64	89.9	18 44.1	75 64	89.6	19 06.5	75 64	89.2	19 28.9	75 64	88.9	8
9	16 12.9	75 64	90.6	16 35.5	75 64	90.2	16 58.0	75 64	89.9	17 20.6	75 64	89.5	17 43.1	75 64	89.2	18 05.5	75 64	88.8	18 27.9	75 64	88.5	18 50.3	75 64	88.1	9
80	15 34.3	75 64	89.8	15 56.9	75 64	89.4	16 19.5	75 64	89.1	16 42.0	75 64	88.8	17 04.5	75 64	88.4	17 27.0	75 64	88.1	17 49.4	75 64	87.7	18 11.8	75 64	87.4	80
1	14 55.8	75 64	89.0	15 18.4	75 64	88.7	15 40.9	75 64	88.3	16 03.5	75 64	88.0	16 26.0	75 64	87.7	16 48.4	75 64	87.3	17 10.9	75 64	87.0	17 33.3	75 64	86.6	1
2	14 17.2	75 64	88.3	14 39.8	75 64	87.9	15 02.4	75 64	87.6	15 24.9	75 64	87.2	15 47.4	75 64	86.9	16 09.9	75 64	86.6	16 32.4	75 64	86.2	16 54.8	75 64	85.9	2
3	13 38.7	75 64	87.5	14 01.3	75 64	87.2	14 23.9	75 64	86.8	14 46.4	75 64	86.5	15 08.9	75 64	86.1	15 31.4	75 64	85.8	15 53.9	75 64	85.5	16 16.3	75 64	85.1	3
4	13 00.1	75 64	86.7	13 22.8	75 64	86.4	13 45.4	75 64	86.1	14 07.9	75 64	85.7	14 30.5	75 64	85.4	14 53.0	75 64	85.0	15 15.5	75 64	84.7	15 37.9	75 64	84.4	4
85	12 21.7	76 64	86.0	12 44.3	75 64	85.7	13 06.9	75 64	85.3	13 29.5	75 64	85.0	13 52.1	75 64	84.6	14 14.6	75 64	84.3	14 37.1	75 64	84.0	14 59.6	75 64	83.6	85
6	11 43.2	76 64	85.2	12 05.9	75 64	84.9	12 28.5	75 64	84.6	12 51.1	75 64	84.2	13 13.7	75 64	83.9	13 36.2	75 64	83.5	13 58.8	75 64	83.2	14 21.3	75 64	82.9	6
7	11 04.8	76 64	84.5	11 27.5	76 64	84.1	11 50.1	75 64	83.8	12 12.8	75 64	83.5	12 35.4	75 64	83.1	12 58.0	75 64	82.8	13 20.5	75 64	82.5	13 43.0	75 64	82.1	7
8	10 26.4	76 64	83.7	10 49.1	76 64	83.4	11 11.8	76 64	83.1	11 34.5	75 64	82.7	11 57.1	75 64	82.4	12 19.7	75 64	82.1	12 42.3	75 64	81.7	13 04.9	75 64	81.4	8
9	9 48.1	76 64	83.0	10 10.8	76 64	82.6	10 33.6	76 64	82.3	10 56.2	76 64	82.0	11 18.9	76 64	81.6	11 41.6	75 63	81.3	12 04.2	75 63	81.0	12 26.8	75 63	80.6	9
	9 09.9	76 64	82.2	9 32.6	76 64	81.9	9 55.4	76 64	81.6	10 18.1	76 63	81.2	10 40.8	76 63	80.9	11 03.5	76 63	80.6	11 26.1	75 63	80.2	11 48.8	75 63	79.9	90

Digitized by Google

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	28 00.0	1.0	01	180.0	27 30.0	1.0	01	180.0	27 00.0	1.0	01	180.0	26 30.0	1.0	01	180.0	26 00.0	1.0	01	180.0	25 30.0	1.0	01	180.0	25 00.0	1.0	01	180.0	24 30.0	1.0	01	180.0	00
1	27 59.6	1.0	02	178.9	27 29.6	1.0	02	178.9	26 59.6	1.0	02	178.9	26 29.6	1.0	02	178.9	25 59.6	1.0	02	178.9	25 29.6	1.0	02	178.9	24 59.6	1.0	02	178.9	24 29.6	1.0	02	178.9	1
2	27 58.5	1.0	03	177.8	27 28.5	1.0	03	177.8	26 58.5	1.0	03	177.8	26 28.5	1.0	03	177.8	25 58.5	1.0	03	177.8	25 28.6	1.0	03	177.9	24 58.6	1.0	03	177.9	24 28.6	1.0	03	177.9	2
3	27 56.6	1.0	04	176.7	27 26.7	1.0	04	176.7	26 56.7	1.0	04	176.7	26 26.7	1.0	04	176.7	25 56.7	1.0	04	176.8	25 26.8	1.0	04	176.8	24 56.8	1.0	04	176.8	24 26.8	1.0	04	176.8	3
4	27 54.0	1.0	06	175.6	27 24.1	1.0	06	175.6	26 54.1	1.0	06	175.6	26 24.2	1.0	05	175.7	25 54.2	1.0	05	175.7	25 24.2	1.0	05	175.7	24 54.3	1.0	05	175.7	24 24.3	1.0	05	175.8	4
05	27 50.7	1.0	07	174.5	27 20.8	1.0	07	174.5	26 50.8	1.0	07	174.5	26 20.9	1.0	07	174.6	25 50.9	1.0	07	174.6	25 21.0	1.0	07	174.6	24 51.0	1.0	07	174.7	24 21.1	1.0	06	174.7	05
6	27 46.6	1.0	08	173.4	27 16.7	1.0	08	173.4	26 46.8	1.0	08	173.4	26 16.9	1.0	08	173.5	25 46.9	1.0	08	173.5	25 17.0	1.0	08	173.6	24 47.1	1.0	08	173.6	24 17.2	1.0	08	173.7	6
7	27 41.8	1.0	09	172.3	27 11.9	1.0	09	172.3	26 42.0	1.0	09	172.4	26 12.1	1.0	09	172.4	25 42.2	1.0	09	172.5	25 12.4	1.0	09	172.5	24 42.5	1.0	09	172.6	24 12.6	1.0	09	172.6	7
8	27 36.2	99	10	171.2	27 06.4	99	10	171.2	26 36.5	99	10	171.3	26 06.7	1.0	10	171.3	25 36.8	1.0	10	171.4	25 07.0	1.0	10	171.4	24 37.1	1.0	10	171.5	24 07.3	1.0	10	171.6	8
9	27 29.9	99	12	170.1	27 00.1	99	12	170.1	26 30.3	99	12	170.2	26 00.5	99	11	170.3	25 30.7	99	11	170.3	25 00.9	99	11	170.4	24 31.1	99	11	170.4	24 01.2	99	11	170.5	9
10	27 22.9	99	13	169.0	26 53.2	99	13	169.0	26 23.4	99	13	169.1	25 53.6	99	13	169.2	25 23.9	99	13	169.3	24 54.1	99	12	169.3	24 24.3	99	12	169.4	23 54.5	99	12	169.5	10
1	27 15.2	99	14	167.9	26 45.5	99	14	168.0	26 15.7	99	14	168.0	25 46.0	99	14	168.1	25 16.3	99	14	168.2	24 46.6	99	14	168.3	24 16.9	99	14	168.3	23 47.1	99	14	168.4	1
2	27 06.7	99	15	166.8	26 37.1	99	15	166.9	26 07.4	99	15	167.0	25 37.7	99	15	167.0	25 08.1	99	15	167.1	24 38.4	99	15	167.2	24 08.7	99	15	167.3	23 39.0	99	15	167.4	2
3	26 57.6	99	16	165.7	26 28.0	99	16	165.8	25 58.3	99	16	165.9	25 28.7	99	16	166.0	24 59.1	99	16	166.1	24 29.5	99	16	166.2	23 59.9	99	16	166.2	23 30.3	99	16	166.3	3
4	26 47.7	98	18	164.6	26 18.1	98	18	164.7	25 48.6	98	17	164.8	25 19.0	99	17	164.9	24 49.5	99	17	165.0	24 19.9	99	17	165.1	23 50.4	99	17	165.2	23 20.8	99	17	165.3	4
15	26 37.1	98	19	163.5	26 07.6	98	19	163.7	25 38.1	98	19	163.8	25 08.7	98	18	163.9	24 39.2	98	18	164.0	24 09.7	98	18	164.1	23 40.2	98	18	164.2	23 10.7	98	18	164.3	15
6	26 25.8	98	20	162.5	25 56.4	98	20	162.6	25 27.0	98	20	162.7	24 57.6	98	20	162.8	24 28.2	98	19	162.9	23 58.7	98	19	163.0	23 29.3	98	19	163.1	22 59.9	98	19	163.2	6
7	26 13.9	98	21	161.4	25 44.6	98	21	161.5	25 15.2	98	21	161.6	24 45.9	98	21	161.8	24 16.5	98	21	161.9	23 47.1	98	20	162.0	23 17.8	98	20	162.1	22 48.4	98	20	162.2	7
8	26 01.3	98	22	160.3	25 32.0	98	22	160.5	25 02.7	98	22	160.6	24 33.5	98	22	160.7	24 04.2	98	22	160.8	23 34.9	98	22	160.9	23 05.6	98	21	161.1	22 36.3	98	21	161.2	8
9	25 47.9	97	23	159.3	25 18.8	97	23	159.4	24 49.6	97	23	159.5	24 20.4	97	23	159.7	23 51.2	97	23	159.8	23 22.0	97	23	159.9	22 52.8	97	22	160.0	22 23.5	97	22	160.2	9
20	25 34.0	97	24	158.2	25 04.9	97	24	158.4	24 35.8	97	24	158.5	24 06.7	97	24	158.6	23 37.5	97	24	158.8	23 08.4	97	24	158.9	22 39.3	97	24	159.0	22 10.1	97	23	159.2	20
1	25 19.3	97	26	157.2	24 50.3	97	25	157.3	24 21.3	97	25	157.5	23 52.3	97	25	157.6	23 23.2	97	25	157.7	22 54.2	97	25	157.9	22 25.1	97	25	158.0	21 56.1	97	24	158.1	1
2	25 04.1	96	27	156.1	24 35.1	96	26	156.3	24 06.2	96	26	156.4	23 37.3	96	26	156.6	23 08.3	97	26	156.7	22 39.4	97	26	156.9	22 10.4	97	26	157.0	21 41.4	97	25	157.1	2
3	24 48.1	96	28	155.1	24 19.3	96	27	155.3	23 50.5	96	27	155.4	23 21.6	96	27	155.6	22 52.8	96	27	155.7	22 23.9	96	27	155.8	21 55.0	96	27	156.0	21 26.1	96	27	156.1	3
4	24 31.6	96	29	154.1	24 02.8	96	28	154.2	23 34.1	96	28	154.4	23 05.3	96	28	154.5	22 36.6	96	28	154.7	22 07.8	96	28	154.8	21 39.0	96	28	155.0	21 10.2	96	28	155.1	4
25	24 14.4	95	30	153.0	23 45.8	95	29	153.2	23 17.1	96	29	153.4	22 48.5	96	29	153.5	22 19.8	96	29	153.7	21 51.1	96	29	153.8	21 22.4	96	29	154.0	20 53.7	96	29	154.2	25
6	23 56.6	95	31	152.0	23 28.1	95	30	152.2	22 59.5	95	30	152.4	22 31.0	95	30	152.5	22 02.4	95	30	152.7	21 33.8	95	30	152.8	21 05.2	95	30	153.0	20 36.6	95	30	153.2	6
7	23 38.2	95	32	151.0	23 09.8	95	31	151.2	22 41.3	95	31	151.4	22 12.9	95	31	151.5	21 44.4	95	31	151.7	21 15.9	95	31	151.9	20 47.4	95	31	152.0	20 18.9	95	30	152.2	7
8	23 19.2	94	33	150.0	22 50.9	94	32	150.2	22 22.5	95	32	150.4	21 54.2	95	32	150.5	21 25.8	95	32	150.7	20 57.4	95	32	150.9	20 29.0	95	32	151.0	20 00.6	95	31	151.2	8
9	22 59.7	94	34	149.0	22 31.4	94	33	149.2	22 03.2	94	33	149.4	21 34.9	94	33	149.5	21 06.6	94	33	149.7	20 38.4	94	33	149.9	20 10.1	94	33	150.1	19 41.8	94	32	150.3	9
30	22 39.5	94	35	148.0	22 11.4	94	34	148.2	21 43.2	94	34	148.4	21 15.1	94	34	148.6	20 46.9	94	34	148.7	20 18.7	94	34	148.9	19 50.5	94	33	149.1	19 22.3	94	33	149.3	30
1	22 18.8	93	35	147.0	21 50.8	93	35	147.2	21 22.7	93	35	147.4	20 54.7	94	35	147.6	20 26.6	94	35	147.8	19 58.6	94	35	148.0	19 30.5	94	34	148.1	19 02.4	94	34	148.3	1
2	21 57.5	93	36	146.0	21 29.6	93	36	146.2	21 01.7	93	36	146.4	20 33.7	93	36	146.6	20 05.8	93	36	146.8	19 37.8	93	35	147.0	19 09.8	93	35	147.2	18 41.9	93	35	147.4	2
3	21 35.7	93	37	145.0	21 07.9	93	37	145.2	20 40.1	93	37	145.4	20 12.2	93	37	145.6	19 44.4	93	37	145.8	19 16.5	93	36	146.0	18 48.7	93	36	146.2	18 20.8	93	36	146.4	3
4	21 13.3	92	38	144.1	20 45.6	92	38	144.3	20 17.9	92	38	144.5	19 50.2	92	38	144.7	19 22.5	92	37	144.9	18 54.7	93	37	145.1	18 27.0	93	37	145.3	17 59.2	93	37	145.5	4
35	20 50.4	92	39	143.1	20 22.8	92	39	143.3	19 55.3	92	39	143.5	19 27.7	92	38	143.7	19 00.0	92	38	143.9	18 32.4	92	38	144.1	18 04.8	92	38	144.4	17 37.1	92	38	144.6	35
6	20 27.0	92	40	142.1	19 59.6	92	40	142.4	19 32.1	92	39	142.6	19 04.6	92	39	142.8	18 37.1	92	39	143.0	18 09.6	92	39	143.2	17 42.0	92	39	143.4	17 14.5	92	39	143.6	6
7	20 03.1	91	41	141.2	19 35.7	91	40	141.4	19 08.4	91	40	141.6	18 41.0	91	40	141.8	18 13.6	91	40	142.1	17 46.2	91	40	142.3	17 18.8	91	40	142.5	16 51.4	91	39	142.7	7
8	19 38.7	91	42	140.3	19 11.4	91	41	140.5	18 44.2	91	41	140.7	18 16.9	91	41	140.9	17 49.7	91	41	141.1	17 22.4	91	41	141.4	16 55.1	91	40	141.6	16 27.7	91	40	141.8	8
9	19 13.8	90	42	139.3	18 46.7	90	42	139.5	18 19.5	90	42	139.8	17 52.4	91	42	140.0	17 25.2	91	42	140.2	16 58.0	91	41	140.4	16 30.8	91	41	140.7	16 03.6	91	41	140.9	9
40	18 48.4	90	43	138.4	18 21.4	90	43	138.6	17 54.4	90	43	138.8	17 27.3	90	42	139.1	17 00.3	90	42	139.3	16 33.2	90	42	139.5	16 06.2	90	42	139.7	15 39.1	90	42	140.0	40
1	18 22.5	90	44	137.5	17 55.7	90	44	137.7	17 28.8	90	43	137.9	17 01.8	90	43	138.1	16 34.9	90	43	138.4	16 08.0	90	43	138.6	15 41.0	90	43	138.8	15 14.0	90	42	139.1	1
2	17 56.2	89	45	136.5	17 29.5	89	44	136.8	17 02.7	89	44	137.0	16 35.9	89	44	137.2	16 09.1	89	44	137.5	15 42.2	89	44	137.7	15 15.4	90	43	137.9	14 48.5	90	43	138.2	2
3	17 29.5	89	45	135.6	17 02.8	89	45	135.9	16 36.2	89	45	136.1	16 09.5	89	45	136.3	15 42.8	89	45	136.6	15 16.1	89	44	136.8	14 49.3	89	44	137.0	14 22.6	89	44	137.3	3
4	17 02.3	88	46	134.7	16 35.8	88	46	135.0	16 09.2	89	46	135.2	15 42.6	89	45	135.4	15 16.0	89	45	135.7	14 49.4	89	45	135.9	14 22.8	89	45	136.2	13 56.2	89	45	136.4	4
45	16 34.7	88	47	133.8	16 08.2	88	47	134.1	15 41.8	88	46	134.3	15 15.4	88	46	134.5	14 48.9	88	46	134.8	14 22.4	88	46	135.0	13 55.9	88	46	135.3	13 29.4	88	45	135.5	45
6	16 06.6	88	47	132.9	15 40.3	88	47	133.2	15 14.0	88	47	133.4	14 47.7	88	47	133.7	14 21.3	88	47	133.9	13 54.9	88	46	134.2	13 28.6	88	46	134.4	13 02.2	88	46	134.6	6
7	15 38.2	87	48	132.0	15 12.0	87	48	132.3	14 45.8	87	48	132.5	14 19.6	87	48	132.8	13 53.3	87	47	133.0	13 27.1	88	47	133.3	13 00.8	88	47	133.5	12 34.5	88	47	133.8	7
8	15 09.3	87	49	131.1	14 43.3	87	49	131.4	14 17.2	87	48	131.7	13 51.1	87	48	131.9	13 24.9	87	48	132.2	12 58.8	87	48	132.4	12 32.6	87	48	132.7	12 06.5	87	47	132.9	8
9	14 40.1	87	49	130.3	14 14.1	87	49	130.5	13 48.1	87	49	130.8	13 22.2	87	49	131.0	12 56.1	87	49	131.3	12 30.1	87	48	131.5	12 04.1	87	48	131.8	11 38.0	87	48	132.1	9
50	14 10.5	86	50	129.4	13 44.6	86	50	129.7	13 18.8	86	50	129.9	12 52.9	86	49	130.2	12 27.0	86	49	130.4	12 01.1	86	49	130.7	11 35.1	86	49	130.9	11 09.2	86	49	131.2	50
1	13 40.5	86	51	128.5	13 14.7	86	50	128.8	12 49.0	86	50	129.1	12 23.2	86	50	129.3	11 57.4	86	50	129.6	11 31.6	86	50	129.8	11 05.8	86	49	130.1	10 40.0	86	49	130.4	1
2	13 10.1	85	51	127.7	12 44.5	85	51	127.9	12 18.9	86	51	128.2	11 53.2	86	51	128.5	11 27.5	86	50	128.7	11 01.8	86	50	129.0	10 36.1	86	50	129.3	10 10.4	86	50	129.5	2
3	12 39.4	85	52	126.8	12 13.9	85	52	127.1	11 48.4	85	51	127.3	11 22.8	85	51	127.6	10 57.3	85	51	127.9	10 31.7	85	51	128.1	10 06.1	85	51	128.4	9 40.5	85	50	128.7	3
4	12 08.4	85	52	126.0	11 43.0	85	52	126.2	11 17.5	85	52	126.5	10 52.1	85	52	126.8	10 26.6	85	52	127.0	10 01.2	85	51	127.3	9 35.7	85	51	127.6	9 10.2	85	51	127.8	4
55	11 37.0	84	53	125.1	11 11.7	84	53	125.4	10 46.4	84	52	125.7	10 21.0	84	52	125.9	9 55.7	85	52	126.2	9 30.3	85	52	126.5	9 05.0	85	52	126.7	8 39.6	85	52	127.0	55
6	11 05.3	84	53	124.3	10 40.1	84	53	124.6	10 14.9	84	53	124.8	9 49.6	84	53	125.1	9 24.4	84	53	125.4	8 59.2	84	52	125.6	8 33.9	84	52	125.9	8 08.6	84	52	126.2	6
7	10 33.3	84	54	123.4	10 08.2	84	54	123.7	9 43.1	84	54	124.0	9 17.9	84	53	124.3	8 52.8	84	53	124.6	8 27.7	84	53	124.8	8 02.5	84	53	125.1	7 37.3	84	53	125.4	7
8	10 00.9	83	54	122.6	9 35.9	83	54	122.9	9 10.9	83	54	123.2	8 45.9	83	54	123.5	8 20.9	83	54	123.7	7 55.8	83	54	124.0	7 30.8	84	53	124.3	7 05.7	84	53	124.6	8
9	9 28.3	83	55	121.8	9 03.4	83	55	122.1	8 38.5	83	55	122.4	8 13.6	83	54	122.6	7 48.7	83	54	122.9	7 23.7	83	54	123.2	6 58.8	83	54	123.5	6 33.8	83	54	123.8	9
60	8 55.4	83	55	121.0	8 30.6	83	55	121.2	8 05.8	83	55	121.5	7 41.0	83	55	121.8	7 16.1	83	55	122.1	6 51.3	83	54	122.4	6 26.4	83	54	122.7	6 01.6	83	54	122.9	60
1	8 22.1	82	56	120.1	7 57.5	82	56	120.4	7 32.8	82	55	120.7	7 08.0	82	55	121.0	6 43.3	82	55	121.3	6 18.6	82	55	121.6	5 53.8	82	55	121.9	5 29.1	83	55	122.1	1
2	7 48.7	82	56	119.3	7 24.1	82	56	119.6	6 59.5	82	56	119.9	6 34.8	82	56	120.2	6 10.2	82	56	120.5	5 45.6	82	55	120.8	5 20.9	82	55	121.1					2
3	7 14.9	82	57	118.5	6 50.4	82	57	118.8	6 25.9	82	56	119.1	6 01.4	82	56	119.4	5 36.8	82	56	119.7	5 12.3	82	56	120.0									3
4	6 40.9	81	57	117.7	6 16.5	81	57	118.0	5 52.1	81	57	118.3	5 27.6	81	57	118.6	5 03.2	81	56	118.9													4
65	6 06.6	81	58	116.9	5 42.3	81	57	117.2	5 18.0	81	57	117.5																					65
6	5 32.1	81	58	116.1	5 07.9	81	58	116.4																									6

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	8 31.7	76	64	81.5	8 54.5	76	63	81.1	9 17.3	76	63	80.8	9 40.0	76	63	80.5	10 02.8	76	63	80.1	10 25.5	76	63	79.8	10 48.2	76	63	79.5	11 10.9	76	63	79.2	91
2	7 53.6	76	63	80.7	8 16.4	76	63	80.4	8 39.2	76	63	80.1	9 02.0	76	63	79.7	9 24.8	76	63	79.4	9 47.6	76	63	79.1	10 10.3	76	63	78.7	10 33.0	76	63	78.4	2
3	7 15.6	76	63	80.0	7 38.4	76	63	79.6	8 01.3	76	63	79.3	8 24.1	76	63	79.0	8 46.9	76	63	78.7	9 09.7	76	63	78.3	9 32.5	76	63	78.0	9 55.3	76	63	77.7	3
4	6 37.6	76	63	79.2	7 00.5	76	63	78.9	7 23.4	76	63	78.6	7 46.3	76	63	78.2	8 09.2	76	63	77.9	8 32.0	76	63	77.6	8 54.9	76	63	77.3	9 17.7	76	62	76.9	4
95	5 59.8	77	63	78.5	6 22.8	76	63	78.1	6 45.7	76	63	77.8	7 08.6	76	63	77.5	7 31.5	76	63	77.2	7 54.4	76	62	76.8	8 17.3	76	62	76.5	8 40.2	76	62	76.2	95
6	5 22.1	77	63	77.7	5 45.1	77	63	77.4	6 08.0	77	63	77.1	6 31.0	77	62	76.7	6 54.0	77	62	76.4	7 16.9	76	62	76.1	7 39.9	76	62	75.8	8 02.8	76	62	75.4	6
7					5 07.5	77	63	76.6	5 30.5	77	62	76.3	5 53.5	77	62	76.0	6 16.5	77	62	75.7	6 39.5	77	62	75.3	7 02.5	77	62	75.0	7 25.5	77	62	74.7	7
8													5 16.2	77	62	75.2	5 39.2	77	62	74.9	6 02.3	77	62	74.6	6 25.3	77	62	74.3	6 48.4	77	62	74.0	8
9																	5 02.1	77	62	74.2	5 25.2	77	62	73.8	5 48.3	77	62	73.5	6 11.4	77	61	73.2	9
100																									5 11.4	77	61	72.8	5 34.5	77	61	72.5	100

Lat. 50°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	56 00.0	1.0 01	180.0	56 30.0	1.0 01	180.0	57 00.0	1.0 01	180.0	57 30.0	1.0 01	180.0	58 00.0	1.0 01	180.0	58 30.0	1.0 01	180.0	59 00.0	1.0 01	180.0	59 30.0	1.0 01	180.0	00
1	55 59.4	1.0 03	178.3	56 29.4	1.0 03	178.3	56 59.4	1.0 03	178.2	57 29.4	1.0 03	178.2	57 59.4	1.0 03	178.2	58 29.4	1.0 03	178.2	58 59.4	1.0 03	178.2	59 29.4	1.0 03	178.1	1
2	55 57.7	1.0 05	176.6	56 27.7	1.0 05	176.5	56 57.6	1.0 05	176.5	57 27.6	1.0 05	176.5	57 57.6	1.0 05	176.4	58 27.6	1.0 05	176.4	58 57.5	1.0 05	176.3	59 27.5	1.0 05	176.3	2
3	55 54.8	1.0 07	174.8	56 24.7	1.0 07	174.8	56 54.7	1.0 07	174.7	57 24.6	1.0 07	174.7	57 54.6	1.0 07	174.6	58 24.5	1.0 07	174.6	58 54.4	1.0 07	174.5	59 24.4	1.0 07	174.4	3
4	55 50.8	1.0 09	173.1	56 20.7	1.0 09	173.1	56 50.6	1.0 09	173.0	57 20.5	1.0 09	172.9	57 50.4	1.0 09	172.8	58 20.3	1.0 09	172.8	58 50.1	1.0 09	172.7	59 20.0	1.0 09	172.6	4
05	55 45.6	1.0 10	171.4	56 15.4	99 11	171.3	56 45.3	99 11	171.3	57 15.1	99 11	171.2	57 45.0	99 11	171.1	58 14.8	99 11	171.0	58 44.6	99 11	170.9	59 14.4	99 11	170.8	05
6	55 39.3	99 12	169.7	56 09.1	99 12	169.6	56 38.8	99 13	169.5	57 08.6	99 13	169.4	57 38.4	99 13	169.3	58 08.1	99 13	169.2	58 37.9	99 13	169.1	59 07.6	99 13	168.9	6
7	55 31.9	99 14	168.1	56 01.6	99 14	167.9	56 31.3	99 15	167.8	57 01.0	99 15	167.7	57 30.6	99 15	167.5	58 00.3	99 15	167.4	58 30.0	99 15	167.3	58 59.6	99 15	167.1	7
8	55 23.3	99 16	166.4	55 52.9	99 16	166.2	56 22.6	99 16	166.1	56 52.2	99 17	165.9	57 21.7	99 17	165.8	57 51.3	99 17	165.6	58 20.9	99 17	165.5	58 50.4	98 17	165.3	8
9	55 13.7	98 18	164.7	55 43.2	98 18	164.6	56 12.7	98 18	164.4	56 42.2	98 18	164.2	57 11.7	98 19	164.1	57 41.2	98 19	163.9	58 10.6	98 19	163.7	58 40.1	98 19	163.5	9
10	55 03.0	98 20	163.1	55 32.4	98 20	162.9	56 01.8	98 20	162.7	56 31.2	98 20	162.5	57 00.6	98 20	162.3	57 29.9	98 21	162.2	57 59.3	98 21	162.0	58 28.6	98 21	161.8	10
1	54 51.2	98 21	161.4	55 20.5	98 22	161.2	55 49.8	98 22	161.0	56 19.1	98 22	160.8	56 48.3	97 22	160.6	57 17.6	97 22	160.4	57 46.8	97 23	160.2	58 15.9	97 23	160.0	1
2	54 38.4	97 23	159.8	55 07.6	97 23	159.6	55 36.8	97 23	159.4	56 05.9	97 24	159.2	56 35.0	97 24	159.0	57 04.1	97 24	158.7	57 33.2	97 24	158.5	58 02.2	97 25	158.3	2
3	54 24.6	97 25	158.2	54 53.6	97 25	158.0	55 22.7	97 25	157.8	55 51.7	97 25	157.5	56 20.6	97 26	157.3	56 49.6	96 26	157.1	57 18.5	96 26	156.8	57 47.4	96 26	156.6	3
4	54 09.8	96 26	156.6	54 38.7	96 27	156.4	55 07.6	96 27	156.1	55 36.4	96 27	155.9	56 05.2	96 27	155.6	56 34.0	96 28	155.4	57 02.8	96 28	155.1	57 31.5	96 28	154.9	4
15	53 54.0	96 28	155.0	54 22.7	96 28	154.8	54 51.5	96 28	154.5	55 20.2	96 29	154.3	55 48.8	96 29	154.0	56 17.5	95 29	153.8	56 46.1	95 30	153.5	57 14.6	95 30	153.2	15
6	53 37.2	95 29	153.5	54 05.8	95 30	153.2	54 34.4	96 30	153.0	55 02.9	95 30	152.7	55 31.5	95 31	152.4	55 59.9	95 31	152.1	56 28.4	95 31	151.8	56 56.8	95 31	151.6	6
7	53 19.5	95 31	151.9	53 48.0	95 31	151.7	54 16.4	95 32	151.4	54 44.8	95 32	151.1	55 13.1	94 32	150.8	55 41.4	94 32	150.5	56 09.7	94 33	150.2	56 37.9	94 33	149.9	7
8	53 00.9	94 32	150.4	53 29.2	94 33	150.1	53 57.5	94 33	149.9	54 25.7	94 33	149.6	54 53.9	94 34	149.3	55 22.0	94 34	149.0	55 50.1	94 34	148.6	56 18.1	93 34	148.3	8
9	52 41.4	94 34	148.9	53 09.6	94 34	148.6	53 37.7	94 34	148.3	54 05.7	93 35	148.0	54 33.7	93 35	147.7	55 01.7	93 35	147.4	55 29.6	93 36	147.1	55 57.4	93 36	146.8	9
20	52 21.1	93 35	147.4	52 49.1	93 36	147.1	53 17.0	93 36	146.8	53 44.9	93 36	146.5	54 12.7	93 36	146.2	54 40.5	92 37	145.9	55 08.2	92 37	145.5	55 35.8	92 37	145.2	20
1	51 59.9	93 37	146.0	52 27.7	93 37	145.7	52 55.5	92 37	145.4	53 23.2	92 38	145.0	53 50.8	92 38	144.7	54 18.4	92 38	144.4	54 45.9	92 38	144.0	55 13.4	91 39	143.7	1
2	51 37.9	92 38	144.5	52 05.6	92 38	144.2	52 33.1	92 39	143.9	53 00.7	92 39	143.6	53 28.1	91 39	143.2	53 55.5	91 39	142.9	54 22.9	91 40	142.5	54 50.2	91 40	142.2	2
3	51 15.2	92 39	143.1	51 42.6	91 39	142.8	52 10.0	91 40	142.5	52 37.4	91 40	142.1	53 04.7	91 40	141.8	53 31.9	91 41	141.4	53 59.0	90 41	141.1	54 26.1	90 41	140.7	3
4	50 51.7	91 40	141.7	51 18.9	91 41	141.4	51 46.2	91 41	141.1	52 13.3	90 41	140.7	52 40.4	90 42	140.4	53 07.5	90 42	140.0	53 34.4	90 42	139.6	54 01.3	90 43	139.3	4
25	50 27.4	90 42	140.4	50 54.5	90 42	140.0	51 21.6	90 42	139.7	51 48.5	90 42	139.3	52 15.5	90 43	139.0	52 42.3	89 43	138.6	53 09.1	89 43	138.2	53 35.8	89 44	137.8	25
6	50 02.5	90 43	139.0	50 29.4	90 43	138.7	50 56.3	89 43	138.3	51 23.1	89 44	137.9	51 49.8	89 44	137.6	52 16.5	89 44	137.2	52 43.0	89 45	136.8	53 09.6	88 45	136.4	6
7	49 36.8	89 44	137.7	50 03.6	89 44	137.3	50 30.3	89 44	137.0	50 56.9	89 45	136.6	51 23.4	88 45	136.2	51 49.9	88 45	135.8	52 16.3	88 46	135.5	52 42.7	88 46	135.1	7
8	49 10.5	89 45	136.3	49 37.1	88 45	136.0	50 03.6	88 45	135.6	50 30.1	88 46	135.3	50 56.4	88 46	134.9	51 22.7	88 46	134.5	51 48.9	87 47	134.1	52 15.1	87 47	133.7	8
9	48 43.6	88 46	135.1	49 10.0	88 46	134.7	49 36.3	88 46	134.3	50 02.6	87 47	133.9	50 28.8	87 47	133.6	50 54.9	87 47	133.2	51 20.9	87 48	132.8	51 46.9	86 48	132.4	9
30	48 16.0	88 47	133.8	48 42.3	87 47	133.4	49 08.4	87 47	133.0	49 34.5	87 48	132.7	50 00.5	87 48	132.3	50 26.5	86 48	131.9	50 52.3	86 49	131.5	51 18.1	86 49	131.1	30
1	47 47.9	87 48	132.5	48 14.0	87 48	132.2	48 40.0	87 48	131.8	49 05.9	86 49	131.4	49 31.7	86 49	131.0	49 57.5	86 49	130.6	50 23.2	85 50	130.2	50 48.8	85 50	129.8	1
2	47 19.2	86 49	131.3	47 45.1	86 49	130.9	48 10.9	86 49	130.5	48 36.7	86 50	130.1	49 02.3	85 50	129.8	49 27.9	85 50	129.4	49 53.4	85 50	128.9	50 18.9	85 51	128.5	2
3	46 49.9	86 50	130.1	47 15.7	86 50	129.7	47 41.3	85 50	129.3	48 06.9	85 50	128.9	48 32.4	85 51	128.5	48 57.8	85 51	128.1	49 23.2	84 51	127.7	49 48.4	84 52	127.3	3
4	46 20.2	85 50	128.9	46 45.7	85 51	128.5	47 11.2	85 51	128.1	47 36.7	85 51	127.7	48 02.0	84 52	127.3	48 27.3	84 52	126.9	48 52.4	84 53	126.5	49 17.5	83 52	126.1	4
35	45 49.9	85 51	127.7	46 15.3	85 52	127.3	46 40.6	84 52	126.9	47 05.9	84 52	126.5	47 31.1	84 52	126.1	47 56.2	83 53	125.7	48 21.2	83 53	125.3	48 46.1	83 53	124.9	35
6	45 19.1	84 52	126.5	45 44.4	84 52	126.1	46 09.6	84 53	125.8	46 34.7	84 53	125.4	46 59.7	83 53	125.0	47 24.6	83 53	124.5	47 49.5	83 54	124.1	48 14.2	82 54	123.7	6
7	44 47.9	84 53	125.4	45 13.0	84 53	125.0	45 38.1	83 53	124.6	46 03.0	83 54	124.2	46 27.9	83 54	123.8	46 52.7	82 54	123.4	47 17.3	82 54	123.0	47 41.9	82 55	122.6	7
8	44 16.3	83 53	124.3	44 41.2	83 54	123.9	45 06.1	83 54	123.5	45 30.9	83 54	123.1	45 55.6	82 54	122.7	46 20.2	82 55	122.3	46 44.8	82 55	121.8	47 09.2	81 55	121.4	8
9	43 44.2	83 54	123.1	44 09.0	83 54	122.8	44 33.7	82 55	122.4	44 58.4	82 55	122.0	45 22.9	82 55	121.6	45 47.4	81 55	121.1	46 11.8	81 56	120.7	46 36.1	81 56	120.3	9
40	43 11.7	82 55	122.1	43 36.4	82 55	121.7	44 01.0	82 55	121.3	44 25.5	82 56	120.9	44 49.9	81 56	120.5	45 14.2	81 56	120.0	45 38.5	81 56	119.6	46 02.6	80 56	119.2	40
1	42 38.8	82 55	121.0	43 03.3	82 56	120.6	43 27.8	81 56	120.2	43 52.2	81 56	119.8	44 16.5	81 56	119.4	44 40.7	81 57	119.0	45 04.8	80 57	118.5	45 28.8	80 57	118.1	1
2	42 05.6	81 56	119.9	42 30.0	81 56	119.5	42 54.3	81 56	119.1	43 18.5	81 57	118.7	43 42.7	80 57	118.3	44 06.7	80 57	117.9	44 30.7	80 57	117.5	44 54.6	79 58	117.0	2
3	41 31.9	81 57	118.9	41 56.2	81 57	118.5	42 20.4	81 57	118.1	42 44.5	80 57	117.7	43 08.6	80 57	117.3	43 32.5	80 58	116.8	43 56.3	79 58	116.4	44 20.1	79 58	116.0	3
4	40 58.0	81 57	117.8	41 22.2	80 57	117.4	41 46.2	80 58	117.0	42 10.2	80 58	116.6	42 34.1	80 58	116.2	42 57.9	79 58	115.8	43 21.7	79 58	115.4	43 45.3	79 59	115.0	4
45	40 23.7	80 58	116.8	40 47.8	80 58	116.4	41 11.7	80 58	116.0	41 35.6	79 58	115.6	41 59.4	79 58	115.2	42 23.1	79 59	114.8	42 46.7	79 59	114.4	43 10.2	78 59	113.9	45
6	39 49.2	80 58	115.8	40 13.1	80 58	115.4	40 36.9	79 58	115.0	41 00.7	79 59	114.6	41 24.3	79 59	114.2	41 47.9	78 59	113.8	42 11.4	78 59	113.4	42 34.8	78 59	112.9	6
7	39 14.3	79 59	114.8	39 38.1	79 59	114.4	40 01.8	79 59	114.0	40 25.5	79 59	113.6	40 49.0	78 59	113.2	41 12.5	78 59	112.8	41 35.9	78 60	112.4	41 59.1	77 60	112.0	7
8	38 39.2	79 59	113.8	39 02.9	79 59	113.4	39 26.5	79 59	113.0	39 50.0	78 60	112.6	40 13.4	78 60	112.2	40 36.8	78 60	111.8	41 00.1	77 60	111.4	41 23.3	77 60	111.0	8
9	38 03.8	79 59	112.9	38 27.3	79 60	112.5	38 50.8	78 60	112.1	39 14.3	78 60	111.7	39 37.6	78 60	111.3	40 00.9	77 60	110.9	40 24.0	77 09	110.4	40 47.1	77 61	110.0	9
50	37 28.1	78 60	111.9	37 51.6	78 60	111.5	38 15.0	78 60	111.1	38 38.3	78 60	110.7	39 01.6	77 60	110.3	39 24.7	77 61	109.9	39 47.8	77 61	109.5	40 10.8	76 61	109.1	50
1	36 52.2	78 60	111.0	37 15.6	78 60	110.6	37 38.9	78 60	110.2	38 02.1	77 61	109.8	38 25.3	77 61	109.4	38 48.4	77 61	109.0	39 11.3	76 61	108.5	39 34.2	76 61	108.1	1
2	36 16.1	78 61	110.0	36 39.4	78 61	109.6	37 02.6	77 61	109.2	37 25.7	77 61	108.8	37 48.8	77 61	108.4	38 11.8	76 61	108.0	38 34.7	76 61	107.6	38 57.5	76 62	107.2	2
3	35 39.7	78 61	109.1	36 02.9	77 61	108.7	36 26.1	77 61	108.3	36 49.1	77 61	107.9	37 12.1	76 61	107.5	37 35.0	76 62	107.1	37 57.8	76 62	106.7	38 20.6	76 62	106.3	3
4	35 03.2	77 61	108.2	35 26.3	77 61	107.8	35 49.4	77 61	107.4	36 12.4	76 62	107.0	36 35.3	76 62	106.6	36 58.1	76 62	106.2	37 20.8	76 62	105.8	37 43.4	75 62	105.4	4
55	34 26.5	77 62	107.3	34 49.5	77 62	106.9	35 12.5	76 62	106.5	35 35.4	76 62	106.1	35 58.2	76 62	105.7	36 21.0	76 62	105.3	36 43.6	75 62	104.9	37 06.2	75 62	104.5	55
6	33 49.5	77 62	106.4	34 12.5	76 62	106.0	34 35.4	76 62	105.6	34 58.3	76 62	105.2	35 21.0	76 62	104.8	35 43.7	75 62	104.4	36 06.3	75 62	104.0	36 28.8	75 63	103.6	6
7	33 12.5	76 62	105.5	33 35.4	76 62	105.1	33 58.2	76 62	104.7	34 21.0	76 62	104.3	34 43.6	75 62	104.0	35 06.3	75 63	103.6	35 28.8	75 63	103.1	35 51.2	75 63	102.7	7
8	32 35.2	76 62	104.6	32 58.1	76 62	104.3	33 20.8	76 63	103.9	33 43.5	76 63	103.5	34 06.1	75 63	103.1	34 28.7	75 63	102.7	34 51.2	75 63	102.3	35 13.5	74 63	101.9	8
9	31 57.8	76 63	103.8	32 20.6	76 63	103.4	32 43.3	76 63	103.0	33 06.0	75 63	102.6	33 28.5	75 63	102.2	33 51.0	75 63	101.8	34 13.4	75 63	101.4	34 35.7	74 63	101.0	9
60	31 20.3	76 63	102.9	31 43.0	76 63	102.5	32 05.7	75 63	102.2	32 28.3	75 63	101.8	32 50.8	75 63	101.4	33 13.2	75 63	101.0	33 35.6	74 63	100.6	33 57.8	74 63	100.2	60
1	30 42.7	76 63	102.1	31 05.3	75 63	101.7	31 27.9	75 63	101.3	31 50.4	75 63	100.9	32 12.9	75 63	100.5	32 35.3	74 63	100.1	32 57.6	74 63	99.7	33 19.8	74 64	99.3	1
2	30 04.9	75 63	101.2	30 27.5	75 63	100.9	30 50.0	75 63	100.5	31 12.5	75 63	100.1	31 34.9	75 63	99.7	31 57.3	74 64	99.3	32 19.5	74 64	98.9	32 41.7	74 64	98.5	2
3	29 27.0	75 63	100.4	29 49.6	75 63	100.0	30 12.1	75 63	99.6	30 34.5	75 64	99.2	30 56.9	74 64	98.9	31 19.2	74 64	98.5	31 41.4	74 64	98.1	32 03.5	74 64	97.7	3
4	28 49.0	75 63	99.6	29 11.5	75 64	99.2	29 34.0	75 64	98.8	29 56.4	75 64	98.4	30 18.7	74 64	98.0	30 41.0	74 64	97.7	31 03.2	74 64	97.3	31 25.3	74 64	96.9	4
65	28 10.9	75 64	98.7	28 33.4	75 64	98.4	28 55.9	75 64	98.0	29 18.2	74 64	97.6	29 40.5	74 64	97.2	30 02.7	74 64	96.8	30 24.9	74 64	96.4	30 47.0	73 64	96.1	65
6	27 32.8	75 64	97.9	27 55.2	75 64	97.6	28 17.6	75 64	97.2	28 39.9	74 64	96.8	29 02.2	74 64	96.4	29 24.4	74 64	96.0	29 46.5	74 64	95.6	30 08.6	73 64	95.2	6
7	26 54.6	75 64	97.1	27 17.0	75 64	96.7	27 39.3	74 64	96.4	28 01.6	74 64	96.0	28 23.8	74 64	95.6	28 46.0	74 64	95.2	29 08.1	74 64	94.8	29 30.2	73 64	94.5	7
8	26 16.3	75 64	96.3	26 38.6	75 64	95.9	27 01.0	74 64	95.6	27 23.2	74 64	95.2	27 45.4	74 64	94.8	28 07.6	74 64	94.4	28 29.7	73 64	94.0	28 51.7	73 64	93.7	8
9	25 37.9	75 64	95.5	26 00.3	74 64	95.1	26 22.6	74 64	94.8	26 44.8	74 64	94.4	27 07.0	74 64	94.0	27 29.1	74 64	93.6	27 51.2	73 64	93.3	28 13.2	73 64	92.9	9
70	24 59.5	75 64	94.7	25 21.8	74 64	94.4	25 44.1	74 64	94.0	26 06.3	74 64	93.6	26 28.5	74 64	93.2	26 50.6	74 64	92.9	27 12.7	73 64	92.5	27 34.6	73 64	92.1	70
1	24 21.0	74 64	93.9	24 43.3	74 64	93.6	25 05.6	74 64	93.2	25 27.8	74 64	92.8	25 50.0	74 64	92.5	26 12.1	74 64	92.1	26 34.1	73 64	91.7	26 56.1	73 64	91.3	1
2	23 42.5	74 64	93.2	24 04.8	74 64	92.8	24 27.1	74 64	92.4	24 49.3	74 64	92.1	25 11.4	74 64	91.7	25 33.5	74 64	91.3	25 55.6	73 64	90.9	26 17.5	73 64	90.5	2
3	23 04.0	74 64	92.4	23 26.3	74 64	92.0	23 48.5	74 64	91.6	24 10.7	74 64	91.3	24 32.9	74 64	90.9	24 55.0	74 64	90.5	25 17.0	73 64	90.2	25 39.0	73 64	89.8	3
4	22 25.5	74 64	91.6	22 47.7	74 64	91.2	23 10.0	74 64	90.9	23 32.2	74 64	90.5	23 54.3	74 64	90.1	24 16.4	74 64	89.8	24 38.4	73 64	89.4	25 00.4	73 64	89.0	4
75	21 46.9	74 64	90.8	22 09.2	74 64	90.5	22 31.4	74 64	90.1	22 53.6	74 64	89.7	23 15.7	74 64	89.4	23 37.8	74 64	89.0	23 59.9	73 64	88.6	24 21.8	73 64	88.3	75
6	21 08.3	74 64	90.1	21 30.6	74 64	89.7	21 52.9	74 64	89.3	22 15.0	74 64	89.0	22 37.2	74 64	88.6	22 59.3	74 64	88.2	23 21.3	73 64	87.9	23 43.3	73 64	87.5	6
7	20 29.8	74 64	89.3	20 52.1	74 64	88.9	21 14.3	74 64	88.6	21 36.5	74 64	88.2	21 58.6	74 64	87.9	22 20.7	74 64	87.5	22 42.8	73 64	87.1	23 04.8	73 64	86.8	7
8	19 51.2	74 64	88.5	20 13.5	74 64	88.2	20 35.7	74 64	87.8	20 58.0	74 64	87.5	21 20.1	74 64	87.1	21 42.2	74 64	86.7	22 04.3	73 64	86.4	22 26.3	73 64	86.0	8
9	19 12.7	74 64	87.8	19 35.0	74 64	87.4	19 57.2	74 64	87.1	20 19.4	74 64	86.7	20 41.6	74 64	86.3	21 03.7	74 64	86.0	21 25.8	74 64	85.6	21 47.8	73 64	85.3	9
80	18 34.1	74 64	87.0	18 56.4	74 64	86.7	19 18.7	74 64	86.3	19 40.9	74 64	86.0	20 03.1	74 64	85.6	20 25.3	74 64	85.2	20 47.4	74 64	84.9	21 09.4	73 64	84.5	80
1	17 55.6	74 64	86.3	18 18.0	74 64	85.9	18 40.2	74 64	85.6	19 02.5	74 64	85.2	19 24.7	74 64	84.9	19 46.9	74 64	84.5	20 09.0	74 64	84.1	20 31.1	74 64	83.8	1
2	17 17.2	75 64	85.5	17 39.5	74 64	85.2	18 01.8	74 64	84.8	18 24.1	74 64	84.5	18 46.3	74 64	84.1	19 08.5	74 64	83.7	19 30.6	74 64	83.4	19 52.8	74 64	83.0	2
3	16 38.7	75 64	84.8	17 01.1	74 64	84.4	17 23.4	74 64	84.1	17 45.7	74 64	83.7	18 08.0	74 64	83.4	18 30.2	74 64	83.0	18 52.4	74 64	82.7	19 14.5	74 64	82.3	3
4	16 00.4	75 64	84.0	16 22.7	75 64	83.7	16 45.1	74 64	83.3	17 07.4	74 64	83.0	17 29.7	74 64	82.6	17 51.9	74 64	82.3	18 14.1	74 64	81.9	18 36.3	74 64	81.6	4
85	15 22.0	75 64	83.3	15 44.4	75 64	82.9	16 06.8	75 64	82.6	16 29.2	74 64	82.2	16 51.5	74 64	81.9	17 13.8	74 64	81.5	17 36.0	74 63	81.2	17 58.2	74 63	80.8	85
6	14 43.8	75 64	82.5	15 06.2	75 64	82.2	15 28.6	75 64	81.8	15 51.0	75 64	81.5	16 13.3	74 63	81.1	16 35.7	74 63	80.8	16 57.9	74 63	80.4	17 20.2	74 63	80.1	6
7	14 05.6	75 64	81.8	14 28.0	75 64	81.4	14 50.5	75 63	81.1	15 12.9	75 63	80.8	15 35.3	75 63	80.4	15 57.6	74 63	80.1	16 19.9	74 63	79.7	16 42.2	74 63	79.4	7
8	13 27.4	75 63	81.0	13 49.9	75 63	80.7	14 12.4	75 63	80.4	14 34.9	75 63	80.0	14 57.3	75 63	79.7	15 19.7	75 63	79.3	15 42.0	74 63	79.0	16 04.4	74 63	78.6	8
9	12 49.4	75 63	80.3	13 11.9	75 63	80.0	13 34.4	75 63	79.6	13 56.9	75 63	79.3	14 19.4	75 63	78.9	14 41.8	75 63	78.6	15 04.2	75 63	78.3	15 26.6	75 63	77.9	9
90	12 11.4	75 63	79.6	12 34.0	75 63	79.2	12 56.5	75 63	78.9	13 19.1	75 63	78.5	13 41.6	75 63	78.2	14 04.1	75 63	77.9	14 26.5	75 63	77.5	14 48.9	75 63	77.2	90

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	24 00.0	1.0	01	180.0	23 30.0	1.0	01	180.0	23 00.0	1.0	01	180.0	22 30.0	1.0	01	180.0	22 00.0	1.0	01	180.0	21 30.0	1.0	01	180.0	21 00.0	1.0	01	180.0	20 30.0	1.0	01	180.0	00
1	23 59.6	1.0	02	178.9	23 29.6	1.0	02	179.0	22 59.6	1.0	02	179.0	22 29.7	1.0	02	179.0	21 59.7	1.0	02	179.0	21 29.7	1.0	02	179.0	20 59.7	1.0	02	179.0	20 29.7	1.0	02	179.0	1
2	23 58.6	1.0	03	177.9	23 28.6	1.0	03	177.9	22 58.6	1.0	03	177.9	22 28.6	1.0	03	177.9	21 58.6	1.0	03	177.9	21 28.6	1.0	03	178.0	20 58.6	1.0	03	178.0	20 28.6	1.0	03	178.0	2
3	23 56.8	1.0	04	176.8	23 26.8	1.0	04	176.9	22 56.9	1.0	04	176.9	22 26.9	1.0	04	176.9	21 56.9	1.0	04	176.9	21 26.9	1.0	04	176.9	20 56.9	1.0	04	177.0	20 27.0	1.0	04	177.0	3
4	23 54.3	1.0	05	175.8	23 24.4	1.0	05	175.8	22 54.4	1.0	05	175.8	22 24.4	1.0	05	175.9	21 54.5	1.0	05	175.9	21 24.5	1.0	05	175.9	20 54.5	1.0	05	176.0	20 24.6	1.0	05	176.0	4
05	23 51.2	1.0	06	174.7	23 21.2	1.0	06	174.8	22 51.3	1.0	06	174.8	22 21.3	1.0	06	174.8	21 51.4	1.0	06	174.9	21 21.4	1.0	06	174.9	20 51.5	1.0	06	174.9	20 21.5	1.0	06	175.0	05
6	23 47.3	1.0	08	173.7	23 17.4	1.0	08	173.7	22 47.4	1.0	08	173.8	22 17.5	1.0	08	173.8	21 47.6	1.0	07	173.9	21 17.7	1.0	07	173.9	20 47.7	1.0	07	173.9	20 17.8	1.0	07	174.0	6
7	23 42.7	1.0	09	172.6	23 12.8	1.0	09	172.7	22 42.9	1.0	09	172.7	22 13.0	1.0	09	172.8	21 43.1	1.0	09	172.8	21 13.2	1.0	09	172.9	20 43.3	1.0	08	172.9	20 13.4	1.0	08	173.0	7
8	23 37.4	1.0	10	171.6	23 07.5	1.0	10	171.7	22 37.7	1.0	10	171.7	22 07.8	1.0	10	171.8	21 38.0	1.0	10	171.8	21 08.1	1.0	10	171.9	20 38.2	1.0	10	171.9	20 08.4	1.0	10	172.0	8
9	23 31.4	99	11	170.6	23 01.6	99	11	170.6	22 31.8	99	11	170.7	22 02.0	99	11	170.7	21 32.1	99	11	170.8	21 02.3	99	11	170.9	20 32.5	99	11	170.9	20 02.7	99	11	171.0	9
10	23 24.8	99	12	169.5	22 55.0	99	12	169.6	22 25.2	99	12	169.7	21 55.4	99	12	169.7	21 25.6	99	12	169.8	20 55.8	99	12	169.8	20 26.1	99	12	169.9	19 56.3	99	12	170.0	10
1	23 17.4	99	13	168.5	22 47.7	99	13	168.6	22 17.9	99	13	168.6	21 48.2	99	13	168.7	21 18.5	99	13	168.8	20 48.7	99	13	168.8	20 19.0	99	13	168.9	19 49.2	99	13	169.0	1
2	23 09.4	99	15	167.4	22 39.7	99	14	167.5	22 10.0	99	14	167.6	21 40.3	99	14	167.7	21 10.6	99	14	167.8	20 40.9	99	14	167.8	20 11.2	99	14	167.9	19 41.5	99	14	168.0	2
3	23 00.6	99	16	166.4	22 31.0	99	16	166.5	22 01.4	99	15	166.6	21 31.7	99	15	166.7	21 02.1	99	15	166.7	20 32.5	99	15	166.8	20 02.8	99	15	166.9	19 33.2	99	15	167.0	3
4	22 51.2	99	17	165.4	22 21.7	99	17	165.5	21 52.1	99	17	165.6	21 22.5	99	16	165.7	20 52.9	99	16	165.7	20 23.3	99	16	165.8	19 53.8	99	16	165.9	19 24.2	99	16	166.0	4
15	22 41.2	98	18	164.4	22 11.7	98	18	164.5	21 42.1	98	18	164.6	21 12.6	98	18	164.6	20 43.1	98	17	164.7	20 13.6	98	17	164.8	19 44.1	98	17	164.9	19 14.5	98	17	165.0	15
6	22 30.4	98	19	163.3	22 01.0	98	19	163.4	21 31.5	98	19	163.5	21 02.1	98	19	163.6	20 32.6	98	19	163.7	20 03.2	98	18	163.8	19 33.7	98	18	163.9	19 04.2	98	18	164.0	6
7	22 19.0	98	20	162.3	21 49.7	98	20	162.4	21 20.3	98	20	162.5	20 50.9	98	20	162.6	20 21.5	98	20	162.7	19 52.1	98	19	162.9	19 22.7	98	19	163.0	18 53.3	98	19	163.1	7
8	22 07.0	98	21	161.3	21 37.7	98	21	161.4	21 08.4	98	21	161.5	20 39.1	98	21	161.6	20 09.8	98	21	161.8	19 40.4	98	21	161.9	19 11.1	98	20	162.0	18 41.8	98	20	162.1	8
9	21 54.3	97	22	160.3	21 25.1	97	22	160.4	20 55.9	97	22	160.5	20 26.6	97	22	160.6	19 57.4	97	22	160.8	19 28.1	98	22	160.9	18 58.9	98	21	161.0	18 29.6	98	21	161.1	9
20	21 41.0	97	23	159.3	21 11.8	97	23	159.4	20 42.7	97	23	159.5	20 13.5	97	23	159.7	19 44.4	97	23	159.8	19 15.2	97	23	159.9	18 46.0	97	22	160.0	18 16.8	97	22	160.2	20
1	21 27.0	97	24	158.3	20 58.0	97	24	158.4	20 28.9	97	24	158.5	19 59.8	97	24	158.7	19 30.7	97	24	158.8	19 01.6	97	24	158.9	18 32.5	97	23	159.1	18 03.4	97	23	159.2	1
2	21 12.4	97	25	157.3	20 43.5	97	25	157.4	20 14.5	97	25	157.6	19 45.5	97	25	157.7	19 16.5	97	25	157.8	18 47.5	97	25	158.0	18 18.4	97	24	158.1	17 49.4	97	24	158.2	2
3	20 57.2	96	26	156.3	20 28.3	96	26	156.4	19 59.4	96	26	156.6	19 30.5	96	26	156.7	19 01.6	96	26	156.9	18 32.7	96	26	157.0	18 03.7	96	25	157.1	17 34.8	96	25	157.3	3
4	20 41.4	96	27	155.3	20 12.6	96	27	155.4	19 43.8	96	27	155.6	19 15.0	96	27	155.7	18 46.1	96	27	155.9	18 17.3	96	27	156.0	17 48.5	96	26	156.2	17 19.6	96	26	156.3	4
25	20 25.0	96	28	154.3	19 56.3	96	28	154.5	19 27.6	96	28	154.6	18 58.8	96	28	154.8	18 30.1	96	28	154.9	18 01.3	96	28	155.1	17 32.6	96	27	155.2	17 03.8	96	27	155.4	25
6	20 08.0	95	29	153.3	19 39.4	95	29	153.5	19 10.7	95	29	153.7	18 42.1	95	29	153.8	18 13.5	95	29	154.0	17 44.8	96	29	154.1	17 16.1	96	28	154.3	16 47.5	96	28	154.4	6
7	19 50.4	95	30	152.4	19 21.9	95	30	152.5	18 53.3	95	30	152.7	18 24.8	95	30	152.8	17 56.2	95	30	153.0	17 27.7	95	30	153.2	16 59.1	95	29	153.3	16 30.5	95	29	153.5	7
8	19 32.2	95	31	151.4	19 03.8	95	31	151.6	18 35.3	95	31	151.7	18 06.9	95	31	151.9	17 38.5	95	31	152.1	17 10.0	95	30	152.2	16 41.5	95	30	152.4	16 13.0	95	30	152.6	8
9	19 13.5	94	32	150.4	18 45.1	94	32	150.6	18 16.8	94	32	150.8	17 48.5	94	32	150.9	17 20.1	95	32	151.1	16 51.7	95	31	151.3	16 23.4	95	31	151.5	15 55.0	95	31	151.6	9
30	18 54.1	94	33	149.5	18 25.9	94	33	149.6	17 57.7	94	33	149.8	17 29.4	94	33	150.0	17 01.2	94	32	150.2	16 32.9	94	32	150.4	16 04.7	94	32	150.5	15 36.4	94	32	150.7	30
1	18 34.3	94	34	148.5	18 06.2	94	34	148.7	17 38.0	94	34	148.9	17 09.9	94	33	149.1	16 41.7	94	33	149.2	16 13.6	94	33	149.4	15 45.4	94	33	149.6	15 17.2	94	33	149.8	1
2	18 13.9	93	35	147.6	17 45.8	93	35	147.8	17 17.8	93	35	147.9	16 49.8	93	34	148.1	16 21.8	93	34	148.3	15 53.7	94	34	148.5	15 25.6	94	34	148.7	14 57.6	94	34	148.9	2
3	17 52.9	93	36	146.6	17 25.0	93	36	146.8	16 57.1	93	35	147.0	16 29.2	93	35	147.2	16 01.2	93	35	147.4	15 33.3	93	35	147.6	15 05.3	93	35	147.8	14 37.4	93	35	148.0	3
4	17 31.4	93	37	145.7	17 03.6	93	36	145.9	16 35.8	93	36	146.1	16 08.0	93	36	146.3	15 40.2	93	36	146.5	15 12.4	93	36	146.7	14 44.5	93	36	146.9	14 16.6	93	35	147.0	4
35	17 09.4	92	38	144.8	16 41.7	92	37	145.0	16 14.1	92	37	145.2	15 46.3	92	37	145.4	15 18.6	92	37	145.6	14 50.9	92	37	145.8	14 23.2	92	36	146.0	13 55.4	93	36	146.1	35
6	16 46.9	92	38	143.8	16 19.3	92	38	144.0	15 51.8	92	38	144.2	15 24.2	92	38	144.4	14 56.6	92	38	144.6	14 28.9	92	37	144.9	14 01.3	92	37	145.1	13 33.7	92	37	145.3	6
7	16 23.9	92	39	142.9	15 56.5	92	39	143.1	15 29.0	92	39	143.3	15 01.5	92	39	143.5	14 34.0	92	38	143.7	14 06.5	92	38	144.0	13 39.0	92	38	144.2	13 11.5	92	38	144.4	7
8	16 00.4	91	40	142.0	15 33.1	91	40	142.2	15 05.7	91	40	142.4	14 38.3	91	39	142.6	14 11.0	91	39	142.8	13 43.6	91	39	143.1	13 16.2	91	39	143.3	12 48.7	91	39	143.5	8
9	15 36.4	91	41	141.1	15 09.2	91	41	141.3	14 41.9	91	40	141.5	14 14.7	91	40	141.7	13 47.4	91	40	142.0	13 20.1	91	40	142.2	12 52.9	91	40	142.4	12 25.6	91	39	142.6	9
40	15 12.0	90	42	140.2	14 44.8	90	41	140.4	14 17.7	90	41	140.6	13 50.6	90	41	140.8	13 23.4	91	41	141.1	12 56.3	91	41	141.3	12 29.1	91	40	141.5	12 01.9	91	40	141.7	40
1	14 47.0	90	42	139.3	14 20.0	90	42	139.5	13 53.0	90	42	139.7	13 26.0	90	42	140.0	12 59.0	90	42	140.2	12 31.9	90	41	140.4	12 04.8	90	41	140.6	11 37.8	90	41	140.8	1
2	14 21.7	90	43	138.4	13 54.8	90	43	138.6	13 27.9	90	43	138.9	13 01.0	90	42	139.1	12 34.0	90	42	139.3	12 07.1	90	42	139.5	11 40.1	90	42	139.8	11 13.2	90	42	140.0	2
3	13 55.8	89	44	137.5	13 29.1	89	44	137.7	13 02.3	89	43	138.0	12 35.5	89	43	138.2	12 08.7	89	43	138.4	11 41.8	89	43	138.7	11 15.0	89	43	138.9	10 48.2	89	42	139.1	3
4	13 29.6	89	44	136.6	13 02.9	89	44	136.9	12 36.2	89	44	137.1	12 09.6	89	44	137.3	11 42.9	89	44	137.6	11 16.2	89	44	137.8	10 49.4	89	43	138.0	10 22.7	89	43	138.3	4
45	13 02.9	88	45	135.8	12 36.3	88	45	136.0	12 09.8	89	45	136.2	11 43.2	89	45	136.5	11 16.6	89	44	136.7	10 50.0	89	44	136.9	10 23.4	89	44	137.2	9 56.8	89	44	137.4	45
6	12 35.7	88	46	134.9	12 09.3	88	46	135.1	11 42.9	88	46	135.4	11 16.4	88	45	135.6	10 50.0	88	45	135.8	10 23.5	88	45	136.1	9 57.0	88	45	136.3	9 30.5	88	45	136.6	6
7	12 08.2	88	47	134.0	11 41.9	88	46	134.3	11 15.6	88	46	134.5	10 49.2	88	46	134.8	10 22.9	88	46	135.0	9 56.5	88	46	135.2	9 30.2	88	45	135.5	9 03.8	88	45	135.7	7
8	11 40.3	87	47	133.2	11 14.1	87	47	133.4	10 47.9	87	47	133.7	10 21.7	87	47	133.9	9 55.4	87	46	134.2	9 29.2	87	46	134.4	9 02.9	88	46	134.6	8 36.7	88	46	134.9	8
9	11 11.9	87	48	132.3	10 45.9	87	48	132.6	10 19.8	87	47	132.8	9 53.7	87	47	133.1	9 27.6	87	47	133.3	9 01.4	87	47	133.6	8 35.3	87	47	133.8	8 09.1	87	47	134.1	9
50	10 43.2	87	48	131.5	10 17.3	87	48	131.7	9 51.3	87	48	132.0	9 25.3	87	48	132.2	8 59.3	87	48	132.5	8 33.3	87	48	132.7	8 07.3	87	47	133.0	7 41.2	87	47	133.2	50
1	10 14.1	86	49	130.6	9 48.3	86	49	130.9	9 22.4	86	49	131.1	8 56.5	86	49	131.4	8 30.7	86	48	131.6	8 04.8	86	48	131.9	7 38.9	86	48	132.1	7 12.9	86	48	132.4	1
2	9 44.7	86	50	129.8	9 18.9	86	50	130.0	8 53.2	86	49	130.3	8 27.4	86	49	130.6	8 01.7	86	49	130.8	7 35.9	86	49	131.1	7 10.1	86	49	131.3	6 44.3	86	48	131.6	2
3	9 14.9	85	50	128.9	8 49.2	85	50	129.2	8 23.6	85	50	129.5	7 57.9	86	50	129.7	7 32.3	86	50	130.0	7 06.6	86	49	130.2	6 40.9	86	49	130.5	6 15.3	86	49	130.8	3
4	8 44.7	85	51	128.1	8 19.2	85	51	128.4	7 53.6	85	50	128.6	7 28.1	85	50	128.9	7 02.6	85	50	129.2	6 37.0	85	50	129.4	6 11.4	85	50	129.7	5 45.9	85	50	130.0	4
55	8 14.2	85	51	127.3	7 48.8	85	51	127.6	7 23.4	85	51	127.8	6 57.9	85	51	128.1	6 32.5	85	51	128.4	6 07.0	85	50	128.6	5 41.6	85	50	128.9	5 16.1	85	50	129.2	55
6	7 43.3	84	52	126.5	7 18.0	84	52	126.7	6 52.7	84	52	127.0	6 27.4	84	51	127.3	6 02.1	84	51	127.5	5 36.7	84	51	127.8	5 11.4	84	51	128.1					6
7	7 12.1	84	52	125.6	6 47.0	84	52	125.9	6 21.8	84	52	126.2	5 56.5	84	52	126.5	5 31.3	84	52	126.7	5 06.1	84	51	127.0									7
8	6 40.6	84	53	124.8	6 15.6	84	53	125.1	5 50.5	84	53	125.4	5 25.4	84	52	125.7	5 00.3	84	52	125.9													8
9	6 08.8	83	54	124.0	5 43.9	83	53	124.3	5 18.9	83	53	124.6																					9
60	5 36.7	83	54	123.2	5 11.9	83	54	123.5																									60
1	5 04.3	83	54	122.4																													1

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	11 33.5	75	63	78.8	11 56.1	75	63	78.5	12 18.7	75	63	78.1	12 41.3	75	63	77.8	13 03.9	75	63	77.5	13 26.4	75	63	77.1	13 48.9	75	62	76.8	14 11.4	75	62	76.4	91
2	10 55.7	76	63	78.1	11 18.4	76	63	77.7	11 41.1	75	63	77.4	12 03.7	75	63	77.1	12 26.3	75	62	76.7	12 48.9	75	62	76.4	13 11.4	75	62	76.1	13 34.0	75	62	75.7	2
3	10 18.0	76	63	77.3	10 40.8	76	63	77.0	11 03.5	76	62	76.7	11 26.1	76	62	76.3	11 48.8	75	62	76.0	12 11.4	75	62	75.7	12 34.1	75	62	75.3	12 56.6	75	62	75.0	3
4	9 40.5	76	62	76.6	10 03.2	76	62	76.3	10 26.0	76	62	75.9	10 48.7	76	62	75.6	11 11.4	76	62	75.3	11 34.1	76	62	74.9	11 56.8	76	62	74.6	12 19.5	75	62	74.3	4
95	9 03.0	76	62	75.9	9 25.8	76	62	75.5	9 48.6	76	62	75.2	10 11.4	76	62	74.9	10 34.2	76	62	74.5	10 57.0	76	62	74.2	11 19.7	76	62	73.9	11 42.4	76	62	73.5	95
6	8 25.7	76	62	75.1	8 48.6	76	62	74.8	9 11.4	76	62	74.5	9 34.3	76	62	74.1	9 57.1	76	62	73.8	10 19.9	76	62	73.5	10 42.7	76	61	73.1	11 05.5	76	61	72.8	6
7	7 48.5	77	62	74.4	8 11.4	76	62	74.0	8 34.3	76	62	73.7	8 57.2	76	61	73.4	9 20.1	76	61	73.1	9 43.0	76	61	72.7	10 05.9	76	61	72.4	10 28.7	76	61	72.1	7
8	7 11.4	77	62	73.6	7 34.4	77	61	73.3	7 57.4	77	61	73.0	8 20.4	77	61	72.7	8 43.3	77	61	72.3	9 06.3	76	61	72.0	9 29.2	76	61	71.7	9 52.1	76	61	71.3	8
9	6 34.5	77	61	72.9	6 57.5	77	61	72.6	7 20.6	77	61	72.2	7 43.6	77	61	71.9	8 06.6	77	61	71.6	8 29.7	77	61	71.3	8 52.7	77	61	70.9	9 15.6	77	60	70.6	9
100	5 57.7	77	61	72.1	6 20.8	77	61	71.8	6 43.9	77	61	71.5	7 07.0	77	61	71.2	7 30.1	77	61	70.9	7 53.2	77	60	70.5	8 16.3	77	60	70.2	8 39.3	77	60	69.9	100
1	5 21.0	77	61	71.4	5 44.2	77	61	71.1	6 07.4	77	61	70.8	6 30.6	77	60	70.4	6 53.8	77	60	70.1	7 16.9	77	60	69.8	7 40.1	77	60	69.5	8 03.2	77	60	69.2	1
2					5 07.8	78	60	70.3	5 31.1	78	60	70.0	5 54.4	77	60	69.7	6 17.6	77	60	69.4	6 40.8	77	60	69.1	7 04.0	77	60	68.7	7 27.3	77	60	68.4	2
3													5 18.3	78	60	69.0	5 41.6	78	60	68.6	6 04.9	78	60	68.3	6 28.2	78	59	68.0	6 51.5	78	59	67.7	3
4																	5 05.8	78	59	67.9	5 29.2	78	59	67.6	5 52.5	78	59	67.3	6 15.9	78	59	66.9	4
105																									5 17.1	78	59	66.5	5 40.5	78	59	66.2	105
6																													5 05.3	78	58	65.5	6

Digitized by Google

Lat. 50°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	60 00.0	1.0 01	180.0	60 30.0	1.0 01	180.0	61 00.0	1.0 01	180.0	61 30.0	1.0 01	180.0	62 00.0	1.0 01	180.0	62 30.0	1.0 01	180.0	63 00.0	1.0 01	180.0	63 30.0	1.0 01	180.0	00
1	59 59.4	1.0 03	178.1	60 29.4	1.0 03	178.1	60 59.4	1.0 03	178.1	61 29.3	1.0 03	178.1	61 59.3	1.0 03	178.0	62 29.3	1.0 03	178.0	62 59.3	1.0 03	178.0	63 29.3	1.0 03	177.9	1
2	59 57.5	1.0 05	176.2	60 27.4	1.0 05	176.2	60 57.4	1.0 05	176.2	61 27.4	1.0 06	176.1	61 57.3	1.0 06	176.1	62 27.3	1.0 06	176.0	62 57.3	1.0 06	175.9	63 27.2	1.0 06	175.9	2
3	59 54.3	1.0 07	174.4	60 24.2	1.0 07	174.3	60 54.2	1.0 08	174.2	61 24.1	1.0 08	174.2	61 54.0	1.0 08	174.1	62 24.0	1.0 08	174.0	62 53.9	1.0 08	173.9	63 23.8	1.0 08	173.8	3
4	59 49.9	1.0 09	172.5	60 19.8	1.0 10	172.4	60 49.7	1.0 10	172.3	61 19.5	1.0 10	172.2	61 49.4	1.0 10	172.1	62 19.3	1.0 10	172.0	62 49.1	1.0 10	171.9	63 19.0	1.0 10	171.8	4
05	59 44.3	99 11	170.6	60 14.1	99 12	170.5	60 43.9	99 12	170.4	61 13.7	99 12	170.3	61 43.5	99 12	170.2	62 13.3	99 12	170.1	62 43.0	99 12	169.9	63 12.8	99 12	169.8	05
6	59 37.4	99 14	168.8	60 07.1	99 14	168.7	60 36.8	99 14	168.5	61 06.5	99 14	168.4	61 36.2	99 14	168.2	62 05.9	99 14	168.1	62 35.6	99 14	167.9	63 05.3	99 15	167.8	6
7	59 29.3	99 16	167.0	59 58.9	99 16	166.8	60 28.5	99 16	166.7	60 58.2	99 16	166.5	61 27.8	99 16	166.3	61 57.3	99 16	166.1	62 26.9	99 17	166.0	62 56.5	99 17	165.8	7
8	59 20.0	98 17	165.1	59 49.5	98 18	165.0	60 19.0	98 18	164.8	60 48.5	98 18	164.6	61 18.0	98 18	164.4	61 47.5	98 19	164.2	62 16.9	98 19	164.0	62 46.4	98 19	163.8	8
9	59 09.5	98 19	163.3	59 38.9	98 20	163.1	60 08.3	98 20	162.9	60 37.7	98 20	162.7	61 07.0	98 20	162.5	61 36.4	98 21	162.3	62 05.7	98 21	162.1	62 35.0	98 21	161.8	9
10	58 57.9	98 21	161.5	59 27.2	98 22	161.3	59 56.4	97 22	161.1	60 25.6	97 22	160.9	60 54.9	97 22	160.7	61 24.0	97 23	160.4	61 53.2	97 23	160.2	62 22.3	97 23	159.9	10
1	58 45.1	97 23	159.8	59 14.2	97 23	159.5	59 43.4	97 24	159.3	60 12.4	97 24	159.1	60 41.5	97 24	158.8	61 10.5	97 24	158.6	61 39.5	97 25	158.3	62 08.5	96 25	158.0	1
2	58 31.2	97 25	158.0	59 00.2	97 25	157.8	59 29.2	96 25	157.5	59 58.1	96 26	157.3	60 27.0	96 26	157.0	60 55.8	96 26	156.7	61 24.7	96 27	156.4	61 53.5	96 27	156.1	2
3	58 16.3	96 27	156.3	58 45.1	96 27	156.0	59 13.9	96 27	155.8	59 42.6	96 28	155.5	60 11.4	96 28	155.2	60 40.0	96 28	154.9	61 08.7	95 28	154.6	61 37.3	95 29	154.3	3
4	58 00.2	96 28	154.6	58 28.9	96 29	154.3	58 57.5	95 29	154.0	59 26.1	95 29	153.7	59 54.6	95 30	153.4	60 23.1	95 30	153.1	60 51.6	95 30	152.8	61 20.0	95 31	152.5	4
15	57 43.2	95 30	152.9	58 11.7	95 30	152.6	58 40.1	95 31	152.3	59 08.5	95 31	152.0	59 36.9	94 31	151.7	60 05.2	94 32	151.3	60 33.4	94 32	151.0	61 01.6	94 32	150.7	15
6	57 25.1	94 32	151.2	57 53.4	94 32	150.9	58 21.7	94 32	150.6	58 49.9	94 33	150.3	59 18.1	94 33	150.0	59 46.2	94 33	149.6	60 14.2	93 34	149.3	60 42.2	93 34	148.9	6
7	57 06.1	94 33	149.6	57 34.2	94 34	149.3	58 02.3	93 34	149.0	58 30.3	93 34	148.6	58 58.3	93 35	148.3	59 26.2	93 35	147.9	59 54.0	93 35	147.5	60 21.8	92 36	147.2	7
8	56 46.1	93 35	148.0	57 14.0	93 35	147.7	57 41.9	93 35	147.3	58 09.7	93 36	147.0	58 37.5	92 36	146.6	59 05.2	92 36	146.2	59 32.8	92 37	145.9	60 00.4	92 37	145.5	8
9	56 25.2	93 36	146.4	56 53.0	92 37	146.1	57 20.6	92 37	145.7	57 48.3	92 37	145.4	58 15.8	92 38	145.0	58 43.3	92 38	144.6	59 10.7	91 38	144.2	59 38.1	91 39	143.8	9
20	56 03.5	92 38	144.9	56 31.0	92 38	144.5	56 58.5	92 38	144.1	57 25.9	91 39	143.8	57 53.2	91 39	143.4	58 20.5	91 39	143.0	58 47.7	91 40	142.6	59 14.9	90 40	142.2	20
1	55 40.8	91 39	143.3	56 08.2	91 39	143.0	56 35.5	91 40	142.6	57 02.7	91 40	142.2	57 29.8	90 40	141.8	57 56.9	90 41	141.4	58 23.9	90 41	141.0	58 50.8	90 42	140.6	1
2	55 17.4	91 40	141.8	55 44.5	90 41	141.4	56 11.6	90 41	141.1	56 38.6	90 41	140.7	57 05.6	90 42	140.3	57 32.4	89 42	139.8	57 59.2	89 42	139.4	58 25.9	89 43	139.0	2
3	54 53.2	90 42	140.3	55 20.1	90 42	139.9	55 47.0	89 42	139.6	56 13.8	89 43	139.2	56 40.5	89 43	138.7	57 07.2	89 43	138.3	57 33.7	88 44	137.9	58 00.2	88 44	137.5	3
4	54 28.2	89 43	138.9	54 54.9	89 43	138.5	55 21.6	89 44	138.1	55 48.2	89 44	137.7	56 14.7	88 44	137.3	56 41.1	88 45	136.8	57 07.5	88 45	136.4	57 33.7	87 45	135.9	4
25	54 02.4	89 44	137.4	54 29.0	88 44	137.0	54 55.5	88 45	136.6	55 21.9	88 45	136.2	55 48.2	88 45	135.8	56 14.4	87 46	135.4	56 40.5	87 46	134.9	57 06.5	87 46	134.5	25
6	53 36.0	88 45	136.0	54 02.4	88 46	135.6	54 28.6	87 46	135.2	54 54.8	87 46	134.8	55 20.9	87 46	134.4	55 47.0	87 47	133.9	56 12.9	86 47	133.5	56 38.7	86 48	133.0	6
7	53 08.9	87 46	134.7	53 35.1	87 47	134.2	54 01.1	87 47	133.8	54 27.1	86 47	133.4	54 53.0	86 48	133.0	55 18.8	86 48	132.5	55 44.6	86 48	132.1	56 10.2	85 49	131.6	7
8	52 41.1	87 47	133.3	53 07.1	86 48	132.9	53 33.0	86 48	132.5	53 58.8	86 48	132.0	54 24.5	86 49	131.6	54 50.1	85 49	131.1	55 15.6	85 49	130.7	55 41.0	84 50	130.2	8
9	52 12.8	86 48	132.0	52 38.6	86 49	131.5	53 04.3	85 49	131.1	53 29.9	85 49	130.7	53 55.4	85 50	130.2	54 20.8	85 50	129.8	54 46.1	84 50	129.3	55 11.3	84 50	128.9	9
30	51 43.8	85 49	130.7	52 09.4	85 50	130.2	52 34.9	85 50	129.8	53 00.3	85 50	129.4	53 25.6	84 50	128.9	53 50.8	84 51	128.5	54 15.9	83 51	128.0	54 40.9	83 51	127.5	30
1	51 14.3	85 50	129.4	51 39.7	85 50	128.9	52 05.0	84 51	128.5	52 30.2	84 51	128.1	52 55.4	84 51	127.6	53 20.4	83 52	127.2	53 45.3	83 52	126.7	54 10.1	82 52	126.2	1
2	50 44.2	84 51	128.1	51 09.4	84 51	127.7	51 34.6	84 52	127.2	51 59.6	83 52	126.8	52 24.5	83 52	126.3	52 49.4	83 52	125.9	53 14.1	82 53	125.4	53 38.7	82 53	124.9	2
3	50 13.6	84 52	126.9	50 38.6	83 52	126.4	51 03.6	83 52	126.0	51 28.5	83 53	125.6	51 53.2	82 53	125.1	52 17.9	82 53	124.6	52 42.4	82 54	124.2	53 06.9	81 54	123.7	3
4	49 42.5	83 53	125.7	50 07.4	83 53	125.2	50 32.2	82 53	124.8	50 56.9	82 53	124.3	51 21.4	82 54	123.9	51 45.9	81 54	123.4	52 10.3	81 54	122.9	52 34.5	81 55	122.5	4
35	49 10.9	83 53	124.5	49 35.6	82 54	124.0	50 00.3	82 54	123.6	50 24.8	82 54	123.1	50 49.2	81 54	122.7	51 13.5	81 55	122.2	51 37.7	80 55	121.7	52 01.8	80 55	121.2	35
6	48 38.9	82 54	123.3	49 03.5	82 54	122.8	49 27.9	81 55	122.4	49 52.3	81 55	121.9	50 16.5	81 55	121.5	50 40.7	80 55	121.0	51 04.7	80 56	120.5	51 28.6	79 56	120.1	6
7	48 06.4	82 55	122.1	48 30.8	81 55	121.7	48 55.1	81 55	121.2	49 19.3	80 56	120.8	49 43.4	80 56	120.3	50 07.4	80 56	119.9	50 31.3	79 56	119.4	50 55.0	79 57	118.9	7
8	47 33.6	81 55	121.0	47 57.8	81 56	120.5	48 22.0	80 56	120.1	48 46.0	80 56	119.7	49 10.0	80 56	119.2	49 33.8	79 57	118.7	49 57.5	79 57	118.2	50 21.1	78 57	117.8	8
9	47 00.3	81 56	119.9	47 24.4	80 56	119.4	47 48.4	80 57	119.0	48 12.3	79 57	118.5	48 36.1	79 57	118.1	48 59.8	79 57	117.6	49 23.3	78 57	117.1	49 46.8	78 58	116.7	9
40	46 26.7	80 57	118.8	46 50.6	80 57	118.3	47 14.5	79 57	117.9	47 38.3	79 57	117.4	48 01.9	79 58	117.0	48 25.4	78 58	116.5	48 48.8	78 58	116.0	49 12.2	77 58	115.6	40
1	45 52.7	80 57	117.7	46 16.5	79 57	117.2	46 40.2	79 58	116.8	47 03.9	79 58	116.3	47 27.4	78 58	115.9	47 50.8	78 58	115.4	48 14.0	77 59	115.0	48 37.2	77 59	114.5	1
2	45 18.4	79 58	116.6	45 42.1	79 58	116.2	46 05.7	78 58	115.7	46 29.1	78 58	115.3	46 52.5	78 59	114.8	47 15.8	77 59	114.4	47 38.9	77 59	113.9	48 02.0	77 59	113.4	2
3	44 43.8	79 58	115.6	45 07.3	78 58	115.1	45 30.8	78 59	114.7	45 54.1	78 59	114.2	46 17.4	77 59	113.8	46 40.5	77 59	113.3	47 03.5	77 59	112.9	47 26.4	76 60	112.4	3
4	44 08.8	78 59	114.5	44 32.2	78 59	114.1	44 55.6	78 59	113.7	45 18.8	77 59	113.2	45 41.9	77 60	112.8	46 04.9	77 60	112.3	46 27.8	76 60	111.8	46 50.6	76 60	111.4	4
45	43 33.6	78 59	113.5	43 56.9	78 59	113.1	44 20.1	77 60	112.6	44 43.2	77 60	112.2	45 06.2	77 60	111.7	45 29.1	76 60	111.3	45 51.9	76 60	110.8	46 14.6	75 60	110.3	45
6	42 58.1	78 60	112.5	43 21.3	77 60	112.1	43 44.4	77 60	111.6	44 07.4	76 60	111.2	44 30.3	76 60	110.7	44 53.1	76 60	110.3	45 15.8	75 61	109.8	45 38.3	75 61	109.4	6
7	42 22.3	77 60	111.5	42 45.4	77 60	111.1	43 08.4	76 60	110.7	43 31.3	76 60	110.2	43 54.1	76 61	109.8	44 16.8	75 61	109.3	44 39.4	75 61	108.8	45 01.8	75 61	108.4	7
8	41 46.3	77 60	110.6	42 09.3	76 61	110.1	42 32.2	76 61	109.7	42 55.0	76 61	109.2	43 17.7	75 61	108.8	43 40.3	75 61	108.3	44 02.8	75 61	107.9	44 25.1	74 62	107.4	8
9	41 10.1	76 61	109.6	41 33.0	76 61	109.2	41 55.8	76 61	108.7	42 18.5	75 61	108.3	42 41.1	75 61	107.8	43 03.6	75 61	107.4	43 26.0	74 62	106.9	43 48.2	74 62	106.5	9
50	40 33.7	76 61	108.6	40 56.5	76 61	108.2	41 19.2	76 61	107.8	41 41.8	75 62	107.3	42 04.3	75 62	106.9	42 26.7	74 62	106.4	42 49.0	74 62	106.0	43 11.1	74 62	105.5	50
1	39 57.0	76 61	107.7	40 19.7	76 62	107.3	40 42.4	75 62	106.8	41 04.9	75 62	106.4	41 27.3	75 62	106.0	41 49.6	74 62	105.5	42 11.8	74 62	105.1	42 33.9	73 62	104.6	1
2	39 20.2	76 62	106.8	39 42.8	75 62	106.4	40 05.4	75 62	105.9	40 27.8	75 62	105.5	40 50.1	74 62	105.1	41 12.4	74 62	104.6	41 34.5	74 62	104.2	41 56.5	73 63	103.7	2
3	38 43.2	75 62	105.9	39 05.7	75 62	105.4	39 28.2	75 62	105.0	39 50.5	74 62	104.6	40 12.8	74 62	104.1	40 35.0	74 63	103.7	40 57.0	73 63	103.3	41 19.0	73 63	102.8	3
4	38 06.0	75 62	105.0	38 28.5	75 62	104.5	38 50.9	74 62	104.1	39 13.1	74 63	103.7	39 35.3	74 63	103.3	39 57.4	73 63	102.8	40 19.4	73 63	102.4	40 41.3	73 63	101.9	4
55	37 28.7	75 62	104.1	37 51.1	75 63	103.7	38 13.4	74 63	103.2	38 35.6	74 63	102.8	38 57.7	74 63	102.4	39 19.8	73 63	101.9	39 41.7	73 63	101.5	40 03.5	73 63	101.0	55
6	36 51.2	75 63	103.2	37 13.5	74 63	102.8	37 35.8	74 63	102.4	37 57.9	74 63	101.9	38 20.0	73 63	101.5	38 42.0	73 63	101.1	39 03.8	73 63	100.6	39 25.6	72 63	100.2	6
7	36 13.6	74 63	102.3	36 35.9	74 63	101.9	36 58.0	74 63	101.5	37 20.1	74 63	101.1	37 42.1	73 63	100.6	38 04.1	73 63	100.2	38 25.9	73 63	99.8	38 47.6	72 64	99.3	7
8	35 35.8	74 63	101.5	35 58.1	74 63	101.1	36 20.2	74 63	100.6	36 42.2	73 63	100.2	37 04.2	73 63	99.8	37 26.0	73 64	99.4	37 47.8	72 64	98.9	38 09.5	72 64	98.5	8
9	34 58.0	74 63	100.6	35 20.2	74 63	100.2	35 42.2	73 63	99.8	36 04.2	73 64	99.4	36 26.1	73 64	98.9	36 48.0	73 64	98.5	37 09.7	72 64	98.1	37 31.3	72 64	97.6	9
60	34 20.0	74 63	99.8	34 42.1	74 64	99.4	35 04.2	73 64	98.9	35 26.1	73 64	98.5	35 48.0	73 64	98.1	36 09.8	72 64	97.7	36 31.5	72 64	97.3	36 53.0	72 64	96.8	60
1	33 42.0	74 64	98.9	34 04.0	73 64	98.5	34 26.0	73 64	98.1	34 48.0	73 64	97.7	35 09.8	73 64	97.3	35 31.5	72 64	96.9	35 53.2	72 64	96.4	36 14.7	72 64	96.0	1
2	33 03.8	74 64	98.1	33 25.9	73 64	97.7	33 47.8	73 64	97.3	34 09.7	73 64	96.9	34 31.5	72 64	96.5	34 53.2	72 64	96.0	35 14.8	72 64	95.6	35 36.3	72 64	95.2	2
3	32 25.6	73 64	97.3	32 47.6	73 64	96.9	33 09.5	73 64	96.5	33 31.4	73 64	96.1	33 53.1	72 64	95.6	34 14.8	72 64	95.2	34 36.4	72 64	94.8	34 57.9	72 64	94.4	3
4	31 47.3	73 64	96.5	32 09.3	73 64	96.1	32 31.2	73 64	95.7	32 53.0	73 64	95.3	33 14.7	72 64	94.8	33 36.4	72 64	94.4	33 57.9	72 64	94.0	34 19.4	71 64	93.6	4
65	31 09.0	73 64	95.7	31 30.9	73 64	95.3	31 52.8	73 64	94.9	32 14.6	72 64	94.5	32 36.3	72 64	94.0	32 57.9	72 64	93.6	33 19.5	72 64	93.2	33 40.9	71 64	92.8	65
6	30 30.6	73 64	94.9	30 52.5	73 64	94.5	31 14.3	73 64	94.1	31 36.1	72 64	93.7	31 57.8	72 64	93.2	32 19.4	72 64	92.8	32 40.9	72 64	92.4	33 02.4	71 64	92.0	6
7	29 52.1	73 64	94.1	30 14.0	73 64	93.7	30 35.8	73 64	93.3	30 57.6	72 64	92.9	31 19.3	72 64	92.5	31 40.9	72 64	92.1	32 02.4	72 64	91.6	32 23.8	71 64	91.2	7
8	29 13.6	73 64	93.3	29 35.5	73 64	92.9	29 57.3	73 64	92.5	30 19.1	72 64	92.1	30 40.7	72 64	91.7	31 02.3	72 64	91.3	31 23.8	72 64	90.9	31 45.3	71 64	90.5	8
9	28 35.1	73 64	92.5	28 57.0	73 64	92.1	29 18.8	73 64	91.7	29 40.5	72 64	91.3	30 02.2	72 64	90.9	30 23.8	72 64	90.5	30 45.3	72 64	90.1	31 06.7	71 64	89.7	9
70	27 56.6	73 64	91.7	28 18.4	73 64	91.3	28 40.2	73 64	90.9	29 01.9	72 64	90.5	29 23.6	72 64	90.1	29 45.2	72 64	89.7	30 06.7	72 64	89.3	30 28.1	71 64	88.9	70
1	27 18.0	73 64	90.9	27 39.9	73 64	90.5	28 01.7	73 64	90.2	28 23.4	72 64	89.8	28 45.0	72 64	89.4	29 06.6	72 64	89.0	29 28.1	72 64	88.6	29 49.6	71 64	88.2	1
2	26 39.4	73 64	90.2	27 01.3	73 64	89.8	27 23.1	73 64	89.4	27 44.8	72 64	89.0	28 06.5	72 64	88.6	28 28.1	72 64	88.2	28 49.6	72 64	87.8	29 11.0	71 64	87.4	2
3	26 00.9	73 64	89.4	26 22.7	73 64	89.0	26 44.5	73 64	88.6	27 06.3	72 64	88.2	27 27.9	72 64	87.9	27 49.5	72 64	87.5	28 11.1	72 64	87.1	28 32.5	71 64	86.7	3
4	25 22.3	73 64	88.6	25 44.2	73 64	88.3	26 06.0	73 64	87.9	26 27.7	72 64	87.5	26 49.4	72 64	87.1	27 11.0	72 64	86.7	27 32.6	72 64	86.3	27 54.0	71 64	85.9	4
75	24 43.8	73 64	87.9	25 05.6	73 64	87.5	25 27.5	73 64	87.1	25 49.2	72 64	86.7	26 10.9	72 64	86.4	26 32.5	72 64	86.0	26 54.1	72 64	85.6	27 15.6	72 64	85.2	75
6	24 05.2	73 64	87.1	24 27.1	73 64	86.8	24 48.9	73 64	86.4	25 10.7	72 64	86.0	25 32.4	72 64	85.6	25 54.1	72 64	85.2	26 15.7	72 64	84.8	26 37.2	72 64	84.5	6
7	23 26.7	73 64	86.4	23 48.6	73 64	86.0	24 10.5	73 64	85.6	24 32.3	73 64	85.3	24 54.0	72 64	84.9	25 15.7	72 64	84.5	25 37.3	72 64	84.1	25 58.8	72 64	83.7	7
8	22 48.3	73 64	85.6	23 10.2	73 64	85.3	23 32.0	73 64	84.9	23 53.8	73 64	84.5	24 15.6	72 64	84.1	24 37.3	72 64	83.8	24 58.9	72 64	83.4	25 20.5	72 64	83.0	8
9	22 09.8	73 64	84.9	22 31.8	73 64	84.5	22 53.6	73 64	84.2	23 15.5	73 64	83.8	23 37.3	73 64	83.4	23 59.0	72 64	83.0	24 20.7	72 64	82.6	24 42.3	72 64	82.3	9
80	21 31.4	73 64	84.1	21 53.4	73 64	83.8	22 15.3	73 64	83.4	22 37.2	73 64	83.0	22 59.0	73 64	82.7	23 20.7	72 64	82.3	23 42.4	72 64	81.9	24 04.1	72 64	81.5	80
1	20 53.1	73 64	83.4	21 15.1	73 64	83.0	21 37.0	73 64	82.7	21 58.9	73 64	82.3	22 20.8	73 64	81.9	22 42.5	73 64	81.6	23 04.3	72 63	81.2	23 26.0	72 63	80.8	1
2	20 14.8	73 64	82.7	20 36.8	73 64	82.3	20 58.8	73 64	81.9	21 20.7	73 64	81.6	21 42.6	73 63	81.2	22 04.4	73 63	80.8	22 26.2	73 63	80.5	22 47.9	72 63	80.1	2
3	19 36.6	74 64	81.9	19 58.6	73 64	81.6	20 20.7	73 63	81.2	20 42.6	73 63	80.9	21 04.5	73 63	80.5	21 26.4	73 63	80.1	21 48.2	73 63	79.7	22 10.0	72 63	79.4	3
4	18 58.4	74 63	81.2	19 20.5	74 63	80.8	19 42.6	73 63	80.5	20 04.6	73 63	80.1	20 26.5	73 63	79.8	20 48.4	73 63	79.4	21 10.3	73 63	79.0	21 32.1	73 63	78.7	4
85	18 20.4	74 63	80.5	18 42.5	74 63	80.1	19 04.6	74 63	79.8	19 26.6	73 63	79.4	19 48.6	73 63	79.0	20 10.6	73 63	78.7	20 32.5	73 63	78.3	20 54.4	73 63	77.9	85
6	17 42.4	74 63	79.7	18 04.5	74 63	79.4	18 26.7	74 63	79.0	18 48.8	74 63	78.7	19 10.8	73 63	78.3	19 32.8	73 63	78.0	19 54.8	73 63	77.6	20 16.7	73 63	77.2	6
7	17 04.5	74 63	79.0	17 26.7	74 63	78.7	17 48.9	74 63	78.3	18 11.0	74 63	78.0	18 33.1	74 63	77.6	18 55.1	73 63	77.2	19 17.2	73 63	76.9	19 39.1	73 62	76.5	7
8	16 26.7	74 63	78.3	16 48.9	74 63	77.9	17 11.1	74 63	77.6	17 33.3	74 63	77.2	17 55.5	74 63	76.9	18 17.6	74 62	76.5	18 39.7	74 62	76.2	19 01.7	73 62	75.8	8
9	15 48.9	74 63	77.6	16 11.3	74 63	77.2	16 33.5	74 62	76.9	16 55.8	74 62	76.5	17 18.0	74 62	76.2	17 40.1	74 62	75.8	18 02.3	74 62	75.5	18 24.4	74 62	75.1	9
	15 11.3	75 62	76.8	15 33.7	74 62	76.5	15 56.0	74 62	76.1	16 18.3	74 62	75.8	16 40.6	74 62	75.4	17 02.8	74 62	75.1	17 25.0	74 62	74.7	17 47.1	74 62	74.4	90

Digitized by Google

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	20 00.0	1.0 01	180.0	19 30.0	1.0 01	180.0	19 00.0	1.0 01	180.0	18 30.0	1.0 01	180.0	18 00.0	1.0 01	180.0	17 30.0	1.0 01	180.0	17 00.0	1.0 01	180.0	16 30.0	1.0 01	180.0	00
1	19 59.7	1.0 02	179.0	19 29.7	1.0 02	179.0	18 59.7	1.0 02	179.0	18 29.7	1.0 02	179.0	17 59.7	1.0 02	179.0	17 29.7	1.0 02	179.0	16 59.7	1.0 02	179.0	16 29.7	1.0 02	179.0	1
2	19 58.7	1.0 03	178.0	19 28.7	1.0 03	178.0	18 58.7	1.0 03	178.0	18 28.7	1.0 03	178.0	17 58.7	1.0 03	178.1	17 28.7	1.0 03	178.1	16 58.7	1.0 03	178.1	16 28.7	1.0 03	178.1	2
3	19 57.0	1.0 04	177.0	19 27.0	1.0 04	177.0	18 57.0	1.0 04	177.0	18 27.0	1.0 04	177.1	17 57.0	1.0 04	177.1	17 27.1	1.0 04	177.1	16 57.1	1.0 04	177.1	16 27.1	1.0 04	177.1	3
4	19 54.6	1.0 05	176.0	19 24.7	1.0 05	176.0	18 54.7	1.0 05	176.1	18 24.7	1.0 05	176.1	17 54.8	1.0 05	176.1	17 24.8	1.0 05	176.1	16 54.8	1.0 05	176.2	16 24.9	1.0 05	176.2	4
05	19 51.6	1.0 06	175.0	19 21.6	1.0 06	175.0	18 51.7	1.0 06	175.1	18 21.8	1.0 06	175.1	17 51.8	1.0 06	175.1	17 21.9	1.0 06	175.2	16 51.9	1.0 06	175.2	16 22.0	1.0 06	175.2	05
6	19 47.9	1.0 07	174.0	19 18.0	1.0 07	174.0	18 48.1	1.0 07	174.1	18 18.1	1.0 07	174.1	17 48.2	1.0 07	174.2	17 18.3	1.0 07	174.2	16 48.4	1.0 07	174.2	16 18.4	1.0 07	174.3	6
7	19 43.5	1.0 08	173.0	19 13.6	1.0 08	173.1	18 43.8	1.0 08	173.1	18 13.9	1.0 08	173.1	17 44.0	1.0 08	173.2	17 14.1	1.0 08	173.2	16 44.2	1.0 08	173.3	16 14.3	1.0 08	173.3	7
8	19 38.5	1.0 09	172.0	19 08.7	1.0 09	172.1	18 38.8	1.0 09	172.1	18 08.9	1.0 09	172.2	17 39.1	1.0 09	172.2	17 09.2	1.0 09	172.3	16 39.3	1.0 09	172.3	16 09.4	1.0 09	172.4	8
9	19 32.8	99 11	171.0	19 03.0	99 10	171.1	18 33.2	99 10	171.1	18 03.3	99 10	171.2	17 33.5	99 10	171.2	17 03.7	99 10	171.3	16 33.8	99 10	171.4	16 04.0	99 10	171.4	9
10	19 26.5	99 12	170.0	18 56.7	99 12	170.1	18 26.9	99 12	170.2	17 57.1	99 11	170.2	17 27.3	99 11	170.3	16 57.5	99 11	170.3	16 27.7	99 11	170.4	15 57.9	99 11	170.5	10
1	19 19.5	99 13	169.0	18 49.7	99 13	169.1	18 20.0	99 13	169.2	17 50.2	99 13	169.3	17 20.5	99 12	169.3	16 50.7	99 12	169.4	16 21.0	99 12	169.5	15 51.2	99 12	169.5	1
2	19 11.8	99 14	168.1	18 42.1	99 14	168.1	18 12.4	99 14	168.2	17 42.7	99 14	168.3	17 13.0	99 14	168.4	16 43.3	99 13	168.4	16 13.6	99 13	168.5	15 43.9	99 13	168.6	2
3	19 03.5	99 15	167.1	18 33.9	99 15	167.2	18 04.2	99 15	167.2	17 34.6	99 15	167.3	17 04.9	99 15	167.4	16 35.3	99 14	167.5	16 05.6	99 14	167.6	15 36.0	99 14	167.6	3
4	18 54.6	99 16	166.1	18 25.0	99 16	166.2	17 55.4	99 16	166.3	17 25.8	99 16	166.4	16 56.2	99 16	166.4	16 26.6	99 16	166.5	15 57.0	99 15	166.6	15 27.4	99 15	166.7	4
15	18 45.0	98 17	165.1	18 15.5	98 17	165.2	17 45.9	98 17	165.3	17 16.4	98 17	165.4	16 46.8	98 17	165.5	16 17.3	98 17	165.6	15 47.8	98 16	165.7	15 18.2	99 16	165.8	15
6	18 34.8	98 18	164.1	18 05.3	98 18	164.2	17 35.8	98 18	164.3	17 06.3	98 18	164.4	16 36.9	98 18	164.5	15 57.4	98 18	164.6	15 37.9	98 17	164.7	15 08.4	98 17	164.8	6
7	18 23.9	98 19	163.2	17 54.5	98 19	163.3	17 25.1	98 19	163.4	16 55.7	98 19	163.5	16 26.3	98 19	163.6	15 56.9	98 19	163.7	15 27.4	98 18	163.8	14 58.0	98 18	163.9	7
8	18 12.4	98 20	162.2	17 43.1	98 20	162.3	17 13.8	98 20	162.4	16 44.4	98 20	162.5	16 15.1	98 20	162.6	15 45.7	98 20	162.7	15 16.4	98 19	162.9	14 47.0	98 19	163.0	8
9	18 00.3	98 21	161.2	17 31.1	98 21	161.4	17 01.8	98 21	161.5	16 32.5	98 21	161.6	16 03.3	98 21	161.7	15 34.0	98 21	161.8	15 04.7	98 20	161.9	14 35.4	98 20	162.0	9
20	17 47.6	97 22	160.3	17 18.4	97 22	160.4	16 49.2	97 22	160.5	16 20.0	97 22	160.6	15 50.8	97 22	160.8	15 21.6	97 22	160.9	14 52.4	97 21	161.0	14 23.2	97 21	161.1	20
1	17 34.3	97 23	159.3	17 05.2	97 23	159.4	16 36.1	97 23	159.6	16 07.0	97 23	159.7	15 37.8	97 23	159.8	15 08.7	97 23	159.9	14 39.6	97 22	160.1	14 10.4	97 22	160.2	1
2	17 20.4	97 24	158.4	16 51.4	97 24	158.5	16 22.3	97 24	158.6	15 53.3	97 24	158.8	15 24.2	97 24	158.9	14 55.2	97 24	159.0	14 26.1	97 23	159.1	13 57.1	97 23	159.3	2
3	17 05.9	96 26	157.4	16 36.9	97 25	157.5	16 08.0	97 26	157.7	15 39.0	97 25	157.8	15 10.0	97 25	158.0	14 41.1	97 24	158.1	14 12.1	97 24	158.2	13 43.1	97 24	158.4	3
4	16 50.8	96 26	156.5	16 21.9	96 26	156.6	15 53.0	96 26	156.7	15 24.2	96 26	156.9	14 55.3	96 26	157.0	14 26.4	96 25	157.2	13 57.5	96 25	157.3	13 28.6	96 25	157.4	4
25	16 35.1	96 27	155.5	16 06.3	96 27	155.7	15 37.5	96 27	155.8	15 08.7	96 27	156.0	14 39.9	96 26	156.1	14 11.1	96 26	156.3	13 42.3	96 26	156.4	13 13.5	96 26	156.5	25
6	16 18.8	96 28	154.6	15 50.1	96 28	154.7	15 21.4	96 28	154.9	14 52.7	96 28	155.0	14 24.0	96 27	155.2	13 55.3	96 27	155.3	13 26.6	96 27	155.5	12 57.9	96 27	155.6	6
7	16 02.0	95 29	153.6	15 33.4	96 29	153.8	15 04.8	95 29	154.0	14 36.2	96 29	154.1	14 07.6	95 28	154.3	13 39.0	95 28	154.4	13 10.3	95 28	154.6	12 41.7	95 28	154.7	7
8	15 44.6	95 30	152.7	15 16.1	95 30	152.9	14 47.6	95 30	153.0	14 19.1	95 29	153.2	13 50.6	95 29	153.4	13 22.0	95 29	153.5	12 53.5	95 29	153.7	12 25.0	95 29	153.8	8
9	15 26.6	95 31	151.8	14 58.2	95 31	152.0	14 29.8	95 30	152.1	14 01.4	95 30	152.3	13 33.0	95 30	152.5	13 04.6	95 30	152.6	12 36.1	95 30	152.8	12 07.7	95 30	153.0	9
30	15 08.1	94 32	150.9	14 39.8	94 32	151.0	14 11.5	94 31	151.2	13 43.2	94 31	151.4	13 14.9	94 31	151.6	12 46.6	94 31	151.7	12 18.2	94 31	151.9	11 49.9	94 31	152.1	30
1	14 49.1	94 33	150.0	14 20.9	94 32	150.1	13 52.7	94 32	150.3	13 24.5	94 32	150.5	12 56.3	94 32	150.7	12 28.0	94 32	150.8	11 59.8	94 32	151.0	11 31.6	94 31	151.2	1
2	14 29.5	94 34	149.0	14 01.4	94 33	149.2	13 33.3	94 33	149.4	13 05.2	94 33	149.6	12 37.1	94 33	149.8	12 09.0	94 33	149.9	11 40.9	94 32	150.1	11 12.7	94 32	150.3	2
3	14 09.4	93 34	148.1	13 41.4	93 34	148.3	13 13.4	93 34	148.5	12 45.4	93 34	148.7	12 17.4	93 34	148.9	11 49.4	93 33	149.1	11 21.4	93 33	149.2	10 53.4	93 33	149.4	3
4	13 48.8	93 35	147.2	13 20.9	93 35	147.4	12 53.0	93 35	147.6	12 25.1	93 35	147.8	11 57.2	93 34	148.0	11 29.3	93 34	148.2	11 01.4	93 34	148.4	10 33.5	93 34	148.6	4
35	13 27.7	93 36	146.3	12 59.9	93 36	146.5	12 32.1	93 36	146.7	12 04.3	93 35	146.9	11 36.6	93 35	147.1	11 08.8	93 35	147.3	10 40.9	93 35	147.5	10 13.1	93 35	147.7	35
6	13 06.0	92 37	145.5	12 38.4	92 37	145.7	12 10.7	92 36	145.8	11 43.0	92 36	146.0	11 15.4	92 36	146.2	10 47.7	92 36	146.4	10 20.0	92 36	146.6	9 52.3	92 36	146.8	6
7	12 43.9	92 38	144.6	12 16.4	92 38	144.8	11 48.8	92 37	145.0	11 21.3	92 37	145.2	10 53.7	92 37	145.4	10 26.1	92 37	145.6	9 58.5	92 37	145.8	9 30.9	92 36	146.0	7
8	12 21.3	91 38	143.7	11 53.9	91 38	143.9	11 26.4	91 38	144.1	10 59.0	92 38	144.3	10 31.5	92 38	144.5	10 04.1	92 38	144.7	9 36.6	92 37	144.9	9 09.1	92 37	145.1	8
9	11 58.2	91 39	142.8	11 30.9	91 39	143.0	11 03.6	91 39	143.2	10 36.3	91 39	143.4	10 08.9	91 38	143.6	9 41.6	91 38	143.9	9 14.2	91 38	144.1	8 46.8	91 38	144.3	9
40	11 34.7	91 40	141.9	11 07.5	91 40	142.1	10 40.3	91 40	142.4	10 13.0	91 39	142.6	9 45.8	91 39	142.8	9 18.6	91 39	143.0	8 51.3	91 39	143.2	8 24.1	91 39	143.4	40
1	11 10.7	90 41	141.1	10 43.6	90 41	141.3	10 16.5	90 40	141.5	9 49.4	90 40	141.7	9 22.3	90 40	141.9	8 55.1	90 40	142.2	8 28.0	90 40	142.4	8 00.9	90 39	142.6	1
2	10 46.2	90 42	140.2	10 19.2	90 41	140.4	9 52.3	90 41	140.6	9 25.3	90 41	140.9	8 58.3	90 41	141.1	8 31.3	90 41	141.3	8 04.2	90 40	141.5	7 37.2	90 40	141.7	2
3	10 21.3	90 42	139.3	9 54.5	90 42	139.6	9 27.6	90 42	139.8	9 00.7	90 42	140.0	8 33.8	90 41	140.2	8 06.9	90 41	140.5	7 40.0	90 41	140.7	7 13.1	90 41	140.9	3
4	9 56.0	89 43	138.5	9 29.2	89 43	138.7	9 02.5	89 43	139.0	8 35.7	89 42	139.2	8 08.9	89 42	139.4	7 42.2	89 42	139.6	7 15.4	89 42	139.9	6 48.6	89 42	140.1	4
45	9 30.2	89 44	137.6	9 03.6	89 43	137.9	8 36.9	89 43	138.1	8 10.3	89 43	138.3	7 43.6	89 43	138.6	7 17.0	89 43	138.8	6 50.3	89 42	139.0	6 23.6	89 42	139.3	45
6	9 04.0	88 44	136.8	8 37.5	88 44	137.0	8 11.0	88 44	137.3	7 44.4	88 44	137.5	7 17.9	88 44	137.7	6 51.4	88 43	138.0	6 24.8	89 43	138.2	5 58.3	89 43	138.5	6
7	8 37.4	88 45	136.0	8 11.0	88 45	136.2	7 44.6	88 45	136.4	7 18.2	88 44	136.7	6 51.8	88 44	136.9	6 25.3	88 44	137.2	5 58.9	88 44	137.4	5 32.5	88 44	137.6	7
8	8 10.4	88 46	135.1	7 44.1	88 45	135.4	7 17.8	88 45	135.6	6 51.5	88 45	135.9	6 25.2	88 45	136.1	5 58.9	88 45	136.3	5 32.6	88 44	136.6	5 06.3	88 44	136.8	8
9	7 43.0	87 46	134.3	7 16.8	87 46	134.5	6 50.7	87 46	134.8	6 24.5	87 46	135.0	5 58.3	87 46	135.3	5 32.1	87 45	135.5	5 05.9	87 45	135.8				9
50	7 15.2	87 47	133.5	6 49.1	87 47	133.7	6 23.1	87 47	134.0	5 57.0	87 46	134.2	5 31.0	87 46	134.5	5 04.9	87 46	134.7							50
1	6 47.0	86 48	132.7	6 21.1	86 47	132.9	5 55.2	86 47	133.2	5 29.2	86 47	133.4	5 03.3	87 47	133.7										1
2	6 18.5	86 48	131.8	5 52.7	86 48	132.1	5 26.8	86 48	132.4																2
3	5 49.6	86 49	131.0	5 23.9	86 48	131.3																			3
4	5 20.3	85 49	130.2																						4

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	14 33.8	75 62	76.1	14 56.3	75 62	75.8	15 18.6	75 62	75.4	15 41.0	74 62	75.1	16 03.3	74 62	74.7	16 25.6	74 62	74.4	16 47.9	74 62	74.0	17 10.1	74 62	73.7	91
2	13 56.5	75 62	75.4	14 18.9	75 62	75.0	14 41.4	75 62	74.7	15 03.8	75 62	74.4	15 26.2	75 62	74.0	15 48.5	74 62	73.7	16 10.8	74 61	73.3	16 33.1	74 61	73.0	2
3	13 19.2	75 62	74.7	13 41.7	75 62	74.3	14 04.2	75 62	74.0	14 26.7	75 62	73.6	14 49.2	75 61	73.3	15 11.6	75 61	72.9	15 34.0	75 61	72.6	15 56.3	74 61	72.3	3
4	12 42.1	75 62	73.9	13 04.7	75 62	73.6	13 27.2	75 61	73.3	13 49.8	75 61	72.9	14 12.3	75 61	72.6	14 34.8	75 61	72.2	14 57.2	75 61	71.9	15 19.7	75 61	71.5	4
95	12 05.1	76 61	73.2	12 27.7	75 61	72.9	12 50.4	75 61	72.5	13 13.0	75 61	72.2	13 35.6	75 61	71.9	13 58.1	75 61	71.5	14 20.7	75 61	71.2	14 43.2	75 61	70.8	95
6	11 28.2	76 61	72.5	11 51.0	76 61	72.1	12 13.7	76 61	71.8	12 36.3	76 61	71.5	12 59.0	75 61	71.1	13 21.6	75 61	70.8	13 44.2	75 60	70.5	14 06.8	75 60	70.1	6
7	10 51.5	76 61	71.7	11 14.3	76 61	71.4	11 37.1	76 61	71.1	11 59.9	76 61	70.8	12 22.6	76 60	70.4	12 45.3	76 60	70.1	13 08.0	76 60	69.7	13 30.6	75 60	69.4	7
8	10 15.0	76 61	71.0	10 37.9	76 61	70.7	11 00.7	76 60	70.4	11 23.5	76 60	70.0	11 46.3	76 60	69.7	12 09.1	76 60	69.4	12 31.9	76 60	69.0	12 54.6	76 60	68.7	8
9	9 38.6	77 60	70.3	10 01.5	76 60	70.0	10 24.5	76 60	69.6	10 47.4	76 60	69.3	11 10.2	76 60	69.0	11 33.1	76 60	68.6	11 55.9	76 60	68.3	12 18.8	76 59	68.0	9
100	9 02.4	77 60	69.6	9 25.4	77 60	69.2	9 48.4	77 60	68.9	10 11.4	77 60	68.6	10 34.3	77 60	68.3	10 57.3	76 59	67.9	11 20.2	76 59	67.6	11 43.1	76 59	67.3	100
1	8 26.3	77 60	68.8	8 49.4	77 60	68.5	9 12.5	77 60	68.2	9 35.6	77 59	67.9	9 58.6	77 59	67.5	10 21.6	77 59	67.2	10 44.6	77 59	66.9	11 07.6	77 59	66.6	1
2	7 50.4	77 60	68.1	8 13.6	77 59	67.8	8 36.8	77 59	67.5	8 59.9	77 59	67.1	9 23.1	77 59	66.8	9 46.2	77 59	66.5	10 09.3	77 59	66.2	10 32.3	77 58	65.8	2
3	7 14.8	78 59	67.4	7 38.0	78 59	67.0	8 01.3	77 59	66.7	8 24.5	77 59	66.4	8 47.7	77 59	66.1	9 10.9	77 58	65.8	9 34.1	77 58	65.4	9 57.2	77 58	65.1	3
4	6 39.3	78 59	66.6	7 02.6	78 59	66.3	7 25.9	78 59	66.0	7 49.2	78 58	65.7	8 12.5	78 58	65.4	8 35.8	78 58	65.0	8 59.1	78 58	64.7	9 22.4	77 58	64.4	4
105	6 03.9	78 58	65.9	6 27.4	78 58	65.6	6 50.8	78 58	65.3	7 14.2	78 58	64.9	7 37.6	78 58	64.6	8 01.0	78 58	64.3	8 24.3	78 58	64.0	8 47.7	78 57	63.7	105
6	5 28.8	78 58	65.2	5 52.4	78 58	64.8	6 15.9	78 58	64.5	6 39.4	78 58	64.2	7 02.8	78 58	63.9	7 26.3	78 57	63.6	7 49.8	78 57	63.3	8 13.2	78 57	63.0	6
7				5 17.6	79 58	64.1	5 41.2	79 57	63.8	6 04.7	79 57	63.5	6 28.3	79 57	63.2	6 51.9	79 57	62.9	7 15.4	78 57	62.5	7 39.0	78 57	62.2	7
8							5 06.7	79 57	63.1	5 30.3	79 57	62.7	5 54.0	79 57	62.4	6 17.7	79 57	62.1	6 41.3	79 56	61.8	7 05.0	79 56	61.5	8
9													5 19.9	79 56	61.7	5 43.7	79 56	61.4	6 07.4	79 56	61.1	6 31.2	79 56	60.8	9
110																5 10.0	80 56	60.7	5 33.8	79 56	60.4	5 57.6	79 56	60.0	110
1																			5 00.4	80 55	59.6	5 24.4	80 55	59.3	1

Digitized by Google

Lat. 50°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
00	64 00.0	1.0 01	180.0	64 30.0	1.0 01	180.0	65 00.0	1.0 01	180.0	65 30.0	1.0 01	180.0	66 00.0	1.0 01	180.0	66 30.0	1.0 01	180.0	67 00.0	1.0 01	180.0	67 30.0	1.0 01	180.0	00
1	63 59.3	1.0 04	177.9	64 29.3	1.0 04	177.9	64 59.3	1.0 04	177.9	65 29.3	1.0 04	177.8	65 59.3	1.0 04	177.8	66 29.2	1.0 04	177.8	66 59.2	1.0 04	177.7	67 29.2	1.0 04	177.7	1
2	63 57.2	1.0 06	175.8	64 27.2	1.0 06	175.8	64 57.1	1.0 06	175.7	65 27.1	1.0 06	175.7	65 57.0	1.0 06	175.6	66 27.0	1.0 06	175.5	66 56.9	1.0 06	175.4	67 26.9	1.0 06	175.4	2
3	63 53.7	1.0 08	173.8	64 23.6	1.0 08	173.7	64 53.5	1.0 08	173.6	65 23.4	1.0 08	173.5	65 53.3	1.0 09	173.4	66 23.2	1.0 09	173.3	66 53.1	1.0 09	173.2	67 23.0	1.0 09	173.1	3
4	63 48.8	99 10	171.7	64 18.7	99 11	171.6	64 48.5	99 11	171.5	65 18.3	99 11	171.3	65 48.2	99 11	171.2	66 18.0	99 11	171.1	66 47.8	99 11	170.9	67 17.6	99 12	170.8	4
05	63 42.6	99 13	169.6	64 12.3	99 13	169.5	64 42.1	99 13	169.3	65 11.8	99 13	169.2	65 41.5	99 13	169.0	66 11.2	99 14	168.9	66 40.9	99 14	168.7	67 10.6	99 14	168.5	05
6	63 35.0	99 15	167.6	64 04.6	99 15	167.4	64 34.2	99 15	167.3	65 03.9	99 16	167.1	65 33.5	99 16	166.9	66 03.1	99 16	166.7	66 32.7	99 16	166.5	67 02.2	99 16	166.3	6
7	63 26.0	98 17	165.6	63 55.5	98 17	165.4	64 25.1	98 18	165.2	64 54.6	98 18	165.0	65 24.0	98 18	164.7	65 53.5	98 18	164.5	66 22.9	98 19	164.3	66 52.3	98 19	164.0	7
8	63 15.8	98 19	163.6	63 45.2	98 19	163.4	64 14.5	98 20	163.1	64 43.9	98 20	162.9	65 13.2	98 20	162.6	65 42.5	98 21	162.4	66 11.8	98 21	162.1	66 41.0	97 21	161.8	8
9	63 04.2	98 21	161.6	63 33.5	97 22	161.4	64 02.7	97 22	161.1	64 31.9	97 22	160.8	65 01.0	97 22	160.6	65 30.1	97 23	160.3	65 59.2	97 23	160.0	66 28.3	97 23	159.7	9
10	62 51.4	97 23	159.7	63 20.5	97 24	159.4	63 49.6	97 24	159.1	64 18.6	97 24	158.8	64 47.5	97 25	158.5	65 16.5	96 25	158.2	65 45.4	96 25	157.9	66 14.2	96 26	157.5	10
1	62 37.4	96 26	157.7	63 06.3	96 26	157.4	63 35.2	96 26	157.1	64 04.0	96 26	156.8	64 32.8	96 27	156.5	65 01.5	96 27	156.1	65 30.2	96 27	155.8	65 58.8	96 28	155.4	1
2	62 22.2	96 27	155.8	62 50.9	96 28	155.5	63 19.6	96 28	155.2	63 48.2	95 28	154.8	64 16.8	95 29	154.5	64 45.3	95 29	154.1	65 13.7	95 29	153.8	65 42.1	95 30	153.4	2
3	62 05.8	95 29	154.0	62 34.3	95 30	153.6	63 02.8	95 30	153.3	63 31.2	95 30	152.9	63 59.6	94 31	152.5	64 27.9	94 31	152.2	64 56.1	94 31	151.8	65 24.3	94 32	151.4	3
4	61 48.3	94 31	152.1	62 16.6	94 31	151.8	62 44.9	94 32	151.4	63 13.1	94 32	151.0	63 41.2	94 32	150.6	64 09.3	93 33	150.2	64 37.3	93 33	149.8	65 05.2	93 34	149.4	4
15	61 29.8	94 33	150.3	61 57.9	94 33	149.9	62 25.9	93 33	149.5	62 53.8	93 34	149.2	63 21.7	93 34	148.7	63 49.6	93 35	148.3	64 17.3	92 35	147.9	64 45.0	92 35	147.4	15
6	61 10.1	93 34	148.5	61 38.0	93 35	148.1	62 05.8	92 35	147.7	62 33.5	92 36	147.3	63 01.2	92 36	146.9	63 28.8	92 36	146.5	63 56.3	92 37	146.0	64 23.7	91 37	145.5	6
7	60 49.5	92 36	146.8	61 17.2	92 36	146.4	61 44.7	92 37	146.0	62 12.2	92 37	145.5	62 39.6	91 38	145.1	63 07.0	91 38	144.6	63 34.2	91 38	144.2	64 01.4	90 39	143.7	7
8	60 27.9	92 38	145.1	60 55.3	91 38	144.6	61 22.7	91 38	144.2	61 49.9	91 39	143.8	62 17.1	90 39	143.3	62 44.2	90 40	142.9	63 11.1	90 40	142.4	63 38.0	89 40	141.9	8
9	60 05.3	91 39	143.4	60 32.5	90 39	143.0	60 59.6	90 40	142.5	61 26.7	90 40	142.1	61 53.6	90 41	141.6	62 20.4	89 41	141.1	62 47.1	89 42	140.6	63 13.8	89 42	140.1	9
20	59 41.9	90 41	141.7	60 08.9	90 41	141.3	60 35.7	89 41	140.8	61 02.5	89 42	140.4	61 29.2	89 42	139.9	61 55.8	88 43	139.4	62 22.2	88 42	138.9	62 48.6	88 43	138.4	20
1	59 17.6	89 42	140.1	59 44.3	89 42	139.7	60 11.0	89 43	139.2	60 37.5	88 43	138.7	61 03.9	88 43	138.3	61 30.2	88 44	137.8	61 56.5	87 44	137.2	62 22.6	87 45	136.7	1
2	58 52.5	88 43	138.5	59 19.0	88 44	138.1	59 45.4	88 44	137.6	60 11.7	87 44	137.1	60 37.8	87 45	136.6	61 03.9	87 45	136.1	61 29.9	86 46	135.6	61 55.7	86 46	135.1	2
3	58 26.5	88 44	137.0	58 52.8	87 45	136.5	59 19.0	87 45	136.1	59 45.0	87 46	135.6	60 11.0	86 46	135.1	60 36.8	86 46	134.6	61 02.5	85 47	134.0	61 28.1	85 47	133.5	3
4	57 59.9	87 46	135.5	58 25.9	87 46	135.0	58 51.8	86 46	134.5	59 17.7	86 47	134.0	59 43.4	86 47	133.5	60 09.0	85 48	133.0	60 34.4	85 48	132.5	60 59.8	84 48	131.9	4
25	57 32.5	86 47	134.0	57 58.3	86 47	133.5	58 24.0	86 48	133.0	58 49.6	85 48	132.5	59 15.1	85 48	132.0	59 40.4	84 49	131.5	60 05.6	84 49	131.0	60 30.7	83 50	130.4	25
6	57 04.4	86 48	132.5	57 30.0	85 48	132.1	57 55.5	85 49	131.6	58 20.8	84 49	131.1	58 46.1	84 49	130.5	59 11.2	84 50	130.0	59 36.2	83 50	129.5	60 01.0	83 51	128.9	6
7	56 35.6	85 49	131.1	57 01.0	84 49	130.6	57 26.3	84 50	130.1	57 51.4	84 50	129.6	58 16.5	83 50	129.1	58 41.4	83 51	128.6	59 06.1	82 51	128.0	59 30.7	82 51	127.5	7
8	56 06.3	84 50	129.7	56 31.5	84 50	129.2	56 56.5	83 51	128.7	57 21.4	83 51	128.2	57 46.2	82 51	127.7	58 10.9	82 52	127.2	58 35.4	82 52	126.6	58 59.8	81 52	126.1	8
9	55 36.3	83 51	128.4	56 01.3	83 51	127.9	56 26.1	83 52	127.4	56 50.9	82 52	126.9	57 15.4	82 52	126.3	57 39.9	81 53	125.8	58 04.2	81 53	125.2	58 28.4	80 53	124.7	9
30	55 05.8	83 52	127.0	55 30.6	82 52	126.5	55 55.2	82 52	126.0	56 19.7	81 53	125.5	56 44.1	81 53	125.0	57 08.3	81 53	124.4	57 32.4	80 54	123.9	57 56.4	80 54	123.3	30
1	54 34.8	82 53	125.7	54 59.3	82 53	125.2	55 23.8	81 53	124.7	55 48.1	81 54	124.2	56 12.3	80 54	123.7	56 36.3	80 54	123.1	57 00.2	79 55	122.6	57 23.9	79 55	122.0	1
2	54 03.2	81 53	124.4	54 27.6	81 54	123.9	54 51.8	81 54	123.4	55 15.9	80 54	122.9	55 39.9	80 55	122.4	56 03.8	79 55	121.8	56 27.5	79 55	121.3	56 51.0	78 56	120.7	2
3	53 31.2	81 54	123.2	53 55.4	80 54	122.7	54 19.4	80 55	122.2	54 43.3	80 55	121.7	55 07.1	79 55	121.1	55 30.8	79 56	120.6	55 54.3	78 56	120.0	56 17.6	78 56	119.5	3
4	52 58.7	80 55	122.0	53 22.7	80 55	121.5	53 46.6	79 55	121.0	54 10.3	79 56	120.4	54 33.9	78 56	119.9	54 57.4	78 56	119.4	55 20.7	77 57	118.8	55 43.9	77 57	118.3	4
35	52 25.7	80 56	120.8	52 49.6	79 56	120.3	53 13.3	79 56	119.7	53 36.8	78 56	119.2	54 00.3	78 57	118.7	54 23.6	77 57	118.2	54 46.7	77 57	117.6	55 09.7	76 58	117.1	35
6	51 52.4	79 56	119.6	52 16.1	79 56	119.1	52 39.6	78 57	118.6	53 03.0	78 57	118.0	53 26.3	77 57	117.5	53 49.4	77 58	117.0	54 12.4	76 58	116.4	54 35.2	76 58	115.9	6
7	51 18.7	79 57	118.4	51 42.2	78 57	117.9	52 05.5	78 57	117.4	52 28.8	77 58	116.9	52 51.9	77 58	116.4	53 14.8	76 58	115.8	53 37.6	76 58	115.3	54 00.3	75 59	114.7	7
8	50 44.6	78 57	117.3	51 07.9	78 58	116.8	51 31.1	77 58	116.3	51 54.2	77 58	115.8	52 17.1	76 58	115.2	52 40.0	76 59	114.7	53 02.6	75 59	114.2	53 25.1	75 59	113.6	8
9	50 10.1	78 58	116.2	50 33.3	77 58	115.7	50 56.4	77 58	115.2	51 19.3	76 59	114.6	51 42.1	76 59	114.1	52 04.8	75 59	113.6	52 27.3	75 59	113.1	52 49.6	74 60	112.5	9
40	49 35.3	77 58	115.1	49 58.4	77 59	114.6	50 21.3	76 59	114.1	50 44.1	76 59	113.6	51 06.8	75 59	113.0	51 29.3	75 60	112.5	51 51.6	74 60	112.0	52 13.9	74 60	111.4	40
1	49 00.2	77 59	114.0	49 23.2	76 59	113.5	49 45.9	76 59	113.0	50 08.6	75 60	112.5	50 31.1	75 60	112.0	50 53.5	74 60	111.4	51 15.7	74 60	110.9	51 37.8	73 60	110.4	1
2	48 24.9	76 59	112.9	48 47.6	76 60	112.4	49 10.3	75 60	111.9	49 32.8	75 60	111.4	49 55.2	74 60	110.9	50 17.5	74 60	110.4	50 39.6	73 61	109.9	51 01.6	73 61	109.3	2
3	47 49.2	76 60	111.9	48 11.9	75 60	111.4	48 34.4	75 60	110.9	48 56.8	74 60	110.4	49 19.1	74 61	109.9	49 41.2	74 61	109.4	50 03.2	73 61	108.8	50 25.1	73 61	108.3	3
4	47 13.3	75 60	110.9	47 35.8	75 60	110.4	47 58.3	75 61	109.9	48 20.5	74 61	109.4	48 42.7	74 61	108.9	49 04.7	73 61	108.4	49 26.6	73 61	107.8	49 48.3	72 62	107.3	4
45	46 37.1	75 61	109.9	46 59.6	75 61	109.4	47 21.9	74 61	108.9	47 44.1	74 61	108.4	48 06.1	73 61	107.9	48 28.0	73 62	107.4	48 49.8	72 62	106.9	49 11.4	72 62	106.3	45
6	46 00.8	75 61	108.9	46 23.1	74 61	108.4	46 45.3	74 61	107.9	47 07.4	73 61	107.4	47 29.3	73 62	106.9	47 51.1	72 62	106.4	48 12.8	72 62	105.9	48 34.3	72 62	105.4	6
7	45 24.2	74 61	107.9	45 46.4	74 62	107.4	46 08.5	73 62	106.9	46 30.5	73 62	106.4	46 52.3	73 62	105.9	47 14.0	72 62	105.4	47 35.6	72 62	104.9	47 57.0	71 62	104.4	7
8	44 47.4	74 62	106.9	45 09.5	74 62	106.5	45 31.5	73 62	106.0	45 53.4	73 62	105.5	46 15.1	72 62	105.0	46 36.8	72 62	104.5	46 58.3	71 62	104.0	47 19.6	71 63	103.5	8
9	44 10.4	74 62	106.0	44 32.4	73 62	105.5	44 54.3	73 62	105.0	45 16.1	72 62	104.6	45 37.8	72 62	104.1	45 59.3	72 63	103.6	46 20.8	71 63	103.1	46 42.0	71 63	102.5	9
50	43 33.2	73 62	105.1	43 55.2	73 62	104.6	44 17.0	73 62	104.1	44 38.7	72 63	103.6	45 00.3	72 63	103.1	45 21.8	71 63	102.6	45 43.1	71 63	102.1	46 04.3	70 63	101.6	50
1	42 55.9	73 62	104.1	43 17.8	73 63	103.7	43 39.5	72 63	103.2	44 01.2	72 63	102.7	44 22.7	72 63	102.2	44 44.1	71 63	101.7	45 05.3	71 63	101.2	45 26.5	70 63	100.7	1
2	42 18.4	73 63	103.2	42 40.2	72 63	102.8	43 01.9	72 63	102.3	43 23.5	72 63	101.8	43 44.9	71 63	101.3	44 06.3	71 63	100.9	44 27.5	70 63	100.4	44 48.5	70 63	99.9	2
3	41 40.8	73 63	102.3	42 02.6	72 63	101.9	42 24.2	72 63	101.4	42 45.7	71 63	100.9	43 07.1	71 63	100.5	43 28.3	71 63	100.0	43 49.5	70 64	99.5	44 10.5	70 64	99.0	3
4	41 03.1	72 63	101.5	41 24.8	72 63	101.0	41 46.3	72 63	100.5	42 07.8	71 63	100.1	42 29.1	71 63	99.6	42 50.3	71 64	99.1	43 11.4	70 64	98.6	43 32.4	70 64	98.1	4
55	40 25.2	72 63	100.6	40 46.8	72 63	100.1	41 08.3	71 63	99.7	41 29.7	71 64	99.2	41 51.0	71 64	98.7	42 12.2	70 64	98.3	42 33.2	70 64	97.8	42 54.1	70 64	97.3	55
6	39 47.3	72 63	99.7	40 08.8	72 64	99.3	40 30.3	71 64	98.8	40 51.6	71 64	98.4	41 12.9	71 64	97.9	41 34.0	70 64	97.4	41 55.0	70 64	96.9	42 15.8	69 64	96.5	6
7	39 09.2	72 64	98.9	39 30.7	72 64	98.4	39 52.1	71 64	98.0	40 13.4	71 64	97.5	40 34.6	70 64	97.0	40 55.7	70 64	96.6	41 16.7	70 64	96.1	41 37.5	69 64	95.6	7
8	38 31.1	72 64	98.0	38 52.5	71 64	97.6	39 13.9	71 64	97.1	39 35.2	71 64	96.7	39 56.3	70 64	96.2	40 17.3	70 64	95.8	40 38.3	70 64	95.3	40 59.1	69 64	94.8	8
9	37 52.8	72 64	97.2	38 14.3	71 64	96.8	38 35.6	71 64	96.3	38 56.8	71 64	95.9	39 17.9	70 64	95.4	39 38.9	70 64	94.9	39 59.8	69 64	94.5	40 20.6	69 64	94.0	9
60	37 14.5	71 64	96.4	37 35.9	71 64	95.9	37 57.2	71 64	95.5	38 18.4	70 64	95.0	38 39.5	70 64	94.6	39 00.5	70 64	94.1	39 21.4	69 64	93.7	39 42.1	69 64	93.2	60
1	36 36.2	71 64	95.6	36 57.5	71 64	95.1	37 18.8	71 64	94.7	37 40.0	70 64	94.2	38 01.1	70 64	93.8	38 22.0	70 64	93.3	38 42.9	69 64	92.9	39 03.6	69 64	92.4	1
2	35 57.8	71 64	94.8	36 19.1	71 64	94.3	36 40.4	71 64	93.9	37 01.5	70 64	93.4	37 22.6	70 64	93.0	37 43.5	70 64	92.5	38 04.3	69 64	92.1	38 25.1	69 64	91.6	2
3	35 19.3	71 64	94.0	35 40.6	71 64	93.5	36 01.9	71 64	93.1	36 23.0	70 64	92.6	36 44.0	70 64	92.2	37 05.0	70 64	91.8	37 25.8	69 64	91.3	37 46.5	69 64	90.8	3
4	34 40.8	71 64	93.2	35 02.1	71 64	92.7	35 23.3	71 64	92.3	35 44.5	70 64	91.9	36 05.5	70 64	91.4	36 26.4	70 64	91.0	36 47.2	69 64	90.5	37 08.0	69 64	90.1	4
65	34 02.3	71 64	92.4	34 23.6	71 64	91.9	34 44.8	71 64	91.5	35 05.9	70 64	91.1	35 26.9	70 64	90.6	35 47.8	70 64	90.2	36 08.7	69 64	89.8	36 29.4	69 64	89.3	65
6	33 23.8	71 64	91.6	33 45.0	71 64	91.2	34 06.2	71 64	90.7	34 27.3	70 64	90.3	34 48.4	70 64	89.9	35 09.3	70 64	89.4	35 30.1	69 64	89.0	35 50.8	69 64	88.6	6
7	32 45.2	71 64	90.8	33 06.5	71 64	90.4	33 27.7	70 64	90.0	33 48.8	70 64	89.5	34 09.8	70 64	89.1	34 30.7	70 64	88.7	34 51.5	69 64	88.2	35 12.3	69 64	87.8	7
8	32 06.6	71 64	90.0	32 27.9	71 64	89.6	32 49.1	71 64	89.2	33 10.2	70 64	88.8	33 31.2	70 64	88.4	33 52.2	70 64	87.9	34 13.0	69 64	87.5	34 33.8	69 64	87.1	8
9	31 28.1	71 64	89.3	31 49.3	71 64	88.9	32 10.5	71 64	88.5	32 31.7	70 64	88.0	32 52.7	70 64	87.6	33 13.6	70 64	87.2	33 34.5	69 64	86.8	33 55.2	69 64	86.3	9
70	30 49.5	71 64	88.5	31 10.8	71 64	88.1	31 32.0	71 64	87.7	31 53.1	70 64	87.3	32 14.2	70 64	86.9	32 35.1	70 64	86.4	32 56.0	69 64	86.0	33 16.8	69 64	85.6	70
1	30 11.0	71 64	87.8	30 32.2	71 64	87.4	30 53.5	71 64	87.0	31 14.6	70 64	86.5	31 35.7	70 64	86.1	31 56.6	70 64	85.7	32 17.5	70 64	85.3	32 38.3	69 64	84.9	1
2	29 32.4	71 64	87.0	29 53.7	71 64	86.6	30 15.0	71 64	86.2	30 36.1	70 64	85.8	30 57.2	70 64	85.4	31 18.2	70 64	85.0	31 39.1	70 64	84.5	32 00.0	69 64	84.1	2
3	28 53.9	71 64	86.3	29 15.3	71 64	85.9	29 36.5	71 64	85.5	29 57.7	70 64	85.1	30 18.8	70 64	84.7	30 39.8	70 64	84.2	31 00.8	70 64	83.8	31 21.6	69 64	83.4	3
4	28 15.5	71 64	85.5	28 36.8	71 64	85.1	28 58.1	71 64	84.7	29 19.3	71 64	84.3	29 40.4	70 64	83.9	30 01.5	70 64	83.5	30 22.4	70 64	83.1	30 43.3	70 64	82.7	4
75	27 37.0	71 64	84.8	27 58.4	71 64	84.4	28 19.7	71 64	84.0	28 40.9	71 64	83.6	29 02.1	70 64	83.2	29 23.2	70 64	82.8	29 44.2	70 64	82.4	30 05.1	70 64	82.0	75
6	26 58.6	71 64	84.1	27 20.0	71 64	83.7	27 41.4	71 64	83.3	28 02.6	71 64	82.9	28 23.8	71 64	82.5	28 44.9	70 64	82.1	29 06.0	70 64	81.7	29 27.0	70 63	81.3	6
7	26 20.3	72 64	83.3	26 41.7	71 64	82.9	27 03.1	71 64	82.5	27 24.4	71 64	82.2	27 45.6	71 64	81.8	28 06.8	70 64	81.4	28 27.9	70 63	80.9	28 48.9	70 63	80.5	7
8	25 42.0	72 64	82.6	26 03.5	71 64	82.2	26 24.9	71 64	81.8	26 46.2	71 64	81.4	27 07.5	71 63	81.0	27 28.7	71 63	80.6	27 49.8	70 63	80.2	28 10.9	70 63	79.8	8
9	25 03.8	72 64	81.9	25 25.3	72 64	81.5	25 46.7	71 63	81.1	26 08.1	71 63	80.7	26 29.4	71 63	80.3	26 50.7	71 63	79.9	27 11.8	70 63	79.5	27 33.0	70 63	79.1	9
80	24 25.7	72 63	81.2	24 47.2	72 63	80.8	25 08.7	71 63	80.4	25 30.1	71 63	80.0	25 51.4	71 63	79.6	26 12.7	71 63	79.2	26 34.0	71 63	78.8	26 55.1	70 63	78.4	80
1	23 47.6	72 63	80.4	24 09.2	72 63	80.1	24 30.7	72 63	79.7	24 52.2	71 63	79.3	25 13.6	71 63	78.9	25 34.9	71 63	78.5	25 56.2	71 63	78.1	26 17.4	71 63	77.7	1
2	23 09.6	72 63	79.7	23 31.2	72 63	79.3	23 52.8	72 63	79.0	24 14.3	72 63	78.6	24 35.8	71 63	78.2	24 57.2	71 63	77.8	25 18.5	71 63	77.4	25 39.8	71 63	77.0	2
3	22 31.7	72 63	79.0	22 53.4	72 63	78.6	23 15.0	72 63	78.3	23 36.6	72 63	77.9	23 58.1	72 63	77.5	24 19.5	71 63	77.1	24 40.9	71 62	76.7	25 02.2	71 62	76.3	3
4	21 53.9	72 63	78.3	22 15.6	72 63	77.9	22 37.3	72 63	77.5	22 58.9	72 63	77.2	23 20.5	72 62	76.8	23 42.0	72 62	76.4	24 03.4	71 62	76.0	24 24.8	71 62	75.6	4
85	21 16.2	73 63	77.6	21 37.9	72 63	77.2	21 59.7	72 62	76.8	22 21.3	72 62	76.5	22 43.0	72 62	76.1	23 04.5	72 62	75.7	23 26.0	72 62	75.3	23 47.5	71 62	75.0	85
6	20 38.6	73 62	76.9	21 00.4	73 62	76.5	21 22.2	73 62	76.1	21 43.9	72 62	75.8	22 05.6	72 62	75.4	22 27.2	72 62	75.0	22 48.8	72 62	74.6	23 10.3	72 62	74.3	6
7	20 01.1	73 62	76.2	20 22.9	73 62	75.8	20 44.8	73 62	75.4	21 06.6	73 62	75.1	21 28.3	72 62	74.7	21 50.0	72 62	74.3	22 11.7	72 62	73.9	22 33.3	72 62	73.6	7
8	19 23.7	73 62	75.4	19 45.6	73 62	75.1	20 07.5	73 62	74.7	20 29.4	73 62	74.4	20 51.2	73 62	74.0	21 13.0	72 62	73.6	21 34.7	72 61	73.2	21 56.3	72 61	72.9	8
9	18 46.4	73 62	74.7	19 08.4	73 62	74.4	19 30.4	73 62	74.0	19 52.3	73 62	73.7	20 14.2	73 61	73.3	20 36.0	73 61	72.9	20 57.8	73 61	72.6	21 19.5	72 61	72.2	9
	18 09.3	74 62	74.0	18 31.3	74 62	73.7	18 53.4	73 61	73.3	19 15.4	73 61	73.0	19 37.3	73 61	72.6	19 59.2	73 61	72.2	20 21.1	73 61	71.9	20 42.9	73 61	71.5	

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	16 00.0	1.0 01	180.0	15 30.0	1.0 01	180.0	15 00.0	1.0 01	180.0	14 30.0	1.0 01	180.0	14 00.0	1.0 01	180.0	13 30.0	1.0 01	180.0	13 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	00
1	15 59.7	1.0 02	179.0	15 29.7	1.0 02	179.1	14 59.7	1.0 02	179.1	14 29.7	1.0 02	179.1	13 59.7	1.0 02	179.1	13 29.7	1.0 02	179.1	12 59.7	1.0 02	179.1	12 29.7	1.0 02	179.1	1
2	15 58.7	1.0 03	178.1	15 28.7	1.0 03	178.1	14 58.7	1.0 03	178.1	14 28.7	1.0 03	178.1	13 58.8	1.0 03	178.1	13 28.8	1.0 03	178.2	12 58.8	1.0 03	178.2	12 28.8	1.0 03	178.2	2
3	15 57.1	1.0 04	177.1	15 27.1	1.0 04	177.2	14 57.2	1.0 04	177.2	14 27.2	1.0 04	177.2	13 57.2	1.0 04	177.2	13 27.2	1.0 04	177.2	12 57.2	1.0 04	177.3	12 27.2	1.0 04	177.3	3
4	15 54.9	1.0 05	176.2	15 24.9	1.0 05	176.2	14 54.9	1.0 05	176.2	14 25.0	1.0 05	176.3	13 55.0	1.0 05	176.3	13 25.0	1.0 05	176.3	12 55.1	1.0 05	176.3	12 25.1	1.0 05	176.4	4
05	15 52.0	1.0 06	175.3	15 22.1	1.0 06	175.3	14 52.1	1.0 06	175.3	14 22.2	1.0 06	175.3	13 52.2	1.0 06	175.4	13 22.3	1.0 06	175.4	12 52.3	1.0 06	175.4	12 22.4	1.0 06	175.5	05
6	15 48.5	1.0 07	174.3	15 18.6	1.0 07	174.3	14 48.6	1.0 07	174.4	14 18.7	1.0 07	174.4	13 48.8	1.0 07	174.4	13 18.9	1.0 07	174.5	12 48.9	1.0 07	174.5	12 19.0	1.0 07	174.6	6
7	15 44.4	1.0 08	173.4	15 14.5	1.0 08	173.4	14 44.6	1.0 08	173.4	14 14.7	1.0 08	173.5	13 44.8	1.0 08	173.5	13 14.8	1.0 08	173.6	12 44.9	1.0 08	173.6	12 15.0	1.0 08	173.6	7
8	15 39.6	1.0 09	172.4	15 09.7	1.0 09	172.5	14 39.8	1.0 09	172.5	14 10.0	1.0 09	172.6	13 40.1	1.0 09	172.6	13 10.2	1.0 09	172.7	12 40.3	1.0 09	172.7	12 10.5	1.0 09	172.7	8
9	15 34.2	99 10	171.5	15 04.3	99 10	171.5	14 34.5	99 10	171.6	14 04.7	99 10	171.6	13 34.8	99 10	171.7	13 05.0	99 10	171.7	12 35.1	99 10	171.8	12 05.3	99 10	171.8	9
10	15 28.1	99 11	170.5	14 58.3	99 11	170.6	14 28.5	99 11	170.6	13 58.7	99 11	170.7	13 28.9	99 11	170.8	12 59.1	99 11	170.8	12 29.3	99 11	170.9	11 59.5	99 11	170.9	10
1	15 21.5	99 12	169.6	14 51.7	99 12	169.7	14 22.0	99 12	169.7	13 52.2	99 12	169.8	13 22.4	99 12	169.8	12 52.7	99 12	169.9	12 22.9	99 12	170.0	11 53.2	99 12	170.0	1
2	15 14.2	99 13	168.6	14 44.5	99 13	168.7	14 14.8	99 13	168.8	13 45.1	99 13	168.9	13 15.3	99 13	168.9	12 45.6	99 13	169.0	12 15.9	99 13	169.1	11 46.2	99 13	169.1	2
3	15 06.3	99 14	167.7	14 36.6	99 14	167.8	14 07.0	99 14	167.9	13 37.3	99 14	167.9	13 07.6	99 14	168.0	12 38.0	99 14	168.1	12 08.3	99 14	168.2	11 38.6	99 14	168.2	3
4	14 57.8	99 15	166.8	14 28.2	99 15	166.9	13 58.6	99 15	166.9	13 28.9	99 15	167.0	12 59.3	99 15	167.1	12 29.7	99 15	167.2	12 00.1	99 15	167.3	11 30.5	99 15	167.4	4
15	14 48.7	99 16	165.8	14 19.1	99 16	165.9	13 49.5	99 16	166.0	13 20.0	99 16	166.1	12 50.4	99 16	166.2	12 20.9	99 16	166.3	11 51.3	99 16	166.4	11 21.7	99 16	166.5	15
6	14 38.9	98 17	164.9	14 09.4	98 17	165.0	13 39.9	98 17	165.1	13 10.4	98 17	165.2	12 40.9	98 17	165.3	12 11.4	98 17	165.4	11 41.9	98 17	165.5	11 12.4	98 16	165.6	6
7	14 28.6	98 18	164.0	13 59.1	98 18	164.1	13 29.7	98 18	164.2	13 00.3	98 18	164.3	12 30.8	98 18	164.4	12 01.4	98 18	164.5	11 32.0	98 18	164.6	11 02.5	98 17	164.7	7
8	14 17.6	98 19	163.1	13 48.3	98 19	163.2	13 18.9	98 19	163.3	12 49.5	98 19	163.4	12 20.2	98 19	163.5	11 50.8	98 19	163.6	11 21.4	98 19	163.7	10 52.0	98 18	163.8	8
9	14 06.1	98 20	162.1	13 36.8	98 20	162.3	13 07.5	98 20	162.4	12 38.2	98 20	162.5	12 08.9	98 20	162.6	11 39.6	98 20	162.7	11 10.3	98 20	162.8	10 41.0	98 19	162.9	9
20	13 54.0	97 21	161.2	13 24.8	97 21	161.3	12 55.5	97 21	161.5	12 26.3	97 21	161.6	11 57.1	97 21	161.7	11 27.8	97 21	161.8	10 58.6	97 20	161.9	10 29.4	97 20	162.0	20
1	13 41.3	97 22	160.3	13 12.1	97 22	160.4	12 43.0	97 22	160.6	12 13.8	97 22	160.7	11 44.7	97 22	160.8	11 15.5	97 22	160.9	10 46.4	97 21	161.0	10 17.2	97 21	161.2	1
2	13 28.0	97 23	159.4	12 58.9	97 23	159.5	12 29.9	97 23	159.7	12 00.8	97 23	159.8	11 31.7	97 23	159.9	11 02.6	97 22	160.0	10 33.5	97 22	160.2	10 04.5	97 22	160.3	2
3	13 14.1	97 24	158.5	12 45.2	97 24	158.6	12 16.2	97 24	158.8	11 47.2	97 24	158.9	11 18.2	97 23	159.0	10 49.2	97 23	159.1	10 20.2	97 23	159.3	9 51.2	97 23	159.4	3
4	12 59.7	96 25	157.6	12 30.8	96 25	157.7	12 01.9	96 25	157.9	11 33.0	96 25	158.0	11 04.1	96 24	158.1	10 35.2	96 24	158.3	10 06.2	96 24	158.4	9 37.3	96 24	158.5	4
25	12 44.7	96 26	156.7	12 15.9	96 26	156.8	11 47.1	96 26	157.0	11 18.3	96 25	157.1	10 49.4	96 25	157.2	10 20.6	96 25	157.4	9 51.8	96 25	157.5	9 22.9	96 25	157.7	25
6	12 29.2	96 27	155.8	12 00.5	96 27	155.9	11 31.7	96 27	156.1	11 03.0	96 26	156.2	10 34.3	96 26	156.4	10 05.5	96 26	156.5	9 36.8	96 26	156.7	9 08.0	96 26	156.8	6
7	12 13.1	95 28	154.9	11 44.5	95 28	155.0	11 15.8	95 27	155.2	10 47.2	95 27	155.3	10 18.5	96 27	155.5	9 49.9	96 27	155.6	9 21.2	96 27	155.8	8 52.6	96 27	155.9	7
8	11 56.5	95 29	154.0	11 27.9	95 28	154.2	10 59.4	95 28	154.3	10 30.8	95 28	154.5	10 02.3	95 28	154.6	9 33.7	95 28	154.8	9 05.1	95 28	154.9	8 36.6	95 28	155.1	8
9	11 39.3	95 30	153.1	11 10.8	95 29	153.3	10 42.4	95 29	153.4	10 13.9	95 29	153.6	9 45.5	95 29	153.8	9 17.0	95 29	153.9	8 48.5	95 29	154.1	8 20.1	95 28	154.2	9
30	11 21.6	94 30	152.2	10 53.2	94 30	152.4	10 24.9	95 30	152.6	9 56.5	95 30	152.7	9 28.2	95 30	152.9	8 59.8	95 30	153.1	8 31.4	95 29	153.2	8 03.1	95 29	153.4	30
1	11 03.3	94 31	151.4	10 35.1	94 31	151.5	10 06.8	94 31	151.7	9 38.6	94 31	151.9	9 10.3	94 31	152.0	8 42.1	94 30	152.2	8 13.8	94 30	152.4	7 45.5	94 30	152.5	1
2	10 44.6	94 32	150.5	10 16.5	94 32	150.7	9 48.3	94 32	150.8	9 20.2	94 32	151.0	8 52.0	94 31	151.2	8 23.8	94 31	151.4	7 55.7	94 31	151.5	7 27.5	94 31	151.7	2
3	10 25.3	93 33	149.6	9 57.3	93 33	149.8	9 29.3	93 33	150.0	9 01.2	94 32	150.1	8 33.2	94 32	150.3	8 05.1	94 32	150.5	7 37.0	94 32	150.7	7 09.0	94 32	150.9	3
4	10 05.6	93 34	148.7	9 37.6	93 34	148.9	9 09.7	93 33	149.1	8 41.8	93 33	149.3	8 13.8	93 33	149.5	7 45.9	93 33	149.7	7 17.9	93 33	149.8	6 49.9	93 32	150.0	4
35	9 45.3	93 35	147.9	9 17.5	93 34	148.1	8 49.7	93 34	148.3	8 21.8	93 34	148.4	7 54.0	93 34	148.6	7 26.1	93 34	148.8	6 58.3	93 34	149.0	6 30.4	93 33	149.2	35
6	9 24.6	92 35	147.0	8 56.9	92 35	147.2	8 29.1	92 35	147.4	8 01.4	92 35	147.6	7 33.7	92 35	147.8	7 05.9	92 34	148.0	6 38.2	92 34	148.2	6 10.4	92 34	148.4	6
7	9 03.3	92 36	146.2	8 35.7	92 36	146.4	8 08.1	92 36	146.6	7 40.5	92 36	146.8	7 12.9	92 35	147.0	6 45.3	92 35	147.2	6 17.6	92 35	147.4	5 50.0	92 35	147.5	7
8	8 41.6	92 37	145.3	8 14.1	92 37	145.5	7 46.6	92 37	145.7	7 19.1	92 36	145.9	6 51.6	92 36	146.1	6 24.1	92 36	146.3	5 56.6	92 36	146.5	5 29.1	92 36	146.7	8
9	8 19.5	91 38	144.5	7 52.1	91 38	144.7	7 24.7	91 37	144.9	6 57.3	91 37	145.1	6 29.9	91 37	145.3	6 02.5	91 37	145.5	5 35.1	91 37	145.7	5 07.7	91 36	145.9	9
40	7 56.8	91 38	143.6	7 29.5	91 38	143.8	7 02.3	91 38	144.1	6 35.0	91 38	144.3	6 07.7	91 38	144.5	5 40.4	91 38	144.7	5 13.1	91 37	144.9				40
1	7 33.7	91 39	142.8	7 06.6	91 39	143.0	6 39.4	91 39	143.2	6 12.2	91 39	143.4	5 45.1	91 38	143.7	5 17.9	91 38	143.9							1
2	7 10.2	90 40	142.0	6 43.1	90 40	142.2	6 16.1	90 40	142.4	5 49.0	90 39	142.6	5 22.0	90 39	142.8										2
3	6 46.2	90 41	141.1	6 19.3	90 40	141.4	5 52.4	90 40	141.6	5 25.4	90 40	141.8													3
4	6 21.8	89 41	140.3	5 55.0	89 41	140.5	5 28.2	89 41	140.8	5 01.4	89 41	141.0													4
45	5 56.9	89 42	139.5	5 30.3	89 42	139.7	5 03.6	89 42	140.0																45
6	5 31.7	89 43	138.7	5 05.1	89 43	138.9																			6
7	5 06.0	88 43	137.9																						7

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	17 32.3	74 61	73.3	17 54.4	74 61	73.0	18 16.5	74 61	72.6	18 38.6	73 61	72.3	19 00.6	73 61	71.9	19 22.6	73 61	71.5	19 44.5	73 61	71.2	20 06.4	73 61	70.8	91
2	16 55.4	74 61	72.6	17 17.6	74 61	72.3	17 39.8	74 61	71.9	18 01.9	74 61	71.6	18 24.0	74 61	71.2	18 46.1	73 61	70.8	19 08.1	73 60	70.5	19 30.1	73 60	70.1	2
3	16 18.6	74 61	71.9	16 40.9	74 61	71.6	17 03.2	74 61	71.2	17 25.4	74 61	70.9	17 47.6	74 60	70.5	18 09.7	74 60	70.1	18 31.8	74 60	69.8	18 53.9	73 60	69.4	3
4	15 42.1	75 61	71.2	16 04.4	74 61	70.9	16 26.7	74 60	70.5	16 49.0	74 60	70.2	17 11.3	74 60	69.8	17 33.5	74 60	69.5	17 55.7	74 60	69.1	18 17.8	74 60	68.7	4
95	15 05.6	75 60	70.5	15 28.1	75 60	70.1	15 50.5	75 60	69.8	16 12.8	75 60	69.5	16 35.2	74 60	69.1	16 57.5	74 60	68.8	17 19.7	74 60	68.4	17 42.0	74 59	68.1	95
6	14 29.4	75 60	69.8	14 51.9	75 60	69.4	15 14.4	75 60	69.1	15 36.8	75 60	68.8	15 59.2	75 60	68.4	16 21.6	75 59	68.1	16 44.0	74 59	67.7	17 06.3	74 59	67.4	6
7	13 53.2	75 60	69.1	14 15.8	75 60	68.7	14 38.4	75 60	68.4	15 00.9	75 59	68.1	15 23.5	75 59	67.7	15 45.9	75 59	67.4	16 08.4	75 59	67.0	16 30.8	75 59	66.7	7
8	13 17.3	76 60	68.4	13 40.0	76 59	68.0	14 02.6	75 59	67.7	14 25.3	75 59	67.4	14 47.9	75 59	67.0	15 10.4	75 59	66.7	15 33.0	75 59	66.3	15 55.5	75 59	66.0	8
9	12 41.5	76 59	67.7	13 04.3	76 59	67.3	13 27.1	76 59	67.0	13 49.8	76 59	66.6	14 12.5	76 59	66.3	14 35.1	75 59	66.0	14 57.7	75 58	65.6	15 20.3	75 58	65.3	9
100	12 06.0	76 59	66.9	12 28.8	76 59	66.6	12 51.6	76 59	66.3	13 14.5	76 59	65.9	13 37.2	76 58	65.6	14 00.0	76 58	65.3	14 22.7	76 58	64.9	14 45.4	76 58	64.6	100
1	11 30.6	77 59	66.2	11 53.5	76 58	65.9	12 16.4	76 58	65.6	12 39.3	76 58	65.2	13 02.2	76 58	64.9	13 25.0	76 58	64.6	13 47.9	76 58	64.2	14 10.7	76 58	63.9	1
2	10 55.4	77 58	65.5	11 18.4	77 58	65.2	11 41.4	77 58	64.9	12 04.4	77 58	64.5	12 27.4	77 58	64.2	12 50.3	76 58	63.9	13 13.2	76 57	63.5	13 36.1	76 57	63.2	2
3	10 20.4	77 58	64.8	10 43.5	77 58	64.5	11 06.6	77 58	64.2	11 29.7	77 58	63.8	11 52.8	77 57	63.5	12 15.8	77 57	63.2	12 38.8	77 57	62.8	13 01.8	77 57	62.5	3
4	9 45.6	77 58	64.1	10 08.8	77 57	63.8	10 32.0	77 57	63.4	10 55.2	77 57	63.1	11 18.3	77 57	62.8	11 41.5	77 57	62.5	12 04.6	77 57	62.1	12 27.7	77 56	61.8	4
105	9 11.0	78 57	63.4	9 34.3	78 57	63.0	9 57.6	78 57	62.7	10 20.9	78 57	62.4	10 44.2	78 57	62.1	11 07.4	77 56	61.8	11 30.6	77 56	61.4	11 53.8	77 56	61.1	105
6	8 36.6	78 57	62.6	9 00.1	78 57	62.3	9 23.5	78 57	62.0	9 46.8	78 56	61.7	10 10.2	78 56	61.4	10 33.5	78 56	61.1	10 56.9	78 56	60.7	11 20.2	78 56	60.4	6
7	8 02.5	78 57	61.9	8 26.0	78 56	61.6	8 49.5	78 56	61.3	9 13.0	78 56	61.0	9 36.5	78 56	60.7	9 59.9	78 56	60.3	10 23.3	78 56	60.0	10 46.7	78 55	59.7	7
8	7 28.6	79 56	61.2	7 52.2	79 56	60.9	8 15.8	79 56	60.6	8 39.4	79 56	60.3	9 03.0	79 55	59.9	9 26.5	78 55	59.6	9 50.0	78 55	59.3	10 13.6	78 55	59.0	8
9	6 54.9	79 56	60.5	7 18.6	79 56	60.2	7 42.3	79 55	59.9	8 06.0	79 55	59.5	8 29.7	79 55	59.2	8 53.3	79 55	58.9	9 17.0	79 55	58.6	9 40.6	79 54	58.3	9
110	6 21.5	79 55	59.7	6 45.3	79 55	59.4	7 09.1	79 55	59.1	7 32.9	79 55	58.8	7 56.7	79 55	58.5	8 20.4	79 54	58.2	8 44.2	79 54	57.9	9 07.9	79 54	57.6	110
1	5 48.3	80 55	59.0	6 12.2	80 55	58.7	6 36.1	80 55	58.4	7 00.0	80 54	58.1	7 23.9	80 54	57.8	7 47.8	80 54	57.5	8 11.7	80 54	57.2	8 35.5	79 54	56.9	1
2	5 15.4	80 54	58.3	5 39.4	80 54	58.0	6 03.4	80 54	57.7	6 27.4	80 54	57.4	6 51.4	80 54	57.1	7 15.4	80 54	56.8	7 39.4	80 53	56.5	8 03.3	80 53	56.2	2
3				5 06.8	80 54	57.2	5 30.9	80 54	56.9	5 55.1	80 53	56.6	6 19.2	80 53	56.3	6 43.3	80 53	56.0	7 07.4	80 53	55.7	7 31.4	80 53	55.4	3
4										5 23.0	81 53	55.9	5 47.2	81 53	55.6	6 11.4	81 53	55.3	6 35.6	81 52	55.0	6 59.8	81 52	54.7	4
115													5 15.5	81 52	54.9	5 39.8	81 52	54.6	6 04.2	81 52	54.3	6 28.5	81 52	54.0	115
6																5 08.6	81 52	53.9	5 33.0	81 51	53.6	5 57.4	81 51	53.3	6
7																			5 02.1	82 51	52.8	5 26.6	82 51	52.6	7

Digitized by Google

Lat. 50°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	68 00.0	1.0 01	180.0	68 30.0	1.0 01	180.0	69 00.0	1.0 01	180.0	70 00.0	1.0 01	180.0
1	67 59.2	1.0 04	177.6	68 29.2	1.0 04	177.6	68 59.2	1.0 04	177.6	69 59.2	1.0 04	177.5
2	67 56.8	1.0 07	175.3	68 26.8	1.0 07	175.2	68 56.7	1.0 07	175.1	69 56.6	1.0 07	174.9
3	67 52.9	1.0 09	173.0	68 22.8	1.0 09	172.8	68 52.6	1.0 10	172.7	69 52.4	1.0 10	172.4
4	67 47.4	99 12	170.6	68 17.2	99 12	170.5	68 46.9	99 12	170.3	69 46.4	99 13	169.9
05	67 40.3	99 14	168.3	68 10.0	99 14	168.1	68 39.6	99 15	167.9	69 38.9	99 15	167.5
6	67 31.8	98 17	166.0	68 01.3	98 17	165.8	68 30.8	98 17	165.5	69 29.7	98 18	165.0
7	67 21.7	98 19	163.8	67 51.1	98 19	163.5	68 20.4	98 20	163.2	69 19.0	98 20	162.6
8	67 10.2	97 22	161.5	67 39.4	97 22	161.2	68 08.5	97 22	160.9	69 06.7	97 23	160.2
9	66 57.3	97 24	159.3	67 26.3	97 24	159.0	67 55.2	96 25	158.7	68 52.9	96 25	157.9
10	66 43.0	96 26	157.2	67 11.8	96 26	156.8	67 40.5	96 27	156.4	68 37.7	96 28	155.6
1	66 27.4	95 28	155.1	66 55.9	95 29	154.7	67 24.4	95 29	154.3	68 21.1	94 30	153.4
2	66 10.5	94 30	153.0	66 38.8	94 31	152.6	67 07.0	94 31	152.1	68 03.2	93 32	151.2
3	65 52.3	94 32	150.9	66 20.4	93 33	150.5	66 48.3	93 33	150.0	67 44.0	92 34	149.1
4	65 33.0	93 34	148.9	66 00.8	92 35	148.5	66 28.5	92 35	148.0	67 23.5	91 36	147.0
15	65 12.6	92 36	147.0	65 40.0	91 36	146.5	66 07.4	91 37	146.0	67 01.9	90 38	144.9
6	64 51.0	91 38	145.1	65 18.2	91 38	144.6	65 45.3	90 39	144.0	66 39.2	89 40	143.0
7	64 28.4	90 39	143.2	64 55.3	90 40	142.7	65 22.2	89 40	142.2	66 15.5	88 41	141.0
8	64 04.8	89 41	141.4	64 31.5	89 41	140.8	64 58.0	88 42	140.3	65 50.7	87 43	139.2
9	63 40.3	88 42	139.6	64 06.7	88 43	139.1	64 32.9	87 43	138.5	65 25.1	86 44	137.3
20	63 14.8	87 44	137.9	63 40.9	87 44	137.3	64 06.9	86 45	136.7	64 58.5	85 46	135.6
1	62 48.5	86 45	136.2	63 14.4	86 46	135.6	63 40.1	85 46	135.0	64 31.1	84 47	133.8
2	62 21.4	85 46	134.5	62 47.0	85 47	134.0	63 12.4	85 47	133.4	64 02.9	84 48	132.2
3	61 53.6	85 48	132.9	62 18.9	84 48	132.3	62 44.0	84 49	131.8	63 33.9	83 49	130.5
4	61 25.0	84 49	131.4	61 50.0	83 49	130.8	62 14.9	83 50	130.2	63 04.2	82 51	128.9
25	60 55.7	83 50	129.8	61 20.5	82 50	129.2	61 45.1	82 51	128.6	62 33.9	81 52	127.4
6	60 25.7	82 51	128.3	60 50.3	82 51	127.8	61 14.7	81 52	127.2	62 03.0	80 53	125.9
7	59 55.2	81 52	126.9	60 19.5	81 52	126.3	60 43.7	80 53	125.7	61 31.5	79 53	124.5
8	59 24.1	81 53	125.5	59 48.1	80 53	124.9	60 12.1	79 54	124.3	60 59.4	78 54	123.0
9	58 52.4	80 54	124.1	59 16.2	79 54	123.5	59 39.9	79 54	122.9	60 26.8	78 55	121.7
30	58 20.2	79 54	122.8	58 43.8	79 55	122.2	59 07.3	78 55	121.6	59 53.7	77 56	120.3
1	57 47.5	78 55	121.4	58 11.0	78 56	120.8	58 34.2	77 56	120.2	59 20.2	76 57	119.0
2	57 14.4	78 56	120.2	57 37.6	77 56	119.6	58 00.7	77 57	119.0	58 46.3	75 57	117.7
3	56 40.8	77 57	118.9	57 03.9	77 57	118.3	57 26.7	76 57	117.7	58 12.0	75 58	116.5
4	56 06.9	76 57	117.7	56 29.7	76 58	117.1	56 52.4	75 58	116.5	57 37.3	74 58	115.3
35	55 32.5	76 58	116.5	55 55.2	75 58	115.9	56 17.7	75 58	115.3	57 02.2	74 59	114.1
6	54 57.8	75 58	115.3	55 20.4	75 59	114.7	55 42.7	74 59	114.1	56 26.8	73 59	112.9
7	54 22.8	75 59	114.2	54 45.2	74 59	113.6	55 07.3	74 59	113.0	55 51.2	72 60	111.8
8	53 47.5	74 59	113.0	54 09.7	74 60	112.5	54 31.7	73 60	111.9	55 15.2	72 60	110.7
9	53 11.8	74 60	111.9	53 33.9	73 60	111.4	53 55.8	73 60	110.8	54 39.0	71 61	109.6
40	52 35.9	73 60	110.9	52 57.8	73 60	110.3	53 19.6	72 61	109.7	54 02.6	71 61	108.6
1	51 59.8	73 61	109.8	52 21.6	72 61	109.3	52 43.2	72 61	108.7	53 25.9	71 61	107.5
2	51 23.4	72 61	108.8	51 45.0	72 61	108.2	52 06.5	71 61	107.7	52 49.0	70 62	106.5
3	50 46.7	72 61	107.8	51 08.3	72 62	107.2	51 29.7	71 62	106.6	52 11.9	70 62	105.5
4	50 09.9	72 62	106.8	50 31.4	71 62	106.2	50 52.6	71 62	105.7	51 34.7	70 62	104.5
45	49 32.9	71 62	105.8	49 54.2	71 62	105.2	50 15.4	70 62	104.7	50 57.3	69 63	103.6
6	48 55.7	71 62	104.8	49 16.9	71 62	104.3	49 38.0	70 63	103.7	50 19.7	69 63	102.6
7	48 18.3	71 63	103.9	48 39.5	70 63	103.3	49 00.5	70 63	102.8	49 42.0	69 63	101.7
8	47 40.8	70 63	102.9	48 01.9	70 63	102.4	48 22.8	69 63	101.9	49 04.2	68 63	100.8
9	47 03.2	70 63	102.0	47 24.2	70 63	101.5	47 45.0	69 63	101.0	48 26.2	68 63	99.9
50	46 25.4	70 63	101.1	46 46.3	70 63	100.6	47 07.1	69 63	100.1	47 48.2	68 64	99.0
1	45 47.5	70 63	100.2	46 08.3	69 63	99.7	46 29.1	69 64	99.2	47 10.1	68 64	98.1
2	45 09.5	70 64	99.4	45 30.3	69 64	98.8	45 50.9	69 64	98.3	46 31.8	68 64	97.3
3	44 31.4	69 64	98.5	44 52.1	69 64	98.0	45 12.7	68 64	97.5	45 53.5	68 64	96.4
4	43 53.2	69 64	97.6	44 13.9	69 64	97.1	44 34.5	68 64	96.6	45 15.2	67 64	95.6
55	43 14.9	69 64	96.8	43 35.6	69 64	96.3	43 56.1	68 64	95.8	44 36.8	67 64	94.8
6	42 36.6	69 64	96.0	42 57.2	69 64	95.5	43 17.7	68 64	95.0	43 58.3	67 64	94.0
7	41 58.2	69 64	95.1	42 18.8	68 64	94.6	42 39.3	68 64	94.2	43 19.8	67 64	93.1
8	41 19.8	69 64	94.3	41 40.4	68 64	93.8	42 00.8	68 64	93.4	42 41.3	67 64	92.4
9	40 41.3	69 64	93.5	41 01.9	68 64	93.0	41 22.3	68 64	92.6	42 02.8	67 64	91.6
60	40 02.8	69 64	92.7	40 23.3	68 64	92.2	40 43.7	68 64	91.8	41 24.2	67 64	90.8
1	39 24.3	69 64	91.9	39 44.8	68 64	91.5	40 05.2	68 64	91.0	40 45.6	67 64	90.0
2	38 45.7	69 64	91.2	39 06.2	68 64	90.7	39 26.6	68 64	90.2	40 07.1	67 64	89.3
3	38 07.1	69 64	90.4	38 27.7	68 64	89.9	38 48.1	68 64	89.5	39 28.5	67 64	88.5
4	37 28.6	69 64	89.6	37 49.1	68 64	89.2	38 09.5	68 64	88.7	38 50.0	67 64	87.8
65	36 50.0	69 64	88.9	37 10.5	68 64	88.4	37 30.9	68 64	87.9	38 11.4	67 64	87.0
6	36 11.5	69 64	88.1	36 32.0	68 64	87.7	36 52.4	68 64	87.2	37 32.9	67 64	86.3
7	35 32.9	69 64	87.4	35 53.5	68 64	86.9	36 13.9	68 64	86.5	36 54.5	67 64	85.5
8	34 54.4	69 64	86.6	35 15.0	68 64	86.2	35 35.4	68 64	85.7	36 16.0	67 64	84.8
9	34 15.9	69 64	85.9	34 36.5	68 64	85.4	34 57.0	68 64	85.0	35 37.7	67 64	84.1
70	33 37.5	69 64	85.1	33 58.1	69 64	84.7	34 18.6	68 64	84.3	34 59.3	68 64	83.4
1	32 59.1	69 64	84.4	33 19.7	69 64	84.0	33 40.2	68 64	83.5	34 21.0	68 64	82.7
2	32 20.7	69 64	83.7	32 41.4	69 64	83.3	33 01.9	68 64	82.8	33 42.8	68 64	82.0
3	31 42.4	69 64	83.0	32 03.1	69 64	82.6	32 23.7	69 64	82.1	33 04.7	68 63	81.3
4	31 04.2	69 64	82.3	31 24.9	69 64	81.8	31 45.5	69 63	81.4	32 26.6	68 63	80.6
75	30 26.0	69 64	81.5	30 46.7	69 63	81.1	31 07.4	69 63	80.7	31 48.6	68 63	79.9
6	29 47.9	70 63	80.8	30 08.7	69 63	80.4	30 29.4	69 63	80.0	31 10.7	68 63	79.2
7	29 09.8	70 63	80.1	29 30.7	69 63	79.7	29 51.5	69 63	79.3	30 32.8	69 63	78.5
8	28 31.9	70 63	79.4	28 52.8	70 63	79.0	29 13.6	69 62	78.6	29 55.1	69 63	77.8
9	27 54.0	70 63	78.7	28 15.0	70 63	78.3	28 35.9	70 63	77.9	29 17.4	69 63	77.1
80	27 16.2	70 63	78.0	27 37.2	70 63	77.6	27 58.2	70 63	77.2	28 39.9	69 62	76.4
1	26 38.5	70 63	77.3	26 59.6	70 63	76.9	27 20.6	70 62	76.5	28 02.5	69 62	75.7
2	26 01.0	71 62	76.6	26 22.1	70 62	76.2	26 43.2	70 62	75.8	27 25.1	70 62	75.0
3	25 23.5	71 62	75.9	25 44.7	71 62	75.6	26 05.9	70 62	75.2	26 47.9	70 62	74.4
4	24 46.1	71 62	75.3	25 07.4	71 62	74.9	25 28.6	71 62	74.5	26 10.9	70 62	73.7
85	24 08.9	71 62	74.6	24 30.2	71 62	74.2	24 51.5	71 62	73.8	25 33.9	70 61	73.0
6	23 31.8	71 62	73.9	23 53.2	71 62	73.5	24 14.6	71 61	73.1	24 57.1	71 61	72.3
7	22 54.8	72 61	73.2	23 16.3	72 61	72.8	23 37.7	71 61	72.4	24 20.4	71 61	71.7
8	22 18.0	72 61	72.5	22 39.5	72 61	72.1	23 01.0	72 61	71.7	23 43.9	71 61	71.0
9	21 41.2	72 61	71.8	22 02.9	72 61	71.4	22 24.5	72 61	71.1	23 07.5	72 60	70.3
90	21 04.7	72 61	71.1	21 26.4	72 61	70.8	21 48.1	72 60	70.4	22 31.3	72 60	69.6

H.A.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	72 00.0	1.0 02	180.0	74 00.0	1.0 02	180.0	74 30.0	1.0 02	180.0	75 30.0	1.0 02	180.0
1	71 59.1	1.0 05	177.3	73 59.0	1.0 05	177.0	74 29.0	1.0 05	176.9	75 28.9	1.0 06	176.8
2	71 56.3	1.0 08	174.5	73 56.0	1.0 08	174.0	74 25.9	1.0 09	173.8	75 25.6	1.0 09	173.5
3	71 51.7	99 11	171.8	73 50.9	99 12	171.0	74 20.7	99 12	170.8	75 20.2	99 13	170.3
4	71 45.3	99 14	169.1	73 43.9	99 15	168.1	74 13.5	99 15	167.8	75 12.7	98 16	167.1
05	71 37.2	98 16	166.4	73 35.0	98 18	165.2	74 04.4	98 18	164.8	75 03.1	98 19	164.0
6	71 27.3	98 19	163.8	73 24.2	97 21	162.3	73 53.4	97 21	161.9	74 51.5	97 22	161.0
7	71 15.7	97 22	161.2	73 11.6	96 24	159.5	73 40.5	96 24	159.1	74 38.0	96 26	158.0
8	71 02.5	96 25	158.7	72 57.3	95 27	156.8	73 25.8	95 27	156.3	74 22.6	94 28	155.1
9	70 47.7	95 27	156.2	72 41.3	94 29	154.2	73 09.5	94 30	153.6	74 05.5	93 31	152.3
10	70 31.4	94 30	153.8	72 23.7	93 32	151.6	72 51.5	93 32	151.0	73 46.8	92 34	149.6
1	70 13.6	93 32	151.4	72 04.6	92 34	149.1	72 32.1	91 35	148.4	73 26.5	90 36	147.0
2	69 54.5	92 34	149.1	71 44.1	90 36	146.6	72 11.2	90 37	145.9	73 04.8	89 38	144.4
3	69 34.1	91 36	146.9	71 22.2	89 39	144.3	71 48.9	89 39	143.6	72 41.7	87 41	142.0
4	69 12.4	90 38	144.7	70 59.1	88 41	142.0	71 25.4	87 41	141.3	72 17.3	86 43	139.7
15	68 49.5	89 40	142.6	70 34.8	87 42	139.8	71 00.7	86 43	139.0	71 51.8	85 44	137.4
6	68 25.5	88 42	140.5	70 09.3	85 44	137.7	70 34.8	85 45	136.9	71 25.2	83 46	135.2
7	68 00.5	86 43	138.5	69 42.9	84 46	135.6	70 06.0	83 46	134.8	70 57.5	82 48	133.2
8	67 34.5	85 45	136.6	69 15.4	83 47	133.7	69 40.2	82 48	132.9	70 28.9	80 49	131.2
9	67 07.5	84 46	134.7	68 47.1	82 49	131.8	69 11.5	81 49	131.0	69 59.4	79 50	129.2
20	66 39.7	83 48	132.9	68 17.9	80 50	129.9	68 41.9	80 50	129.1	69 29.2	78 52	127.4
1	66 11.1	82 49	131.2	67 48.0	79 51	128.2	68 11.6	78 52	127.3	68 58.2	77 53	125.6
2	65 41.7	81 50	129.5	67 17.3	78 52	126.5	67 40.6	77 53	125.6	68 26.5	76 54	123.9
3	65 11.6	80 51	127.8	66 45.9	77 53	124.8	67 08.9	76 54	124.0	67 54.2	74 55	122.3
4	64 40.8	79 52	126.2	66 14.0	76 54	123.2	66 36.7	75 55	122.4	67 21.3	73 56	120.7
25	64 09.4	78 53	124.7	65 41.4	75 55	121.7	66 03.8	74 56	120.9	66 47.9	72 57	119.2
6	63 37.4	77 54	123.2	65 08.3	74 56	120.2	65 30.5	73 56	119.4	66 13.9	71 57	117.7
7	63 04.8	76 55	121.7	64 34.8	73 57	118.7	64 56.6	72 57	117.9	65 39.6	71 58	116.3
8	62 31.8	76 56	120.3	64 00.7	73 57	117.3	64 22.3	72 58	116.6	65 04.8	70 59	114.9
9	61 58.3	75 57	119.0	63 26.2	72 58	116.0	63 47.6	71 58	115.2	64 29.6	69 59	113.6
30	61 24.3	74 57	117.6	62 51.4	71 59	114.7	63 12.6	70 59	113.9	63 54.1	68 60	112.3
1	60 49.9	73 58	116.3	62 16.2	70 59	113.4	62 37.1	69 60	112.6	63 18.2	68 60	111.0
2	60 15.2	73 58	115.1	61 40.6	70 60	112.2	62 01.4	69 60	111.4	62 42.1	67 61	109.8
3	59 40.1	72 59	113.9	61 04.8	69 60	111.0	61 25.3	68 61	110.2	62 05.7	66 61	108.7
4	59 04.6	71 60	112.7	60 28.6	68 61	109.8	60 49.0	68 61	109.1	61 29.0	66 61	107.5
35	58 28.9	71 60	111.5	59 52.2	68 61	108.7	60 12.4	67 61	107.9	60 52.1	65 62	106.4
6	57 52.9	70 60	110.4	59 15.5	67 61	107.6	59 35.6	67 62	106.8	60 15.0	65 62	105.3
7	57 16.6	70 61	109.2	58 38.7	67 62	106.5	58 58.6	66 62	105.8	59 37.8	64 62	104.3
8	56 40.1	69 61	108.2	58 01.6	66 62	105.4	58 21.4	66 62	104.7	59 00.3	64 63	103.3
9	56 03.3	69 62	107.1	57 24.3	66 62	104.4	57 44.0	65 63	103.7	58 22.7	64 63	102.3
40	55 26.3	69 62	106.1	56 46.9	66 63	103.4	57 06.5	65 63	102.7	57 44.9	63 63	101.3
1	54 49.2	68 62	105.1	56 09.3	65 63	102.4	56 28.8	65 63	101.7	57 07.1	63 63	100.3
2	54 11.9	68 62	104.1	55 31.6	65 63	101.5	55 51.0	64 63	100.8	56 29.1	63 63	99.4
3	53 34.4	67 63	103.1	54 53.7	65 63	100.5	55 13.0	64 63	99.9	55 51.0	62 64	98.5
4	52 56.7	67 63	102.1	54 15.7	64 63	99.6	54 35.0	64 64	98.9	55 12.8	62 64	97.6
45	52 19.0	67 63	101.2	53 37.7	64 64	98.7	53 56.8	64 64	98.0	54 34.5	62 64	96.7
6	51 41.1	67 63	100.3	52 59.5	64 64	97.8	53 18.6	63 64	97.2	53 56.2	62 64	95.8
7	51 03.1	66 64	99.4	52 21.2	64 64	96.9	52 40.3	63 64	96.3	53 17.8	62 64	95.0
8	50 25.0	66 64	98.5	51 42.9	64 64	96.1	52 01.9	63 64	95.4	52 39.3	62 64	94.2
9	49 46.8	66 64	97.6	51 04.5	64 64	95.2	51 23.5	63 64	94.6	52 00.8	62 64	93.3
50	49 08.5	66 64	96.8	50 26.1	63 64	94.4	50 45.0	63 64	93.8	51 22.3	61 64	92.5
1	48 30.2	66 64	95.9	49 47.6	63 64	93.6	50 06.5	63 64	93.0	50 43.8	61 64	91.7
2	47 51.8	66 64	95.1	49 09.1	63 64	92.8	49 28.0	63 64	92.2	50 05.2	61 64	91.0
3	47 13.4	65 64	94.3	48 30.6	63 64	92.0	48 49.5	63 64	91.4	49 26.7	61 64	90.2
4	46 34.9	65 64	93.4	47 52.0	63 64	91.2	48 10.9	63 64	90.6	48 48.1	61 64	89.4
55	45 56.4	65 64	92.6	47 13.5	63 64	90.4	47 32.3	63 64	89.8	48 09.5	61 64	88.7
6	45 17.8	65 64	91.8	46 34.9	63 64	89.6	46 53.8	63 64	89.1	47 31.0	61 64	87.9
7	44 39.3	65 64	91.1	45 56.4	63 64	88.9	46 15.2	63 64	88.3	46 52.5	61 64	87.2
8	44 00.7	65 64	90.3	45 17.8	63 64	88.1	45 36.7	63 64	87.6	46 14.0	62 64	86.5
9	43 22.2	65 64	89.5	44 39.3	63 64	87.4	44 58.2	63 64	86.8	45 35.5	62 64	85.7
60	42 43.6	65 64	88.8	44 00.7	63 64	86.7	44 19.7	63 64	86.1	44 57.0	62 64	85.0
1	42 05.0	65 64	88.0	43 22.3	63 64	85.9	43 41.2	63 64	85.4	44 18.6	62 64	84.3
2	41 26.5	65 64	87.3	42 43.8	63 64	85.2	43 02.8	63 64	84.7	43 40.3	62 64	83.6
3	40 48.0	65 64	86.5	42 05.4	64 64	84.5	42 24.4	63 64	84.0	43 02.0	62 64	82.9
4	40 09.5	65 64	85.8	41 27.0	64 64	83.8	41 46.1	63 64	83.3	42 23.7	62 64	82.2
65	39 31.1	66 64	85.1	40 48.7	64 64	83.1	41 07.8	63 64	82.6	41 45.6	62 64	81.5
6	38 52.7	66 64	84.4	40 10.5	64 64	82.4	40 29.6	64 64	81.9	41 07.4	63 63	80.9
7	38 14.3	66 64	83.7	39 32.3	64 64	81.7	39 51.4	64 63	81.2	40 29.4	63 63	80.2
8	37 36.0	66 64	82.9	38 54.1	64 63	81.0	39 13.4	64 63	80.5	39 51.4	63 63	79.5
9	36 57.8	66 64	82.2	38 16.1	64 63	80.3	38 35.4	64 63	79.8	39 13.6	63 63	78.9
70	36 19.6	66 64	81.5	37 38.1	65 63	79.7	37 57.4	64 63	79.2	38 35.8	63 63	78.2
1	35 41.5	66 63	80.9	37 00.2	65 63	79.0	37 19.6	64 63	78.5	37 58.1	64 63	77.5
2	35 03.4	67 63	80.2	36 22.4	65 63	78.3	36 41.9	65 63	77.8	37 20.4	64 63	76.9
3	34 25.5	67 63	79.5	35 44.7	65 63	77.6	36 04.2	65 63	77.2	36 42.9	64 62	76.2
4	33 47.6	67 63	78.8	35 07.0	66 63	77.0	35 26.6	65 62	76.5	36 05.5	64 62	75.6
75	33 09.8	67 63	78.1	34 29.5	66 62	76.3	34 49.2	65 62	75.9	35 28.2	65 62	74.9
6	32 32.1	67 63	77.4	33 52.1	66 62	75.6	34 11.9	66 62	75.2	34 51.1	65 62	74.3
7	31 54.5	68 62	76.8	33 14.8	66 62	75.0	33 34.6	66 62	74.5	34 14.0	65 62	73.6
8	31 17.0	68 62	76.1	32 37.6	67 62	74.3	32 57.5	66 62	73.9	33 37.0	66 61	73.0
9	30 39.6	68 62	75.4	32 00.5	67 62	73.7	32 20.5	67 61	73.2	33 00.2	66 61	72.4
80	30 02.4	68 62	74.7	31 23.6	67 61	73.0	31 43.7	67 61	72.6	32 23.5	66 61	71.7
1	29 25.2	68 62	74.1	30 46.7	67 61	72.4	31 06.9	67 61	71.9	31 47.0	66 61	71.1
2	28 48.2	69 62	73.4	30 10.1	68 61	71.7	30 30.3	67 61	71.3	31 10.6	67 60	70.4
3	28 11.3	69 61	72.7	29 33.5	68 61	71.1	29 53.9	68 61	70.7	30 34.3	67 60	69.8
4	27 34.5	69 61	72.1	28 57.1	68 60	70.4	29 17.5	68 60	70.0	29 58.2	67 60	69.2
85	26 57.9	70 61	71.4	28 20.8	69 60	69.8	28 41.4	68 60	69.4	29 22.2	68 60	68.5
6	26 21.4	70 61	70.8	27 44.7	69 60	69.1	28 05.4	69 60	68.7	28 46.4	68 59	67.9
7	25 45.1	70 60	70.1	27 08.7	69 60	68.5	27 29.5	69 60	68.1	28 10.8	69 59	67.3
8	25 08.9	70 60	69.4	26 32.9	70 59	67.8	26 53.8	69 59	67.4	27 35.3	69 59	66.6
9	24 32.9	71 60	68.8	25 57.3	70 59	67.2	26 18.3	70 59	66.8	26 59.9	69 59	66.0
90	23 57.0	71 60	68.1	25 21.8	70 59	66.6	25 42.9	70 59	66.2	26 24.8	70 58	65.4

Digitized by Google

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	11 00.0	1.0 00	180.0	10 00.0	1.0 00	180.0	8 00.0	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0				00
1	11 59.7	1.0 02	179.1	11 29.7	1.0 02	179.1	10 59.7	1.0 02	179.1	9 59.7	1.0 01	179.1	7 59.7	1.0 01	179.1	5 59.7	1.0 01	179.2	5 29.7	1.0 01	179.2				1
2	11 58.8	1.0 03	178.2	11 28.8	1.0 03	178.2	10 58.8	1.0 02	178.2	9 58.8	1.0 02	178.2	7 58.8	1.0 02	178.3	5 58.9	1.0 02	178.3	5 28.9	1.0 02	178.3				2
3	11 57.3	1.0 04	177.3	11 27.3	1.0 04	177.3	10 57.3	1.0 04	177.3	9 57.3	1.0 03	177.4	7 57.4	1.0 03	177.4	5 57.5	1.0 03	177.5	5 27.5	1.0 03	177.5				3
4	11 55.1	1.0 05	176.4	11 25.2	1.0 04	176.4	10 55.2	1.0 04	176.4	9 55.3	1.0 04	176.5	7 55.4	1.0 04	176.6	5 55.5	1.0 04	176.7	5 25.5	1.0 04	176.7				4
05	11 52.4	1.0 06	175.5	11 22.5	1.0 06	175.5	10 52.5	1.0 06	175.5	9 52.6	1.0 05	175.6	7 52.8	1.0 05	175.7	5 53.0	1.0 05	175.8	5 23.0	1.0 05	175.9				05
6	11 49.1	1.0 07	174.6	11 19.1	1.0 07	174.6	10 49.2	1.0 06	174.7	9 49.4	1.0 06	174.7	7 49.6	1.0 06	174.9	5 49.9	1.0 06	175.0	5 20.0	1.0 06	175.0				6
7	11 45.1	1.0 08	173.7	11 15.2	1.0 08	173.7	10 45.3	1.0 07	173.8	9 45.5	1.0 07	173.9	7 45.9	1.0 07	174.0	5 46.3	1.0 07	174.2	5 16.4	1.0 07	174.2				7
8	11 40.6	1.0 09	172.8	11 10.7	1.0 08	172.8	10 40.8	1.0 08	172.9	9 41.1	1.0 08	173.0	7 41.6	1.0 08	173.2	5 42.1	1.0 08	173.3	5 12.2	1.0 08	173.4				8
9	11 35.5	99 10	171.9	11 05.6	99 10	171.9	10 35.8	99 09	172.0	9 36.1	99 09	172.1	7 36.7	99 09	172.3	5 37.3	99 09	172.5	5 07.5	99 09	172.6				9
10	11 29.7	99 11	171.0	10 59.9	99 10	171.1	10 30.1	99 10	171.1	9 30.5	99 10	171.2	7 31.3	99 10	171.5	5 32.0	99 10	171.7	5 02.2	99 10	171.7				10
1	11 23.4	99 12	170.1	10 53.6	99 11	170.2	10 23.9	99 11	170.2	9 24.3	99 11	170.4	7 25.3	99 11	170.6	5 26.2	99 11	170.9							1
2	11 16.5	99 13	169.2	10 46.7	99 12	169.3	10 17.0	99 12	169.3	9 17.6	99 12	169.5	7 18.7	99 12	169.8	5 19.8	99 12	170.0							2
3	11 09.0	99 14	168.3	10 39.3	99 13	168.4	10 09.6	99 13	168.5	9 10.3	99 13	168.6	7 11.5	99 13	168.9	5 12.8	99 12	169.2							3
4	11 00.9	99 14	167.4	10 31.2	99 14	167.5	10 01.6	99 14	167.6	9 02.4	99 14	167.8	7 03.8	99 14	168.1	5 05.3	99 13	168.4							4
15	10 52.2	99 15	166.5	10 22.6	99 15	166.6	9 53.0	99 15	166.7	8 53.9	99 15	166.9	6 55.6	99 15	167.2										15
6	10 42.9	98 16	165.7	10 13.4	98 16	165.8	9 43.9	98 16	165.8	8 44.9	98 16	166.0	6 46.8	98 16	166.4										6
7	10 33.1	98 17	164.8	10 03.6	98 17	164.9	9 34.2	98 17	165.0	8 35.3	98 17	165.2	6 37.4	98 16	165.5										7
8	10 22.7	98 18	163.9	9 53.3	98 18	164.0	9 23.9	98 18	164.1	8 25.1	98 18	164.3	6 27.5	98 17	164.7										8
9	10 11.7	98 19	163.0	9 42.4	98 19	163.1	9 13.0	98 19	163.2	8 14.4	98 19	163.4	6 17.1	98 18	163.9										9
20	10 00.1	97 20	162.1	9 30.9	97 20	162.3	9 01.6	97 20	162.4	8 03.1	98 20	162.6	6 06.1	98 19	163.0										20
1	9 48.0	97 21	161.3	9 18.9	97 21	161.4	8 49.7	97 21	161.5	7 51.3	97 21	161.7	5 54.6	97 20	162.2										1
2	9 35.4	97 22	160.4	9 06.3	97 22	160.5	8 37.2	97 22	160.6	7 39.0	97 21	160.9	5 42.6	97 21	161.4										2
3	9 22.1	97 23	159.5	8 53.1	97 23	159.7	8 24.1	97 23	159.8	7 26.1	97 22	160.0	5 30.0	97 22	160.6										3
4	9 08.4	96 24	158.7	8 39.5	96 24	158.8	8 10.5	96 24	158.9	7 12.7	96 23	159.2	5 16.9	96 23	159.7										4
25	8 54.1	96 25	157.8	8 25.2	96 25	157.9	7 56.4	96 24	158.1	6 58.7	96 24	158.4	5 03.3	96 24	158.9										25
6	8 39.3	96 26	157.0	8 10.5	96 25	157.1	7 41.7	96 25	157.2	6 44.2	96 25	157.5													6
7	8 23.9	96 26	156.1	7 55.2	96 26	156.2	7 26.6	96 26	156.4	6 29.2	96 26	156.7													7
8	8 08.0	95 27	155.2	7 39.4	95 27	155.4	7 10.9	95 27	155.6	6 13.7	95 27	155.9													8
9	7 51.6	95 28	154.4	7 23.1	95 28	154.6	6 54.6	95 28	154.7	5 57.7	95 28	155.0													9
30	7 34.7	95 29	153.6	7 06.3	95 29	153.7	6 37.9	95 29	153.9	5 41.1	95 28	154.2													30
1	7 17.2	94 30	152.7	6 49.0	94 30	152.9	6 20.7	94 30	153.0	5 24.1	94 29	153.4													1
2	6 59.3	94 31	151.9	6 31.1	94 31	152.0	6 03.0	94 30	152.2	5 06.6	94 30	152.6													2
3	6 40.9	94 32	151.0	6 12.8	94 31	151.2	5 44.7	94 31	151.4																3
4	6 22.0	93 32	150.2	5 54.0	93 32	150.4	5 26.0	93 32	150.6																4
35	6 02.6	93 33	149.4	5 34.7	93 33	149.6	5 06.8	93 33	149.8																35
6	5 42.7	93 34	148.6	5 14.9	93 34	148.8																			6
7	5 22.3	92 35	147.7																						7
8	5 01.5	92 35	146.9																						8

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	20 28.3	73 60	70.4	20 50.1	73 60	70.1	21 11.8	72 60	69.7	21 55.2	72 60	69.0	23 21.3	71 59	67.5	24 46.5	71 59	65.9	25 07.7	70 58	65.5	25 49.8	70 58	64.7	91
2	19 52.0	73 60	69.8	20 13.9	73 60	69.4	20 35.7	73 60	69.0	21 19.3	72 60	68.3	22 45.8	72 59	66.8	24 11.4	71 58	65.3	24 32.7	71 58	64.9	25 15.0	70 58	64.1	2
3	19 15.9	73 60	69.1	19 37.9	73 60	68.7	19 59.8	73 60	68.4	20 43.5	73 59	67.6	22 10.4	72 59	66.1	23 36.5	71 58	64.6	23 57.9	71 58	64.2	24 40.4	71 57	63.5	3
4	18 39.9	74 60	68.4	19 02.0	73 59	68.0	19 24.0	73 59	67.7	20 07.9	73 59	66.9	21 35.2	72 58	65.5	23 01.7	72 58	64.0	23 23.2	72 57	63.6	24 06.0	71 57	62.8	4
95	18 04.2	74 59	67.7	18 26.3	74 59	67.3	18 48.4	74 59	67.0	19 32.5	73 59	66.3	21 00.2	73 58	64.8	22 27.2	72 57	63.3	22 48.8	72 57	63.0	23 31.8	72 57	62.2	95
6	17 28.6	74 59	67.0	17 50.8	74 59	66.7	18 13.0	74 59	66.3	18 57.3	74 58	65.6	20 25.4	73 58	64.2	21 52.8	72 57	62.7	22 14.5	72 57	62.3	22 57.8	72 56	61.6	6
7	16 53.2	75 59	66.3	17 15.5	74 59	66.0	17 37.8	74 58	65.6	18 22.3	74 58	64.9	19 50.8	73 57	63.5	21 18.6	73 57	62.0	21 40.5	73 56	61.7	22 24.0	72 56	60.9	7
8	16 17.9	75 58	65.6	16 40.4	75 58	65.3	17 02.8	75 58	64.9	17 47.5	74 58	64.2	19 16.4	74 57	62.8	20 44.7	73 56	61.4	21 06.6	73 56	61.0	21 50.4	73 56	60.3	8
9	15 42.9	75 58	65.0	16 05.4	75 58	64.6	16 27.9	75 58	64.3	17 12.8	75 57	63.6	18 42.2	74 57	62.2	20 10.9	74 56	60.7	20 33.0	74 56	60.4	21 17.0	73 55	59.6	9
100	15 08.1	75 58	64.3	15 30.7	75 58	63.9	15 53.3	75 57	63.6	16 38.4	75 57	62.9	18 08.2	75 56	61.5	19 37.4	74 56	60.1	19 59.6	74 55	59.7	20 43.8	74 55	59.0	100
1	14 33.4	76 57	63.6	14 56.2	76 57	63.2	15 18.9	76 57	62.9	16 04.2	75 57	62.2	17 34.4	75 56	60.8	19 04.1	74 55	59.4	19 26.4	74 55	59.1	20 10.9	74 55	58.4	1
2	13 59.0	76 57	62.9	14 21.8	76 57	62.5	14 44.6	76 57	62.2	15 30.2	76 56	61.5	17 00.8	75 56	60.2	18 31.0	75 55	58.8	18 53.4	75 55	58.4	19 38.2	74 54	57.7	2
3	13 24.8	77 57	62.2	13 47.7	76 56	61.9	14 10.6	76 56	61.5	14 56.4	76 56	60.9	16 27.5	76 55	59.5	17 58.1	75 54	58.1	18 20.7	75 54	57.8	19 05.7	75 54	57.1	3
4	12 50.8	77 56	61.5	13 13.8	77 56	61.2	13 36.8	77 56	60.8	14 22.8	77 56	60.2	15 54.4	76 55	58.8	17 25.5	76 54	57.5	17 48.2	76 54	57.1	18 33.4	75 53	56.4	4
105	12 17.0	77 56	60.8	12 40.1	77 56	60.5	13 03.3	77 56	60.1	13 49.5	77 55	59.5	15 21.5	77 54	58.2	16 53.1	76 54	56.8	17 15.9	76 53	56.5	18 01.4	76 53	55.8	105
6	11 43.4	78 56	60.1	12 06.7	78 55	59.8	12 29.9	77 55	59.4	13 16.4	77 55	58.8	14 48.9	77 54	57.5	16 20.9	77 53	56.2	16 43.9	76 53	55.8	17 29.6	76 53	55.1	6
7	11 10.1	78 55	59.4	11 33.5	78 55	59.1	11 56.9	78 55	58.8	12 43.5	78 54	58.1	14 16.5	77 54	56.8	15 49.0	77 53	55.5	16 12.1	77 53	55.2	16 58.1	77 52	54.5	7
8	10 37.1	78 55	58.7	11 00.5	78 54	58.4	11 24.0	78 54	58.1	12 10.9	78 54	57.4	13 44.3	78 53	56.1	15 17.4	77 52	54.8	15 40.6	77 52	54.5	16 26.8	77 52	53.8	8
9	10 04.2	79 54	58.0	10 27.8	79 54	57.7	10 51.4	79 54	57.4	11 38.5	78 54	56.7	13 12.4	78 53	55.5	14 46.0	78 52	54.2	15 09.3	78 52	53.8	15 55.8	77 51	53.2	9
110	9 31.7	79 54	57.3	9 55.4	79 54	57.0	10 19.1	79 53	56.7	11 06.4	79 53	56.0	12 40.8	79 52	54.8	14 14.8	78 51	53.5	14 38.3	78 51	53.2	15 25.1	78 51	52.5	110
1	8 59.3	79 53	56.6	9 23.2	79 53	56.3	9 47.0	79 53	56.0	10 34.5	79 53	55.3	12 09.4	79 52	54.1	13 44.0	79 51	52.8	14 07.5	79 51	52.5	14 54.6	78 50	51.9	1
2	8 27.3	80 53	55.9	8 51.2	80 53	55.6	9 15.1	80 53	55.2	10 02.9	80 52	54.6	11 38.3	79 51	53.4	13 13.4	79 51	52.1	13 37.1	79 50	51.8	14 24.4	79 50	51.2	2
3	7 55.5	80 52	55.1	8 19.6	80 52	54.8	8 43.6	80 52	54.5	9 31.6	80 52	53.9	11 07.5	80 51	52.7	12 43.1	80 50	51.5	13 06.9	79 50	51.2	13 54.5	79 49	50.5	3
4	7 24.0	81 52	54.4	7 48.2	81 52	54.1	8 12.3	80 52	53.8	9 00.6	80 51	53.2	10 37.0	80 50	52.0	12 13.0	80 50	50.8	12 37.0	80 49	50.5	13 24.9	80 49	49.9	4
115	6 52.8	81 52	53.7	7 17.1	81 51	53.4	7 41.3	81 51	53.1	8 29.8	81 51	52.5	10 06.7	81 50	51.3	11 43.3	80 49	50.1	12 07.4	80 49	49.8	12 55.5	80 48	49.2	115
6	6 21.8	81 51	53.0	6 46.2	81 51	52.7	7 10.6	81 51	52.4	7 59.4	81 50	51.8	9 36.7	81 49	50.6	11 13.8	81 49	49.4	11 38.1	81 48	49.1	12 26.5	81 48	48.5	6
7	5 51.2	82 51	52.3	6 15.7	82 50	52.0	6 40.2	82 50	51.7	7 29.2	82 50	51.1	9 07.1	81 49	49.9	10 44.7	81 48	48.8	11 09.1	81 48	48.5	11 57.7	81 47	47.9	7
8	5 20.8	82 50	51.5	5 45.5	82 50	51.2	6 10.1	82 50	51.0	6 59.3	82 49	50.4	8 37.7	82 48	49.2	10 15.9	82 48	48.1	10 40.4	82 47	47.8	11 29.3	82 47	47.2	8
9				5 15.5	83 49	50.5	5 40.3	83 49	50.2	6 29.8	82 49	49.7	8 08.7	82 48	48.5	9 47.3	82 47	47.4	10 11.9	82 47	47.1	11 01.2	82 46	46.5	9
120							5 10.8	83 49	49.5	6 00.5	83 48	49.0	7 39.9	83 47	47.8	9 19.1	83 46	46.7	9 43.9	83 46	46.4	10 33.3	82 46	45.8	120
1										5 31.6	83 48	48.2	7 11.5	83 47	47.1	8 51.2	83 46	46.0	9 16.1	83 46	45.7	10 05.8	83 45	45.1	1
2										5 03.0	84 47	47.5	6 43.4	84 46	46.4	8 23.6	83 45	45.3	8 48.7	83 45	45.0	9 38.7	83 45	44.5	2
3													6 15.6	84 46	45.7	7 56.4	84 45	44.6	8 21.5	84 45	44.3	9 11.8	84 44	43.8	3
4													5 48.2	84 45	45.0	7 29.5	84 44	43.9	7 54.8	84 44	43.6	8 45.3	84 44	43.1	4
125													5 21.1	85 45	44.2	7 02.9	85 44	43.2	7 28.3	85 43	42.9	8 19.2	85 43	42.4	125
6																6 36.7	85 43	42.5	7 02.3	85 43	42.2	7 53.3	85 42	41.7	6
7																6 10.8	86 42	41.8	6 36.5	86 42	41.5	7 27.9	86 42	41.0	7
8																5 45.3	86 42	41.0	6 11.1	86 42	40.8	7 02.8	86 41	40.3	8
9																5 20.2	87 41	40.3	5 46.1	86 41	40.1	6 38.0	86 41	39.6	9
130																			5 21.5	87 40	39.4	6 13.6	87 40	38.9	130
1																						5 49.6	87 39	38.1	1
2																						5 26.0	88 39	37.4	2
3																						5 02.7	88 38	36.7	3

Digitized by Google

Lat. 50°

H.A.	36° 00′ Alt.	Az.	37° 00′ Alt.	Az.	38° 30′ Alt.	Az.	40° 00′ Alt.	Az.	42° 00′ Alt.	Az.	42° 30′ Alt.	Az.	43° 00′ Alt.	Az.	45° 00′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	76 00.0 1.0 02	180.0	77 00.0 1.0 02	180.0	78 30.0 1.0 02	180.0	80 00.0 1.0 02	180.0	82 00.0 1.0 03	180.0	82 30.0 1.0 03	180.0	83 00.0 1.0 03	180.0	85 00.0 1.0 05	180.0	00
1	75 58.9 1.0 06	176.7	76 58.8 1.0 06	176.5	78 28.7 1.0 07	176.1	79 58.5 1.0 07	175.6	81 58.2 1.0 09	174.7	82 28.1 1.0 09	174.4	82 58.0 1.0 10	174.0	84 57.3 99 13	171.9	1
2	75 55.5 1.0 09	173.3	76 55.2 1.0 10	172.9	78 24.7 99 11	172.2	79 54.1 99 12	171.2	81 52.9 99 15	169.4	82 22.5 99 15	168.8	82 52.0 98 16	168.1	84 49.3 97 22	164.1	2
3	75 49.9 99 13	170.0	76 49.3 99 14	169.4	78 18.2 99 15	168.3	79 46.8 98 17	166.9	81 44.1 97 20	164.3	82 13.2 97 21	163.4	82 42.2 96 22	162.5	84 36.4 93 29	156.8	3
4	75 42.2 98 16	166.8	76 41.1 98 17	166.0	78 09.2 98 19	164.6	79 36.7 97 21	162.8	81 32.1 95 25	159.4	82 00.6 95 26	158.3	82 28.8 94 28	157.1	84 19.1 89 35	150.1	4
05	75 32.3 97 20	163.6	76 30.7 97 21	162.6	77 57.7 96 23	160.9	79 24.0 95 25	158.7	81 17.0 93 30	154.7	81 44.8 92 31	153.4	82 12.2 91 33	152.0	83 58.1 85 40	144.1	05
6	75 20.4 96 23	160.5	76 18.1 96 24	159.4	77 44.0 95 27	157.4	79 08.8 93 29	154.8	80 59.2 90 34	150.3	81 26.1 89 35	148.8	81 52.7 88 37	147.2	83 34.1 80 44	138.7	6
7	75 06.6 95 26	157.4	76 03.5 95 28	156.2	77 28.1 93 30	153.9	78 51.2 91 33	151.1	80 38.9 88 38	146.1	81 05.0 86 39	144.6	81 30.6 85 41	142.9	83 07.4 76 48	134.0	7
8	74 50.9 94 29	154.5	75 47.0 93 31	153.1	77 10.1 92 33	150.6	78 31.6 89 36	147.6	80 16.3 85 41	142.3	80 41.5 83 42	140.6	81 06.3 82 44	138.8	82 38.7 72 51	129.8	8
9	74 33.4 93 32	151.6	75 28.7 92 33	150.1	76 50.3 90 36	147.5	78 10.0 87 39	144.2	79 51.7 82 44	138.7	80 16.1 80 45	137.0	80 39.9 78 47	135.1	82 08.2 68 53	126.0	9
10	74 14.2 91 35	148.9	75 08.6 90 36	147.3	76 28.7 88 39	144.5	77 46.6 85 42	141.1	79 25.4 79 46	135.3	79 49.0 78 48	133.6	80 11.9 76 49	131.8	81 36.4 64 55	122.7	10
1	73 53.5 90 37	146.2	74 47.0 88 38	144.5	76 05.5 86 41	141.6	77 21.5 83 44	138.1	78 57.6 77 49	132.2	79 20.3 75 50	130.5	79 42.5 73 51	128.6	81 03.4 61 56	119.8	1
2	73 31.4 88 39	143.6	74 23.9 87 41	141.9	75 40.8 84 43	138.9	76 55.1 81 46	135.3	78 28.4 74 51	129.4	78 50.4 72 52	127.6	79 11.7 70 53	125.8	80 29.5 59 58	117.1	2
3	73 07.8 87 41	141.2	73 59.4 85 43	139.4	75 14.8 82 45	136.3	76 27.3 79 48	132.6	77 58.0 72 52	126.7	78 19.3 70 53	125.0	78 39.9 68 55	123.2	79 54.8 56 59	114.7	3
4	72 43.0 85 43	138.8	73 33.7 84 45	136.9	74 47.5 81 47	133.8	75 58.4 77 50	130.1	77 26.6 70 54	124.2	77 47.2 68 55	122.5	78 07.2 66 56	120.7	79 19.5 54 60	112.6	4
15	72 17.0 84 45	136.5	73 06.8 82 47	134.6	74 19.2 79 49	131.5	75 28.4 75 52	127.8	76 54.2 68 55	121.9	77 14.3 66 56	120.2	77 33.7 64 57	118.5	78 43.6 53 61	110.6	15
6	71 50.0 82 47	134.3	72 38.8 80 48	132.4	73 49.8 77 51	129.2	74 57.4 73 53	125.6	76 21.1 66 56	119.8	76 40.6 64 57	118.1	76 59.5 62 58	116.4	78 07.3 51 61	108.8	6
7	71 21.9 81 48	132.2	72 09.9 79 50	130.3	73 19.5 76 52	127.1	74 25.7 71 54	123.5	75 47.3 64 57	117.7	76 06.3 62 58	116.2	76 24.6 60 59	114.5	77 30.6 49 62	107.1	7
8	70 52.9 80 50	130.2	71 40.0 78 51	128.3	72 48.3 74 53	125.1	73 53.1 70 55	121.5	75 12.9 63 58	115.9	75 31.4 61 59	114.3	75 49.3 59 60	112.7	76 53.6 48 62	105.5	8
9	70 23.0 78 51	128.3	71 09.4 76 52	126.4	72 16.4 73 54	123.2	73 19.9 68 56	119.6	74 37.9 61 59	114.1	74 56.0 59 60	112.6	75 13.5 57 60	111.0	76 16.3 47 63	104.1	9
20	69 52.4 77 52	126.5	70 38.0 75 54	124.5	71 43.8 71 55	121.4	72 46.1 67 57	117.8	74 02.5 60 60	112.4	74 20.2 58 60	110.9	74 37.3 56 61	109.4	75 38.8 46 63	102.7	20
1	69 21.0 76 53	124.7	70 05.9 74 55	122.8	71 10.5 70 56	119.6	72 11.7 66 58	116.1	73 26.6 59 60	110.8	73 44.0 57 61	109.4	74 00.8 55 61	107.9	75 01.1 45 63	101.4	1
2	68 49.0 75 54	123.0	69 33.1 72 56	121.1	70 36.7 69 57	118.0	71 36.8 65 59	114.5	72 50.4 58 61	109.3	73 07.5 56 61	107.9	73 23.9 54 62	106.5	74 23.2 45 63	100.2	2
3	68 16.4 73 55	121.4	68 59.8 71 56	119.5	70 02.4 68 58	116.4	71 01.5 64 59	113.0	72 13.9 57 61	107.9	72 30.6 55 62	106.6	72 46.8 53 62	105.1	73 45.2 44 64	99.1	3
4	67 43.2 72 56	119.8	68 26.0 70 57	117.9	69 27.7 67 59	114.9	70 25.8 63 60	111.5	71 37.0 56 62	106.6	71 53.5 54 62	105.2	72 09.5 52 63	103.9	73 07.0 44 64	98.0	4
25	67 09.4 71 57	118.3	67 51.7 69 58	116.4	68 52.5 66 59	113.4	69 49.8 62 61	110.1	70 59.9 55 62	105.3	71 16.2 53 63	104.0	71 31.9 51 63	102.7	72 28.8 43 64	96.9	25
6	66 35.2 71 58	116.8	67 16.9 68 59	115.0	68 16.9 65 60	112.0	69 13.4 61 61	108.8	70 22.6 54 63	104.1	70 38.7 53 63	102.8	70 54.2 51 63	101.5	71 50.5 43 64	96.0	6
7	66 00.6 70 58	115.4	66 41.8 68 59	113.6	67 41.0 64 60	110.7	68 36.8 60 62	107.5	69 45.1 54 63	102.9	70 01.0 52 63	101.6	70 16.3 50 63	100.4	71 12.1 42 64	95.0	7
8	65 25.6 69 59	114.0	66 06.2 67 60	112.2	67 04.7 63 61	109.4	67 59.9 59 62	106.3	69 07.4 53 63	101.7	69 23.1 52 63	100.5	69 38.3 50 64	99.3	70 33.6 42 64	94.1	8
9	64 50.2 68 60	112.7	65 30.4 66 60	111.0	66 28.2 63 61	108.1	67 22.7 59 62	105.1	68 29.6 53 63	100.7	68 45.2 51 64	99.5	69 00.2 49 64	98.3	69 55.1 42 64	93.2	9
30	64 14.4 67 60	111.4	64 54.2 65 61	109.7	65 51.4 62 62	106.9	66 45.4 58 63	103.9	67 51.6 52 63	99.6	68 07.1 51 64	98.5	68 22.0 49 64	97.3	69 16.6 42 64	92.4	30
1	63 38.4 67 61	110.2	64 17.8 65 61	108.5	65 14.4 61 62	105.8	66 07.9 57 63	102.8	67 13.6 52 64	98.6	67 28.9 50 64	97.5	67 43.7 49 64	96.3	68 38.1 42 64	91.5	1
2	63 02.0 66 61	109.0	63 41.1 64 62	107.3	64 37.2 61 62	104.6	65 30.2 57 63	101.8	66 35.4 51 64	97.6	66 50.6 50 64	96.5	67 05.4 48 64	95.4	67 59.5 42 64	90.7	2
3	62 25.5 65 61	107.9	63 04.1 63 62	106.2	63 59.8 60 63	103.5	64 52.4 57 63	100.7	65 57.1 51 64	96.7	66 12.2 50 64	95.6	66 26.9 48 64	94.5	67 20.9 42 64	90.0	3
4	61 48.6 65 62	106.7	62 27.0 63 62	105.1	63 22.2 60 63	102.5	64 14.4 56 63	99.7	65 18.8 51 64	95.8	65 33.8 49 64	94.7	65 48.5 48 64	93.7	66 42.4 42 64	89.2	4
35	61 11.6 64 62	105.6	61 49.7 62 62	104.0	62 44.5 59 63	101.5	63 36.4 56 64	98.7	64 40.4 51 64	94.9	64 55.4 49 64	93.8	65 10.0 48 64	92.8	66 03.8 42 64	88.5	35
6	60 34.4 64 62	104.6	61 12.2 62 63	103.0	62 06.6 59 63	100.5	62 58.2 56 64	97.8	64 01.9 51 64	94.0	64 16.9 49 64	93.0	64 31.4 48 64	92.0	65 25.3 42 64	87.8	6
7	59 56.9 64 63	103.5	60 34.5 62 63	102.0	61 28.6 59 63	99.5	62 19.9 55 64	96.9	63 23.4 50 64	93.1	63 38.4 49 64	92.2	63 52.9 48 64	91.2	64 46.7 42 64	87.1	7
8	59 19.4 63 63	102.5	59 56.7 61 63	101.0	60 50.5 58 64	98.5	61 41.6 55 64	96.0	62 44.9 50 64	92.3	62 59.8 49 64	91.4	63 14.3 48 64	90.4	64 08.2 42 64	86.4	8
9	58 41.6 63 63	101.5	59 18.8 61 63	100.0	60 12.4 58 64	97.6	61 03.2 55 64	95.1	62 06.4 50 64	91.5	62 21.2 49 64	90.6	62 35.7 48 64	89.6	63 29.8 42 64	85.7	9
40	58 03.8 62 63	100.6	58 40.7 61 64	99.1	59 34.1 58 64	96.7	60 24.8 55 64	94.2	61 27.8 50 64	90.7	61 42.7 49 64	89.8	61 57.2 48 64	88.9	62 51.3 42 64	85.0	40
1	57 25.8 62 63	99.6	58 02.6 60 64	98.1	58 55.8 58 64	95.8	59 46.3 55 64	93.4	60 49.2 50 64	89.9	61 04.1 49 64	89.1	61 18.6 48 64	88.1	62 12.9 43 64	84.4	1
2	56 47.7 62 64	98.7	57 24.4 60 64	97.2	58 17.4 57 64	95.0	59 07.8 55 64	92.6	60 10.7 50 64	89.2	60 25.6 49 64	88.3	60 40.1 48 64	87.4	61 34.6 43 64	83.7	2
3	56 09.6 62 64	97.8	56 46.1 60 64	96.3	57 38.9 57 64	94.1	58 29.2 54 64	91.8	59 32.1 50 64	88.4	59 47.0 49 64	87.6	60 01.6 48 64	86.7	60 56.2 43 64	83.1	3
4	55 31.3 61 64	96.9	56 07.7 60 64	95.5	57 00.4 57 64	93.3	57 50.7 54 64	91.0	58 53.6 50 64	87.7	59 08.5 49 64	86.9	59 23.1 48 64	86.0	60 18.0 43 64	82.5	4
45	54 53.0 61 64	96.0	55 29.3 60 64	94.6	56 21.9 57 64	92.5	57 12.1 54 64	90.2	58 15.0 50 64	87.0	58 30.0 49 64	86.2	58 44.6 48 64	85.3	59 39.8 44 64	81.9	45
6	54 14.6 61 64	95.2	54 50.8 60 64	93.8	55 43.4 57 64	91.7	56 33.6 54 64	89.4	57 36.5 50 64	86.3	57 51.5 49 64	85.5	58 06.2 48 64	84.7	59 01.6 44 64	81.3	6
7	53 36.2 61 64	94.3	54 12.3 59 64	93.0	55 04.8 57 64	90.9	55 55.0 54 64	88.7	56 58.1 51 64	85.6	57 13.1 50 64	84.8	57 27.8 49 64	84.0	58 23.5 44 63	80.7	7
8	52 57.7 61 64	93.5	53 33.8 59 64	92.2	54 26.2 57 64	90.1	55 16.4 54 64	87.9	56 19.6 51 64	84.9	56 34.7 50 64	84.1	56 49.5 49 64	83.3	57 45.5 45 63	80.1	8
9	52 19.2 61 64	92.7	52 55.3 59 64	91.4	53 47.7 57 64	89.3	54 37.9 55 64	87.2	55 41.2 51 64	84.2	55 56.4 50 64	83.5	56 11.2 49 64	82.7	57 07.6 45 63	79.5	9
50	51 40.7 61 64	91.9	52 16.7 59 64	90.6	53 09.1 57 64	88.6	53 59.4 55 64	86.5	55 02.9 51 64	83.6	55 18.1 50 64	82.8	55 33.0 49 64	82.0	56 29.7 45 63	78.9	50
1	51 02.1 61 64	91.1	51 38.1 59 64	89.8	52 30.6 57 64	87.8	53 20.9 55 64	85.8	54 24.6 51 64	82.9	54 39.8 50 64	82.2	54 54.8 49 64	81.4	55 51.9 46 63	78.3	1
2	50 23.5 61 64	90.3	50 59.6 59 64	89.1	51 52.0 57 64	87.1	52 42.5 55 64	85.1	53 46.3 52 64	82.3	54 01.7 51 64	81.5	54 16.7 50 63	80.8	55 14.1 46 63	77.7	2
3	49 45.0 61 64	89.6	50 21.0 59 64	88.3	51 13.5 57 64	86.4	52 04.1 55 64	84.4	53 08.2 52 64	81.6	53 23.6 51 63	80.9	53 38.7 50 63	80.2	54 36.5 46 63	77.2	3
4	49 06.4 61 64	88.8	49 42.5 59 64	87.6	50 35.1 57 64	85.7	51 25.7 55 64	83.7	52 30.0 52 63	81.0	52 45.5 51 63	80.3	53 00.7 50 63	79.6	53 58.9 47 62	76.6	4
55	48 27.9 61 64	88.1	49 04.0 60 64	86.9	49 56.6 57 64	85.0	50 47.4 55 64	83.0	51 52.0 52 63	80.3	52 07.5 51 63	79.6	52 22.8 51 63	78.9	53 21.5 47 62	76.1	55
6	47 49.3 61 64	87.3	48 25.5 60 64	86.1	49 18.2 58 64	84.3	50 09.1 56 64	82.4	51 14.0 53 63	79.7	51 29.6 52 63	79.0	51 45.0 51 63	78.3	52 44.1 47 62	75.5	6
7	47 10.8 61 64	86.6	47 47.0 60 64	85.4	48 39.9 58 64	83.6	49 31.0 56 64	81.7	50 36.1 53 63	79.1	50 51.8 52 63	78.4	51 07.3 51 63	77.7	52 06.8 48 62	74.9	7
8	46 32.3 61 64	85.9	47 08.6 60 64	84.7	48 01.6 58 64	82.9	48 52.8 56 63	81.1	49 58.3 53 63	78.5	50 14.1 52 63	77.8	50 29.6 52 63	77.1	51 29.6 48 62	74.4	8
9	45 53.9 61 64	85.2	46 30.2 60 64	84.0	47 23.3 58 64	82.2	48 14.8 56 63	80.4	49 20.5 53 63	77.9	49 36.4 53 63	77.2	49 52.1 52 62	76.6	50 52.5 49 62	73.8	9
60	45 15.5 61 64	84.5	45 51.9 60 64	83.3	46 45.1 58 64	81.6	47 36.8 56 63	79.8	48 42.8 54 63	77.3	48 58.8 53 62	76.6	49 14.6 52 62	76.0	50 15.5 49 61	73.3	60
1	44 37.1 61 64	83.8	45 13.6 60 64	82.6	46 07.0 59 63	80.9	46 58.9 57 63	79.1	48 05.3 54 62	76.7	48 21.4 53 62	76.0	48 37.3 53 62	75.4	49 38.6 50 61	72.8	1
2	43 58.8 61 64	83.1	44 35.4 60 64	82.0	45 29.0 59 63	80.3	46 21.0 57 63	78.5	47 27.8 54 62	76.1	47 44.0 54 62	75.4	48 00.0 53 62	74.8	49 01.8 50 61	72.2	2
3	43 20.5 62 64	82.4	43 57.2 61 64	81.3	44 51.0 59 63	79.6	45 43.3 57 63	77.9	46 50.4 55 62	75.5	47 06.7 54 62	74.9	47 22.8 53 62	74.2	48 25.2 51 61	71.7	3
4	42 42.3 62 64	81.7	43 19.1 61 63	80.6	44 13.1 59 63	79.0	45 05.6 57 63	77.2	46 13.1 55 62	74.9	46 29.5 54 62	74.3	46 45.8 54 62	73.7	47 48.6 51 61	71.1	4
65	42 04.2 62 63	81.0	42 41.1 61 63	79.9	43 35.3 59 63	78.3	44 28.0 58 62	76.6	45 35.9 55 62	74.3	45 52.5 55 62	73.7	46 08.8 54 61	73.1	47 12.2 51 61	70.6	65
6	41 26.2 62 63	80.3	42 03.2 61 63	79.3	42 57.6 60 63	77.7	43 50.6 58 62	76.0	44 58.9 56 62	73.7	45 15.5 55 61	73.1	45 32.0 55 61	72.5	46 35.9 52 60	70.1	6
7	40 48.2 62 63	79.7	41 25.3 61 63	78.6	42 19.9 60 63	77.0	43 13.2 58 62	75.4	44 21.9 56 61	73.1	44 38.7 56 61	72.5	44 55.2 55 61	71.9	45 59.7 52 60	69.5	7
8	40 10.3 63 63	79.0	40 47.6 62 63	78.0	41 42.4 60 62	76.4	42 35.9 59 62	74.8	43 45.1 57 61	72.5	44 01.9 56 61	72.0	44 18.6 55 61	71.4	45 23.6 53 60	69.0	8
9	39 32.5 63 63	78.4	40 09.9 62 63	77.3	41 05.0 61 62	75.8	41 58.8 59 62	74.2	43 08.3 57 61	72.0	43 25.3 56 61	71.4	43 42.1 56 61	70.8	44 47.6 53 60	68.5	9
70	38 54.7 63 63	77.7	39 32.3 62 62	76.7	40 27.6 61 62	75.1	41 21.7 59 62	73.6	42 31.7 57 61	71.4	42 48.8 57 61	70.8	43 05.8 56 60	70.2	44 11.8 54 59	67.9	70
1	38 17.1 63 63	77.0	38 54.8 62 62	76.0	39 50.4 61 62	74.5	40 44.8 60 61	73.0	41 55.2 58 61	70.8	42 12.5 57 60	70.2	42 29.5 57 60	69.7	43 36.2 54 59	67.4	1
2	37 39.6 64 62	76.4	38 17.4 63 62	75.4	39 13.3 61 62	73.9	40 08.0 60 61	72.3	41 18.9 58 60	70.2	41 36.2 58 60	69.7	41 53.4 57 60	69.1	43 00.6 55 59	66.9	2
3	37 02.1 64 62	75.7	37 40.2 63 62	74.8	38 36.3 62 61	73.3	39 31.3 60 61	71.7	40 42.7 59 60	69.6	41 00.1 58 60	69.1	41 17.5 58 60	68.6	42 25.2 55 59	66.3	3
4	36 24.8 64 62	75.1	37 03.0 63 62	74.1	37 59.4 62 61	72.7	38 54.7 61 61	71.1	40 06.6 59 60	69.1	40 24.2 58 60	68.5	40 41.6 58 59	68.0	41 50.0 56 59	65.8	4
75	35 47.6 64 62	74.5	36 26.0 64 62	73.5	37 22.7 62 61	72.0	38 18.3 61 60	70.6	39 30.6 59 60	68.5	39 48.4 59 59	68.0	40 06.0 58 59	67.4	41 14.9 56 58	65.3	75
6	35 10.5 65 62	73.8	35 49.1 64 61	72.9	36 46.1 63 61	71.4	37 42.0 62 60	70.0	38 54.8 60 59	67.9	39 12.7 59 59	67.4	39 30.4 59 59	66.9	40 39.9 57 58	64.8	6
7	34 33.5 65 61	73.2	35 12.3 64 61	72.2	36 09.6 63 61	70.8	37 05.8 62 60	69.4	38 19.1 60 59	67.4	38 37.1 60 59	66.8	38 55.0 59 59	66.3	40 05.1 57 58	64.2	7
8	33 56.7 65 61	72.5	34 35.6 65 61	71.6	35 33.2 63 60	70.2	36 29.8 62 60	68.8	37 43.6 61 59	66.8	38 01.8 60 59	66.3	38 19.8 60 58	65.8	39 30.4 58 58	63.7	8
9	33 19.9 66 61	71.9	33 59.1 65 61	71.0	34 57.0 64 60	69.6	35 53.9 63 60	68.2	37 08.3 61 59	66.2	37 26.5 61 58	65.7	37 44.7 60 58	65.2	38 55.9 58 57	63.2	9
80	32 43.4 66 61	71.3	33 22.7 65 60	70.4	34 20.9 64 60	69.0	35 18.2 63 59	67.6	36 33.0 62 58	65.6	36 51.4 61 58	65.2	37 09.7 61 58	64.7	38 21.6 59 57	62.6	80
1	32 06.9 66 61	70.6	32 46.4 66 60	69.7	33 45.0 65 60	68.4	34 42.6 64 59	67.0	35 58.0 62 58	65.1	36 16.5 62 58	64.6	36 35.0 61 58	64.1	37 47.4 60 57	62.1	1
2	31 30.6 67 60	70.0	32 10.3 66 60	69.1	33 09.2 65 59	67.8	34 07.2 64 59	66.4	35 23.1 62 58	64.5	35 41.8 62 58	64.0	36 00.3 62 57	63.5	37 13.4 60 56	61.6	2
3	30 54.4 67 60	69.4	31 34.4 66 60	68.5	32 33.6 65 59	67.2	33 32.0 64 58	65.8	34 48.4 63 58	63.9	35 07.2 63 57	63.5	35 25.9 62 57	63.0	36 39.6 61 56	61.0	3
4	30 18.4 67 60	68.7	30 58.6 67 59	67.9	31 58.1 66 59	66.6	32 56.9 65 58	65.2	34 13.8 63 57	63.4	34 32.8 63 57	62.9	34 51.6 63 57	62.4	36 06.0 61 56	60.5	4
85	29 42.5 68 60	68.1	30 22.9 67 59	67.3	31 22.8 66 59	66.0	32 21.9 65 58	64.6	33 39.4 64 57	62.8	33 58.5 64 57	62.3	34 17.5 63 57	61.9	35 32.5 62 56	60.0	85
6	29 06.8 68 59	67.5	29 47.4 67 59	66.6	30 47.7 67 58	65.3	31 47.2 66 58	64.0	33 05.2 64 57	62.2	33 24.5 64 56	61.8	33 43.6 64 56	61.3	34 59.2 62 55	59.4	6
7	28 31.3 68 59	66.9	29 12.1 68 59	66.0	30 12.7 67 58	64.7	31 12.6 66 57	63.4	32 31.2 65 56	61.7	32 50.6 65 56	61.2	33 09.9 64 56	60.7	34 26.1 63 55	58.9	7
8	27 55.9 69 59	66.2	28 36.9 68 58	65.4	29 37.9 67 58	64.1	30 38.2 67 57	62.8	31 57.3 65 56	61.1	32 16.9 65 56	60.6	32 36.3 65 56	60.2	33 53.1 63 55	58.3	8
9	27 20.7 69 58	65.6	28 02.0 69 58	64.8	29 03.3 68 57	63.5	30 04.9 67 57	62.3	31 23.6 66 56	60.5	31 43.3 66 56	60.1	32 02.9 65 55	59.6	33 20.4 64 54	57.8	9
90	26 45.7 69 58	65.0	27 27.2 69 58	64.2	28 28.9 68 57	62.9	29 29.9 67 56	61.7	30 50.2 66 55	59.9	31 10.0 66 55	59.5	31 29.8 66 55	59.1	32 47.9 64 54	57.8	90

Digitized by Google

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	26 10.8	70 58	64.3	26 52.5	69 57	63.5	27 54.6	69 57	62.3	28 56.1	68 56	61.1	30 16.9	67 55	59.4	30 36.9	67 55	58.9	30 56.8	66 55	58.5	32 15.5	65 54	56.7	91
2	25 36.1	70 57	63.7	26 18.1	70 57	62.9	27 20.6	69 56	61.7	28 22.4	68 56	60.5	29 43.8	67 55	58.8	30 03.9	67 55	58.4	30 24.0	67 54	57.9	31 43.4	66 53	56.2	2
3	25 01.7	71 57	63.1	25 43.9	70 57	62.3	26 46.7	69 56	61.1	27 49.0	69 55	59.9	29 10.9	68 54	58.2	29 31.2	68 54	57.8	29 51.4	67 54	57.4	31 11.4	66 53	55.6	3
4	24 27.4	71 57	62.4	25 09.8	71 56	61.7	26 13.1	70 56	60.5	27 15.7	69 55	59.3	28 38.2	68 54	57.6	28 58.7	68 54	57.2	29 19.0	68 54	56.8	30 39.7	67 53	55.1	4
95	23 53.3	71 56	61.8	24 36.0	71 56	61.0	25 39.6	70 55	59.9	26 42.7	70 55	58.7	28 05.8	69 54	57.1	28 26.4	69 54	56.6	28 46.9	68 53	56.2	30 08.2	67 52	54.5	95
6	23 19.4	72 56	61.2	24 02.3	71 56	60.4	25 06.3	71 55	59.3	26 09.8	70 54	58.1	27 33.5	69 53	56.5	27 54.3	69 53	56.1	28 14.9	69 53	55.7	29 36.9	68 52	54.0	6
7	22 45.7	72 56	60.6	23 28.9	72 55	59.8	24 33.3	71 55	58.7	25 37.2	71 54	57.5	27 01.5	70 53	55.9	27 22.4	70 53	55.5	27 43.2	69 53	55.1	29 05.8	68 51	53.4	7
8	22 12.2	73 55	59.9	22 55.7	72 55	59.2	24 00.5	72 54	58.0	25 04.8	71 54	56.9	26 29.6	70 53	55.3	26 50.7	70 52	54.9	27 11.7	70 52	54.5	28 34.9	69 51	52.9	8
9	21 38.9	73 55	59.3	22 22.7	73 55	58.5	23 27.9	72 54	57.4	24 32.6	72 53	56.3	25 58.0	71 52	54.7	26 19.2	71 52	54.3	26 40.4	70 52	53.9	28 04.3	69 51	52.3	9
100	21 05.9	73 55	58.6	21 49.9	73 54	57.9	22 55.5	73 54	56.8	24 00.6	72 53	55.7	25 26.7	71 52	54.1	25 48.0	71 52	53.8	26 09.3	71 51	53.4	27 33.9	70 50	51.8	100
1	20 33.1	74 54	58.0	21 17.3	74 54	57.3	22 23.3	73 53	56.2	23 28.9	73 52	55.1	24 55.5	72 52	53.6	25 17.0	72 51	53.2	25 38.5	71 51	52.8	27 03.7	71 50	51.2	1
2	20 00.5	74 54	57.4	20 45.0	74 54	56.7	21 51.4	74 53	55.6	22 57.4	73 52	54.5	24 24.6	72 51	53.0	24 46.3	72 51	52.6	25 07.9	72 51	52.2	26 33.8	71 50	50.6	2
3	19 28.1	75 54	56.7	20 12.9	74 53	56.0	21 19.7	74 52	54.9	22 26.1	74 52	53.9	23 54.0	73 51	52.4	24 15.8	73 50	52.0	24 37.5	72 50	51.6	26 04.1	72 49	50.1	3
4	18 56.0	75 53	56.1	19 41.0	75 53	55.4	20 48.2	74 52	54.3	21 55.1	74 51	53.2	23 23.5	73 50	51.8	23 45.5	73 50	51.4	24 07.4	73 50	51.0	25 34.6	72 49	49.5	4
105	18 24.1	76 53	55.4	19 09.4	75 52	54.8	20 17.0	75 52	53.7	21 24.3	75 51	52.6	22 53.4	74 50	51.2	23 15.5	74 50	50.8	23 37.6	74 49	50.4	25 05.4	73 48	49.0	105
6	17 52.5	76 52	54.8	18 38.0	76 52	54.1	19 46.1	75 51	53.1	20 53.8	75 50	52.0	22 23.4	74 49	50.6	22 45.7	74 49	50.2	23 08.0	74 49	49.9	24 36.4	73 48	48.4	6
7	17 21.1	77 52	54.2	18 06.9	76 51	53.5	19 15.4	76 51	52.4	20 23.5	75 50	51.4	21 53.8	75 49	50.0	22 16.2	75 49	49.6	22 38.6	75 48	49.3	24 07.7	74 47	47.8	7
8	16 49.9	77 51	53.5	17 36.0	77 51	52.8	18 44.9	76 50	51.8	19 53.5	76 50	50.8	21 24.3	75 49	49.4	21 47.0	75 48	49.0	22 09.5	75 48	48.7	23 39.3	74 47	47.2	8
9	16 19.1	77 51	52.8	17 05.4	77 51	52.2	18 14.8	77 50	51.2	19 23.8	76 49	50.2	20 55.2	76 48	48.8	21 18.0	76 48	48.4	21 40.7	76 48	48.1	23 11.1	75 47	46.7	9
110	15 48.5	78 51	52.2	16 35.1	78 50	51.5	17 44.8	77 49	50.5	18 54.3	77 49	49.5	20 26.3	76 48	48.2	20 49.2	76 47	47.8	21 12.1	76 47	47.5	22 43.2	76 46	46.1	110
1	15 18.1	78 50	51.5	16 05.0	78 50	50.9	17 15.2	78 49	49.9	18 25.1	77 48	48.9	19 57.7	77 47	47.6	20 20.8	77 47	47.2	20 43.8	77 47	46.9	22 15.5	76 46	45.5	1
2	14 48.1	79 50	50.9	15 35.3	79 49	50.2	16 45.8	78 48	49.3	17 56.1	78 48	48.3	19 29.4	77 47	47.0	19 52.6	77 46	46.6	20 15.8	77 46	46.3	21 48.2	77 45	44.9	2
3	14 18.3	79 49	50.2	15 05.7	79 49	49.6	16 16.7	79 48	48.6	17 27.5	78 47	47.7	19 01.3	78 46	46.4	19 24.7	78 46	46.0	19 48.1	78 46	45.7	21 21.1	77 45	44.3	3
4	13 48.8	80 49	49.6	14 36.5	79 48	48.9	15 47.9	79 48	48.0	16 59.1	79 47	47.0	18 33.6	79 46	45.7	18 57.1	78 46	45.4	19 20.6	78 45	45.1	20 54.2	78 44	43.7	4
115	13 19.6	80 48	48.9	14 07.6	80 48	48.3	15 19.4	80 47	47.3	16 31.0	79 46	46.4	18 06.1	79 45	45.1	18 29.8	79 45	44.8	18 53.4	79 45	44.5	20 27.7	78 44	43.2	115
6	12 50.7	81 48	48.2	13 39.0	80 47	47.6	14 51.2	80 47	46.7	16 03.3	80 46	45.8	17 38.9	80 45	44.5	18 02.8	79 45	44.2	18 26.6	79 44	43.9	20 01.5	79 43	42.6	6
7	12 22.1	81 47	47.6	13 10.6	81 47	47.0	14 23.3	81 46	46.0	15 35.8	80 45	45.1	17 12.0	80 44	43.9	17 36.0	80 44	43.6	18 00.0	80 44	43.2	19 35.5	79 43	42.0	7
8	11 53.7	81 47	46.9	12 42.6	81 46	46.3	13 55.7	81 46	45.4	15 08.6	81 45	44.5	16 45.5	81 44	43.3	17 09.6	80 44	42.9	17 33.7	80 43	42.6	19 09.9	80 42	41.4	8
9	11 25.7	82 46	46.2	12 14.9	82 46	45.6	13 28.4	82 45	44.7	14 41.7	81 44	43.8	16 19.2	81 43	42.6	16 43.5	81 43	42.3	17 07.8	81 43	42.0	18 44.6	80 42	40.8	9
120	10 58.1	82 46	45.5	11 47.5	82 45	45.0	13 01.4	82 44	44.1	14 15.2	82 44	43.2	15 53.2	82 43	42.0	16 17.7	81 42	41.7	16 42.1	81 42	41.4	18 19.5	81 41	40.2	120
1	10 30.7	83 45	44.9	11 20.4	83 45	44.3	12 34.7	83 44	43.4	13 48.9	82 43	42.5	15 27.6	82 42	41.4	15 52.2	82 42	41.1	16 16.8	82 42	40.8	17 54.8	82 41	39.6	1
2	10 03.7	83 45	44.2	10 53.6	83 44	43.6	12 08.4	83 43	42.8	13 23.0	83 43	41.9	15 02.2	83 42	40.7	15 27.0	82 41	40.4	15 51.7	82 41	40.1	17 30.4	82 40	39.0	2
3	9 37.0	84 44	43.5	10 27.2	84 44	42.9	11 42.4	83 43	42.1	12 57.4	83 42	41.2	14 37.2	83 41	40.1	15 02.1	83 41	39.8	15 27.0	83 41	39.5	17 06.3	83 40	38.4	3
4	9 10.6	84 43	42.8	10 01.1	84 43	42.2	11 16.7	84 42	41.4	12 32.2	84 42	40.6	14 12.6	84 41	39.5	14 37.6	83 40	39.2	15 02.6	83 40	38.9	16 42.5	83 39	37.7	4
125	8 44.6	85 43	42.1	9 35.3	85 42	41.6	10 51.3	84 42	40.7	12 07.2	84 41	39.9	13 48.2	84 40	38.8	14 13.4	84 40	38.5	14 38.6	84 40	38.3	16 19.1	84 39	37.1	125
6	8 18.9	85 42	41.4	9 09.9	85 42	40.9	10 26.3	85 41	40.1	11 42.7	85 40	39.3	13 24.2	85 39	38.2	13 49.6	84 39	37.9	14 14.9	84 39	37.6	15 56.0	84 38	36.5	6
7	7 53.5	86 42	40.7	8 44.8	85 41	40.2	10 01.7	85 40	39.4	11 18.4	85 40	38.6	13 00.5	85 39	37.5	13 26.0	85 39	37.3	13 51.5	85 38	37.0	15 33.2	85 37	35.9	7
8	7 28.6	86 41	40.0	8 20.1	86 41	39.5	9 37.4	86 40	38.7	10 54.5	86 39	37.9	12 37.2	85 38	36.9	13 02.9	85 38	36.6	13 28.5	85 38	36.3	15 10.8	85 37	35.3	8
9	7 03.9	86 40	39.3	7 55.8	86 40	38.8	9 13.4	86 39	38.0	10 31.0	86 39	37.3	12 14.3	86 38	36.2	12 40.0	86 37	36.0	13 05.8	86 37	35.7	14 48.7	86 36	34.6	9
130	6 39.7	87 40	38.6	7 31.8	87 39	38.1	8 49.9	87 39	37.4	10 07.8	87 38	36.6	11 51.6	86 37	35.6	12 17.6	86 37	35.3	12 43.5	86 37	35.1	14 26.9	86 36	34.0	130
1	6 15.8	87 39	37.9	7 08.2	87 39	37.4	8 26.6	87 38	36.7	9 45.0	87 37	35.9	11 29.4	87 36	34.9	11 55.5	87 36	34.7	12 21.5	87 36	34.4	14 05.5	87 35	33.4	1
2	5 52.3	88 39	37.2	6 44.9	88 38	36.7	8 03.8	88 37	36.0	9 22.6	87 37	35.2	11 07.5	87 36	34.3	11 33.7	87 36	34.0	11 59.9	87 35	33.8	13 44.5	87 34	32.7	2
3	5 29.2	88 38	36.5	6 22.1	88 37	36.0	7 41.3	88 37	35.3	9 00.5	88 36	34.6	10 46.0	88 35	33.6	11 12.3	88 35	33.3	11 38.6	88 35	33.1	13 23.8	88 34	32.1	3
4	5 06.5	89 37	35.8	5 59.6	89 37	35.3	7 19.2	88 36	34.6	8 38.8	88 36	33.9	10 24.8	88 35	32.9	10 51.3	88 34	32.7	11 17.8	88 34	32.4	13 03.5	88 33	31.5	4
135				5 37.5	89 36	34.6	6 57.6	89 36	33.9	8 17.5	89 35	33.2	10 04.1	89 34	32.3	10 30.7	89 34	32.0	10 57.3	89 34	31.8	12 43.5	88 33	30.8	135
6				5 15.8	89 35	33.9	6 36.3	89 35	33.2	7 56.6	89 34	32.5	9 43.7	89 33	31.6	10 10.4	89 33	31.4	10 37.1	89 33	31.1	12 24.0	89 32	30.2	6
7							6 15.3	90 34	32.5	7 36.1	90 34	31.8	9 23.7	90 33	30.9	9 50.5	90 32	30.7	10 17.4	90 32	30.5	12 04.7	89 31	29.5	7
8							5 54.8	90 34	31.8	7 16.0	90 33	31.1	9 04.0	90 32	30.2	9 31.0	90 32	30.0	9 58.0	90 32	29.8	11 45.9	90 31	28.9	8
9							5 34.7	91 33	31.1	6 56.2	91 32	30.4	8 44.8	90 31	29.6	9 11.9	90 31	29.3	9 39.1	90 31	29.1	11 27.5	90 30	28.3	9
140							5 15.0	91 32	30.3	6 36.9	91 32	29.7	8 26.0	91 31	28.9	8 53.2	91 30	28.7	9 20.5	91 30	28.5	11 09.4	91 29	27.6	140
1										6 18.0	91 31	29.0	8 07.6	91 30	28.2	8 34.9	91 30	28.0	9 02.3	91 30	27.8	10 51.7	91 29	26.9	1
2										5 59.5	92 30	28.3	7 49.6	92 29	27.5	8 17.1	92 29	27.3	8 44.5	92 29	27.1	10 34.5	92 28	26.3	2
3										5 41.4	92 29	27.6	7 31.9	92 29	26.8	7 59.6	92 28	26.6	8 27.2	92 28	26.4	10 17.6	92 27	25.6	3
4										5 23.8	93 29	26.9	7 14.8	92 28	26.1	7 42.5	92 28	25.9	8 10.2	92 28	25.7	10 01.1	92 27	25.0	4
145										5 06.5	93 28	26.2	6 58.0	93 27	25.4	7 25.8	93 27	25.2	7 53.7	93 27	25.1	9 45.0	93 26	24.3	145
6													6 41.6	93 27	24.7	7 09.6	93 26	24.6	7 37.6	93 26	24.4	9 29.4	93 25	23.6	6
7													6 25.7	94 26	24.0	6 53.8	94 26	23.9	7 21.9	94 25	23.7	9 14.1	93 25	23.0	7
8													6 10.2	94 25	23.3	6 38.4	94 25	23.2	7 06.6	94 25	23.0	8 59.3	94 24	22.3	8
9													5 55.2	94 24	22.6	6 23.4	94 24	22.5	6 51.7	94 24	22.3	8 44.8	94 23	21.6	9
150													5 40.5	95 24	21.9	6 08.9	95 23	21.8	6 37.3	95 23	21.6	8 30.8	95 23	20.9	150
1													5 26.4	95 23	21.2	5 54.9	95 23	21.1	6 23.3	95 23	20.9	8 17.3	95 22	20.3	1
2													5 12.6	95 22	20.5	5 41.2	96 22	20.4	6 09.8	95 22	20.2	8 04.1	95 21	19.6	2
3																5 28.0	96 21	19.6	5 56.7	96 21	19.5	7 51.4	96 20	18.9	3
4																5 15.3	96 20	18.9	5 44.1	96 20	18.8	7 39.1	96 20	18.2	4
155																5 03.0	96 20	18.2	5 31.8	96 20	18.1	7 27.3	96 19	17.5	155
6																			5 20.1	96 19	17.4	7 15.9	96 18	16.9	6
7																			5 08.8	97 18	16.7	7 04.9	97 18	16.2	7
8																						6 54.4	97 17	15.5	8
9																						6 44.3	97 16	14.8	9
160																						6 34.7	98 15	14.1	160
1																						6 25.6	98 14	13.4	1
2																						6 16.8	98 14	12.7	2
3																						6 08.6	98 13	12.0	3
4																						6 00.8	98 12	11.3	4
165																						5 53.5	99 11	10.6	165
6																						5 46.6	99 11	09.9	6
7																						5 40.2	99 10	09.2	7
8																						5 34.3	99 09	08.5	8
9																						5 28.8	99 08	07.8	9
170																						5 23.8	99 08	07.1	170
1																						5 19.3	99 07	06.4	1
2																						5 15.3	1.0 06	05.7	2
3																						5 11.7	1.0 05	05.0	3
4																						5 08.6	1.0 04	04.3	4
175																						5 06.0	1.0 04	03.5	175
6																						5 03.8	1.0 03	02.8	6
7																						5 02.2	1.0 02	02.1	7
8																						5 01.0	1.0 01	01.4	8
9																						5 00.2	1.0 00	00.7	9
180																						5 00.0	1.0 00	00.0	180

Digitized by Google

Lat. 50°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	86 00.0	1.0 06	180.0	87 00.0	1.0 07	180.0	88 30.0	1.0 14	180.0	89 30.0	1.0 32	180.0	89 30.0	1.0 31	00.0	88 30.0	1.0 13	00.0	87 30.0	1.0 08	00.0	86 00.0	1.0 05	00.0	00
1	85 56.7	99 16	170.1	86 55.7	98 21	167.2	88 21.9	92 35	156.1	89 11.0	62 57	127.4	89 11.4	61 56	51.6	88 22.3	92 33	22.5	87 25.4	97 22	13.7	85 57.2	99 14	08.4	1
2	85 46.9	96 26	160.8	86 43.2	92 32	155.4	88 00.7	76 48	138.2	88 36.9	37 62	110.4	88 37.6	35 61	67.9	88 02.3	76 46	39.4	87 12.3	89 33	25.8	85 48.9	95 22	16.3	2
3	85 31.5	90 34	152.2	86 24.1	84 40	145.3	87 32.0	62 54	126.3	87 59.9	27 63	103.3	88 01.1	23 62	74.2	87 34.8	60 52	50.5	86 52.4	79 41	35.7	85 35.7	90 29	23.6	3
4	85 11.3	85 40	144.7	85 59.9	77 47	137.0	86 59.4	52 58	118.4	87 22.1	22 64	99.4	87 23.6	17 63	77.4	87 03.5	49 56	57.8	86 27.8	69 47	43.5	85 18.3	84 35	30.1	4
05	84 47.3	79 45	138.2	85 31.9	69 51	130.3	86 24.6	45 60	112.8	86 43.9	19 64	96.9	86 45.9	12 63	79.2	86 30.0	40 58	62.7	85 59.8	60 51	49.5	84 57.3	77 40	35.6	05
6	84 20.2	73 49	132.6	85 01.3	63 54	124.8	85 48.4	39 61	108.7	86 05.5	17 64	95.1	86 07.9	09 63	80.3	85 55.2	33 59	66.1	85 29.4	52 53	54.0	84 33.5	71 43	40.4	6
7	83 50.7	68 52	127.9	84 28.8	58 57	120.2	85 11.6	36 62	105.5	85 27.1	16 64	93.6	85 29.9	06 64	80.9	85 19.6	28 60	68.6	84 57.5	45 55	57.6	84 07.5	64 46	44.4	7
8	83 19.4	64 55	123.7	83 54.8	54 58	116.5	84 34.2	33 63	103.0	84 48.6	15 64	92.5	84 51.8	04 64	81.3	84 43.4	23 61	70.4	84 24.4	40 56	60.4	83 39.7	59 49	47.8	8
9	82 46.7	60 56	120.2	83 19.8	50 60	113.3	83 56.4	30 63	100.9	84 10.0	15 64	91.5	84 13.6	03 64	81.6	84 06.9	19 61	71.8	83 50.5	35 58	62.6	83 10.5	53 51	50.7	9
10	82 12.8	57 58	117.1	82 44.0	47 61	110.6	83 18.5	29 64	99.1	83 31.5	14 64	90.6	83 35.5	01 64	81.7	83 30.2	16 62	72.8	83 16.0	31 58	64.4	82 40.1	48 52	53.1	10
1	81 38.1	54 59	114.3	82 07.6	45 61	108.2	82 40.3	27 64	97.6	82 52.9	14 64	89.8	82 57.3	00 64	81.7	82 53.3	14 62	73.6	82 41.0	27 59	65.8	82 08.8	44 53	55.2	1
2	81 02.6	51 60	111.9	81 30.8	42 62	106.1	82 02.0	26 64	96.2	82 14.3	14 64	89.1	82 19.1	02 64	81.7	82 16.2	11 62	74.2	82 05.7	24 59	67.0	81 36.8	40 54	56.9	2
3	80 26.6	49 61	109.8	80 53.6	41 63	104.2	81 23.6	26 64	95.0	81 35.8	15 64	88.4	81 41.0	03 64	81.6	81 39.1	09 62	74.7	81 30.1	21 60	67.9	81 04.2	36 55	58.4	3
4	79 50.0	47 62	107.8	80 16.0	39 63	102.6	80 45.2	25 64	94.0	80 57.2	15 64	87.8	81 02.8	04 64	81.4	81 01.8	07 62	75.0	80 54.2	18 60	68.7	80 31.2	33 56	59.7	4
15	79 13.1	46 62	106.0	79 38.3	38 63	101.1	80 06.7	25 64	93.0	80 18.7	15 64	87.2	80 24.7	05 64	81.3	80 24.6	05 62	75.2	80 18.2	16 60	69.3	79 57.7	30 56	60.8	15
6	78 35.9	44 62	104.4	79 00.4	37 63	99.7	79 28.2	25 64	92.0	79 40.2	15 64	86.6	79 46.6	06 63	81.1	79 47.2	04 62	75.4	79 42.1	13 60	69.8	79 23.9	27 57	61.7	6
7	77 58.4	43 63	102.9	78 22.3	36 64	98.4	78 49.6	24 64	91.2	79 01.7	16 64	86.1	79 08.5	07 63	80.8	79 09.9	02 62	75.5	79 05.8	11 61	70.2	78 49.8	24 57	62.5	7
8	77 20.7	42 63	101.5	77 44.1	35 64	97.2	78 11.0	24 64	90.4	78 23.2	16 64	85.5	78 30.4	08 63	80.6	78 32.6	01 62	75.6	78 29.5	09 61	70.5	78 15.4	22 58	63.2	8
9	76 42.9	41 63	100.2	77 05.8	35 64	96.1	77 32.5	24 64	89.6	77 44.8	17 64	85.0	77 52.4	09 63	80.3	77 55.2	01 62	75.6	77 53.1	08 61	70.8	77 40.9	19 58	63.8	9
20	76 04.8	41 64	99.0	76 27.4	34 64	95.1	76 53.9	24 64	88.9	77 06.4	17 64	84.5	77 14.4	10 63	80.1	77 17.9	02 62	75.5	77 16.7	06 61	71.0	77 06.3	17 58	64.3	20
1	75 26.7	40 64	97.9	75 48.9	34 64	94.1	76 15.4	24 64	88.2	76 28.0	18 64	84.0	76 36.4	10 63	79.8	76 40.5	03 62	75.5	76 40.2	04 61	71.1	76 31.5	15 58	64.7	1
2	74 48.4	39 64	96.8	75 10.5	34 64	93.2	75 36.8	25 64	87.5	75 49.7	18 64	83.6	75 58.5	11 63	79.5	76 03.2	04 62	75.4	76 03.7	03 61	71.2	75 56.6	13 58	65.0	2
3	74 10.1	39 64	95.8	74 31.9	34 64	92.3	74 58.3	25 64	86.9	75 11.4	19 64	83.1	75 20.6	12 63	79.2	75 25.9	05 62	75.2	75 27.2	01 61	71.3	75 21.6	11 58	65.3	3
4	73 31.7	39 64	94.8	73 53.4	34 64	91.5	74 19.8	25 64	86.2	74 33.1	19 64	82.6	74 42.7	13 63	78.9	74 48.6	07 62	75.1	74 50.6	00 61	71.3	74 46.5	09 59	65.6	4
25	72 53.2	38 64	93.9	73 14.8	33 64	90.7	73 41.3	25 64	85.6	73 54.9	20 64	82.1	74 04.9	14 63	78.6	74 11.4	08 62	74.9	74 14.1	02 61	71.3	74 11.3	08 59	65.7	25
6	72 14.8	38 64	93.0	72 36.3	33 64	89.9	73 02.9	26 64	85.0	73 16.7	20 64	81.7	73 27.1	15 63	78.2	73 34.1	09 62	74.7	73 37.6	03 61	71.2	73 36.2	06 59	65.9	6
7	71 36.2	38 64	92.1	71 57.7	33 64	89.1	72 24.5	26 64	84.5	72 38.5	21 64	81.2	72 49.4	15 63	77.9	72 56.9	10 62	74.5	73 01.1	04 61	71.1	73 00.9	04 59	66.0	7
8	70 57.7	38 64	91.3	71 19.1	34 64	88.4	71 46.1	26 64	83.9	72 00.5	21 63	80.8	72 11.7	16 63	77.6	72 19.8	11 62	74.3	72 24.6	05 61	71.0	72 25.7	03 59	66.1	8
9	70 19.1	38 64	90.5	70 40.6	34 64	87.7	71 07.8	27 64	83.3	71 22.4	22 63	80.3	71 34.1	17 63	77.2	71 42.7	12 62	74.1	71 48.2	07 61	70.9	71 50.4	01 59	66.1	9
30	69 40.5	38 64	89.7	70 02.1	34 64	87.0	70 29.5	27 64	82.8	70 44.4	22 63	79.9	70 56.5	18 63	76.9	71 05.6	13 62	73.9	71 11.7	08 61	70.8	71 15.2	00 59	66.1	30
1	69 02.0	38 64	89.0	69 23.6	34 64	86.4	69 51.3	28 64	82.3	70 06.5	23 63	79.4	70 18.9	18 62	76.6	70 28.6	14 62	73.6	70 35.3	09 61	70.6	70 39.9	01 59	66.1	1
2	68 23.4	38 64	88.3	68 45.1	34 64	85.7	69 13.1	28 64	81.7	69 28.6	24 63	79.0	69 41.5	19 62	76.2	69 51.6	15 62	73.4	69 59.0	10 61	70.5	70 04.6	03 59	66.1	2
3	67 44.9	38 64	87.6	68 06.6	34 64	85.1	68 34.9	28 63	81.2	68 50.8	24 63	78.6	69 04.0	20 62	75.9	69 14.7	16 61	73.1	69 22.6	11 60	70.3	69 29.4	04 59	66.0	3
4	67 06.4	38 64	86.9	67 28.2	35 64	84.5	67 56.8	29 63	80.7	68 13.0	25 63	78.1	68 26.7	21 62	75.5	68 37.8	16 61	72.8	68 46.3	12 60	70.1	68 54.2	05 59	65.9	4
35	66 27.9	38 64	86.2	66 49.9	35 64	83.9	67 18.8	29 63	80.2	67 35.3	25 63	77.7	67 49.4	21 62	75.1	68 01.0	17 61	72.5	68 10.1	13 60	69.9	68 19.0	07 59	65.8	35
6	65 49.4	39 64	85.5	66 11.5	35 64	83.3	66 40.8	30 63	79.7	66 57.6	26 63	77.3	67 12.1	22 62	74.8	67 24.2	18 61	72.2	67 33.9	14 60	69.7	67 43.8	08 59	65.7	6
7	65 11.0	39 64	84.9	65 33.3	36 64	82.7	66 02.9	30 63	79.2	66 20.0	27 63	76.8	66 34.9	23 62	74.4	66 47.5	19 61	71.9	66 57.8	15 60	69.4	67 08.6	09 59	65.6	7
8	64 32.6	39 64	84.3	64 55.0	36 64	82.1	65 25.1	31 63	78.7	65 42.5	27 62	76.4	65 57.8	24 62	74.0	66 10.9	20 61	71.6	66 21.7	16 60	69.2	66 33.5	10 58	65.5	8
9	63 54.2	39 64	83.6	64 16.9	36 64	81.5	64 47.3	31 63	78.2	65 05.1	28 62	76.0	65 20.8	24 62	73.7	65 34.3	21 61	71.3	65 45.7	17 60	68.9	65 58.5	11 58	65.3	9
40	63 15.9	40 64	83.0	63 38.8	37 63	80.9	64 09.6	32 63	77.7	64 27.7	29 62	75.5	64 43.8	25 62	73.3	64 57.8	22 61	71.0	65 09.7	18 60	68.7	65 23.5	12 58	65.1	40
1	62 37.7	40 64	82.4	63 00.7	37 63	80.4	63 31.9	32 63	77.3	63 50.4	29 62	75.1	64 06.9	26 61	72.9	64 21.4	22 61	70.7	64 33.8	19 60	68.4	64 48.5	14 58	65.0	1
2	61 59.5	40 64	81.8	62 22.7	37 63	79.8	62 54.3	33 63	76.8	63 13.1	30 62	74.7	63 30.1	27 61	72.5	63 45.0	23 60	70.4	63 58.0	20 60	68.1	64 13.6	15 58	64.8	2
3	61 21.3	40 63	81.2	61 44.8	38 63	79.3	62 16.8	33 62	76.3	62 36.0	30 62	74.2	62 53.3	27 61	72.2	63 08.8	24 60	70.0	63 22.2	21 59	67.9	63 38.7	16 58	64.6	3
4	60 43.2	41 63	80.6	61 06.9	38 63	78.7	61 39.4	34 62	75.8	61 58.9	31 62	73.8	62 16.6	28 61	71.8	62 32.5	25 60	69.7	62 46.6	22 59	67.6	63 03.9	17 58	64.3	4
45	60 05.2	41 63	80.1	60 29.1	39 63	78.2	61 02.0	35 62	75.3	61 21.9	32 62	73.4	61 40.1	29 61	71.4	61 56.4	26 60	69.4	62 10.9	23 59	67.3	62 29.2	18 58	64.1	45
6	59 27.3	42 63	79.5	59 51.4	39 63	77.7	60 24.8	35 62	74.9	60 45.0	32 61	73.0	61 03.5	29 61	71.0	61 20.4	27 60	69.0	61 35.4	24 59	67.0	61 54.5	19 58	63.9	6
7	58 49.4	42 63	78.9	59 13.8	39 63	77.1	59 47.6	36 62	74.4	60 08.2	33 61	72.5	60 27.1	30 61	70.6	60 44.4	27 60	68.7	61 00.0	24 59	66.7	61 19.9	20 58	63.6	7
8	58 11.6	42 63	78.4	58 36.2	40 62	76.6	59 10.5	36 62	73.9	59 31.4	34 61	72.1	59 50.8	31 60	70.2	60 08.5	28 60	68.3	60 24.6	25 59	66.4	60 45.4	21 57	63.4	8
9	57 33.8	43 63	77.8	57 58.7	40 62	76.1	58 33.5	37 62	73.5	58 54.8	34 61	71.7	59 14.5	32 60	69.8	59 32.7	29 60	68.0	59 49.3	26 59	66.1	60 11.0	22 57	63.1	9
50	56 56.2	43 63	77.3	57 21.3	41 62	75.6	57 56.5	37 61	73.0	58 18.2	35 61	71.2	58 38.4	32 60	69.4	58 57.0	30 59	67.6	59 14.1	27 59	65.7	59 36.6	23 57	62.9	50
1	56 18.6	43 62	76.7	56 44.0	41 62	75.1	57 19.7	38 61	72.5	57 41.7	36 61	70.8	58 02.3	33 60	69.0	58 21.4	31 59	67.2	58 39.0	28 58	65.4	59 02.3	24 57	62.6	1
2	55 41.1	44 62	76.2	56 06.8	42 62	74.6	56 42.9	38 61	72.1	57 05.4	36 60	70.4	57 26.3	34 60	68.6	57 45.9	31 59	66.9	58 03.9	29 58	65.1	58 28.1	25 57	62.3	2
3	55 03.7	44 62	75.6	55 29.7	42 62	74.0	56 06.3	39 61	71.6	56 29.1	37 60	69.9	56 50.5	35 60	68.2	57 10.5	32 59	66.5	57 29.0	30 58	64.7	57 54.0	26 57	62.1	3
4	54 26.4	45 62	75.1	54 52.6	43 62	73.5	55 29.8	40 61	71.1	55 52.9	37 60	69.5	56 14.7	35 59	67.8	56 35.2	33 59	66.1	56 54.2	31 58	64.4	57 20.0	27 57	61.8	4
55	53 49.2	45 62	74.6	54 15.7	43 61	73.0	54 53.3	40 61	70.7	55 16.8	38 60	69.1	55 39.0	36 59	67.4	55 59.9	34 59	65.8	56 19.4	31 58	64.1	56 46.0	28 56	61.5	55
6	53 12.0	46 62	74.0	53 38.9	44 61	72.5	54 17.0	41 60	70.2	54 40.8	39 60	68.6	55 03.5	37 59	67.0	55 24.8	34 58	65.4	55 44.8	32 58	63.7	56 12.2	29 56	61.2	6
7	52 35.0	46 62	73.5	53 02.1	44 61	72.0	53 40.7	41 60	69.8	54 05.0	39 60	68.2	54 28.0	37 59	66.6	54 49.8	35 58	65.0	55 10.3	33 57	63.4	55 38.5	30 56	60.9	7
8	51 58.1	47 61	73.0	52 25.5	45 61	71.5	53 04.6	42 60	69.3	53 29.2	40 59	67.8	53 52.7	38 59	66.2	54 14.9	36 58	64.6	54 35.9	34 57	63.0	55 04.8	31 56	60.6	8
9	51 21.2	47 61	72.5	51 49.0	45 61	71.0	52 28.6	43 60	68.8	52 53.6	41 59	67.3	53 17.4	39 59	65.8	53 40.1	37 58	64.2	54 01.5	35 57	62.7	54 31.3	31 56	60.2	9
60	50 44.5	48 61	71.9	51 12.6	46 60	70.5	51 52.7	43 60	68.4	52 18.1	41 59	66.9	52 42.3	39 58	65.4	53 05.4	38 58	63.9	53 27.3	35 57	62.3	53 57.9	32 56	59.9	60
1	50 07.9	48 61	71.4	50 36.3	46 60	70.0	51 16.9	44 59	67.9	51 42.6	42 59	66.4	52 07.3	40 58	65.0	52 30.9	38 57	63.5	52 53.2	36 57	61.9	53 24.6	33 55	59.6	1
2	49 31.4	49 61	70.9	50 00.1	47 60	69.5	50 41.2	44 59	67.4	51 07.3	43 59	66.0	51 32.4	41 58	64.6	51 56.4	39 57	63.1	52 19.3	37 56	61.6	52 51.4	34 55	59.3	2
3	48 55.0	49 60	70.4	49 24.0	47 60	69.0	50 05.6	45 59	67.0	50 32.2	43 58	65.6	50 57.7	42 58	64.1	51 22.1	40 57	62.7	51 45.4	38 56	61.2	52 18.3	35 55	58.9	3
4	48 18.8	50 60	69.8	48 48.0	48 60	68.5	49 30.2	46 59	66.5	49 57.1	44 58	65.1	50 23.0	42 58	63.7	50 47.9	41 57	62.3	51 11.7	39 56	60.8	51 45.3	36 55	58.6	4
65	47 42.6	50 60	69.3	48 12.2	49 60	68.0	48 54.9	46 59	66.0	49 22.2	45 58	64.7	49 48.5	43 57	63.3	50 13.8	41 57	61.9	50 38.1	40 56	60.4	51 12.4	37 55	58.2	65
6	47 06.6	51 60	68.8	47 36.5	49 59	67.5	48 19.7	47 58	65.6	48 47.4	45 58	64.2	49 14.1	44 57	62.9	49 39.9	42 56	61.5	50 04.6	40 56	60.1	50 39.7	38 54	57.9	6
7	46 30.7	51 60	68.3	47 00.9	50 59	67.0	47 44.7	48 58	65.1	48 12.7	46 58	63.8	48 39.9	44 57	62.4	49 06.0	43 56	61.1	49 31.2	41 55	59.7	50 07.1	39 54	57.5	7
8	45 54.9	52 59	67.8	46 25.5	50 59	66.5	47 09.8	48 58	64.6	47 38.2	47 57	63.3	48 05.7	45 57	62.0	48 32.4	44 56	60.7	48 58.0	42 55	59.3	49 34.6	39 54	57.2	8
9	45 19.3	52 59	67.3	45 50.2	51 59	66.0	46 35.0	49 58	64.2	47 03.8	47 57	62.9	47 31.8	46 56	61.6	47 58.8	44 56	60.3	48 24.9	43 55	58.9	49 02.3	40 54	56.8	9
70	44 43.8	53 59	66.8	45 15.0	51 58	65.5	46 00.3	49 58	63.7	46 29.5	48 57	62.4	46 57.9	47 56	61.1	47 25.4	45 55	59.8	47 52.0	44 55	58.5	48 30.1	41 53	56.5	70
1	44 08.4	53 59	66.2	44 40.0	52 58	65.0	45 25.8	50 57	63.2	45 55.4	49 57	62.0	46 24.2	47 56	60.7	46 52.1	46 55	59.4	47 19.1	44 54	58.1	47 58.0	42 53	56.1	1
2	43 33.2	54 58	65.7	44 05.1	53 58	64.6	44 51.5	51 57	62.8	45 21.5	49 56	61.5	45 50.6	48 56	60.3	46 19.0	47 55	59.0	46 46.5	45 54	57.7	47 26.0	43 53	55.7	2
3	42 58.1	54 58	65.2	43 30.3	53 58	64.1	44 17.3	51 57	62.3	44 47.6	50 56	61.1	45 17.2	49 55	59.8	45 46.0	47 55	58.6	46 13.9	46 54	57.3	46 54.2	44 53	55.4	3
4	42 23.2	55 58	64.7	42 55.7	54 57	63.6	43 43.2	52 57	61.8	44 13.9	51 56	60.6	44 43.9	49 55	59.4	45 13.2	48 54	58.2	45 41.6	47 54	56.9	46 22.6	44 53	55.0	4
75	41 48.4	55 58	64.2	42 21.2	54 57	63.1	43 09.3	53 56	61.3	43 40.4	51 56	60.1	44 10.8	50 55	59.0	44 40.5	49 54	57.7	45 09.3	47 53	56.5	45 51.1	45 52	54.6	75
6	41 13.7	56 57	63.7	41 46.9	55 57	62.6	42 35.5	53 56	60.8	43 07.0	52 55	59.7	43 37.9	51 55	58.5	44 07.9	49 54	57.3	44 37.2	48 53	56.1	45 19.7	46 52	54.2	6
7	40 39.2	56 57	63.1	41 12.8	55 57	62.0	42 01.9	54 56	60.4	42 33.8	53 55	59.2	43 05.1	51 54	58.1	43 35.6	50 54	56.9	44 05.3	49 53	55.7	44 48.5	47 52	53.8	7
8	40 04.9	57 57	62.6	40 38.8	56 56	61.5	41 28.5	54 55	59.9	42 00.8	53 55	58.8	42 32.4	52 54	57.6	43 03.3	51 53	56.4	43 33.5	50 53	55.3	44 17.4	48 52	53.4	8
9	39 30.7	58 57	62.1	40 05.0	57 56	61.0	40 55.2	55 55	59.4	41 27.9	54 55	58.3	41 59.9	53 54	57.2	42 31.3	52 53	56.0	43 01.9	50 52	54.8	43 46.5	49 51	53.0	9
80	38 56.7	58 56	61.6	39 31.3	57 56	60.5	40 22.1	56 55	58.9	40 55.2	55 54	57.8	41 27.6	54 54	56.7	41 59.4	52 53	55.6	42 30.5	51 52	54.4	43 15.8	49 51	52.6	80
1	38 22.9	59 56	61.1	38 57.8	58 56	60.0	39 49.1	56 55	58.4	40 22.6	55 54	57.4	40 55.4	54 53	56.3	41 27.7	53 53	55.1	41 59.2	52 52	54.0	42 45.2	50 51	52.2	1
2	37 49.2	59 56	60.6	38 24.5	58 55	59.5	39 16.4	57 54	58.0	39 50.2	56 54	56.9	40 23.5	55 53	55.8	40 56.1	54 52	54.7	41 28.1	53 52	53.6	42 14.8	51 50	51.8	2
3	37 15.7	60 56	60.0	37 51.3	59 55	59.0	38 43.8	58 54	57.5	39 18.0	57 53	56.4	39 51.7	56 53	55.3	40 24.7	55 52	54.2	40 57.1	54 51	53.1	41 44.6	52 50	51.4	3
4	36 42.4	60 55	59.5	37 18.4	60 55	58.5	38 11.3	58 54	57.0	38 46.0	57 53	55.9	39 20.0	56 52	54.9	39 53.5	55 52	53.8	40 26.4	54 51	52.7	41 14.5	53 50	51.0	4
85	36 09.3	61 55	59.0	36 45.6	60 54	58.0	37 39.1	59 53	56.5	38 14.1	58 53	55.5	38 48.6	57 52	54.4	39 22.5	56 51	53.3	39 55.8	55 51	52.3	40 44.6	53 50	50.6	85
6	35 36.3	61 55	58.5	36 13.0	61 54	57.5	37 07.0	59 53	56.0	37 42.4	59 52	55.0	38 17.3	58 52	53.9	38 51.6	57 51	52.9	39 25.4	56 50	51.8	40 14.9	54 49	50.2	6
7	35 03.5	62 54	57.9	35 40.5	61 54	57.0	36 35.1	60 53	55.5	37 10.9	59 52	54.5	37 46.2	58 52	53.5	38 21.0	57 51	52.4	38 55.1	57 50	51.4	39 45.3	55 49	49.8	7
8	34 30.9	63 54	57.4	35 08.3	62 53	56.5	36 03.5	61 52	55.0	36 39.6	60 52	54.0	37 15.3	59 51	53.0	37 50.5	58 50	52.0	38 25.1	57 50	50.9	39 16.0	56 49	49.4	8
9	33 58.5	63 54	56.9	34 36.2	62 53	55.9	35 32.0	61 52	54.5	36 08.5	61 52	53.5	36 44.6	60 51	52.5	37 20.2	59 50	51.5	37 55.3	58 49	50.5	38 46.8	57 48	48.9	9
90	33 26.3	64 53	56.4	34 04.4	63 53	55.4	35 00.7	62 52	54.0	35 37.6	61 51	53.0	36 14.1	60 51	52.1	36 50.1	60 50	51.1	37 25.6	59 49	50.0	38 17.8	57 48	48.5	90

Digitized by Google

H.A.	46° 00′ Alt.		Az.	47° 00′ Alt.		Az.	48° 30′ Alt.		Az.	49° 30′ Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
91	32 54.3	64 53	55.8	33 32.7	64 52	54.9	34 29.6	63 52	53.5	35 06.9	62 51	52.5
2	32 22.5	65 53	55.3	33 01.3	64 52	54.4	33 58.7	63 51	53.0	34 36.4	63 51	52.1
3	31 50.9	65 52	54.8	32 30.0	65 52	53.9	33 28.0	64 51	52.5	34 06.1	63 50	51.6
4	31 19.5	66 52	54.2	31 59.0	65 51	53.3	32 57.5	64 50	52.0	33 36.0	64 50	51.1
95	30 48.3	67 52	53.7	31 28.2	66 51	52.8	32 27.2	65 50	51.5	33 06.1	64 49	50.6
6	30 17.4	67 51	53.1	30 57.5	67 51	52.3	31 57.1	66 50	51.0	32 36.4	65 49	50.1
7	29 46.6	68 51	52.6	30 27.2	67 50	51.7	31 27.3	63 49	50.4	32 06.9	66 49	49.6
8	29 16.1	68 50	52.1	29 57.0	68 50	51.2	30 57.7	67 49	49.9	31 37.7	66 48	49.1
9	28 45.8	69 50	51.5	29 27.0	68 50	50.7	30 28.3	68 49	49.4	31 08.7	67 48	48.5
100	28 15.7	70 50	51.0	28 57.3	69 49	50.1	29 59.1	68 48	48.9	30 39.9	68 48	48.0
1	27 45.9	70 49	50.4	28 27.8	70 49	49.6	29 30.2	69 48	48.4	30 11.3	68 47	47.5
2	27 16.3	71 49	49.9	27 58.6	70 48	49.1	29 01.5	69 47	47.8	29 43.0	69 47	47.0
3	26 46.9	71 49	49.3	27 29.6	71 48	48.5	28 33.0	70 47	47.3	29 14.9	70 46	46.5
4	26 17.8	72 48	48.8	27 00.8	71 48	48.0	28 04.8	71 47	46.8	28 47.1	70 46	46.0
105	25 48.9	72 48	48.2	26 32.3	72 47	47.4	27 36.8	71 46	46.2	28 19.4	71 46	45.4
6	25 20.3	73 47	47.6	26 04.0	73 47	46.9	27 09.0	72 46	45.7	27 52.1	72 45	44.9
7	24 52.0	74 47	47.1	25 36.0	73 46	46.3	26 41.6	73 45	45.2	27 25.0	72 45	44.4
8	24 23.9	74 46	46.5	25 08.2	74 46	45.8	26 14.3	73 45	44.6	26 58.1	73 44	43.9
9	23 56.0	75 46	45.9	24 40.7	74 45	45.2	25 47.4	74 44	44.1	26 31.5	73 44	43.3
110	23 28.4	75 46	45.4	24 13.5	75 45	44.6	25 20.7	74 44	43.5	26 05.2	74 43	42.8
1	23 01.1	76 45	44.8	23 46.5	75 44	44.1	24 54.2	75 44	43.0	25 39.1	75 43	42.3
2	22 34.1	76 45	44.2	23 19.8	76 44	43.5	24 28.1	76 43	42.5	25 13.3	75 43	41.7
3	22 07.3	77 44	43.7	22 53.4	77 44	43.0	24 02.2	76 43	41.9	24 47.8	76 42	41.2
4	21 40.8	78 44	43.1	22 27.2	77 43	42.4	23 36.5	77 42	41.3	24 22.5	76 42	40.6
115	21 14.6	78 43	42.5	22 01.4	78 43	41.8	23 11.2	77 42	40.8	23 57.5	77 41	40.1
6	20 48.7	79 43	41.9	21 35.8	78 42	41.2	22 46.2	78 41	40.2	23 32.8	78 41	39.5
7	20 23.1	79 42	41.3	21 10.5	79 42	40.7	22 21.4	79 41	39.7	23 08.4	78 40	39.0
8	19 57.8	80 42	40.7	20 45.6	79 41	40.1	21 56.9	79 40	39.1	22 44.3	79 40	38.4
9	19 32.8	80 41	40.1	20 20.9	80 41	39.5	21 32.7	80 40	38.5	22 20.5	79 39	37.9
120	19 08.1	81 41	39.6	19 56.5	81 40	38.9	21 08.9	80 39	38.0	21 56.9	80 39	37.3
1	18 43.7	81 40	39.0	19 32.4	81 40	38.3	20 45.3	81 39	37.4	21 33.7	81 38	36.8
2	18 19.6	82 40	38.4	19 08.6	82 39	37.8	20 22.0	81 38	36.8	21 10.8	81 38	36.2
3	17 55.8	82 39	37.8	18 45.2	82 39	37.2	19 59.0	82 38	36.3	20 48.1	82 37	35.6
4	17 32.3	83 39	37.2	18 22.0	83 38	36.6	19 36.4	82 37	35.7	20 25.8	82 37	35.1
125	17 09.2	83 38	36.6	17 59.2	83 37	36.0	19 14.1	83 37	35.1	20 03.3	83 36	34.5
6	16 46.4	84 37	35.9	17 36.7	84 37	35.4	18 52.1	84 36	34.5	19 42.1	83 36	33.9
7	16 23.9	84 37	35.3	17 14.6	84 36	34.8	18 30.4	84 36	33.9	19 20.8	84 35	33.3
8	16 01.8	85 36	34.7	16 52.8	85 36	34.2	18 09.0	85 35	33.3	18 59.7	84 34	32.8
9	15 40.0	85 36	34.1	16 31.3	85 35	33.6	17 48.0	85 34	32.7	18 39.0	85 34	32.2
130	15 18.6	86 35	33.5	16 10.1	86 35	33.0	17 27.3	86 34	32.1	18 18.6	85 33	31.6
1	14 57.5	86 35	32.9	15 49.3	86 34	32.3	17 06.9	86 33	31.6	17 58.6	86 33	31.0
2	14 36.7	87 34	32.2	15 28.8	87 34	31.7	16 46.9	87 33	31.0	17 38.9	87 32	30.4
3	14 16.3	87 33	31.6	15 08.7	87 33	31.1	16 27.3	87 32	30.4	17 19.5	87 32	29.8
4	13 56.3	88 33	31.0	14 49.0	88 32	30.5	16 08.0	88 32	29.7	17 00.5	88 31	29.2
135	13 36.6	88 32	30.4	14 29.6	88 32	29.9	15 49.0	88 31	29.1	16 41.8	88 31	28.6
6	13 17.3	89 32	29.7	14 10.6	89 31	29.3	15 30.4	89 30	28.5	16 23.5	89 30	28.1
7	12 58.4	89 31	29.1	13 51.9	89 30	28.6	15 12.2	89 30	27.9	16 05.6	89 29	27.5
8	12 39.8	90 30	28.5	13 33.6	90 30	28.0	14 54.3	90 29	27.3	15 48.0	89 29	26.8
9	12 21.6	90 30	27.8	13 15.7	90 29	27.4	14 36.8	90 29	26.7	15 30.7	90 28	26.2
140	12 03.8	91 29	27.2	12 58.2	91 20	26.7	14 19.6	90 28	26.1	15 13.9	90 28	25.6
1	11 46.4	91 28	26.5	12 41.0	91 28	26.1	14 02.9	91 27	25.5	14 57.4	91 27	25.0
2	11 29.4	91 28	25.9	12 24.2	91 27	25.5	13 46.5	91 27	24.8	14 41.2	91 26	24.4
3	11 12.7	92 27	25.2	12 07.8	92 27	24.8	13 30.5	92 26	24.2	14 25.5	92 26	23.8
4	10 56.5	92 26	24.6	11 51.9	92 26	24.2	13 14.8	92 25	23.6	14 10.1	92 25	23.2
145	10 40.6	93 26	23.9	11 36.3	93 25	23.5	12 59.6	93 25	23.0	13 55.1	93 24	22.6
6	10 25.2	93 25	23.3	11 21.0	93 25	22.9	12 44.7	93 24	22.3	13 40.5	93 24	21.9
7	10 10.2	93 24	22.6	11 06.2	93 24	22.2	12 30.3	93 23	21.7	13 26.3	93 23	21.3
8	9 55.6	94 24	21.9	10 51.9	94 23	21.6	12 16.2	94 23	21.1	13 12.5	94 22	20.7
9	9 41.4	94 23	21.3	10 37.9	94 23	20.9	12 02.6	94 22	20.4	12 59.0	94 22	20.1
150	9 27.6	95 22	20.6	10 24.3	95 22	20.3	11 49.3	94 21	19.8	12 46.0	94 21	19.4
1	9 14.2	95 22	20.0	10 11.1	95 21	19.6	11 36.5	95 21	19.1	12 33.3	95 20	18.8
2	9 01.3	95 21	19.3	9 58.4	95 21	19.0	11 24.0	95 20	18.5	12 21.1	95 20	18.2
3	8 48.7	96 20	18.6	9 46.0	96 20	18.3	11 12.0	95 19	17.9	12 09.3	95 19	17.6
4	8 36.6	96 19	17.9	9 34.1	96 19	17.6	11 02.4	96 19	17.2	11 57.8	96 18	16.9
155	8 25.0	96 19	17.3	9 22.7	96 18	17.0	10 49.2	96 18	16.6	11 46.8	96 18	16.3
6	8 13.7	96 18	16.6	9 11.6	96 18	16.3	10 38.4	96 17	15.9	11 36.2	96 17	15.6
7	8 03.0	97 17	15.9	9 01.0	97 17	15.7	10 28.0	97 17	15.3	11 26.0	97 16	15.0
8	7 52.6	97 16	15.2	8 50.8	97 16	15.0	10 18.1	97 16	14.6	11 16.2	97 16	14.4
9	7 42.7	97 16	14.5	8 41.0	97 16	14.3	10 08.6	97 15	14.0	11 06.9	97 15	13.7
160	7 33.2	98 15	13.9	8 31.7	97 15	13.6	9 59.5	97 14	13.3	10 57.9	97 14	13.1
1	7 24.2	98 14	13.2	8 22.9	98 14	13.0	9 50.8	98 14	12.6	10 49.4	98 13	12.4
2	7 15.6	98 14	12.5	8 14.4	98 13	12.3	9 42.6	98 13	12.0	10 41.3	98 13	11.8
3	7 07.5	98 13	11.8	8 06.4	98 13	11.6	9 34.8	98 12	11.3	10 33.7	98 12	11.1
4	6 59.8	98 12	11.1	7 58.9	98 12	10.9	9 27.4	98 12	10.7	10 26.4	98 11	10.5
165	6 52.6	99 11	10.4	7 51.8	99 11	10.3	9 20.5	99 11	10.0	10 19.6	99 11	09.8
6	6 45.9	99 10	09.7	7 45.1	99 10	09.6	9 14.0	99 10	09.3	10 13.3	99 10	09.2
7	6 39.6	99 10	09.1	7 38.9	99 10	08.9	9 08.0	99 09	08.7	10 07.3	99 09	08.5
8	6 33.7	99 09	08.4	7 33.2	99 09	08.2	9 02.4	99 09	08.0	10 01.8	99 08	07.9
9	6 28.4	99 08	07.7	7 27.9	99 08	07.5	8 57.2	99 08	07.4	9 56.8	99 08	07.2
170	6 23.5	99 07	07.0	7 23.1	99 07	06.9	8 52.5	99 07	06.7	9 52.1	99 07	06.6
1	6 19.0	99 07	06.3	7 18.7	99 07	06.2	8 48.2	99 06	06.0	9 47.9	99 06	05.9
2	6 15.0	1.0 06	05.6	7 14.8	1.0 06	05.5	8 44.4	1.0 06	05.4	9 44.2	1.0 06	05.3
3	6 11.5	1.0 05	04.9	7 11.3	1.0 05	04.8	8 41.0	1.0 05	04.7	9 40.8	1.0 05	04.6
4	6 08.5	1.0 04	04.2	7 08.3	1.0 04	04.1	8 38.1	1.0 04	04.0	9 38.0	1.0 04	03.9
175	6 05.9	1.0 04	03.5	7 05.8	1.0 03	03.4	8 35.6	1.0 03	03.3	9 35.5	1.0 03	03.3
6	6 03.8	1.0 03	02.8	7 03.7	1.0 03	02.7	8 33.6	1.0 03	02.7	9 33.5	1.0 03	02.6
7	6 02.1	1.0 02	02.1	7 02.1	1.0 02	02.1	8 32.0	1.0 02	02.0	9 32.0	1.0 02	02.0
8	6 00.9	1.0 01	01.4	7 00.9	1.0 01	01.4	8 30.9	1.0 01	01.3	9 30.9	1.0 01	01.3
9	6 00.2	1.0 00	00.7	7 00.2	1.0 00	00.7	8 30.2	1.0 00	00.7	9 30.2	1.0 00	00.7
180	6 00.0	1.0 00	00.0	7 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	9 30.0	1.0 00	00.0

50° 30′ Alt.		Az.	51° 30′ Alt.		Az.	52° 30′ Alt.		Az.	54° 00′ Alt.		Az.	H.A.
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
35 43.8	61 50	51.6	36 20.2	60 50	50.6	36 56.1	59 49	49.6	37 49.1	58 48	48.1	91
35 13.7	62 50	51.1	35 50.5	61 49	50.1	36 26.9	60 48	49.1	37 20.5	59 47	47.6	2
34 43.8	62 50	50.6	35 21.0	62 49	49.7	35 57.8	61 48	48.7	36 52.1	60 47	47.2	3
34 14.1	63 49	50.1	34 51.7	62 48	49.2	35 28.9	62 48	48.2	36 23.9	60 47	46.8	4
33 44.6	64 49	49.6	34 22.6	63 48	48.7	35 00.3	62 47	47.8	35 55.9	61 46	46.3	95
33 15.3	64 48	49.2	33 53.8	64 48	48.2	34 31.8	63 47	47.3	35 28.1	62 46	45.9	6
32 46.2	65 48	48.7	33 25.1	64 47	47.8	34 03.6	64 47	46.8	35 00.5	63 46	45.4	7
32 17.4	66 48	48.2	32 56.7	65 47	47.3	33 35.6	65 46	46.4	34 33.1	63 45	45.0	8
31 48.7	66 47	47.7	32 28.4	66 47	46.8	33 07.8	65 46	45.9	34 06.0	64 45	44.5	9
31 20.3	67 47	47.2	32 00.4	67 46	46.3	32 40.2	66 46	45.4	33 39.1	65 44	44.1	100
30 52.2	68 47	46.7	31 32.7	67 46	45.8	32 12.8	67 45	44.9	33 12.4	66 44	43.6	1
30 24.2	68 46	46.2	31 05.1	68 46	45.3	31 45.7	67 45	44.5	32 45.9	66 44	43.1	2
29 56.5	69 46	45.7	30 37.8	69 45	44.8	31 18.8	68 44	44.0	32 19.6	67 43	42.7	3
29 29.1	70 45	45.2	30 10.8	69 45	44.3	30 52.1	69 44	43.5	31 53.6	68 43	42.2	4
29 01.8	70 45	44.6	29 43.9	70 44	43.8	30 25.7	69 44	43.0	31 27.8	69 43	41.7	105
28 34.9	71 45	44.1	29 17.4	71 44	43.3	29 59.5	70 43	42.5	31 02.3	69 42	41.3	6
28 08.1	72 44	43.6	28 51.0	71 43	42.8	29 33.6	71 43	42.0	30 36.9	70 42	40.8	7
27 41.7	72 44	43.1	28 24.9	72 43	42.3	29 07.9	71 42	41.5	30 11.9	71 41	40.3	8
27 15.4	73 43	42.6	27 59.1	73 43	41.8	28 42.5	72 42	41.0	29 47.1	71 41	39.8	9
26 49.5	74 43	42.1	27 33.5	73 42	41.3	28 17.3	73 42	40.5	29 22.5	72 41	39.3	110
26 23.8	74 42	41.5	27 08.2	74 42	40.8	27 52.4	73 41	40.0	28 58.2	73 40	38.8	1
25 58.3	75 42	41.0	26 43.1	74 41	40.3	27 27.7	74 41	39.5	28 34.1	73 40	38.4	2
25 33.2	75 41	40.5	26 18.4	75 41	39.7	27 03.3	75 40	39.0	28 10.3	74 39	37.9	3
25 08.3	76 41	39.9	25 53.8	76 40	39.2	26 39.2	75 40	38.5	27 46.8	75 39	37.4	4
24 43.7	77 41	39.4	25 29.6	76 40	38.7	26 15.3	76 39	38.0	27 23.5	75 38	36.9	115
24 19.3	77 40	38.9	25 05.6	77 40	38.2	25 51.7	77 39	37.4	27 00.5	76 38	36.4	6
23 55.3	78 40	38.3	24 41.9	78 39	37.6	25 28.4	77 38	36.9	26 37.8	77 37	35.9	7
23 31.5	79 39	37.8	24 18.5	78 39	37.1	25 05.4	78 38	36.4	26 15.3	77 37	35.4	8
23 08.0	79 39	37.2	23 55.4	79 38	36.6	24 42.6	79 37	35.9	25 53.1	78 36	34.8	9
22 44.8	80 38	36.7	23 32.6	79 38	36.0	24 20.2	79 37	35.4	25 31.2	79 36	34.3	120
22 21.9	80 38	36.1	23 10.1	80 37	35.5	23 58.0	80 36	34.8	25 09.6	79 36	33.8	1
21 59.4	81 37	35.6	22 47.8	81 37	34.9	23 36.1	80 36	34.3	24 48.3	80 35	33.3	2
21 37.1	81 37	35.0	22 25.9	81 36	34.4	23 14.6	81 35	33.8	24 27.3	81 35	32.8	3
21 15.1	82 36	34.5	22 04.3	82 36	33.8	22 53.3	82 35	33.2	24 06.5	81 34	32.3	4
20 53.4	83 36	33.9	21 42.9	82 35	33.3	22 32.3	82 34	32.7	23 46.1	82 34	31.7	125
20 32.1	83 35	33.3	21 21.9	83 34	32.7	22 11.6	83 34	32.1	23 25.9	82 33	31.2	6
20 11.0	84 35	32.8	21 01.2	84 34	32.2	21 51.3	83 33	31.6	23 06.1	83 33	30.7	7
19 50.3	84 34	32.2	20 40.8	84 33	31.6	21 31.2	84 33	31.0	22 46.6	84 32	30.2	8
19 29.9	85 33	31.6	20 20.8	85 33	31.1	21 11.5	84 32	30.5	22 27.4	84 32	29.6	9
19 09.9	85 33	31.1	20 01.0	85 32	30.5	20 52.1	85 32	29.9	22 08.4	85 31	29.1	130
18 50.2	86 32	30.5	19 41.6	86 32	29.9	20 33.0	86 31	29.4	21 49.9	85 30	28.5	1
18 30.8	86 32	29.9	19 22.6	86 31	29.4	20 14.2	86 31	28.8	21 31.6	86 30	28.0	2
18 11.7	87 31	29.3	19 03.8	87 31	28.8	19 55.8	87 30	28.3	21 13.6	86 29	27.5	3
17 53.0	87 31	28.7	18 45.4	87 30	28.2	19 37.7	87 30	27.7	20 56.0	87 29	26.9	4
17 34.6	88 30	28.2	18 27.3	88 30	27.6	19 20.0	88 29	27.1	20 38.7	87 28	26.4	135
17 16.6	88 29	27.6	18 09.6	88 29	27.1	19 02.5	88 28	26.6	20 21.8	88 28	25.8	6
16 58.9	89 29	27.0	17 52.2	89 28	26.5	18 45.4	89 28	26.0	20 05.1	88 27	25.3	7
16 41.6	89 28	26.4	17 35.2	89 28	25.9	18 28.7	89 27	25.4	19 48.8	89 27	24.7	8
16 24.7	90 28	25.8	17 18.5	90 27	25.3	18 12.3	90 27	24.9	19 32.9	89 26	24.2	9
16 08.1	90 27	25.2	17 02.2	90 27	24.7	17 56.3	90 26	24.3	19 17.3	90 25	23.6	140
15 51.8	91 26	24.6	16 46.2	91 26	24.2	17 40.6	91 26	23.7	19 02.0	90 25	23.0	1
15 36.0	91 26	24.0	16 30.6	91 25	23.6	17 25.3	91 25	23.1	18 47.1	91 24	22.5	2
15 20.5	92 25	23.4	16 15.4	92 25	23.0	17 10.3	91 24	22.5	18 32.5	91 24	21.9	3
15 05.3	92 25	22.8	16 00.5	92 24	22.4	16 55.7	92 24	22.0	18 18.3	92 23	21.3	4
14 50.6	92 24	22.2	15 46.0	92 24	21.8	16 41.4	92 23	21.4	18 04.5	92 22	20.8	145
14 36.2	93 23	21.6	15 31.9	93 23	21.2	16 27.6	93 22	20.8	17 51.0	93 22	20.2	6
14 22.3	93 23	21.0	15 18.2	93 22	20.6	16 14.1	93 22	20.2	17 37.8	93 21	19.6	7
14 08.7	94 22	20.3	15 04.8	94 22	20.0	16 00.9	94 21	19.6	17 25.1	93 21	19.1	8
13 55.4	94 21	19.7	14 51.8	94 21	19.4	15 48.2	94 21	19.0	17 12.6	94 20	18.5	9
13 42.6	94 21	19.1	14 39.2	94 20	18.8	15 35.8	94 20	18.4	17 00.6	94 19	17.9	150
13 30.2	95 20	18.5	14 27.0	95 20	18.2	15 23.8	95 19	17.8	16 48.9	95 19	17.3	1
13 18.2	95 19	17.9	14 15.2	95 19	17.5	15 12.2	95 19	17.2	16 37.6	95 18	16.7	2
13 06.5	95 19	17.2	14 03.8	95 18	16.9	15 01.0	95 18	16.6	16 26.7	95 18	16.2	3
12 55.3	96 18	16.6	13 52.7	96 18	16.3	14 50.1	96 17	16.0	16 16.2	96 17	15.6	4
12 44.5	96 17	16.0	13 42.1	96 17	15.7	14 39.7	96 17	15.4	16 06.0	96 16	15.0	155
12 34.0	96 17	15.4	13 31.8	96 16	15.1	14 29.6	96 16	14.8	15 56.2	96 16	14.4	6
12 24.0	97 16	14.7	13 22.0	97 16	14.5	14 19.9	97 15	14.2	15 46.8	97 15	13.8	7
12 14.4	97 15	14.1	13 12.5	97 15	13.9	14 10.7	97 15	13.6	15 37.8	97 14	13.2	8
12 05.2	97 15	13.5	13 03.5	97 14	13.2	14 01.8	97 14	13.0	15 29.2	97 14	12.6	9
11 56.4	97 14	12.8	12 54.9	97 14	12.6	13 53.3	97 13	12.4	15 21.0	97 13	12.0	160
11 48.1	98 13	12.2	12 46.7	98 13	12.0	13 45.3	98 13	11.8	15 13.1	98 12	11.4	1
11 40.1	98 13	11.6	12 38.8	98 12	11.4	13 37.6	98 12	11.2	15 05.7	98 12	10.8	2
11 32.6	98 12	10.9	12 31.5	98 12	10.7	13 30.3	98 11	10.5	14 58.6	98 11	10.2	3
11 25.5	98 11	10.3	12 24.5	98 11	10.1	13 23.5	98 11	09.9	14 52.0	98 10	09.7	4
11 18.8	99 10	09.7	12 17.9	99 10	09.5	13 17.0	99 10	09.3	14 45.7	99 10	09.1	165
11 12.5	99 10	09.0	12 11.8	99 10	08.9	13 11.0	99 09	08.7	14 39.8	99 09	08.5	6
11 06.7	99 09	08.4	12 06.0	99 09	08.2	13 05.4	99 09	08.1	14 34.4	99 08	07.9	7
11 01.3	99 08	07.7	12 00.7	99 08	07.6	13 00.1	99 08	07.5	14 29.3	99 08	07.3	8
10 56.3	99 08	07.1	11 55.8	99 07	07.0	12 55.3	99 07	06.8	14 24.6	99 07	06.6	9
10 51.7	99 07	06.5	11 51.3	99 07	06.3	12 50.9	99 07	06.2	14 20.4	99 06	06.0	170
10 47.6	99 06	05.8	11 47.3	99 06	05.7	12 47.0	99 06	05.6	14 16.5	99 06	05.4	1
10 43.9	1.0 05	05.2	11 43.7	1.0 05	05.1	12 43.4	1.0 05	05.0	14 13.0	1.0 05	04.8	2
10 40.7	1.0 05	04.5	11 40.5	1.0 05	04.4	12 40.3	1.0 05	04.4	14 10.0	1.0 04	04.2	3
10 37.8	1.0 04	03.9	11 37.7	1.0 04	03.8	12 37.5	1.0 04	03.7	14 07.3	1.0 04	03.6	4
10 35.4	1.0 03	03.2	11 35.3	1.0 03	03.2	12 35.2	1.0 03	03.1	14 05.1	1.0 03	03.0	175
10 33.5	1.0 03	02.6	11 33.4	1.0 02	02.5	12 33.4	1.0 02	02.5	14 03.3	1.0 02	02.4	6
10 32.0	1.0 02	01.9	11 31.9	1.0 02	01.9	12 31.9	1.0 02	01.9	14 01.8	1.0 02	01.8	7
10 30.9	1.0 01	01.3	11 30.9	1.0 01	01.3	12 30.8	1.0 01	01.2	14 00.8	1.0 01	01.2	8
10 30.2	1.0 00	00.6	11 30.2	1.0 00	00.6	12 30.2	1.0 00	00.6	14 00.2	1.0 00	00.6	9
10 30.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 30.0	1.0 00	00.0	14 00.0	1.0 00	00.0	180

Digitized by Google

Lat. 50°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	85 30.0	1.0 04	00.0	85 00.0	1.0 04	00.0	84 00.0	1.0 03	00.0	83 30.0	1.0 03	00.0	83 00.0	1.0 02	00.0	82 30.0	1.0 02	00.0	81 00.0	1.0 02	00.0	80 30.0	1.0 02	00.0	00
1	85 27.5	99 12	07.4	84 57.8	99 11	06.5	83 58.2	99 09	05.3	83 28.4	1.0 08	04.9	82 58.5	1.0 07	04.5	82 28.6	1.0 07	04.1	80 58.9	1.0 06	03.3	80 29.0	1.0 05	03.1	1
2	85 20.2	96 20	14.4	84 51.3	97 18	12.9	83 52.9	98 15	10.5	83 23.5	98 13	09.6	82 54.0	98 12	08.8	82 24.5	99 11	08.2	80 55.6	99 09	06.5	80 25.9	99 09	06.1	2
3	85 08.4	92 26	21.0	84 40.7	93 24	18.9	83 44.2	95 20	15.6	83 15.5	96 18	14.2	82 46.7	96 17	13.1	82 17.7	97 16	12.1	80 50.1	98 13	09.7	80 20.8	98 12	09.1	3
4	84 52.7	86 32	27.0	84 26.4	89 29	24.4	83 32.3	92 25	20.3	83 04.6	93 23	18.6	82 36.6	94 21	17.2	82 08.4	94 20	15.9	80 42.6	96 16	12.9	80 13.7	96 15	12.0	4
05	84 33.6	81 36	32.3	84 09.0	84 34	29.4	83 17.5	88 29	24.7	82 50.9	89 27	22.7	82 24.0	91 25	21.0	81 56.6	92 23	19.5	80 33.0	94 19	15.9	80 04.7	95 18	14.9	05
6	84 11.7	75 40	36.9	83 48.8	78 38	33.8	83 00.2	83 33	28.7	82 34.9	85 30	26.5	82 09.0	87 28	24.6	81 42.6	88 27	22.9	80 21.5	92 22	18.8	79 53.9	92 21	17.6	6
7	83 47.5	66 44	40.9	83 26.2	78 41	37.7	82 40.6	79 36	32.3	82 16.6	81 34	30.0	81 51.9	83 32	28.0	81 26.6	85 30	26.1	80 08.2	89 25	21.5	79 41.4	90 24	20.2	7
8	83 21.4	63 46	44.3	83 01.7	66 44	41.1	82 19.0	74 39	35.6	81 56.3	77 37	33.2	81 32.9	79 35	31.0	81 08.8	81 33	29.1	79 53.3	86 28	24.1	79 27.3	87 26	22.7	8
9	82 53.7	58 48	47.3	82 35.6	63 46	44.1	81 55.8	70 41	38.5	81 34.4	73 39	36.1	81 12.2	75 37	33.9	80 49.2	78 35	31.8	79 36.8	83 30	26.5	79 11.7	84 28	25.1	9
10	82 24.8	53 50	49.8	82 08.1	58 48	46.7	81 31.0	65 43	41.2	81 11.0	69 41	38.7	80 50.0	71 39	36.4	80 28.2	74 37	34.3	79 18.8	80 32	28.8	78 54.6	81 30	27.3	10
1	81 54.9	49 51	52.0	81 39.5	53 49	49.0	81 05.1	61 45	43.5	80 46.2	64 43	41.0	80 26.4	67 41	38.7	80 05.8	70 39	36.6	78 59.6	77 34	31.0	78 36.4	78 32	29.4	1
2	81 24.1	45 52	53.9	81 10.0	49 50	50.9	80 38.0	57 47	45.6	80 20.4	60 45	43.1	80 01.7	64 43	40.8	79 42.2	66 41	38.7	78 39.2	73 36	33.0	78 16.9	75 34	31.3	2
3	80 52.6	41 53	55.5	80 39.7	45 52	52.7	80 10.0	53 48	47.4	79 53.5	57 46	45.0	79 36.0	60 44	42.7	79 17.6	63 43	40.6	78 17.7	70 38	34.8	77 56.3	72 36	33.1	3
4	80 20.6	38 54	56.9	80 08.7	42 53	54.2	79 41.2	50 49	49.1	79 25.8	53 47	46.7	79 09.4	56 46	44.5	78 52.1	59 44	42.3	77 55.2	67 39	36.5	77 34.8	69 37	34.8	4
15	79 48.1	34 55	58.1	79 37.2	38 53	55.5	79 11.8	46 50	50.5	78 57.4	50 48	48.2	78 42.0	53 47	46.0	78 25.7	56 45	43.9	77 31.8	64 40	38.1	77 12.3	66 39	36.4	15
6	79 15.1	31 55	59.1	79 05.2	35 54	56.6	78 41.7	43 51	51.8	78 28.3	46 49	49.6	78 14.0	50 48	47.4	77 58.6	53 46	45.3	77 07.6	61 42	39.6	76 49.0	63 40	37.8	6
7	78 41.9	28 56	60.0	78 32.8	32 55	57.6	78 11.1	40 52	53.0	77 58.7	43 50	50.8	77 45.3	46 49	48.7	77 30.9	49 47	46.6	76 42.6	58 43	40.9	76 25.0	60 41	39.2	7
8	78 08.3	26 56	60.8	78 00.0	30 55	58.5	77 40.1	37 52	54.0	77 28.6	40 51	51.9	77 16.1	43 49	49.8	77 02.6	46 48	47.8	76 17.1	55 44	42.2	76 00.3	57 42	40.4	8
9	77 34.5	23 57	61.5	77 27.0	27 55	59.3	77 08.7	34 53	54.9	76 58.1	37 52	52.8	76 46.4	40 50	50.8	76 33.8	43 49	48.8	75 50.9	52 45	43.3	75 35.0	54 43	41.6	9
20	77 00.6	21 57	62.1	76 53.8	24 56	59.9	76 37.0	31 53	55.7	76 27.2	35 52	53.7	76 16.3	38 51	51.7	76 04.6	41 49	49.8	75 24.2	49 45	44.3	75 09.1	51 44	42.6	20
1	76 26.4	19 57	62.6	76 20.3	22 56	60.5	76 05.0	29 54	56.4	75 55.9	32 53	54.5	75 45.9	35 51	52.5	75 34.9	38 50	50.7	74 57.0	46 46	45.3	74 42.8	49 45	43.6	1
2	75 52.1	17 57	63.0	75 46.6	20 56	61.0	75 32.8	26 54	57.1	75 24.4	29 53	55.1	75 15.1	32 52	53.3	75 04.9	35 50	51.4	74 29.4	43 47	46.2	74 15.9	46 45	44.5	2
3	75 17.7	15 56	63.4	75 12.8	18 57	61.4	75 00.3	24 54	57.6	74 52.6	27 53	55.8	74 44.1	30 52	53.9	74 34.6	33 51	52.1	74 01.4	41 47	47.0	73 48.7	43 46	45.3	3
4	74 43.2	13 56	63.7	74 38.9	16 57	61.8	74 27.6	22 55	58.1	74 20.6	25 54	56.3	74 12.8	28 53	54.5	74 04.1	30 51	52.8	73 33.0	38 48	47.7	73 21.1	41 47	46.1	4
25	74 08.6	11 56	63.9	74 04.9	14 57	62.1	73 54.8	20 55	58.5	73 48.5	23 54	56.8	73 41.3	25 53	55.0	73 33.2	28 52	53.3	73 04.3	36 48	48.4	72 53.1	38 47	46.8	25
6	73 33.9	09 56	64.1	73 30.7	12 57	62.4	73 21.9	18 55	58.9	73 16.1	20 54	57.2	73 09.6	23 53	55.5	73 02.2	26 52	53.8	72 35.3	34 49	49.0	72 24.9	36 48	47.4	6
7	72 59.2	07 56	64.3	72 56.5	10 57	62.6	72 48.8	16 55	59.2	72 43.6	18 54	57.6	72 37.7	21 53	55.9	72 31.0	24 52	54.3	72 06.1	31 49	49.5	71 56.3	34 48	48.0	7
8	72 24.4	06 56	64.4	72 22.3	08 57	62.8	72 15.6	14 55	59.5	72 11.0	16 55	57.9	72 05.7	19 54	56.3	71 59.6	22 53	54.7	71 36.7	29 49	50.0	71 27.6	32 48	48.5	8
9	71 49.6	04 56	64.5	71 48.0	07 57	62.9	71 42.3	12 56	59.7	71 38.3	15 55	58.2	71 33.6	17 54	56.6	71 28.0	20 53	55.0	71 07.0	27 50	50.5	70 58.6	29 49	49.0	9
30	71 14.8	03 56	64.6	71 13.6	05 57	63.0	71 09.0	10 56	59.9	71 05.5	13 55	58.4	71 01.3	15 54	56.9	70 56.4	18 53	55.4	70 37.2	25 50	50.9	70 29.3	27 49	49.4	30
1	70 39.9	01 56	64.6	70 39.2	04 57	63.1	70 35.6	09 56	60.1	70 32.6	11 55	58.6	70 29.0	13 54	57.1	70 24.6	16 53	55.6	70 07.2	23 50	51.3	70 00.0	25 49	49.8	1
2	70 05.1	00 56	64.6	70 04.8	02 57	63.1	70 02.1	07 56	60.2	69 59.7	09 55	58.8	69 56.6	12 54	57.3	69 52.7	14 53	55.9	69 37.0	21 50	51.6	69 30.4	23 50	50.2	2
3	69 30.3	02 56	64.6	69 30.4	01 57	63.2	69 28.6	05 56	60.3	69 26.7	08 55	58.9	69 24.1	10 54	57.5	69 20.8	12 53	56.1	69 06.7	19 51	51.9	69 00.7	21 50	50.5	3
4	68 55.4	03 56	64.6	68 56.0	01 57	63.2	68 55.1	04 56	60.4	68 53.7	06 55	59.0	68 51.5	08 54	57.6	68 48.7	10 53	56.2	68 36.3	17 51	52.1	68 30.9	19 50	50.8	4
35	68 20.6	04 56	64.5	68 21.6	02 57	63.1	68 21.6	02 56	60.4	68 20.6	04 55	59.1	68 18.9	07 54	57.7	68 16.6	09 54	56.4	68 05.8	15 51	52.4	68 00.9	17 50	51.0	35
6	67 45.8	06 56	64.4	67 47.2	04 57	63.1	67 48.0	01 56	60.4	67 47.5	03 55	59.1	67 46.3	05 54	57.8	67 44.5	07 54	56.5	67 35.2	13 51	52.6	67 30.9	15 50	51.3	6
7	67 11.0	07 56	64.3	67 12.8	05 57	63.0	67 14.5	01 56	60.4	67 14.4	01 55	59.2	67 13.7	03 54	57.9	67 12.3	06 54	56.6	67 04.6	12 51	52.7	67 00.8	14 50	51.5	7
8	66 36.3	08 56	64.2	66 38.4	06 57	63.0	66 40.9	02 56	60.4	66 41.3	00 55	59.2	66 41.0	02 54	57.9	66 40.1	04 54	56.6	66 33.9	10 51	52.9	66 30.6	12 50	51.6	8
9	66 01.6	09 56	64.1	66 04.1	07 57	62.9	66 07.4	04 56	60.4	66 08.2	02 55	59.2	66 08.3	00 54	57.9	66 07.9	02 54	56.7	66 03.1	08 51	53.0	66 00.3	10 51	51.8	9
40	65 26.9	11 56	63.9	65 29.8	09 57	62.7	65 33.9	05 56	60.3	65 35.0	03 55	59.1	65 35.6	01 54	57.9	65 35.7	01 54	56.7	65 32.3	07 51	53.1	65 30.0	09 51	51.9	40
1	64 52.3	12 56	63.8	64 55.5	10 57	62.6	65 00.4	06 56	60.3	65 02.0	04 55	59.1	65 03.0	02 54	57.9	65 03.4	01 54	56.7	65 01.4	05 51	53.2	64 59.6	07 51	52.0	1
2	64 17.7	13 56	63.6	64 21.3	11 57	62.5	64 26.9	08 56	60.2	64 28.9	06 55	59.0	64 30.3	04 54	57.9	64 31.2	02 54	56.7	64 30.5	03 52	53.2	64 29.2	05 51	52.0	2
3	63 43.2	14 57	63.4	63 47.1	12 57	62.3	63 53.5	09 56	60.1	63 55.8	07 55	58.9	63 57.7	05 54	57.8	63 59.0	03 54	56.7	63 59.7	02 52	53.2	63 58.8	04 51	52.1	3
4	63 08.7	15 57	63.3	63 13.0	13 57	62.2	63 20.1	10 56	59.9	63 22.8	08 55	58.8	63 25.0	07 54	57.7	63 26.8	05 54	56.6	63 28.8	00 52	53.2	63 28.4	02 51	52.1	4
45	62 34.3	16 57	63.1	62 38.9	15 57	62.0	62 46.7	11 56	59.8	62 49.8	10 55	58.7	62 52.5	08 54	57.6	62 54.6	06 54	56.5	62 57.9	01 52	53.2	62 57.9	01 51	52.1	45
6	62 00.0	17 57	62.8	62 04.9	16 57	61.8	62 13.4	12 55	59.7	62 16.9	11 55	58.6	62 19.9	09 54	57.5	62 22.4	08 54	56.5	62 27.0	03 51	53.2	62 27.5	01 51	52.1	6
7	61 25.7	18 57	62.6	61 31.0	17 56	61.6	61 40.1	14 55	59.5	61 44.0	12 55	58.5	61 47.4	10 54	57.4	61 50.3	09 54	56.4	61 56.1	04 51	53.2	61 57.0	02 51	52.1	7
8	60 51.5	19 57	62.4	60 57.1	18 56	61.4	61 06.9	15 55	59.3	61 11.1	13 55	58.3	61 14.9	12 54	57.3	61 18.2	10 53	56.3	61 25.2	06 51	53.1	61 26.6	04 51	52.1	8
9	60 17.3	20 57	62.2	60 23.3	19 56	61.2	60 33.8	16 55	59.2	60 38.3	15 55	58.2	60 42.5	13 54	57.2	60 46.1	11 53	56.1	60 54.4	07 51	53.1	60 56.2	05 51	52.0	9
50	59 43.3	22 57	61.9	59 49.5	20 56	60.9	60 00.7	17 55	59.0	60 05.6	16 54	58.0	60 10.1	14 54	57.0	60 14.1	13 53	56.0	60 23.5	08 51	53.0	60 25.8	07 51	52.0	50
1	59 09.3	23 57	61.7	59 15.8	21 56	60.7	59 27.7	18 55	58.8	59 32.9	17 54	57.8	59 37.8	15 54	56.8	59 42.2	14 53	55.9	59 52.8	10 51	52.9	59 55.4	08 51	51.9	1
2	58 35.4	24 56	61.4	58 42.2	22 56	60.5	58 54.7	19 55	58.6	59 00.3	18 54	57.6	59 05.5	17 54	56.7	59 10.3	15 53	55.7	59 22.0	11 51	52.8	59 25.1	09 50	51.8	2
3	58 01.6	25 56	61.1	58 08.7	23 56	60.2	58 21.8	21 55	58.4	58 27.8	19 54	57.4	58 33.3	18 54	56.5	58 38.5	16 53	55.5	58 51.3	12 51	52.7	58 54.8	11 50	51.7	3
4	57 27.8	26 56	60.9	57 35.3	24 56	60.0	57 49.0	22 55	58.1	57 55.3	20 54	57.2	58 01.2	19 53	56.3	58 06.7	18 53	55.4	58 20.7	13 51	52.6	58 24.5	12 50	51.6	4
55	56 54.2	26 56	60.6	57 01.9	26 55	59.7	57 16.3	23 54	57.9	57 22.9	21 54	57.0	57 29.2	20 53	56.1	57 35.0	19 53	55.2	57 50.1	15 51	52.4	57 54.3	13 50	51.5	55
6	56 20.6	27 56	60.3	56 28.7	26 55	59.4	56 43.7	24 54	57.7	56 50.6	23 54	56.8	56 57.2	21 53	55.9	57 03.4	20 53	55.0	57 19.6	16 51	52.3	57 24.2	15 50	51.4	6
7	55 47.2	28 56	60.0	55 55.5	27 55	59.2	56 11.1	25 54	57.4	56 18.4	24 54	56.6	56 25.3	22 53	55.7	56 31.8	21 52	54.8	56 49.1	17 51	52.1	56 54.1	16 50	51.2	7
8	55 13.8	29 55	59.7	55 22.5	28 55	58.9	55 38.7	26 54	57.2	55 46.3	25 53	56.3	55 53.5	23 53	55.5	56 00.3	22 52	54.6	56 18.7	18 51	51.9	56 24.0	17 50	51.1	8
9	54 40.6	30 55	59.4	54 49.5	29 55	58.6	55 06.3	27 54	56.9	55 14.2	26 53	56.1	55 21.8	25 53	55.2	55 29.0	23 52	54.4	55 48.3	20 50	51.8	55 54.1	18 50	50.9	9
60	54 07.4	31 55	59.1	54 16.6	30 55	58.3	54 34.1	28 54	56.6	54 42.3	27 53	55.8	54 50.1	26 53	55.0	54 57.7	24 52	54.1	55 18.1	21 50	51.6	55 24.2	20 50	50.7	60
1	53 34.4	32 55	58.8	53 43.9	31 54	58.0	54 01.9	29 53	56.4	54 10.4	28 53	55.6	54 18.6	27 52	54.7	54 26.4	26 52	53.9	54 47.9	22 50	51.4	54 54.4	21 50	50.5	1
2	53 01.4	33 55	58.5	53 11.2	32 54	57.7	53 29.8	30 53	56.1	53 38.7	29 53	55.3	53 47.2	28 52	54.5	53 55.3	27 52	53.7	54 17.8	23 50	51.2	54 24.6	22 49	50.4	2
3	52 28.6	34 54	58.2	52 38.7	33 54	57.4	52 57.9	31 53	55.8	53 07.0	30 53	55.0	53 15.8	29 52	54.2	53 24.3	28 52	53.4	53 47.8	24 50	51.0	53 55.0	23 49	50.2	3
4	51 55.9	35 54	57.8	52 06.3	34 54	57.1	52 26.0	32 53	55.6	52 35.5	31 52	54.7	52 44.6	30 52	54.0	52 53.4	29 51	53.2	53 17.9	26 50	50.8	53 25.4	25 49	50.0	4
65	51 23.3	36 54	57.5	51 33.9	35 54	56.7	51 54.3	33 53	55.2	52 04.0	32 52	54.5	52 13.4	31 52	53.7	52 22.6	30 51	52.9	52 48.1	27 50	50.5	52 55.9	26 49	49.7	65
6	50 50.9	37 54	57.2	51 01.7	36 53	56.4	51 22.7	34 52	54.9	51 32.7	33 52	54.2	51 42.4	32 52	53.4	51 51.9	31 51	52.6	52 18.3	28 49	50.3	52 26.5	27 49	49.5	6
7	50 18.5	38 54	56.8	50 29.7	37 53	56.1	50 51.2	35 52	54.6	51 01.5	34 52	53.9	51 11.5	33 51	53.1	51 21.3	32 51	52.4	51 48.7	29 49	50.1	51 57.3	28 49	49.3	7
8	49 46.3	39 53	56.5	49 57.7	38 53	55.8	50 19.8	36 52	54.3	50 30.4	35 52	53.6	50 40.7	34 51	52.8	50 50.8	33 51	52.1	51 19.2	30 49	49.8	51 28.1	29 48	49.1	8
9	49 14.2	39 53	56.1	49 25.9	39 53	55.4	49 48.5	37 52	54.0	49 59.4	36 51	53.3	50 10.0	35 51	52.5	50 20.4	34 50	51.8	50 49.8	31 49	49.6	50 59.0	30 48	48.8	9
70	48 42.3	40 53	55.8	48 54.2	39 53	55.1	49 17.4	38 52	53.7	49 28.6	37 51	53.0	49 39.5	36 51	52.2	49 50.1	35 50	51.5	50 20.5	32 49	49.3	50 30.0	31 48	48.6	70
1	48 10.4	41 53	55.4	48 22.7	40 52	54.7	48 46.4	39 51	53.3	48 57.8	38 51	52.6	49 09.1	37 50	51.9	49 20.0	36 50	51.2	49 51.3	33 48	49.1	50 01.2	32 48	48.3	1
2	47 38.8	42 53	55.1	47 51.2	41 52	54.4	48 15.5	40 51	53.0	48 27.3	39 51	52.3	48 38.8	38 50	51.6	48 50.0	37 50	50.9	49 22.2	34 48	48.8	49 32.4	34 48	48.1	2
3	47 07.2	43 52	54.7	47 20.0	42 52	54.0	47 44.8	41 51	52.7	47 56.8	40 51	52.0	48 08.6	39 50	51.3	48 20.1	38 50	50.6	48 53.3	36 48	48.5	49 03.8	35 48	47.8	3
4	46 35.8	44 52	54.3	46 48.8	43 52	53.7	47 14.2	41 51	52.3	47 26.5	41 50	51.7	47 38.6	40 50	51.0	47 50.4	39 49	50.3	48 24.4	37 48	48.2	48 35.3	36 47	47.5	4
75	46 04.5	45 52	54.0	46 17.8	44 51	53.3	46 43.7	42 51	52.0	46 56.3	42 50	51.3	47 08.7	41 50	50.7	47 20.8	40 49	50.0	47 55.7	38 48	47.9	48 06.9	37 47	47.2	75
6	45 33.4	46 52	53.6	45 47.0	45 51	52.9	46 13.4	43 50	51.6	46 26.2	43 50	51.0	46 38.9	42 49	50.3	46 51.3	41 49	49.7	47 27.2	39 47	47.6	47 38.6	38 47	47.0	6
7	45 02.5	46 51	53.2	45 16.3	46 51	52.6	45 43.2	44 50	51.3	45 56.3	43 50	50.7	46 09.3	43 49	50.0	46 22.0	42 49	49.3	46 58.7	40 47	47.4	47 10.5	39 47	46.7	7
8	44 31.7	47 51	52.8	44 45.7	46 51	52.2	45 13.2	45 50	50.9	45 26.6	44 49	50.3	45 39.8	44 49	49.7	45 52.8	43 48	49.0	46 30.4	41 47	47.1	46 42.5	40 46	46.4	8
9	44 01.0	48 51	52.4	44 15.3	47 50	51.8	44 43.3	46 50	50.6	44 57.0	45 49	50.0	45 10.5	45 49	49.3	45 23.8	44 48	48.7	46 02.3	42 47	46.7	46 14.7	41 46	46.1	9
80	43 30.5	49 51	52.0	43 45.1	48 50	51.4	44 13.6	47 49	50.2	44 27.5	46 49	49.6	44 41.3	46 48	49.0	44 54.9	45 48	48.3	45 34.2	43 46	46.4	45 46.9	42 46	45.8	80
1	43 00.2	50 50	51.7	43 15.0	49 50	51.1	43 44.0	48 49	49.9	43 58.3	47 49	49.2	44 12.3	46 48	48.6	44 26.1	46 48	48.0	45 06.4	44 46	46.1	45 19.4	43 46	45.5	1
2	42 30.0	50 50	51.3	42 45.1	50 50	50.7	43 14.6	49 49	49.5	43 29.1	48 48	48.9	43 43.4	47 48	48.3	43 57.5	47 47	47.7	44 38.7	45 46	45.8	44 52.0	44 45	45.2	2
3	42 00.0	51 50	50.9	42 15.3	51 49	50.3	42 45.4	49 48	49.1	43 00.1	49 48	48.5	43 14.7	48 48	47.9	43 29.1	48 47	47.3	44 11.1	46 46	45.5	44 24.7	45 45	44.8	3
4	41 30.2	52 49	50.5	41 45.8	52 49	49.9	42 16.3	50 48	48.7	42 31.3	50 48	48.1	42 46.2	49 47	47.5	43 00.8	49 47	47.0	43 43.7	47 45	45.1	43 57.6	46 45	44.5	4
85	41 00.6	53 49	50.1	41 16.3	52 49	49.5	41 47.4	51 48	48.3	42 02.7	51 47	47.8	42 17.8	50 47	47.2	42 32.7	49 47	46.6	43 16.4	48 45	44.8	43 30.6	47 45	44.2	85
6	40 31.1	54 49	49.6	40 47.1	53 48	49.1	41 18.7	52 48	48.0	41 34.2	52 47	47.4	41 49.6	51 47	46.8	42 04.8	50 46	46.2	42 49.3	49 45	44.5	43 03.8	48 44	43.9	6
7	40 01.8	55 49	49.2	40 18.1	54 48	48.7	40 50.1	53 47	47.6	41 05.9	52 47	47.0	41 21.6	52 46	46.4	41 37.0	51 46	45.9	42 22.4	50 45	44.1	42 37.1	49 44	43.5	7
8	39 32.7	55 48	48.8	39 49.2	55 48	48.3	40 21.8	54 47	47.2	40 37.8	53 47	46.6	40 53.7	53 46	46.1	41 09.4	52 46	45.5	41 55.6	50 44	43.8	42 10.7	50 44	43.2	8
9	39 03.7	56 48	48.4	39 20.5	56 48	47.9	39 53.6	55 47	46.8	40 09.9	54 46	46.2	40 26.0	54 46	45.7	40 42.0	53 45	45.1	41 29.0	51 44	43.4	41 44.3	51 44	42.8	9
90	38 35.0	57 48	48.0	38 52.0	56 47	47.4	39 25.6	55 46	46.4	39 42.1	55 46	45.8	39 58.5	54 46	45.3	40 14.8	54 45	44.7	41 02.6	52 44	43.1	41 18.2	52 43	42.5	90

Digitized by Google

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	
91	38 06.4	58 47	47.6	38 23.7	57 47	47.0	38 57.7	56 46	46.0	39 14.5	56 46	45.4	39 31.2	55 45	44.9	39 47.7	55 45	44.4	40 36.3	53 43	42.7	40 52.2	53 43	42.2	91
2	37 38.1	58 47	47.1	37 55.5	58 47	46.6	38 30.1	57 46	45.6	38 47.2	57 45	45.0	39 04.1	56 45	44.5	39 20.8	56 44	44.0	40 10.3	54 43	42.3	40 26.4	54 43	41.8	2
3	37 09.9	59 47	46.7	37 27.6	59 46	46.2	38 02.6	58 45	45.2	38 20.0	57 45	44.6	38 37.1	57 45	44.1	38 54.2	57 44	43.6	39 44.4	55 43	42.0	40 00.8	55 42	41.4	3
4	36 41.9	60 46	46.3	36 59.9	60 46	45.8	37 35.4	59 45	44.7	37 53.0	58 45	44.2	38 10.4	58 44	43.7	38 27.7	57 44	43.2	39 18.7	56 43	41.6	39 35.4	55 42	41.1	4
95	36 14.2	61 46	45.8	36 32.4	60 46	45.3	37 08.3	60 45	44.3	37 26.2	59 44	43.8	37 43.8	59 44	43.3	38 01.4	58 44	42.8	38 53.2	57 42	41.2	39 10.2	56 42	40.7	95
6	35 46.6	62 46	45.4	36 05.0	61 45	44.9	36 41.5	60 44	43.9	36 59.5	60 44	43.4	37 17.5	60 44	42.9	37 35.3	59 43	42.4	38 27.8	58 42	40.9	38 45.1	57 41	40.3	6
7	35 19.3	62 45	44.9	35 37.9	62 45	44.5	36 14.9	61 44	43.5	36 33.1	61 44	43.0	36 51.3	60 43	42.5	37 09.4	60 43	42.0	38 02.7	59 42	40.5	38 20.2	58 41	40.0	7
8	34 52.1	63 45	44.5	35 11.0	63 44	44.0	35 48.4	62 44	43.1	36 06.9	62 43	42.6	36 25.4	61 43	42.1	36 43.6	61 42	41.6	37 37.8	60 41	40.1	37 55.6	59 41	39.6	8
9	34 25.2	64 44	44.1	34 44.3	63 44	43.6	35 22.2	63 43	42.6	35 41.0	62 43	42.2	35 59.6	62 43	41.7	36 18.1	62 42	41.2	37 13.0	60 41	39.7	37 31.1	60 40	39.2	9
100	33 58.5	65 44	43.6	34 17.8	64 44	43.1	34 56.2	64 43	42.2	35 15.2	63 43	41.7	35 34.1	63 42	41.3	35 52.9	62 42	40.8	36 48.5	61 41	39.3	37 06.8	61 40	38.8	100
1	33 32.0	65 44	43.1	33 51.6	65 43	42.7	34 30.4	64 43	41.8	34 49.6	64 42	41.3	35 08.7	64 42	40.8	35 27.8	63 41	40.4	36 24.2	62 40	38.9	36 42.7	62 40	38.4	1
2	33 05.8	66 43	42.7	33 25.5	66 43	42.2	34 04.8	65 42	41.3	34 24.3	65 42	40.9	34 43.6	64 41	40.4	35 02.9	64 41	39.9	36 00.0	63 40	38.5	36 18.9	63 39	38.0	2
3	32 39.7	67 43	42.2	32 59.7	67 43	41.8	33 39.4	66 42	40.9	33 59.1	66 42	40.4	34 18.8	65 41	40.0	34 38.3	65 41	39.5	35 36.1	64 39	38.1	35 55.2	63 39	37.6	3
4	32 13.9	68 43	41.8	32 34.1	67 42	41.3	33 14.3	67 42	40.4	33 34.2	66 41	40.0	33 54.1	66 41	39.5	34 13.8	66 40	39.1	35 12.4	65 39	37.7	35 31.8	64 39	37.2	4
105	31 48.3	68 42	41.3	32 08.8	68 42	40.9	32 49.4	67 41	40.0	33 09.6	67 41	39.6	33 29.6	67 40	39.1	33 49.6	66 40	38.7	34 49.0	65 39	37.3	35 08.5	65 38	36.8	105
6	31 23.0	69 42	40.8	31 43.7	69 41	40.4	32 24.7	68 41	39.5	32 45.1	68 40	39.1	33 05.4	68 40	38.7	33 25.6	67 40	38.2	34 25.7	66 38	36.9	34 45.5	66 38	36.4	6
7	30 57.9	70 41	40.4	31 18.8	69 41	39.9	32 00.3	69 40	39.1	32 20.9	69 40	38.7	32 41.4	68 40	38.2	33 01.9	68 39	37.8	34 02.7	67 38	36.5	34 22.7	67 38	36.0	7
8	30 33.0	70 41	39.9	30 54.1	70 41	39.5	31 36.1	70 40	38.6	31 56.9	69 40	38.2	32 17.7	69 39	37.8	32 38.4	69 39	37.4	33 39.9	68 38	36.1	34 00.2	68 37	35.6	8
9	30 08.4	71 41	39.4	30 29.7	71 40	39.0	31 12.1	70 40	38.2	31 33.2	70 39	37.8	31 54.2	70 39	37.3	32 15.1	70 38	36.9	33 17.3	69 37	35.6	33 37.8	68 37	35.2	9
110	29 44.1	72 40	38.9	30 05.6	72 40	38.5	30 48.4	71 39	37.7	31 09.7	71 39	37.3	31 30.9	71 38	36.9	31 52.0	70 38	36.5	32 54.9	69 37	35.2	33 15.7	69 36	34.8	110
1	29 20.0	73 40	38.5	29 41.7	72 39	38.1	30 24.9	72 39	37.3	30 46.4	72 38	36.8	31 07.9	71 38	36.4	31 29.2	71 38	36.0	32 32.8	70 36	34.8	32 53.8	70 36	34.4	1
2	28 56.1	73 39	38.0	29 18.0	73 39	37.6	30 01.7	73 38	36.8	30 23.4	72 38	36.4	30 45.1	72 38	36.0	31 06.7	72 37	35.6	32 10.9	71 36	34.3	32 32.2	71 36	33.9	2
3	28 32.5	74 39	37.5	28 54.7	74 39	37.1	29 38.7	73 38	36.3	30 00.7	73 38	35.9	30 22.5	73 37	35.5	30 44.3	73 37	35.1	31 49.3	72 36	33.9	32 10.8	72 35	33.5	3
4	28 09.2	75 38	37.0	28 31.5	74 38	36.6	29 16.0	74 37	35.8	29 38.2	74 37	35.5	30 00.3	73 37	35.1	30 22.3	73 36	34.7	31 27.9	73 35	33.5	31 49.6	72 35	33.1	4
115	27 46.1	75 38	36.5	28 08.7	75 38	36.1	28 53.6	75 37	35.4	29 15.9	74 37	35.0	29 38.2	74 36	34.6	30 00.5	74 36	34.2	31 06.7	73 35	33.0	31 28.7	73 34	32.6	115
6	27 23.3	76 38	36.0	27 46.1	76 37	35.6	28 31.4	75 37	34.9	28 53.9	75 36	34.5	29 16.5	75 36	34.1	29 38.9	75 36	33.8	30 45.8	74 34	32.6	31 08.0	74 34	32.2	6
7	27 00.8	77 37	35.5	27 23.7	76 37	35.1	28 09.4	76 36	34.4	28 32.2	76 36	34.0	28 54.9	76 35	33.7	29 17.6	75 35	33.3	30 25.2	75 34	32.2	30 47.6	75 34	31.8	7
8	26 38.5	77 37	35.0	27 01.7	77 36	34.6	27 47.8	77 36	33.9	28 10.8	77 35	33.6	28 33.7	76 35	33.2	28 56.6	76 35	32.8	30 04.8	75 34	31.7	30 27.4	75 33	31.3	8
9	26 16.5	78 36	34.5	26 39.9	78 36	34.2	27 26.4	77 35	33.4	27 49.6	77 35	33.1	28 12.7	77 35	32.7	28 35.8	77 34	32.4	29 44.6	76 33	31.3	30 07.5	76 33	30.9	9
120	25 54.8	79 36	34.0	26 18.4	78 35	33.6	27 05.3	78 35	33.0	27 28.7	78 34	32.6	27 52.0	78 34	32.2	28 15.3	77 34	31.9	29 24.8	77 33	30.8	29 47.8	77 32	30.4	120
1	25 33.4	79 35	33.5	25 57.1	79 35	33.1	26 44.4	79 34	32.5	27 08.0	79 34	32.1	27 31.6	78 34	31.8	27 55.0	78 33	31.4	29 05.2	78 32	30.3	29 28.4	77 32	30.0	1
2	25 12.3	80 35	33.0	25 36.2	80 34	32.6	26 23.9	79 34	32.0	26 47.7	79 33	31.6	27 11.4	79 33	31.3	27 35.1	79 33	30.9	28 45.8	78 32	29.9	29 09.3	78 31	29.5	2
3	24 51.4	80 34	32.5	25 15.5	80 34	32.1	26 03.6	80 33	31.5	26 27.6	80 33	31.1	26 51.5	80 33	30.8	27 15.4	80 32	30.5	28 26.7	79 31	29.4	28 50.4	79 31	29.1	3
4	24 30.9	81 34	31.9	24 55.2	81 33	31.6	25 43.6	81 33	31.0	26 07.8	80 33	30.6	26 31.9	80 32	30.3	26 56.0	80 32	30.0	28 07.9	80 31	29.0	28 31.8	80 31	28.6	4
125	24 10.6	82 33	31.4	24 35.1	82 33	31.1	25 23.9	81 32	30.5	25 48.3	81 32	30.1	26 12.6	81 32	29.8	26 36.8	81 31	29.5	27 49.4	80 30	28.5	28 13.5	80 30	28.2	125
6	23 50.6	82 33	30.9	24 15.3	82 32	30.6	25 04.5	82 32	30.0	25 29.0	82 32	29.6	25 53.5	82 31	29.3	26 18.0	81 31	29.0	27 31.1	81 30	28.0	27 55.4	81 30	27.7	6
7	23 31.0	83 32	30.4	23 55.8	83 32	30.1	24 45.4	82 31	29.5	25 10.1	82 31	29.1	25 34.8	82 31	28.8	25 59.4	82 30	28.5	27 13.1	82 30	27.6	27 37.6	82 29	27.2	7
8	23 11.6	83 32	29.9	23 36.6	83 31	29.6	24 26.6	83 31	28.9	24 51.5	83 31	28.6	25 16.3	83 30	28.3	25 41.2	83 30	28.0	26 55.4	82 29	27.1	27 20.1	82 29	26.8	8
9	22 52.6	84 31	29.3	23 17.8	84 31	29.0	24 08.1	84 30	28.4	24 33.1	84 30	28.1	24 58.2	83 30	27.8	25 23.2	83 29	27.5	26 38.0	83 29	26.6	27 02.9	83 28	26.3	9
130	22 33.8	85 31	28.8	22 59.2	84 30	28.5	23 49.8	84 30	27.9	24 15.1	84 30	27.6	24 40.3	84 29	27.3	25 05.5	84 29	27.0	26 20.9	84 28	26.1	26 45.9	83 28	25.8	130
1	22 15.4	85 30	28.3	22 41.0	85 30	28.0	23 31.9	85 29	27.4	23 57.4	85 29	27.1	24 22.8	85 29	26.8	24 48.2	85 28	26.5	26 04.1	84 28	25.6	26 29.3	84 27	25.3	1
2	21 57.3	86 30	27.7	22 23.0	86 29	27.5	23 14.3	85 29	26.9	23 39.9	85 29	26.6	24 05.5	85 28	26.3	24 31.1	85 28	26.0	25 47.5	85 27	25.2	26 12.9	85 27	24.9	2
3	21 39.5	86 29	27.2	22 05.4	86 29	26.9	22 57.0	86 28	26.4	23 22.8	86 28	26.1	23 48.6	86 28	25.8	24 14.3	86 27	25.5	25 31.3	85 27	24.7	25 56.9	85 26	24.4	3
4	21 22.1	87 29	26.7	21 48.1	87 28	26.4	22 40.1	87 28	25.8	23 06.0	86 27	25.6	23 31.9	86 27	25.3	23 57.8	86 27	25.0	25 15.3	86 26	24.2	25 41.1	86 26	23.9	4
135	21 04.9	87 28	26.1	21 31.1	87 28	25.8	22 23.4	87 27	25.3	22 49.5	87 27	25.1	23 15.6	87 27	24.8	23 41.7	87 26	24.5	24 59.7	87 26	23.7	25 25.6	86 25	23.4	135
6	20 48.1	88 27	25.6	21 14.5	88 27	25.3	22 07.1	88 27	24.8	22 33.4	88 26	24.5	22 59.6	87 26	24.3	23 25.8	87 26	24.0	24 44.3	87 25	23.2	25 10.4	87 25	22.9	6
7	20 31.7	88 27	25.0	20 58.2	88 27	24.8	21 51.1	88 26	24.3	22 17.5	88 26	24.0	22 43.9	88 26	23.7	23 10.3	88 25	23.5	24 29.3	88 25	22.7	24 55.6	88 24	22.4	7
8	20 15.5	89 26	24.5	20 42.2	89 26	24.2	21 35.4	89 26	23.7	22 02.0	89 25	23.5	22 28.5	89 25	23.2	22 55.1	88 25	23.0	24 14.6	88 24	22.2	24 41.0	88 24	21.9	8
9	19 59.7	89 26	23.9	20 26.5	89 26	23.7	21 20.0	89 25	23.2	21 46.8	89 25	23.0	22 13.5	89 25	22.7	22 40.2	89 24	22.5	24 00.1	89 24	21.7	24 26.7	89 23	21.5	9
140	19 44.2	90 25	23.4	20 11.2	90 25	23.1	21 05.0	90 24	22.7	21 31.9	90 24	22.4	21 58.8	90 24	22.2	22 25.6	89 24	21.9	23 46.0	89 23	21.2	24 12.8	89 23	21.0	140
1	19 29.1	90 25	22.8	19 56.2	90 24	22.6	20 50.3	90 24	22.1	21 17.4	90 24	21.9	21 44.4	90 23	21.7	22 11.4	90 23	21.4	23 32.2	90 22	20.7	23 59.1	90 22	20.5	1
2	19 14.3	91 24	22.3	19 41.6	91 24	22.0	20 36.0	91 23	21.6	21 03.2	91 23	21.4	21 30.3	91 23	21.1	21 57.5	90 23	20.9	23 18.8	90 22	20.2	23 45.8	90 22	20.0	2
3	18 59.9	91 23	21.7	19 27.3	91 23	21.5	20 22.0	91 23	21.0	20 49.3	91 23	20.8	21 16.6	91 22	20.6	21 43.9	91 22	20.4	23 05.6	91 21	19.7	23 32.8	91 21	19.5	3
4	18 45.8	92 23	21.1	19 13.3	92 23	20.9	20 08.3	92 22	20.5	20 35.7	91 22	20.3	21 03.2	91 22	20.1	21 30.6	91 22	19.8	22 52.8	91 21	19.2	23 20.1	91 21	19.0	4
145	18 32.1	92 22	20.6	18 59.7	92 22	20.4	19 55.0	92 22	19.9	20 22.5	92 21	19.7	20 50.1	92 21	19.5	21 17.7	92 21	19.3	22 40.3	92 20	18.7	23 07.8	92 20	18.5	145
6	18 18.7	93 22	20.0	18 46.5	93 22	19.8	19 42.0	92 21	19.4	20 09.7	92 21	19.2	20 37.4	92 21	19.0	21 05.1	92 20	18.8	22 28.1	92 20	18.2	22 55.7	92 20	17.9	6
7	18 05.7	93 21	19.4	18 33.6	93 21	19.2	19 29.3	93 20	18.8	19 57.2	93 20	18.7	20 25.0	93 20	18.5	20 52.8	93 20	18.3	22 16.2	93 19	17.6	22 44.0	93 19	17.4	7
8	17 53.1	93 20	18.9	18 21.1	93 20	18.7	19 17.1	93 20	18.3	19 45.0	93 20	18.1	20 13.0	93 19	17.9	20 40.9	93 19	17.7	22 04.7	93 19	17.1	22 32.6	93 18	16.9	8
9	17 40.8	94 20	18.3	18 08.9	94 20	18.1	19 05.1	94 19	17.7	19 33.2	94 19	17.6	20 01.3	94 19	17.4	20 29.4	94 19	17.2	21 53.5	93 18	16.6	22 21.5	93 18	16.4	9
150	17 28.9	94 19	17.7	17 57.1	94 19	17.5	18 53.5	94 19	17.2	19 21.8	94 19	17.0	19 50.0	94 18	16.8	20 18.1	94 18	16.6	21 42.6	94 18	16.1	22 10.8	94 17	15.9	150
1	17 17.3	95 19	17.1	17 45.7	94 18	17.0	18 42.3	94 18	16.6	19 10.7	94 18	16.5	19 39.0	94 18	16.3	20 07.3	94 18	16.1	21 32.1	94 17	15.6	22 00.4	94 17	15.4	1
2	17 06.1	95 18	16.6	17 34.6	95 18	16.4	18 31.5	95 17	16.1	18 59.9	95 17	15.9	19 28.3	95 17	15.7	19 56.8	95 17	15.6	21 21.9	95 16	15.0	21 50.3	95 16	14.9	2
3	16 55.3	95 17	16.0	17 23.9	95 17	15.8	18 21.0	95 17	15.5	18 49.5	95 17	15.4	19 18.1	95 17	15.2	19 46.6	95 16	15.0	21 12.1	95 16	14.5	21 40.6	95 16	14.4	3
4	16 44.9	96 17	15.4	17 13.5	96 17	15.3	18 10.8	96 16	15.0	18 39.5	95 16	14.8	19 08.1	95 16	14.6	19 36.8	95 16	14.5	21 02.6	95 15	14.0	21 31.2	95 15	13.8	4
155	16 34.8	96 16	14.8	17 03.6	96 16	14.7	18 01.1	96 16	14.4	18 29.8	96 16	14.2	18 58.6	96 15	14.1	19 27.3	96 15	13.9	20 53.4	96 15	13.5	21 22.1	96 14	13.3	155
6	16 25.1	96 16	14.3	16 54.0	96 15	14.1	17 51.7	96 15	13.8	18 20.5	96 15	13.7	18 49.4	96 15	13.5	19 18.2	96 15	13.4	20 44.6	96 14	12.9	21 13.4	96 14	12.8	6
7	16 15.8	97 15	13.7	16 44.8	96 15	13.5	17 42.6	96 14	13.3	18 11.6	96 14	13.1	18 40.5	96 14	13.0	19 09.4	96 14	12.8	20 36.2	96 14	12.4	21 05.1	96 13	12.3	7
8	16 06.9	97 14	13.1	16 35.9	97 14	13.0	17 34.0	97 14	12.7	18 03.0	97 14	12.6	18 32.0	97 14	12.4	19 01.0	97 13	12.3	20 28.0	97 13	11.9	20 57.0	97 13	11.7	8
9	15 58.3	97 14	12.5	16 27.5	97 13	12.4	17 25.7	97 13	12.1	17 54.8	97 13	12.0	18 23.9	97 13	11.9	18 53.0	97 13	11.7	20 20.3	97 12	11.4	20 49.4	97 12	11.2	9
160	15 50.2	97 13	11.9	16 19.4	97 13	11.8	17 17.8	97 13	11.6	17 47.0	97 12	11.4	18 16.2	97 12	11.3	18 45.3	97 12	11.2	20 12.9	97 12	10.8	20 42.0	97 12	10.7	160
1	15 42.4	98 12	11.3	16 11.7	98 12	11.2	17 10.2	98 12	11.0	17 39.5	98 12	10.9	18 08.8	98 12	10.8	18 38.0	98 12	10.6	20 05.8	97 11	10.3	20 35.0	97 11	10.2	1
2	15 35.0	98 12	10.7	16 04.4	98 12	10.6	17 03.1	98 11	10.4	17 32.4	98 11	10.3	18 01.8	98 11	10.2	18 31.1	98 11	10.1	19 59.1	98 11	09.8	20 28.4	98 10	09.6	2
3	15 28.0	98 11	10.1	15 57.5	98 11	10.0	16 56.3	98 11	09.8	17 25.7	98 11	09.7	17 55.1	98 10	09.6	18 24.5	98 10	09.5	19 52.7	98 10	09.2	20 22.1	98 10	09.1	3
4	15 21.4	98 10	09.6	15 50.9	98 10	09.5	16 49.9	98 10	09.3	17 19.4	98 10	09.2	17 48.9	98 10	09.1	18 18.3	98 10	09.0	19 46.7	98 09	08.7	20 16.2	98 09	08.6	4
165	15 15.2	99 10	09.0	15 44.8	98 10	08.9	16 43.9	98 09	08.7	17 13.4	98 09	08.6	17 43.0	98 09	08.5	18 12.5	98 09	08.4	19 41.1	98 09	08.1	20 10.6	98 09	08.0	165
6	15 09.4	99 09	08.4	15 39.0	99 09	08.3	16 38.2	99 09	08.1	17 07.8	99 09	08.0	17 37.4	99 09	07.9	18 07.0	99 08	07.9	19 35.8	99 08	07.6	20 05.4	99 08	07.5	6
7	15 04.0	99 08	07.8	15 33.7	99 08	07.7	16 33.0	99 08	07.5	17 02.6	99 08	07.5	17 32.3	99 08	07.4	18 02.0	99 08	07.3	19 30.9	99 08	07.1	20 00.5	99 08	07.0	7
8	14 59.0	99 08	07.2	15 28.7	99 08	07.1	16 28.1	99 07	07.0	16 57.8	99 07	06.9	17 27.5	99 07	06.8	17 57.2	99 07	06.7	19 26.3	99 07	06.5	19 56.0	99 07	06.4	8
9	14 54.4	99 07	06.6	15 24.1	99 07	06.5	16 23.6	99 07	06.4	16 53.4	99 07	06.3	17 23.1	99 07	06.3	17 52.9	99 07	06.2	19 22.1	99 06	06.0	19 51.9	99 06	05.9	9
170	14 50.2	99 06	06.0	15 20.0	99 06	05.9	16 19.5	99 06	05.8	16 49.3	99 06	05.7	17 19.1	99 06	05.7	17 48.9	99 06	05.6	19 18.3	99 06	05.4	19 48.1	99 06	05.4	170
1	14 46.3	99 06	05.4	15 16.2	99 06	05.3	16 15.8	99 06	05.2	16 45.7	99 05	05.2	17 15.5	99 05	05.1	17 45.3	99 05	05.1	19 14.8	99 05	04.9	19 44.7	99 05	04.8	1
2	14 42.9	1.0 05	04.8	15 12.8	1.0 05	04.7	16 12.5	1.0 05	04.6	16 42.4	1.0 05	04.6	17 12.3	1.0 05	04.6	17 42.1	1.0 05	04.5	19 11.7	1.0 05	04.4	19 41.6	1.0 05	04.3	2
3	14 39.9	1.0 04	04.2	15 09.8	1.0 04	04.2	16 09.6	1.0 04	04.1	16 39.5	1.0 04	04.0	17 09.4	1.0 04	04.0	17 39.3	1.0 04	03.9	19 09.0	1.0 04	03.8	19 38.9	1.0 04	03.8	3
4	14 37.3	1.0 04	03.6	15 07.2	1.0 04	03.6	16 07.0	1.0 04	03.5	16 37.0	1.0 04	03.5	17 06.9	1.0 04	03.4	17 36.8	1.0 03	03.4	19 06.6	1.0 03	03.3	19 36.5	1.0 03	03.2	4
175	14 35.0	1.0 03	03.0	15 05.0	1.0 03	03.0	16 04.9	1.0 03	02.9	16 34.8	1.0 03	02.9	17 04.8	1.0 03	02.8	17 34.7	1.0 03	02.8	19 04.6	1.0 03	02.7	19 34.5	1.0 03	02.7	175
6	14 33.2	1.0 02	02.4	15 03.2	1.0 02	02.4	16 03.1	1.0 02	02.3	16 33.1	1.0 02	02.3	17 03.1	1.0 02	02.3	17 33.0	1.0 02	02.3	19 02.9	1.0 02	02.2	19 32.9	1.0 02	02.2	6
7	14 31.8	1.0 02	01.8	15 01.8	1.0 02	01.8	16 01.8	1.0 02	01.7	16 31.7	1.0 02	01.7	17 01.7	1.0 02	01.7	17 31.7	1.0 02	01.7	19 01.7	1.0 02	01.6	19 31.6	1.0 02	01.6	7
8	14 30.8	1.0 01	01.2	15 00.8	1.0 01	01.2	16 00.8	1.0 01	01.2	16 30.8	1.0 01	01.2	17 00.8	1.0 01	01.1	17 30.8	1.0 01	01.1	19 00.7	1.0 01	01.1	19 30.7	1.0 01	01.1	8
9	14 30.2	1.0 00	00.6	15 00.2	1.0 00	00.6	16 00.2	1.0 00	00.6	16 30.2	1.0 00	00.6	17 00.2	1.0 00	00.6	17 30.2	1.0 00	00.6	19 00.2	1.0 00	00.5	19 30.2	1.0 00	00.5	9
180	14 30.0	1.0 00	00.0	15 00.0	1.0 00	00.0	16 00.0	1.0 00	00.0	16 30.0	1.0 00	00.0	17 00.0	1.0 00	00.0	17 30.0	1.0 00	00.0	19 00.0	1.0 00	00.0	19 30.0	1.0 00	00.0	180

Lat. 50°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	80 00.0	1.0 02	00.0	79 30.0	1.0 02	00.0	78 00.0	1.0 01	00.0	77 30.0	1.0 01	00.0
1	79 59.0	1.0 05	02.9	79 29.1	1.0 05	02.7	77 59.2	1.0 04	02.3	77 29.3	1.0 04	02.1
2	79 56.1	99 08	05.7	79 26.4	99 08	05.4	77 57.0	99 06	04.5	77 27.1	99 06	04.3
3	79 51.3	98 11	08.5	79 21.9	98 10	08.0	77 53.2	99 09	06.7	77 23.6	99 08	06.4
4	79 44.7	97 14	11.3	79 15.6	97 13	10.6	77 47.9	98 11	08.9	77 18.6	98 11	08.4
05	79 36.2	95 17	14.0	79 07.7	95 16	13.2	77 41.2	96 13	11.1	77 12.3	97 13	10.5
6	79 26.1	93 20	16.6	78 58.1	94 19	15.6	77 33.2	95 16	13.2	77 04.6	95 15	12.5
7	79 14.3	91 22	19.0	78 47.0	92 21	18.0	77 23.7	93 18	15.2	76 55.6	94 17	14.4
8	79 01.0	88 25	21.4	78 34.3	89 23	20.2	77 13.0	91 20	17.2	76 45.4	92 19	16.3
9	78 46.2	86 27	23.7	78 20.3	87 26	22.4	77 01.0	89 22	19.1	76 34.0	90 21	18.1
10	78 30.0	83 29	25.8	78 05.0	84 28	24.5	76 47.8	87 24	20.9	76 21.5	88 23	19.9
1	78 12.6	80 31	27.8	77 48.4	81 30	26.4	76 33.4	85 26	22.7	76 07.8	86 24	21.6
2	77 54.0	77 33	29.7	77 30.7	79 31	28.3	76 18.1	83 27	24.3	75 53.1	84 26	23.2
3	77 34.4	74 34	31.5	77 11.9	76 33	30.0	76 01.7	80 29	25.9	75 37.5	81 28	24.7
4	77 13.7	71 36	33.2	76 52.1	73 34	31.6	75 44.3	78 30	27.5	75 20.9	79 29	26.2
15	76 52.2	68 37	34.7	76 31.5	70 36	33.2	75 26.1	75 32	28.9	75 03.4	76 30	27.6
6	76 29.8	65 39	36.2	76 10.0	67 37	34.6	75 07.1	72 33	30.3	74 45.1	74 32	28.9
7	76 06.7	62 40	37.5	75 47.7	64 38	35.9	74 47.3	70 34	31.5	74 26.1	71 33	30.2
8	75 42.9	59 41	38.8	75 24.7	61 39	37.2	74 26.8	67 35	32.8	74 06.4	69 34	31.4
9	75 18.4	57 42	39.9	75 01.1	59 40	38.3	74 05.6	65 36	33.9	73 45.9	66 35	32.5
20	74 53.4	54 43	41.0	74 36.9	56 41	39.4	73 43.8	62 37	35.0	73 24.9	64 36	33.6
1	74 27.8	51 43	42.0	74 12.2	53 42	40.4	73 21.4	59 38	36.0	73 03.3	61 37	34.6
2	74 01.8	48 44	42.9	73 46.9	51 43	41.3	72 58.5	57 39	36.9	72 41.1	59 38	35.5
3	73 35.3	46 45	43.7	73 21.2	48 44	42.2	72 35.1	54 40	37.8	72 18.5	56 39	36.4
4	73 08.5	43 45	44.5	72 55.1	46 44	43.0	72 11.2	52 40	38.6	71 55.3	54 39	37.2
25	72 41.2	41 46	45.2	72 28.7	43 45	43.7	71 46.9	49 41	39.4	71 31.8	51 40	38.0
6	72 13.7	38 46	45.9	72 01.8	41 45	44.4	71 22.3	47 42	40.1	71 07.8	49 41	38.7
7	71 45.9	36 47	46.5	71 34.7	38 46	45.0	70 57.2	45 42	40.8	70 43.5	47 41	39.4
8	71 17.8	34 47	47.1	71 07.3	36 46	45.6	70 31.9	42 43	41.4	70 18.9	44 42	40.1
9	70 49.4	32 48	47.6	70 39.6	34 47	46.1	70 06.2	40 43	42.0	69 53.9	42 42	40.6
30	70 20.8	29 48	48.0	70 11.7	32 47	46.6	69 40.3	38 44	42.5	69 28.6	40 43	41.2
1	69 52.1	27 48	48.4	69 43.5	30 47	47.0	69 14.1	36 44	43.0	69 03.1	38 43	41.7
2	69 23.1	25 48	48.8	69 15.2	27 48	47.4	68 47.7	34 44	43.5	68 37.3	36 43	42.2
3	68 54.0	23 49	49.2	68 46.7	25 48	47.8	68 21.1	32 45	43.9	68 11.3	33 44	42.6
4	68 24.8	21 49	49.5	68 18.1	23 48	48.1	67 54.2	29 45	44.3	67 45.1	31 44	43.0
35	67 55.4	19 49	49.7	67 49.3	21 48	48.4	67 27.2	27 45	44.6	67 18.7	29 44	43.4
6	67 25.9	18 49	50.0	67 20.4	20 48	48.7	67 00.1	25 46	44.9	66 52.2	27 45	43.7
7	66 56.4	16 49	50.2	66 51.3	18 49	48.9	66 32.8	24 46	45.2	66 25.4	25 45	44.0
8	66 26.7	14 50	50.4	66 22.2	16 49	49.1	66 05.3	22 46	45.5	65 58.6	23 45	44.3
9	65 56.9	12 50	50.5	65 53.0	14 49	49.3	65 37.8	20 46	45.7	65 31.6	22 45	44.5
40	65 27.1	10 50	50.7	65 23.7	12 49	49.5	65 10.1	18 46	45.9	65 04.5	20 45	44.8
1	64 57.3	09 50	50.8	64 54.4	11 49	49.6	64 42.4	16 46	46.1	64 37.3	18 46	45.0
2	64 27.4	07 50	50.9	64 25.0	09 49	49.7	64 14.5	14 47	46.3	64 10.0	16 46	45.2
3	63 57.4	06 50	51.0	63 55.5	07 49	49.8	63 46.6	13 47	46.4	63 42.6	14 46	45.3
4	63 27.5	04 50	51.0	63 26.0	06 49	49.9	63 18.6	11 47	46.6	63 15.1	13 46	45.5
45	62 57.5	02 50	51.0	62 56.5	04 49	49.9	62 50.6	09 47	46.7	62 47.6	11 46	45.6
6	62 27.5	01 50	51.1	62 27.0	02 49	50.0	62 22.5	07 47	46.7	62 20.0	09 46	45.7
7	61 57.5	01 50	51.1	61 57.5	01 49	50.0	61 54.4	06 47	46.8	61 52.4	07 46	45.8
8	61 27.5	02 50	51.0	61 27.9	01 49	50.0	61 26.3	04 47	46.9	61 24.8	06 46	45.8
9	60 57.5	04 50	51.0	60 58.4	02 49	50.0	60 58.1	03 47	46.9	60 57.1	04 46	45.9
50	60 27.5	05 50	51.0	60 28.8	04 49	50.0	60 30.0	01 47	46.9	60 29.4	03 46	45.9
1	59 57.6	07 50	50.9	59 59.3	05 49	49.9	60 01.8	00 47	46.9	60 01.7	01 46	45.9
2	59 27.7	08 50	50.8	59 29.8	06 49	49.9	59 33.6	02 47	46.9	59 34.0	01 46	45.9
3	58 57.8	09 50	50.8	59 00.4	08 49	49.8	59 05.5	04 47	46.9	59 06.3	02 46	45.9
4	58 27.9	11 50	50.7	58 30.9	09 49	49.7	58 37.3	05 47	46.8	58 38.6	04 46	45.9
55	57 58.1	12 50	50.6	58 01.5	11 49	49.6	58 09.2	06 47	46.8	58 10.9	05 46	45.8
6	57 28.4	13 50	50.4	57 32.2	12 49	49.5	57 41.1	08 47	46.7	57 43.3	07 46	45.8
7	56 58.7	15 49	50.3	57 02.9	13 49	49.4	57 13.1	09 47	46.7	57 15.7	08 46	45.7
8	56 29.0	16 49	50.2	56 33.6	15 49	49.3	56 45.0	11 47	46.6	56 48.1	09 46	45.7
9	55 59.4	17 49	50.0	56 04.4	16 49	49.1	56 17.0	12 47	46.5	56 20.5	11 46	45.6
60	55 29.9	18 49	49.9	55 35.3	17 48	49.0	55 49.1	14 46	46.4	55 53.0	12 46	45.5
1	55 00.5	20 49	49.7	55 06.2	19 48	48.8	55 21.2	15 46	46.2	55 25.5	14 46	45.4
2	54 31.1	21 49	49.5	54 37.2	20 48	48.7	54 53.4	16 46	46.1	54 58.1	15 46	45.3
3	54 01.8	22 49	49.3	54 08.3	21 48	48.5	54 25.6	18 46	46.0	54 30.7	16 46	45.1
4	53 32.6	23 49	49.1	53 39.4	22 48	48.3	53 57.9	19 46	45.8	54 03.4	18 45	45.0
65	53 03.5	25 48	48.9	53 10.7	23 48	48.1	53 30.3	20 46	45.7	53 36.2	19 45	44.9
6	52 34.4	26 48	48.7	52 42.0	25 48	47.9	53 02.8	21 46	45.5	53 09.0	20 45	44.7
7	52 05.5	27 48	48.5	52 13.4	26 48	47.7	52 35.3	23 46	45.3	52 41.9	22 45	44.5
8	51 36.6	28 48	48.3	51 44.9	27 47	47.5	52 07.9	24 46	45.2	52 14.9	23 45	44.4
9	51 07.9	29 48	48.1	51 16.5	28 47	47.3	51 40.6	25 45	45.0	51 48.0	24 45	44.2
70	50 39.3	30 48	47.8	50 48.2	29 47	47.1	51 13.4	26 45	44.8	51 21.2	25 45	44.0
1	50 10.7	32 47	47.6	50 20.1	31 47	46.8	50 46.3	28 45	44.6	50 54.4	27 44	43.8
2	49 42.3	33 47	47.3	49 52.0	32 47	46.6	50 19.2	29 45	44.4	50 27.7	28 44	43.6
3	49 14.0	34 47	47.1	49 24.0	33 46	46.4	49 52.3	30 45	44.2	50 01.2	29 44	43.4
4	48 45.8	35 47	46.8	48 56.2	34 46	46.1	49 25.5	31 44	43.9	49 34.7	30 44	43.2
75	48 17.8	36 47	46.5	48 28.4	35 46	45.8	48 58.8	32 44	43.7	49 08.4	32 44	43.0
6	47 49.8	37 46	46.3	48 00.8	36 46	45.6	48 32.2	34 44	43.5	48 42.2	33 44	42.8
7	47 22.0	38 46	46.0	47 33.3	37 46	45.3	48 05.7	35 44	43.2	48 16.0	34 43	42.5
8	46 54.4	39 46	45.7	47 06.0	38 45	45.0	47 39.4	36 44	43.0	47 50.0	35 43	42.3
9	46 26.8	40 46	45.4	46 38.8	39 45	44.8	47 13.2	37 44	42.7	47 24.1	36 43	42.0
80	45 59.4	41 45	45.1	46 11.7	40 45	44.5	46 47.0	38 43	42.5	46 58.4	37 43	41.8
1	45 32.2	42 45	44.8	45 44.7	42 45	44.2	46 21.1	39 43	42.2	46 32.7	38 43	41.5
2	45 05.0	43 45	44.5	45 17.9	43 44	43.9	45 55.2	40 43	41.9	46 07.2	40 42	41.3
3	44 38.1	44 45	44.2	44 51.3	44 44	43.6	45 29.5	41 43	41.7	45 41.8	41 42	41.0
4	44 11.3	45 44	43.9	44 24.7	45 44	43.3	45 04.0	43 42	41.4	45 16.6	42 42	40.7
85	43 44.6	46 44	43.6	43 58.4	46 44	43.0	44 38.5	44 42	41.1	44 51.5	43 42	40.5
6	43 18.1	47 44	43.3	43 32.2	47 43	42.7	44 13.3	45 42	40.8	44 26.6	44 41	40.2
7	42 51.7	48 44	42.9	43 06.1	48 43	42.3	43 48.1	46 42	40.5	44 01.7	45 41	39.9
8	42 25.5	49 43	42.6	42 40.2	49 43	42.0	43 23.2	47 41	40.2	43 37.1	46 41	39.6
9	41 59.5	50 43	42.3	42 14.5	50 43	41.7	42 58.3	48 41	39.9	43 12.6	47 41	39.3
90	41 33.6	51 43	41.9	41 48.9	51 42	41.4	42 33.7	49 41	39.6	42 48.2	48 40	39.0

63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
77 00.0	1.0 01	00.0	71 00.0	1.0 01	00.0	70 30.0	1.0 01	00.0	65 30.0	1.0 00	00.0	00
76 59.3	1.0 03	02.0	70 59.6	1.0 02	01.1	70 29.6	1.0 02	01.0	65 29.8	1.0 01	00.6	1
76 57.3	1.0 06	04.0	70 58.5	1.0 03	02.2	70 28.6	1.0 03	02.1	65 29.1	1.0 02	01.3	2
76 53.9	99 08	06.0	70 56.7	99 04	03.3	70 26.8	99 04	03.1	65 28.0	1.0 03	01.9	3
76 49.2	98 10	08.0	70 54.1	99 06	04.4	70 24.4	99 05	04.2	65 26.5	99 03	02.6	4
76 43.2	97 12	09.9	70 50.8	99 07	05.5	70 21.2	99 06	05.2	65 24.6	99 04	03.2	05
76 35.9	96 14	11.8	70 46.7	98 08	06.5	70 17.4	98 08	06.2	65 22.2	99 05	03.8	6
76 27.4	94 16	13.7	70 42.0	97 09	07.6	70 12.8	97 09	07.2	65 19.4	98 05	04.5	7
76 17.7	93 18	15.5	70 36.6	96 10	08.6	70 07.6	96 10	08.2	65 16.2	98 06	05.1	8
76 06.9	91 20	17.2	70 30.4	95 11	09.7	70 01.8	96 11	09.2	65 12.6	97 07	05.7	9
75 54.9	89 22	18.9	70 23.6	94 12	10.7	69 55.3	95 12	10.2	65 08.5	96 07	06.3	10
75 41.9	87 23	20.5	70 16.1	93 14	11.7	69 48.1	93 13	11.2	65 04.1	96 08	06.9	1
75 27.9	85 25	22.1	70 08.0	92 15	12.7	69 40.4	92 14	12.1	64 59.2	95 09	07.6	2
75 12.9	82 26	23.6	69 59.2	91 16	13.6	69 32.0	91 15	13.0	64 53.9	94 09	08.1	3
74 57.0	80 28	25.0	69 49.8	89 17	14.6	69 23.0	90 16	13.9	64 48.3	93 10	08.7	4
74 40.3	78 29	26.4	69 39.8	88 18	15.5	69 13.4	88 17	14.8	64 42.2	92 11	09.3	15
74 22.8	75 30	27.7	69 29.2	86 19	16.4	69 03.3	87 18	15.7	64 35.8	91 11	09.9	6
74 04.5	73 32	28.9	69 18.1	85 20	17.2	68 52.6	85 19	16.5	64 29.0	90 12	10.4	7
73 45.5	70 33	30.1	69 06.4	83 20	18.1	68 41.4	84 20	17.3	64 21.8	89 13	11.0	8
73 25.8	68 34	31.2	68 54.1	81 21	18.9	68 29.6	82 20	18.1	64 14.2	88 13	11.5	9
73 05.5	65 35	32.3	68 41.4	80 22	19.7	68 17.4	80 21	18.9	64 06.3	86 14	12.1	20
72 44.6	63 36	33.3	68 28.1	78 23	20.5	68 04.7	79 22	19.6	63 58.1	85 14	12.6	1
72 23.2	61 37	34.2	68 14.4	76 24	21.2	67 51.5	77 23	20.4	63 49.5	84 15	13.1	2
72 01.3	58 37	35.1	68 00.2	74 24	22.0	67 37.8	75 23	21.1	63 40.6	82 15	13.6	3
71 38.9	56 38	35.9	67 45.6	72 25	22.6	67 23.7	73 24	21.8	63 31.4	81 16	14.1	4
71 16.1	53 39	36.7	67 30.5	70 26	23.3	67 09.2	71 25	22.4	63 21.8	80 16	14.6	25
70 52.8	51 39	37.4	67 15.0	68 26	24.0	66 54.3	70 25	23.0	63 11.9	78 17	15.1	6
70 29.2	49 40	38.1	66 59.2	67 27	24.6	66 39.0	68 26	23.7	63 01.8	77 17	15.5	7
70 05.2	46 40	38.7	66 42.9	65 28	25.2	66 23.4	66 27	24.2	62 51.3	75 18	16.0	8
69 40.9	44 41	39.3	66 26.4	63 28	25.8	66 07.4	64 27	24.8	62 40.6	73 18	16.4	9
69 16.3	42 41	39.9	66 09.4	61 29	26.3	65 51.0	62 28	25.3	62 29.5	72 19	16.8	30
68 51.5	40 42	40.4	65 52.2	59 29	26.8	65 34.4	60 28	25.9	62 18.2	70 19	17.2	1
68 26.3	38 42	40.9	65 34.6	57 30	27.3	65 17.4	58 29	26.4	62 06.7	69 20	17.6	2
68 01.0	35 43	41.3	65 16.7	55 30	27.8	65 00.1	56 29	26.8	61 54.9	67 20	18.0	3
67 35.4	33 43	41.8	64 58.6	53 31	28.3	64 42.6	54 30	27.3	61 42.8	65 20	18.4	4
67 09.6	31 43	42.1	64 40.2	51 31	28.7	64 24.8	52 30	27.7	61 30.6	63 21	18.7	35
66 43.7	29 44	42.5	64 21.6	49 31	29.1	64 06.7	50 30	28.1	61 18.1	62 21	19.1	6
66 17.5	27 44	42.8	64 02.7	47 32	29.5	63 48.4	48 31	28.5	61 05.3	60 22	19.4	7
65 51.3	25 44	43.1	63 43.6	45 32	29.9	63 29.9	46 31	28.9	60 52.4	58 22	19.8	8
65 24.8	23 44	43.4	63 24.2	43 33	30.2	63 11.2	44 32	29.2	60 39.3	56 22	20.1	9
64 58.3	21 44	43.6	63 04.7	41 33	30.6	62 52.2	42 32	29.6	60 25.9	55 23	20.4	40
64 31.6	20 45	43.8	62 45.0	39 33	30.9	62 33.1	40 32	29.9	60 12.4	53 23	20.7	1
64 04.9	18 45	44.0	62 25.1	37 33	31.2	62 13.8	38 32	30.2	59 58.7	51 23	20.9	2
63 38.0	16 45	44.2	62 05.0	35 34	31.5	61 54.3	37 33	30.5	59 44.9	49 23	21.2	3
63 11.1	14 45	44.4	61 44.8	33 34	31.7	61 34.7	35 33	30.7	59 30.8	47 24	21.5	4
62 44.1	12 45	44.5	61 24.5	31 34	32.0	61 14.9	33 33	31.0	59 16.6	46 24	21.7	45
62 17.0	11 45	44.6	61 04.0	29 34	32.2	60 54.9	31 33	31.2	59 02.3	44 24	21.9	6
61 49.9	09 45	44.7	60 43.4	28 35	32.4	60 34.9	29 34	31.4	58 47.8	42 24	22.2	7
61 22.8	07 45	44.8	60 22.7	26 35	32.6	60 14.7	27 34	31.6	58 33.2	40 25	22.4	8
60 55.6	06 45	44.8	60 01.8	24 35	32.8	59 54.5	25 34	31.8	58 18.4	38 25	22.6	9
60 28.4	04 45	44.9	59 40.9	22 35	32.9	59 34.1	23 34	32.0	58 03.6	37 25	22.8	50
60 01.2	03 45	44.9	59 19.9	20 35	33.1	59 13.6	22 34	32.1	57 48.6	35 25	22.9	1
59 34.0	01 45	44.9	58 58.8	18 35	33.2	58 53.0	20 34	32.3	57 33.5	33 25	23.1	2
59 06.7	01 45	44.9	58 37.6	17 35	33.4	58 32.4	18 34	32.4	57 18.3	31 26	23.3	3
58 39.5	02 45	44.9	58 16.4	15 36	33.5	58 11.7	16 35	32.5	57 03.0	29 26	23.4	4
58 12.3	04 45	44.9	57 55.1	13 36	33.6	57 50.9	14 35	32.6	56 47.7	27 26	23.6	55
57 45.0	05 45	44.9	57 33.7	11 36	33.6	57 30.1	13 35	32.7	56 32.2	26 26	23.7	6
57 17.8	07 45	44.8	57 12.4	10 36	33.7	57 09.3	11 35	32.8	56 16.7	24 26	23.8	7
56 50.7	08 45	44.7	56 50.9	08 36	33.8	56 48.4	09 35	32.9	56 01.1	22 26	23.9	8
56 23.5	10 45	44.7	56 29.5	06 36	33.8	56 27.4	08 35	32.9	55 45.4	20 26	24.0	9
55 56.5	11 45	44.6	56 08.0	05 36	33.8	56 06.5	06 35	32.9	55 29.7	19 26	24.1	60
55 29.4	12 45	44.5	55 46.5	03 36	33.9	55 45.5	04 35	33.0	55 13.9	17 26	24.2	1
55 02.4	14 45	44.4	55 25.0	01 36	33.9	55 24.5	03 35	33.0	54 58.1	15 26	24.3	2
54 35.4	15 45	44.3	55 03.5	00 36	33.9	55 03.5	01 35	33.0	54 42.2	13 26	24.3	3
54 08.5	17 45	44.2	54 42.0	02 36	33.9	54 42.5	01 35	33.0	54 26.3	11 27	24.4	4
53 41.7	18 45	44.0	54 20.6	04 36	33.9	54 21.4	02 35	33.0	54 10.3	10 27	24.4	65
53 14.9	19 44	43.9	53 59.1	05 36	33.8	54 00.4	04 35	33.0	53 54.4	08 27	24.5	6
52 48.2	21 44	43.7	53 37.6	07 36	33.8	53 39.5	06 35	33.0	53 38.4	06 27	24.5	7
52 21.6	22 44	43.6	53 16.2	08 36	33.8	53 18.5	07 35	32.9	53 22.4	05 27	24.5	8
51 55.1	23 44	43.4	52 54.8	10 36	33.7	52 57.5	09 35	32.9	53 06.3	03 27	24.6	9
51 28.6	24 44	43.2	52 33.4	11 36	33.6	52 36.6	10 35	32.8	52 50.3	01 27	24.6	70
51 02.2	26 44	43.1	52 12.0	13 36	33.6	52 15.7	12 35	32.8	52 34.3	01 27	24.6	1
50 36.0	27 44	42.9	51 50.7	14 35	33.5	51 54.9	13 35	32.7	52 18.2	02 77	24.6	2
50 09.8	28 43	42.7	51 29.5	16 35	33.4	51 34.1	15 35	32.6	52 02.2	04 27	24.5	3
49 43.7	29 43	42.5	51 08.3	17 35	33.3	51 13.3	16 34	32.5	51 46.2	05 27	24.5	4
49 17.7	31 43	42.3	50 47.1	19 35	33.2	50 52.6	18 34	32.4	51 30.2	07 27	24.5	75
48 51.8	32 43	42.0	50 26.0	20 35	33.1	50 32.0	19 34	32.3	51 14.2	09 27	24.5	6
48 26.1	33 43	41.8	50 05.0	22 35	33.0	50 11.4	21 34	32.2	50 58.2	10 27	24.4	7
48 00.4	34 43	41.6	49 44.1	23 35	32.8	49 50.9	22 34	32.1	50 42.3	12 26	24.4	8
47 34.9	35 42	41.4	49 23.2	25 35	32.7	49 30.4	24 34	32.0	50 26.4	14 26	24.3	9
47 09.4	37 42	41.1	49 02.4	26 35	32.6	49 10.0	25 34	31.8	50 10.5	15 26	24.3	80
46 44.1	38 42	40.9	48 41.7	27 34	32.4	48 49.7	26 34	31.7	49 54.7	17 26	24.2	1
46 19.0	39 42	40.6	48 21.0	29 34	32.3	48 29.5	28 34	31.6	49 38.9	18 26	24.1	2
45 53.9	40 42	40.4	48 00.5	30 34	32.1	48 09.4	29 33	31.4	49 23.2	20 26	24.0	3
45 29.0	41 41	40.1	47 40.0	31 34	32.0	47 49.3	31 33	31.2	49 07.5	21 26	24.0	4
45 04.3	42 41	39.8	47 19.7	33 34	31.8	47 29.4	32 33	31.1	48 51.9	23 26	23.9	85
44 39.6	43 41	39.5	46 59.4	34 34	31.6	47 09.5	33 33	30.9	48 36.3	24 26	23.8	6
44 15.2	44 41	39.3	46 39.2	35 33	31.4	46 49.7	35 33	30.7	48 20.8	26 26	23.7	7
43 50.8	45 40	39.0	46 19.2	37 33	31.2	46 30.1	36 33	30.6	48 05.3	27 26	23.6	8
43 26.6	47 40	38.7	45 59.2	38 33	31.0	46 10.5	37 32	30.4	47 49.9	29 26	23.5	9
43 02.6	48 40	38.4	45 39.4	39 33	30.8	45 51.1	39 32	30.2	47 34.6	30 25	23.3	90

Digitized by Google

H.A.	60° 00′		60° 30′		62° 00′		62° 30′		63° 00′		69° 00′		69° 30′		74° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	41 08.0 52 43	41.6	41 23.5 52 42	41.0	42 09.2 50 41	39.3	42 24.0 49 40	38.7	42 38.7 49 40	38.1	45 19.7 41 33	30.6	45 31.7 40 32	30.0	47 19.4 32 25	23.2	91
2	40 42.4 53 42	41.2	40 58.3 53 42	40.7	41 44.8 51 40	39.0	42 00.0 50 40	38.4	42 15.0 50 39	37.8	45 00.1 42 32	30.4	45 12.5 41 32	29.8	47 04.2 33 25	23.1	2
3	40 17.1 54 42	40.9	40 33.2 54 41	40.3	41 20.7 52 40	38.6	41 36.1 51 40	38.1	41 51.4 51 39	37.5	44 40.6 43 32	30.2	44 53.4 42 32	29.6	46 49.1 35 25	23.0	3
4	39 52.0 55 42	40.5	40 08.4 54 41	40.0	40 56.7 53 40	38.3	41 12.4 52 39	37.8	41 28.0 52 39	37.2	44 21.3 44 32	30.0	44 34.4 44 31	29.4	46 34.1 36 25	22.8	4
95	39 27.0 56 41	40.2	39 43.7 55 41	39.6	40 32.8 54 39	38.0	40 48.9 53 39	37.4	41 04.8 53 38	36.9	44 02.1 45 32	29.8	44 15.6 45 31	29.2	46 19.2 37 25	22.7	95
6	39 02.2 57 41	39.8	39 19.2 56 41	39.3	40 09.2 55 39	37.7	40 25.6 54 39	37.1	40 41.8 54 38	36.5	43 43.0 47 32	29.5	43 56.9 46 31	28.9	46 04.4 39 25	22.5	6
7	38 37.6 58 41	39.4	38 54.9 57 40	38.9	39 45.7 56 39	37.3	40 02.4 55 38	36.8	40 18.9 55 38	36.2	43 24.0 48 31	29.3	43 38.3 47 31	28.7	45 49.7 40 24	22.4	7
8	38 13.2 59 40	39.1	38 30.7 58 40	38.5	39 22.4 57 38	37.0	39 39.4 56 38	36.4	39 56.2 56 38	35.9	43 05.2 49 31	29.1	43 19.8 48 31	28.5	45 35.0 42 24	22.2	8
9	37 49.0 60 40	38.7	38 06.8 59 40	38.2	38 59.3 58 38	36.6	39 16.6 57 38	36.1	39 33.7 57 37	35.6	42 46.5 50 31	28.8	43 01.5 50 30	28.2	45 20.5 43 24	22.1	9
100	37 25.0 60 40	38.3	37 43.0 60 39	37.8	38 36.4 59 38	36.3	38 53.9 58 37	35.8	39 11.3 58 37	35.2	42 28.0 51 31	28.6	42 43.3 51 30	28.0	45 06.1 44 24	21.9	100
1	37 01.2 61 39	37.9	37 19.5 61 39	37.4	38 13.7 60 38	35.9	38 31.5 59 37	35.4	38 49.2 59 37	34.9	42 09.6 52 30	28.3	42 25.3 52 30	27.8	44 51.7 46 24	21.7	1
2	36 37.6 62 39	37.5	36 56.2 62 39	37.1	37 51.2 60 37	35.6	38 09.3 60 37	35.1	38 27.2 60 36	34.5	41 51.4 54 30	28.1	42 07.4 53 30	27.5	44 37.5 47 24	21.5	2
3	36 14.2 63 39	37.2	36 33.0 63 38	36.7	37 28.8 61 37	35.2	37 47.2 61 36	34.7	38 05.4 61 36	34.2	41 33.3 55 30	27.8	41 49.7 54 29	27.3	44 23.4 48 23	21.4	3
4	35 51.0 64 38	36.8	36 10.1 63 38	36.3	37 06.7 62 37	34.8	37 25.3 62 36	34.3	37 43.9 61 36	33.8	41 15.4 56 30	27.6	41 32.1 55 29	27.0	44 09.4 49 23	21.2	4
105	35 28.0 65 38	36.4	35 47.4 64 38	35.9	36 44.8 63 36	34.5	37 03.7 63 36	34.0	37 22.5 62 35	33.5	40 57.7 57 29	27.3	41 14.7 56 29	26.7	43 55.5 51 23	21.0	105
6	35 05.2 66 38	36.0	35 24.9 65 37	35.5	36 23.1 64 36	34.1	36 42.2 64 35	33.6	37 01.3 63 35	33.1	40 40.1 58 29	27.0	40 57.4 57 29	26.5	43 41.8 52 23	20.8	6
7	34 42.7 66 37	35.6	35 02.6 66 37	35.1	36 01.5 65 36	33.7	36 21.0 65 35	33.2	36 40.3 64 35	32.8	40 22.6 59 29	26.7	40 40.3 59 28	26.2	43 28.1 53 23	20.6	7
8	34 20.4 67 37	35.2	34 40.5 67 36	34.7	35 40.2 66 35	33.3	35 59.9 66 35	32.9	36 19.5 65 34	32.4	40 05.4 60 28	26.5	40 23.3 60 28	25.9	43 14.6 54 22	20.4	8
9	33 58.3 68 36	34.8	34 18.6 68 36	34.3	35 19.1 67 35	33.0	35 39.1 66 34	32.5	35 59.0 66 34	32.0	39 48.3 61 28	26.2	40 06.5 61 28	25.7	43 01.2 56 22	20.2	9
110	33 36.4 69 36	34.3	33 57.0 69 36	33.9	34 58.3 68 34	32.6	35 18.5 67 34	32.1	35 38.6 67 34	31.7	39 31.3 62 28	25.9	39 49.9 62 27	25.4	42 48.0 57 22	20.0	110
1	33 14.8 70 36	33.9	33 35.6 69 35	33.5	34 37.6 68 34	32.2	34 58.1 68 34	31.7	35 18.5 68 33	31.3	39 14.6 63 28	25.6	39 33.5 63 27	25.1	42 34.8 58 22	19.8	1
2	32 53.4 70 35	33.5	33 14.4 70 35	33.1	34 17.2 69 34	31.8	34 37.9 69 33	31.4	34 58.6 69 33	30.9	38 58.0 64 27	25.3	39 17.2 64 27	24.8	42 21.8 59 21	19.6	2
3	32 32.2 71 35	33.1	32 53.5 71 34	32.7	33 57.0 70 33	31.4	34 18.0 70 33	31.0	34 38.9 69 32	30.5	38 41.6 65 27	25.0	39 01.1 65 27	24.5	42 09.0 60 21	19.4	3
4	32 11.2 72 34	32.7	32 32.8 72 34	32.3	33 37.0 71 33	31.0	33 58.2 71 32	30.6	34 19.4 70 32	30.1	38 25.4 66 27	24.7	38 45.2 66 26	24.2	41 56.2 61 21	19.2	4
115	31 50.6 73 34	32.2	32 12.3 73 34	31.8	33 17.3 72 33	30.6	33 38.7 71 32	30.2	34 00.1 71 32	29.8	38 09.4 67 26	24.4	38 29.5 67 26	23.9	41 43.6 63 21	18.9	115
6	31 30.1 74 34	31.8	31 52.1 73 33	31.4	32 57.7 73 32	30.2	33 19.5 72 32	29.8	33 41.1 72 31	29.4	37 53.6 68 26	24.1	38 13.9 68 26	23.6	41 31.2 64 20	18.7	6
7	31 09.9 74 33	31.4	31 32.2 74 33	31.0	32 38.5 73 32	29.8	33 00.4 73 31	29.4	33 22.3 73 31	29.0	37 37.9 69 26	23.8	37 58.6 69 25	23.3	41 18.9 65 20	18.5	7
8	30 49.9 75 33	30.9	31 12.4 75 32	30.6	32 19.4 74 31	29.4	32 41.6 74 31	29.0	33 03.7 74 31	28.6	37 22.5 70 25	23.5	37 43.4 70 25	23.0	41 06.7 66 20	18.3	8
9	30 30.2 76 32	30.5	30 52.9 76 32	30.1	32 00.6 75 31	29.0	32 23.1 75 31	28.6	32 45.4 74 30	28.2	37 07.2 71 25	23.1	37 28.4 71 25	22.7	40 54.7 67 20	18.0	9
120	30 10.8 77 32	30.1	30 33.7 76 32	29.7	31 42.1 76 31	28.5	32 04.7 75 30	28.2	32 27.3 75 30	27.8	36 52.1 72 25	22.8	37 13.6 72 24	22.4	40 42.9 68 20	17.8	120
1	29 51.6 77 32	29.6	30 14.7 77 31	29.2	31 23.8 76 30	28.1	31 46.7 76 30	27.7	32 09.5 76 29	27.4	36 37.3 73 24	22.5	36 59.0 72 24	22.1	40 31.2 69 19	17.5	1
2	29 32.7 78 31	29.2	29 56.0 78 31	28.8	31 05.7 77 30	27.7	31 28.8 77 29	27.3	31 51.9 77 29	27.0	36 22.6 74 24	22.2	36 44.7 73 24	21.8	40 19.6 70 19	17.3	2
3	29 14.0 79 31	28.7	29 37.6 78 30	28.4	30 47.9 78 29	27.3	31 11.2 78 29	26.9	31 34.5 77 29	26.5	36 08.2 74 24	21.8	36 30.5 74 23	21.4	40 08.3 71 19	17.0	3
4	28 55.6 79 30	28.3	29 19.4 79 30	27.9	30 30.4 79 29	26.9	30 53.9 78 28	26.5	31 17.4 78 28	26.1	35 53.9 75 23	21.5	36 16.5 75 23	21.1	39 57.0 72 18	16.8	4
125	28 37.5 80 30	27.8	29 01.5 80 29	27.5	30 13.1 79 28	26.4	30 36.8 79 28	26.1	31 00.5 79 28	25.7	35 39.9 76 23	21.2	36 02.7 76 23	20.8	39 46.0 73 18	16.5	125
6	28 19.6 81 29	27.4	28 43.8 81 29	27.0	29 56.0 80 28	26.0	30 20.0 80 28	25.6	30 43.9 80 27	25.3	35 26.0 77 23	20.8	35 49.1 77 22	20.5	39 35.1 74 18	16.3	6
7	28 02.0 81 29	26.9	28 26.4 81 29	26.6	29 39.3 81 28	25.6	30 03.4 81 27	25.2	30 27.6 80 27	24.9	35 12.4 78 22	20.5	35 35.7 78 22	20.1	39 24.3 75 18	16.0	7
8	27 44.7 82 28	26.4	28 09.3 82 28	26.1	29 22.8 81 27	25.1	29 47.1 81 27	24.8	30 11.5 81 26	24.4	34 59.0 79 22	20.2	35 22.6 78 22	19.8	39 13.8 76 17	15.8	8
9	27 27.7 83 28	26.0	27 52.5 83 28	25.7	29 06.5 82 27	24.7	29 31.1 82 26	24.4	29 55.6 82 26	24.0	34 45.8 79 22	19.8	35 09.6 79 21	19.4	39 03.4 77 17	15.5	9
130	27 10.9 83 27	25.5	27 35.9 83 27	25.2	28 50.5 83 26	24.2	29 15.3 83 26	23.9	29 40.1 82 26	23.6	34 32.9 80 21	19.5	34 56.9 80 21	19.1	38 53.1 77 17	15.2	130
1	26 54.5 84 27	25.0	27 19.6 84 27	24.7	28 34.8 83 26	23.8	28 59.8 83 25	23.5	29 24.8 83 25	23.2	34 20.1 81 21	19.1	34 44.4 81 20	18.8	38 43.1 78 16	15.0	1
2	26 38.3 85 26	24.6	27 03.6 84 26	24.3	28 19.4 84 25	23.3	28 44.6 84 25	23.0	29 09.7 84 25	22.7	34 07.6 82 20	18.8	34 32.1 81 20	18.4	38 33.2 79 16	14.7	2
3	26 22.4 85 26	24.1	26 47.9 85 26	23.8	28 04.3 85 25	22.9	28 29.6 84 24	22.6	28 55.0 84 24	22.3	33 55.3 82 20	18.4	34 20.0 82 20	18.1	38 23.5 80 16	14.4	3
4	26 06.8 86 26	23.6	26 32.5 86 25	23.3	27 49.4 85 24	22.4	28 15.0 85 24	22.2	28 40.5 85 24	21.9	33 43.2 83 20	18.1	34 08.2 83 19	17.7	38 14.0 81 16	14.2	4
135	25 51.5 86 25	23.1	26 17.4 86 25	22.9	27 34.8 86 24	22.0	28 00.6 86 24	21.7	28 26.3 86 23	21.4	33 31.4 84 19	17.7	33 56.5 84 19	17.4	38 04.6 82 15	13.9	135
6	25 36.5 87 24	22.7	26 02.6 87 24	22.4	27 20.5 86 23	21.5	27 46.4 86 23	21.3	28 12.3 86 23	21.0	33 19.8 85 19	17.3	33 45.1 84 19	17.0	37 55.4 82 15	13.6	6
7	25 21.8 87 24	22.2	25 48.0 87 24	21.9	27 06.5 87 23	21.1	27 32.6 77 23	20.8	27 58.7 87 22	20.5	33 08.4 85 19	17.0	33 34.0 85 18	16.7	37 46.5 83 15	13.3	7
8	25 07.4 88 24	21.7	25 33.8 88 23	21.4	26 52.8 88 22	20.6	27 19.0 88 22	20.3	27 45.3 87 22	20.1	32 57.3 86 18	16.6	33 23.0 86 18	16.3	37 37.7 84 14	13.0	8
9	24 53.3 89 23	21.2	25 19.9 88 23	20.9	26 39.3 88 22	20.2	27 05.8 88 22	19.9	27 32.2 88 21	19.6	32 46.4 87 18	16.2	33 12.3 86 17	15.9	37 29.0 85 14	12.8	9
140	24 39.5 89 22	20.7	25 06.2 89 22	20.5	26 26.2 89 21	19.7	26 52.8 89 21	19.4	27 19.4 89 21	19.2	32 35.7 87 17	15.9	33 01.8 87 17	15.6	37 20.6 85 14	12.5	140
1	24 26.0 90 22	20.2	24 52.9 90 22	20.0	26 13.3 89 21	19.2	26 40.1 89 21	19.0	27 06.8 89 20	18.7	32 25.3 88 17	15.5	32 51.6 88 17	15.2	37 12.4 86 13	12.2	1
2	24 12.9 90 21	19.7	24 39.9 90 21	19.5	26 00.8 90 20	18.8	26 27.7 90 20	18.5	26 54.6 90 20	18.3	32 15.1 88 17	15.1	32 41.6 88 16	14.8	37 04.3 87 13	11.9	2
3	24 00.0 91 21	19.2	24 27.2 91 21	19.0	25 48.5 90 20	18.3	26 15.6 90 20	18.1	26 42.7 90 19	17.8	32 05.2 89 16	14.7	32 31.8 89 16	14.5	36 56.5 88 13	11.6	3
4	23 47.5 91 20	18.7	24 14.8 91 20	18.5	25 36.6 91 19	17.8	26 03.8 91 19	17.6	26 31.0 91 19	17.4	31 55.5 90 16	14.4	32 22.3 89 15	14.1	36 48.8 88 12	11.3	4
145	23 35.2 92 20	18.2	24 02.7 91 20	18.0	25 24.9 91 19	17.3	25 52.3 91 19	17.1	26 19.7 91 18	16.9	31 46.0 90 15	14.0	32 13.0 90 15	13.7	36 41.3 89 12	11.0	145
6	23 23.3 92 19	17.7	23 50.9 92 19	17.5	25 13.6 92 18	16.9	25 41.1 92 18	16.6	26 08.6 92 18	16.4	31 36.8 91 15	13.6	32 04.0 91 15	13.4	36 34.1 89 12	10.7	6
7	23 11.7 92 19	17.2	23 39.5 92 19	17.0	25 02.6 92 18	16.4	25 30.2 92 18	16.2	25 57.9 92 17	16.0	31 27.9 91 14	13.2	31 55.2 91 14	13.0	36 27.0 90 11	10.4	7
8	23 00.5 93 18	16.7	23 28.3 93 18	16.5	24 51.8 93 17	15.9	25 19.6 93 17	15.7	25 47.4 93 17	15.5	31 19.2 92 14	12.8	31 46.7 92 14	12.6	36 20.1 91 11	10.1	8
9	22 49.5 93 18	16.2	23 17.5 93 17	16.0	24 41.4 93 17	15.4	25 09.3 93 17	15.2	25 37.2 93 16	15.0	31 10.7 92 14	12.5	31 38.4 92 13	12.2	36 13.4 91 11	09.8	9
150	22 38.9 94 17	15.7	23 07.0 94 17	15.5	24 31.3 94 16	15.0	24 59.4 94 16	14.8	25 27.4 93 16	14.6	31 02.5 93 13	12.1	31 30.3 93 13	11.9	36 07.0 92 10	09.5	150
1	22 28.6 94 17	15.2	22 56.9 94 16	15.0	24 21.5 94 16	14.5	24 49.7 94 16	14.3	25 17.9 94 15	14.1	30 54.6 93 13	11.7	31 22.5 93 13	11.5	36 00.7 92 10	09.2	1
2	22 18.7 95 16	14.7	22 47.0 94 16	14.5	24 12.0 94 15	14.0	24 40.3 94 15	13.8	25 08.6 94 15	13.6	30 46.9 94 12	11.3	31 15.0 94 12	11.1	35 54.6 93 10	08.9	2
3	22 09.1 95 15	14.2	22 37.5 95 15	14.0	24 02.9 95 15	13.5	24 31.3 95 15	13.3	24 59.7 95 14	13.1	30 39.5 94 12	10.9	31 07.7 94 12	10.7	35 48.7 93 09	08.6	3
4	21 59.8 95 15	13.7	22 28.4 95 15	13.5	23 54.0 95 14	13.0	24 22.6 95 14	12.8	24 51.1 95 14	12.7	30 32.3 94 12	10.5	31 00.7 94 11	10.3	35 43.1 94 09	08.3	4
155	21 50.8 96 14	13.2	22 19.5 96 14	13.0	23 45.5 95 14	12.5	24 14.1 95 14	12.4	24 42.8 95 13	12.2	30 25.4 95 11	10.1	30 53.9 95 11	09.9	35 37.6 94 09	08.0	155
6	21 42.2 96 14	12.6	22 11.0 96 14	12.5	23 37.3 96 13	12.0	24 06.1 96 13	11.9	24 34.8 96 13	11.7	30 18.8 95 11	09.7	30 47.4 95 10	09.5	35 32.3 95 08	07.7	6
7	21 33.9 96 13	12.1	22 02.8 96 13	12.0	23 29.4 96 13	11.5	23 58.3 96 12	11.4	24 27.1 96 12	11.2	30 12.4 96 10	09.3	30 41.1 96 10	09.2	35 27.3 95 08	07.4	7
8	21 26.0 97 13	11.6	21 55.0 97 12	11.5	23 21.9 96 12	11.0	23 50.8 96 12	10.9	24 19.8 96 12	10.8	30 06.3 96 10	08.9	30 35.1 96 10	08.8	35 22.5 96 08	07.1	8
9	21 18.4 97 12	11.1	21 47.5 97 12	11.0	23 14.6 97 12	10.6	23 43.7 97 11	10.4	24 12.7 97 11	10.3	30 00.4 96 09	08.5	30 29.3 96 09	08.4	35 17.8 96 07	06.7	9
160	21 11.2 97 12	10.6	21 40.3 97 11	10.4	23 07.8 97 11	10.1	23 36.9 97 11	09.9	24 06.0 97 11	09.8	29 54.8 97 09	08.1	30 23.9 97 09	08.0	35 13.4 96 07	06.4	160
1	21 04.3 97 11	10.0	21 33.5 97 11	09.9	23 01.2 97 10	09.6	23 30.4 97 10	09.4	23 59.6 97 10	09.3	29 49.5 97 08	07.7	30 18.6 97 08	07.6	35 09.2 97 07	06.1	1
2	20 57.7 98 10	09.5	21 27.0 98 10	09.4	22 54.9 98 10	09.1	23 24.2 98 10	08.9	23 53.5 98 10	08.8	29 44.5 97 08	07.3	30 13.7 97 08	07.2	35 05.2 97 06	05.8	2
3	20 51.5 98 10	09.0	21 20.9 98 10	08.9	22 49.0 98 09	08.6	23 18.4 98 09	08.5	23 47.8 98 09	08.3	29 39.7 98 08	06.9	30 09.0 98 07	06.8	35 01.4 97 06	05.5	3
4	20 45.7 98 09	08.5	21 15.1 98 09	08.4	22 43.5 98 09	08.1	23 12.9 98 09	08.0	23 42.3 98 09	07.9	29 35.2 98 07	06.5	30 04.5 98 07	06.4	34 57.8 98 06	05.2	4
165	20 40.1 98 09	08.0	21 09.7 98 08	07.9	22 38.2 98 08	07.6	23 07.7 98 08	07.5	23 37.2 98 08	07.4	29 30.9 98 07	06.1	30 00.4 98 06	06.0	34 54.5 98 05	04.8	165
6	20 35.0 99 08	07.4	21 04.6 99 08	07.3	22 33.3 99 08	07.1	23 02.9 99 08	07.0	23 32.4 99 07	06.9	29 27.0 98 06	05.7	29 56.5 98 06	05.6	34 51.3 98 05	04.5	6
7	20 30.2 99 07	06.9	20 59.8 99 07	06.8	22 28.7 99 07	06.6	22 58.4 99 07	06.5	23 28.0 99 07	06.4	29 23.2 99 06	05.3	29 52.8 99 06	05.2	34 48.4 98 05	04.2	7
8	20 25.7 99 07	06.4	20 55.4 99 07	06.3	22 24.5 99 06	06.1	22 54.2 99 06	06.0	23 23.9 99 06	05.9	29 19.8 99 05	04.9	29 49.5 99 05	04.8	34 45.7 99 04	03.9	8
9	20 21.6 99 06	05.8	20 51.4 99 06	05.8	22 20.6 99 06	05.6	22 50.3 99 06	05.5	23 20.0 99 06	05.4	29 16.7 99 05	04.5	29 46.4 99 05	04.4	34 43.2 99 04	03.6	9
170	20 17.9 99 06	05.3	20 47.7 99 06	05.2	22 17.0 99 05	05.1	22 46.8 99 05	05.0	23 16.6 99 05	04.9	29 13.8 99 04	04.1	29 43.5 99 04	04.0	34 40.9 99 03	03.2	170
1	20 14.5 99 05	04.8	20 44.3 99 05	04.7	22 13.8 99 05	04.6	22 43.6 99 05	04.5	23 13.4 99 05	04.4	29 11.2 99 04	03.7	29 41.0 99 04	03.6	34 38.8 99 03	02.9	1
2	20 11.4 1.0 04	04.3	20 41.3 1.0 04	04.2	22 10.9 1.0 04	04.0	22 40.8 1.0 04	04.0	23 10.6 1.0 04	03.9	29 08.8 99 03	03.3	29 38.7 99 03	03.2	34 37.0 99 03	02.6	2
3	20 08.8 1.0 04	03.7	20 38.7 1.0 04	03.7	22 08.3 1.0 04	03.5	22 38.2 1.0 04	03.5	23 08.1 1.0 04	03.4	29 06.8 1.0 03	02.9	29 36.6 1.0 03	02.8	34 35.3 1.0 02	02.3	3
4	20 06.4 1.0 03	03.2	20 36.4 1.0 03	03.2	22 06.1 1.0 03	03.0	22 36.1 1.0 03	03.0	23 06.0 1.0 03	03.0	29 05.0 1.0 03	02.5	29 34.9 1.0 02	02.4	34 33.9 1.0 02	01.9	4
175	20 04.5 1.0 03	02.7	20 34.4 1.0 03	02.6	22 04.3 1.0 03	02.5	22 34.2 1.0 03	02.5	23 04.1 1.0 02	02.5	29 03.4 1.0 02	02.0	29 33.4 1.0 02	02.0	34 32.7 1.0 02	01.6	175
6	20 02.9 1.0 02	02.1	20 32.8 1.0 02	02.1	22 02.7 1.0 02	02.0	22 32.7 1.0 02	02.0	23 02.7 1.0 02	02.0	29 02.2 1.0 02	01.6	29 32.2 1.0 02	01.6	34 31.7 1.0 01	01.3	6
7	20 01.6 1.0 02	01.6	20 31.6 1.0 02	01.6	22 01.5 1.0 01	01.5	22 31.5 1.0 01	01.5	23 01.5 1.0 01	01.5	29 01.2 1.0 01	01.2	29 31.2 1.0 01	01.2	34 31.0 1.0 01	01.0	7
8	20 00.7 1.0 01	01.1	20 30.7 1.0 01	01.1	22 00.7 1.0 01	01.0	22 30.7 1.0 01	01.0	23 00.7 1.0 01	01.0	29 00.6 1.0 01	00.8	29 30.5 1.0 01	00.8	34 30.4 1.0 01	00.6	8
9	20 00.2 1.0 00	00.5	20 30.2 1.0 00	00.5	22 00.2 1.0 00	00.5	22 30.2 1.0 00	00.5	23 00.2 1.0 00	00.5	29 00.1 1.0 00	00.4	29 30.1 1.0 00	00.4	34 30.1 1.0 00	00.3	9
180	20 00.0 1.0 00	00.0	20 30.0 1.0 00	00.0	22 00.0 1.0 00	00.0	22 30.0 1.0 00	00.0	23 00.0 1.0 00	00.0	29 00.0 1.0 00	00.0	29 30.0 1.0 00	00.0	34 30.0 1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 50°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	44	180	48	180	52	180	56	180	60	180	64	180	68	180	72	180	76	180	80	180	84	180	00
4	44	174	48	174	52	174	56	173	60	173	64	172	68	171	72	169	76	167	80	163	83	154	4
8	44	169	47	168	51	167	55	166	59	165	63	164	67	162	71	159	75	154	79	148	82	135	8
12	43	164	47	162	51	161	55	160	59	158	62	156	66	153	70	149	74	144	77	135	80	122	12
16	42	158	46	157	50	155	54	153	57	151	61	149	65	145	68	141	72	134	75	126	78	113	16
20	41	153	45	151	49	150	52	147	56	145	60	142	63	138	67	133	70	126	73	118	75	106	20
24	40	148	43	146	47	144	51	142	54	139	58	135	61	131	65	126	68	120	70	112	73	101	24
28	38	143	42	141	46	139	49	136	53	133	56	130	59	125	63	120	65	114	68	106	70	97	28
32	37	139	40	137	44	134	47	131	51	128	54	124	57	120	60	115	63	109	66	102	68	93	32
36	35	134	38	132	42	129	45	127	49	123	52	120	55	115	58	110	61	105	63	98	65	90	36
40	33	130	36	128	40	125	43	122	46	119	50	115	53	111	55	106	58	101	60	94	62	87	40
44	31	126	34	124	38	121	41	118	44	115	47	111	50	107	53	102	56	97	58	91	60	84	44
48	29	122	32	120	35	117	39	114	42	111	45	107	48	103	50	98	53	94	55	88	57	82	48
52	27	118	30	116	33	113	36	110	39	107	42	103	45	99	48	95	50	90	53	85	55	79	52
56	24	115	28	112	31	109	34	106	37	103	40	100	43	96	45	92	48	87	50	82	52	77	56
60	22	111	25	109	28	106	31	103	34	100	37	96	40	93	43	89	45	84	48	80	50	75	60
64	20	108	23	105	26	102	29	100	32	96	35	93	37	90	40	86	43	82	45	77	47	72	64
68	17	105	20	102	23	99	26	96	29	93	32	90	35	87	38	83	40	79	43	75	45	70	68
72	15	101	18	99	21	96	24	93	27	90	30	87	32	84	35	80	38	76	40	72	42	68	72
76	12	98	15	96	18	93	21	90	24	87	27	84	30	81	33	77	35	74	38	70	40	66	76
80	09	95	13	92	16	90	19	87	22	84	24	81	27	78	30	75	33	71	35	68	38	64	80
84	07	92	10	89	13	87	16	84	19	81	22	78	25	75	28	72	30	69	33	65	35	61	84
88	04	89	07	86	10	84	13	81	16	78	19	75	22	73	25	69	28	66	31	63	33	59	88
92	02	86	05	83	08	81	11	78	14	75	17	73	20	70	23	67	26	64	28	60	31	57	92
96	*01*	83	02	80	05	78	08	75	11	72	14	70	17	67	20	64	23	61	26	58	29	55	96
100	*03*	80	*00*	77	03	75	06	72	09	70	12	67	15	64	18	62	21	59	24	56	27	53	100
104	*06*	77	*03*	74	00	72	04	69	07	67	10	64	13	61	16	59	19	56	22	53	25	50	104
108	*08*	74	*05*	71	*02*	69	01	66	04	64	07	61	11	59	14	56	17	54	20	51	23	48	108
112	*11*	70	*08*	68	*04*	65	*01*	63	02	61	05	58	08	56	12	53	15	51	18	48	21	46	112
116	*13*	67	*10*	65	*07*	62	*03*	60	*00*	58	03	55	06	53	10	51	13	48	16	46	19	43	116
120	*15*	64	*12*	61	*09*	59	*06*	57	*02*	55	01	52	04	50	08	48	11	46	14	43	18	41	120
124	*18*	60	*14*	58	*11*	56	*08*	54	*04*	51	*01*	49	02	47	06	45	09	43	13	41	16	38	124
128	*20*	57	*17*	55	*13*	52	*10*	50	*06*	48	*03*	46	01	44	04	42	07	40	11	38	14	36	128
132	*22*	53	*19*	51	*15*	49	*12*	47	*08*	45	*05*	43	*01*	41	02	39	06	37	09	35	13	33	132
136	*24*	49	*21*	47	*17*	45	*13*	43	*10*	42	*06*	40	*03*	38	01	36	04	34	08	32	12	31	136
140	*26*	45	*22*	44	*19*	42	*15*	40	*12*	38	*08*	36	*04*	35	*01*	33	03	31	07	30	10	28	140
144	*28*	41	*24*	40	*20*	38	*17*	36	*13*	35	*09*	33	*06*	31	*02*	30	02	28	05	27	09	25	144
148	*29*	37	*26*	36	*22*	34	*18*	32	*14*	31	*11*	30	*07*	28	*03*	27	01	25	04	24	08	23	148
152	*31*	33	*27*	31	*23*	30	*20*	29	*16*	27	*12*	26	*08*	25	*04*	24	*01*	22	03	21	07	20	152
156	*32*	29	*28*	27	*25*	26	*21*	25	*17*	24	*13*	22	*09*	21	*05*	20	*01*	19	02	18	06	17	156
160	*33*	24	*29*	23	*26*	22	*22*	21	*18*	20	*14*	19	*10*	18	*06*	17	*02*	16	02	15	06	14	160
164	*34*	19	*30*	18	*26*	18	*23*	17	*19*	16	*15*	15	*11*	14	*07*	14	*03*	13	01	12	05	11	164
168	*35*	15	*31*	14	*27*	13	*23*	13	*19*	12	*15*	11	*11*	11	*07*	10	*03*	10	01	09	05	09	168
172	*36*	10	*32*	09	*28*	09	*24*	08	*20*	08	*16*	08	*12*	07	*08*	07	*04*	06	00	06	04	06	172
176	*36*	05	*32*	05	*28*	04	*24*	04	*20*	04	*16*	04	*12*	04	*08*	03	*04*	03	00	03	04	03	176
180	*36*	00	*32*	00	*28*	00	*24*	00	*20*	00	*16*	00	*12*	00	*08*	00	*04*	00	00	00	04	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—15096

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

Lat. 50°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	88	180	88	00	84	00	80	00	76	00	72	00	68	00	64	00	60	00	56	00	52	00	00
4	87	126	87	50	84	20	80	11	76	07	72	05	68	03	64	02	60	01	56	01	52	00	4
8	84	108	85	65	82	36	79	21	75	14	72	10	68	07	64	04	60	03	56	01	52	00	8
12	82	100	82	71	81	46	78	30	75	20	71	14	67	10	64	06	60	04	56	02	52	01	12
16	79	95	80	73	79	52	76	36	74	25	70	18	67	13	63	09	60	05	56	03	52	01	16
20	77	91	77	73	77	56	75	41	72	30	69	21	66	15	63	10	59	07	56	04	52	01	20
24	74	88	75	73	74	58	73	45	71	33	68	25	66	18	62	12	59	08	55	04	52	01	24
28	72	85	72	73	72	59	71	47	70	36	67	27	65	20	62	14	59	09	55	05	52	02	28
32	69	83	70	72	70	60	69	49	68	38	66	29	64	22	61	15	58	10	55	06	52	02	32
36	67	81	67	71	68	60	67	50	66	40	65	31	63	23	60	17	58	11	55	06	52	02	36
40	64	79	65	70	66	60	65	51	65	41	63	33	62	25	60	18	57	12	54	07	52	02	40
44	61	77	63	69	63	60	63	51	63	42	62	34	61	26	59	19	57	13	54	07	51	02	44
48	59	75	60	67	61	59	61	51	61	43	61	35	59	27	58	20	56	13	54	08	51	02	48
52	57	73	58	66	59	59	59	51	60	43	59	35	58	28	57	21	55	14	53	08	51	03	52
56	54	71	56	65	57	58	57	50	58	43	58	35	57	28	56	21	55	14	53	08	51	03	56
60	52	69	53	63	55	57	55	50	56	43	56	36	56	28	55	22	54	15	53	09	51	03	60
64	49	67	51	62	52	56	54	49	54	42	55	36	55	29	54	22	53	15	52	09	51	03	64
68	47	65	49	60	50	54	52	48	53	42	53	35	53	29	53	22	53	15	52	09	51	03	68
72	45	63	47	58	48	53	50	47	51	41	52	35	52	29	52	22	52	16	52	09	51	03	72
76	42	61	44	57	46	52	48	46	49	41	50	35	51	28	51	22	51	16	51	09	50	03	76
80	40	59	42	55	44	50	46	45	48	40	49	34	50	28	50	22	51	16	51	09	50	03	80
84	38	57	40	53	42	49	44	44	46	39	47	33	49	28	49	22	50	16	50	09	50	03	84
88	36	55	38	51	40	47	42	43	44	38	46	33	47	27	48	21	49	15	50	09	50	03	88
92	34	53	36	50	39	46	41	41	43	37	45	32	46	26	48	21	49	15	49	09	50	03	92
96	32	51	34	48	37	44	39	40	41	35	43	31	45	26	47	21	48	15	49	09	50	03	96
100	30	49	32	46	35	42	37	38	40	34	42	30	44	25	46	20	47	15	49	09	50	03	100
104	28	47	31	44	33	40	36	37	38	33	41	29	43	24	45	19	47	14	48	09	49	03	104
108	26	45	29	42	32	39	34	35	37	31	39	27	42	23	44	19	46	14	48	09	49	03	108
112	24	43	27	40	30	37	33	34	36	30	38	26	41	22	43	18	45	13	47	08	49	03	112
116	22	41	25	38	29	35	32	32	34	29	37	25	40	21	42	17	45	13	47	08	49	03	116
120	21	38	24	36	27	33	30	30	33	27	36	24	39	20	42	16	44	12	47	08	49	03	120
124	19	36	22	34	26	31	29	28	32	25	35	22	38	19	41	15	44	12	46	07	49	03	124
128	18	34	21	31	24	29	28	26	31	24	34	21	37	18	40	14	43	11	46	07	49	02	128
132	16	31	20	29	23	27	27	25	30	22	33	19	37	17	40	14	43	10	46	06	49	02	132
136	15	29	19	27	22	25	26	23	29	20	32	18	36	15	39	13	42	09	46	06	49	02	136
140	14	26	17	25	21	23	25	21	28	19	32	16	35	14	39	11	42	09	45	05	48	02	140
144	13	24	16	22	20	20	24	19	27	17	31	15	35	13	38	10	42	08	45	05	48	02	144
148	12	21	16	20	19	18	33	17	27	15	30	13	34	11	38	09	41	07	45	04	48	02	148
152	11	19	15	17	19	16	22	15	26	13	30	12	34	10	37	08	41	06	45	04	48	01	152
156	10	16	14	15	18	14	22	13	26	11	29	10	33	09	37	07	41	05	44	03	48	01	156
160	10	13	13	13	17	12	21	11	25	10	29	08	33	07	37	06	41	04	44	03	48	01	160
164	09	11	13	10	17	09	21	08	25	08	29	07	33	06	36	05	40	04	44	02	48	01	164
168	09	08	13	08	16	07	20	06	24	06	28	05	32	04	36	04	40	03	44	02	48	01	168
172	08	05	12	05	16	05	20	04	24	04	28	03	32	03	36	02	40	02	44	01	48	00	172
176	08	03	12	03	16	02	20	02	24	02	28	02	32	01	36	01	40	01	44	01	48	00	176
180	08	00	12	00	16	00	20	00	24	00	28	00	32	00	36	00	40	00	44	00	48	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

Lat. 51°

H.A.	0° 00′ Alt.	Az.	0° 30′ Alt.	Az.	1° 00′ Alt.	Az.	1° 30′ Alt.	Az.	2° 00′ Alt.	Az.	2° 30′ Alt.	Az.	3° 00′ Alt.	Az.	3° 30′ Alt.	Az.	H.A.
°	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	°
00	39 00.0	1.0 01 180.0	39 30.0	1.0 01 180.0	40 00.0	1.0 01 180.0	40 30.0	1.0 01 180.0	41 00.0	1.0 01 180.0	41 30.0	1.0 01 180.0	42 00.0	1.0 01 180.0	42 30.0	1.0 01 180.0	00
1	38 59.6	1.0 02 178.7	39 29.6	1.0 02 178.7	39 59.6	1.0 02 178.7	40 29.6	1.0 02 178.7	40 59.6	1.0 02 178.7	41 29.6	1.0 02 178.7	41 59.6	1.0 02 178.7	42 29.6	1.0 02 178.6	1
2	38 58.3	1.0 04 177.4	39 28.3	1.0 04 177.4	39 58.3	1.0 04 177.4	40 28.3	1.0 04 177.4	40 58.3	1.0 04 177.4	41 28.2	1.0 04 177.3	41 58.2	1.0 04 177.3	42 28.2	1.0 04 177.3	2
3	38 56.2	1.0 05 176.1	39 26.2	1.0 05 176.1	39 56.1	1.0 05 176.1	40 26.1	1.0 05 176.1	40 56.1	1.0 05 176.0	41 26.0	1.0 05 176.0	41 56.0	1.0 05 176.0	42 26.0	1.0 05 175.9	3
4	38 53.2	1.0 06 174.9	39 23.2	1.0 06 174.8	39 53.1	1.0 06 174.8	40 23.1	1.0 06 174.7	40 53.0	1.0 07 174.7	41 23.0	1.0 07 174.7	41 52.9	1.0 07 174.6	42 22.9	1.0 07 174.6	4
05	38 49.4	1.0 08 173.6	39 19.3	1.0 08 173.5	39 49.3	1.0 08 173.5	40 19.2	1.0 08 173.4	40 49.1	1.0 08 173.4	41 19.0	1.0 08 173.3	41 49.0	1.0 08 173.3	42 18.9	1.0 08 173.2	05
6	38 44.8	1.0 09 172.3	39 14.7	1.0 09 172.2	39 44.6	1.0 09 172.2	40 14.4	1.0 09 172.1	40 44.3	1.0 09 172.1	41 14.2	1.0 09 172.0	41 44.1	1.0 10 172.0	42 14.0	1.0 10 171.9	6
7	38 39.3	1.0 10 171.0	39 09.2	1.0 11 171.0	39 39.0	1.0 11 170.9	40 08.9	99 11 170.8	40 38.7	99 11 170.8	41 08.5	99 11 170.7	41 38.4	99 11 170.6	42 08.2	99 11 170.6	7
8	38 33.0	99 12 169.7	39 02.8	99 12 169.7	39 32.6	99 12 169.6	40 02.4	99 12 169.5	40 32.2	99 12 169.5	41 02.0	99 12 169.4	41 31.8	99 12 169.3	42 01.6	99 12 169.2	8
9	38 25.9	99 13 168.5	38 55.6	99 13 168.4	39 25.4	99 13 168.3	39 55.1	99 14 168.2	40 24.9	99 14 168.2	40 54.6	99 14 168.1	41 24.4	99 14 168.0	41 54.1	99 14 167.9	9
10	38 17.9	99 15 167.2	38 47.6	99 15 167.1	39 17.3	99 15 167.0	39 47.0	99 15 166.9	40 16.7	99 15 166.9	40 46.4	99 15 166.8	41 16.1	99 15 166.7	41 45.8	99 15 166.6	10
1	38 09.2	99 16 166.0	38 38.8	99 16 165.9	39 08.4	99 16 165.8	39 38.1	99 16 165.7	40 07.7	99 16 165.6	40 37.3	99 16 165.5	41 07.0	99 17 165.3	41 36.6	99 17 165.2	1
2	37 59.6	99 17 164.7	38 29.2	99 17 164.6	38 58.7	99 18 164.5	39 28.3	99 18 164.4	39 57.9	99 18 164.3	40 27.4	99 18 164.2	40 57.0	98 18 164.0	41 26.5	98 18 163.9	2
3	37 49.2	98 19 163.5	38 18.7	98 19 163.3	38 48.3	98 19 163.2	39 17.7	98 19 163.1	39 47.2	98 19 163.0	40 16.7	98 19 162.9	40 46.2	98 19 162.7	41 15.7	98 19 162.6	3
4	37 38.1	98 20 162.2	38 07.5	98 20 162.1	38 37.0	98 20 162.0	39 06.4	98 20 161.8	39 35.8	98 20 161.7	40 05.2	98 21 161.6	40 34.6	98 21 161.5	41 04.0	98 21 161.3	4
15	37 26.2	98 21 161.0	37 55.5	98 21 160.8	38 24.9	98 21 160.7	38 54.2	98 22 160.6	39 23.5	98 22 160.4	39 52.9	98 22 160.3	40 22.2	98 22 160.2	40 51.5	98 23 160.0	15
6	37 13.5	98 23 159.7	37 42.8	98 23 159.6	38 12.0	98 23 159.5	38 41.3	97 23 159.3	39 10.5	97 23 159.2	39 39.8	97 23 159.0	40 09.0	97 23 158.9	40 38.2	97 23 158.7	6
7	37 00.0	97 24 158.5	37 29.2	97 24 158.4	37 58.4	97 24 158.2	38 27.6	97 24 158.1	38 56.7	97 24 157.9	39 25.9	97 24 157.8	39 55.0	97 25 157.6	40 24.1	97 25 157.5	7
8	36 45.8	97 25 157.3	37 14.9	97 25 157.2	37 44.0	97 25 157.0	38 13.1	97 25 156.8	38 42.1	97 26 156.7	39 11.2	97 26 156.5	39 40.2	97 26 156.4	40 09.2	97 26 156.2	8
9	36 30.9	97 26 156.1	36 59.9	97 26 155.9	37 28.9	97 26 155.8	37 57.9	97 27 155.6	38 26.8	97 27 155.5	38 55.8	96 27 155.3	39 24.7	96 27 155.1	39 53.6	96 27 154.9	9
20	36 15.2	96 27 154.9	36 44.2	96 27 154.7	37 13.0	96 28 154.6	37 41.9	96 28 154.4	38 10.8	96 28 154.2	38 39.6	96 28 154.0	39 08.5	96 28 153.9	39 37.3	96 28 153.7	20
1	35 58.9	96 28 153.7	36 27.7	96 29 153.5	36 56.5	96 29 153.4	37 25.2	96 29 153.2	37 54.0	96 29 153.0	38 22.7	96 29 152.8	38 51.5	96 30 152.6	39 20.2	96 30 152.5	1
2	35 41.8	96 30 152.5	36 10.5	96 30 152.4	36 39.2	96 30 152.2	37 07.9	96 30 152.0	37 36.5	95 30 151.8	38 05.1	95 30 151.6	38 33.8	95 31 151.4	39 02.3	95 31 151.2	2
3	35 24.0	96 31 151.4	35 52.6	95 31 151.2	36 21.2	95 31 151.0	36 49.8	95 31 150.8	37 18.3	95 31 150.6	37 46.8	95 32 150.4	38 15.3	95 32 150.2	38 43.8	95 32 150.0	3
4	35 05.6	95 32 150.2	35 34.1	95 32 150.0	36 02.6	95 32 149.8	36 31.0	95 32 149.6	36 59.4	95 33 149.4	37 27.8	95 33 149.2	37 56.2	95 33 149.0	38 24.6	95 33 148.8	4
25	34 46.5	95 33 149.0	35 14.9	95 33 148.8	35 43.2	94 33 148.6	36 11.6	94 33 148.4	36 39.9	94 34 148.2	37 08.2	94 34 148.0	37 36.5	94 34 147.8	38 04.7	94 34 147.6	25
6	34 26.8	94 34 147.9	34 55.0	94 34 147.7	35 23.3	94 34 147.5	35 51.5	94 35 147.3	36 19.7	94 35 147.1	36 47.9	94 35 146.8	37 16.0	94 35 146.6	37 44.1	94 35 146.4	6
7	34 06.4	94 35 146.7	34 34.5	94 35 146.5	35 02.6	94 35 146.3	35 30.7	94 36 146.1	35 58.8	94 36 145.9	36 26.9	93 36 145.7	36 54.9	93 36 145.5	37 22.9	93 36 145.2	7
8	33 45.4	93 36 145.6	34 13.4	93 36 145.4	34 41.4	93 36 145.2	35 09.4	93 37 145.0	35 37.3	93 37 144.7	36 05.3	93 37 144.5	36 33.2	93 37 144.3	37 01.1	93 37 144.1	8
9	33 23.7	93 37 144.5	33 51.6	93 37 144.3	34 19.5	93 37 144.1	34 47.4	93 38 143.8	35 15.2	93 38 143.6	35 43.1	93 38 143.4	36 10.8	93 38 143.1	36 38.6	92 38 142.9	9
30	33 01.5	93 38 143.4	33 29.3	93 38 143.2	33 57.1	93 38 142.9	34 24.8	92 39 142.7	34 52.5	92 39 142.5	35 20.2	92 39 142.2	35 47.9	92 39 142.0	36 15.5	92 39 141.8	30
1	32 38.7	92 39 142.3	33 06.4	92 39 142.1	33 34.0	92 39 141.8	34 01.7	92 40 141.6	34 29.2	92 40 141.4	34 56.8	92 40 141.1	35 24.4	92 40 140.9	35 51.9	92 40 140.6	1
2	32 15.3	92 40 141.2	32 42.9	92 40 141.0	33 10.4	92 40 140.7	33 37.9	92 40 140.5	34 05.4	92 41 140.2	34 32.8	91 41 140.0	35 00.2	91 41 139.8	35 27.6	91 41 139.5	2
3	31 51.4	91 41 140.1	32 18.8	91 41 139.9	32 46.2	91 41 139.6	33 13.6	91 41 139.4	33 41.0	91 42 139.1	34 08.3	91 42 138.9	34 35.6	91 42 138.6	35 02.8	91 42 138.4	3
4	31 26.9	91 42 139.0	31 54.2	91 42 138.8	32 21.5	91 42 138.6	32 48.8	91 42 138.3	33 16.0	91 42 138.1	33 43.2	91 43 137.8	34 10.4	91 43 137.5	34 37.5	90 43 137.3	4
35	31 01.9	91 43 138.0	31 29.1	91 43 137.7	31 56.2	91 43 137.5	32 23.4	90 43 137.2	32 50.5	90 43 137.0	33 17.6	90 44 136.7	33 44.6	90 44 136.5	34 11.6	90 44 136.2	35
6	30 36.4	90 43 136.9	31 03.4	90 44 136.7	31 30.5	90 44 136.4	31 57.5	90 44 136.2	32 24.5	90 44 135.9	32 51.4	90 44 135.6	33 18.3	90 45 135.4	33 45.2	90 45 135.1	6
7	30 10.3	90 44 135.9	30 37.3	90 44 135.6	31 04.2	90 45 135.4	31 31.1	90 45 135.1	31 57.9	89 45 134.9	32 24.8	89 45 134.6	32 51.6	89 45 134.3	33 18.3	89 46 134.0	7
8	29 43.8	89 45 134.8	30 10.6	89 45 134.6	30 37.4	89 45 134.3	31 04.2	89 46 134.1	31 30.9	89 46 133.8	31 57.6	89 46 133.5	32 24.3	89 46 133.3	32 51.0	89 46 133.0	8
9	29 16.8	89 46 133.8	29 43.5	89 46 133.6	30 10.2	89 46 133.3	30 36.8	89 46 133.0	31 03.4	89 47 132.8	31 30.0	89 47 132.5	31 56.6	88 47 132.2	32 23.1	88 47 131.9	9
40	28 49.3	89 47 132.8	29 15.9	89 47 132.5	29 42.5	88 47 132.3	30 09.0	88 47 132.0	30 35.5	88 47 131.7	31 02.0	88 48 131.5	31 28.4	88 48 131.2	31 54.8	88 48 130.9	40
1	28 21.4	88 47 131.8	28 47.9	88 48 131.5	29 14.3	88 48 131.3	29 40.7	88 48 131.0	30 07.1	88 48 130.7	30 33.4	88 48 130.4	30 59.8	88 48 130.2	31 26.0	88 49 129.9	1
2	27 53.0	88 48 130.8	28 19.4	88 48 130.5	28 45.7	88 48 130.3	29 12.0	88 49 130.0	29 38.3	87 49 129.7	30 04.5	87 49 129.4	30 30.7	87 49 129.1	30 56.8	87 49 128.9	2
3	27 24.2	88 49 129.8	27 50.5	87 49 129.5	28 16.7	87 49 129.3	28 42.9	87 49 129.0	29 09.0	87 49 128.7	29 35.1	87 50 128.4	30 01.2	87 50 128.1	30 27.2	87 50 127.8	3
4	26 55.0	87 49 128.8	27 21.1	87 50 128.5	27 47.2	87 50 128.3	28 13.3	87 50 128.0	28 39.3	87 50 127.7	29 05.3	87 50 127.4	29 31.3	86 50 127.1	29 57.2	86 51 126.8	4
45	26 25.4	87 50 127.9	26 51.4	87 50 127.6	27 17.4	87 50 127.3	27 43.3	86 51 127.0	28 09.3	86 51 126.7	28 35.1	86 51 126.4	29 01.0	86 51 126.1	29 26.8	86 51 125.9	45
6	25 55.4	86 51 126.9	26 21.3	86 51 126.6	26 47.2	86 51 126.3	27 13.0	86 51 126.0	27 38.8	86 51 125.8	28 04.6	86 52 125.5	28 30.3	86 52 125.2	28 56.0	86 52 124.9	6
7	25 25.0	86 51 125.9	25 50.8	86 51 125.6	26 16.6	86 52 125.4	26 42.3	86 52 125.1	27 08.0	86 52 124.8	27 33.6	85 52 124.5	27 59.3	85 52 124.2	28 24.8	85 53 123.9	7
8	24 54.2	86 52 125.0	25 19.9	86 52 124.7	25 45.6	85 52 124.4	26 11.2	85 52 124.1	26 36.8	85 53 123.8	27 02.3	85 53 123.5	27 27.8	85 53 123.2	27 53.3	85 53 122.9	8
9	24 23.1	85 52 124.0	24 48.7	85 53 123.8	25 14.3	85 53 123.5	25 39.8	85 53 123.2	26 05.2	85 53 122.9	26 30.7	85 53 122.6	26 56.1	85 53 122.3	27 21.5	85 54 122.0	9
50	23 51.7	85 53 123.1	24 17.1	85 53 122.8	24 42.6	85 53 122.5	25 08.0	85 54 122.2	25 33.4	85 54 121.9	25 58.7	84 54 121.6	26 24.0	84 54 121.3	26 49.3	84 54 121.0	50
1	23 19.9	85 54 122.2	23 45.2	85 54 121.9	24 10.6	84 54 121.6	24 35.9	84 54 121.3	25 01.2	84 54 121.0	25 26.4	84 54 120.7	25 51.6	84 55 120.4	26 16.8	84 55 120.1	1
2	22 47.7	84 54 121.3	23 13.0	84 54 121.0	23 38.3	84 54 120.7	24 03.5	84 55 120.4	24 28.6	84 55 120.1	24 53.8	84 55 119.8	25 18.9	84 55 119.5	25 43.9	83 55 119.2	2
3	22 15.3	84 55 120.4	22 40.5	84 55 120.1	23 05.6	84 55 119.8	23 30.7	84 55 119.5	23 55.8	84 55 119.2	24 20.9	83 55 118.9	24 45.9	83 56 118.6	25 10.8	83 56 118.3	3
4	21 42.6	84 55 119.4	22 07.7	84 55 119.2	22 32.7	83 55 118.9	22 57.7	83 56 118.6	23 22.7	83 56 118.3	23 47.6	83 56 118.0	24 12.6	83 56 117.6	24 37.4	83 56 117.3	4
55	21 09.6	83 56 118.6	21 34.5	83 56 118.3	21 59.5	83 56 118.0	22 24.4	83 56 117.7	22 49.3	83 56 117.4	23 14.2	83 56 117.0	23 39.0	83 56 116.7	24 03.8	83 57 116.4	55
6	20 36.3	83 56 117.7	21 01.1	83 56 117.4	21 26.0	83 56 117.1	21 50.8	83 56 116.8	22 15.6	83 57 116.5	22 40.4	82 57 116.2	23 05.1	82 57 115.8	23 29.8	82 57 115.5	6
7	20 02.7	83 56 116.8	20 27.5	83 57 116.5	20 52.3	83 57 116.2	21 17.0	82 57 115.9	21 41.7	82 57 115.6	22 06.4	82 57 115.3	22 31.0	82 57 115.0	22 55.6	82 57 114.6	7
8	19 28.8	82 57 115.9	19 53.6	82 57 115.6	20 18.2	82 57 115.3	20 42.9	82 57 115.0	21 07.5	82 57 114.7	21 32.1	82 58 114.4	21 56.7	82 58 114.1	22 21.2	82 58 113.8	8
9	18 54.8	82 57 115.0	19 19.4	82 57 114.7	19 44.0	82 58 114.4	20 08.5	82 58 114.1	20 33.1	82 58 113.8	20 57.6	82 58 113.5	21 22.1	82 58 113.2	21 46.5	81 58 112.9	9
60	18 20.4	82 58 114.2	18 45.0	82 58 113.9	19 09.5	82 58 113.6	19 34.0	82 58 113.3	19 58.4	81 58 112.9	20 22.9	81 58 112.6	20 47.2	81 58 112.3	21 11.6	81 59 112.0	60
1	17 45.9	82 58 113.3	18 10.3	82 58 113.0	18 34.8	81 58 112.7	18 59.2	81 58 112.4	19 23.5	81 58 112.1	19 47.9	81 59 111.8	20 12.2	81 59 111.5	20 36.5	81 59 111.1	1
2	17 11.1	81 58 112.5	17 35.5	81 58 112.1	17 59.8	81 59 111.8	18 24.1	81 59 111.5	18 48.5	81 59 111.2	19 12.7	81 59 110.9	19 37.0	81 59 110.6	20 01.2	81 59 110.3	2
3	16 36.1	81 59 111.6	17 00.4	81 59 111.3	17 24.7	81 59 111.0	17 48.9	81 59 110.7	18 13.2	81 59 110.4	18 37.4	81 59 110.1	19 01.5	81 59 109.7	19 25.7	80 60 109.4	3
4	16 00.9	81 59 110.8	16 25.1	81 59 110.5	16 49.3	81 59 110.1	17 13.5	81 59 109.8	17 37.7	80 59 109.5	18 01.8	80 60 109.2	18 25.9	80 60 108.9	18 50.0	80 60 108.6	4
65	15 25.4	81 59 109.9	15 49.6	81 59 109.6	16 13.8	80 60 109.3	16 37.9	80 60 109.0	17 02.0	80 60 108.7	17 26.0	80 60 108.4	17 50.1	80 60 108.1	18 14.1	80 60 107.7	65
6	14 49.9	80 60 109.1	15 14.0	80 60 108.8	15 38.0	80 60 108.5	16 02.1	80 60 108.2	16 26.1	80 60 107.8	16 50.1	80 60 107.5	17 14.1	80 60 107.2	17 37.0	80 60 106.9	6
7	14 14.1	80 60 108.3	14 38.1	80 60 107.9	15 02.1	80 60 107.6	15 26.1	80 60 107.3	15 50.1	80 60 107.0	16 14.0	80 60 106.7	16 37.9	80 60 106.4	17 01.8	80 61 106.1	7
8	13 38.1	80 60 107.4	14 02.1	80 60 107.1	14 26.1	80 60 106.8	14 50.0	80 60 106.5	15 13.9	80 61 106.2	15 37.8	80 61 105.9	16 01.6	79 61 105.6	16 25.5	79 61 105.2	8
9	13 02.0	80 60 106.6	13 26.0	80 61 106.3	13 49.9	80 61 106.0	14 13.7	80 61 105.7	14 37.6	79 61 105.4	15 01.4	79 61 105.1	15 25.2	79 61 104.7	15 49.0	79 61 104.4	9
70	12 25.8	80 61 105.8	12 49.6	80 61 105.5	13 13.5	79 61 105.2	13 37.3	79 61 104.9	14 01.1	79 61 104.5	14 24.9	79 61 104.2	14 48.6	79 61 103.9	15 12.3	79 61 103.6	70
1	11 49.4	79 61 105.0	12 13.2	79 61 104.7	12 37.0	79 61 104.4	13 00.7	79 61 104.0	13 24.5	79 61 103.7	13 48.2	79 61 103.4	14 11.9	79 61 103.1	14 35.6	79 61 102.8	1
2	11 12.8	79 61 104.2	11 36.6	79 61 103.9	12 00.3	79 61 103.5	12 24.0	79 61 103.2	12 47.7	79 61 102.9	13 11.4	79 62 102.6	13 35.1	79 62 102.3	13 58.7	79 62 102.0	2
3	10 36.2	79 61 103.4	10 59.9	79 61 103.1	11 23.6	79 61 102.7	11 47.2	79 62 102.4	12 10.9	79 62 102.1	12 34.5	79 62 101.8	12 58.1	79 62 101.5	13 21.7	79 62 101.2	3
4	9 59.4	79 62 102.6	10 23.0	79 62 102.3	10 46.7	79 62 101.9	11 10.3	79 62 101.6	11 33.9	79 62 101.3	11 57.5	79 62 101.0	12 21.1	79 62 100.7	12 44.6	78 62 100.4	4
75	9 22.4	79 62 101.8	9 46.1	79 62 101.5	10 09.7	79 62 101.1	10 33.3	79 62 100.8	10 56.8	79 62 100.5	11 20.4	78 62 100.2	11 43.9	78 62 99.9	12 07.4	78 62 99.6	75
6	8 45.4	79 62 101.0	9 09.0	79 62 100.7	9 32.6	79 62 100.3	9 56.1	78 62 100.0	10 19.7	78 62 99.7	10 43.2	78 62 99.4	11 06.7	78 62 99.1	11 30.1	78 62 98.8	6
7	8 08.3	79 62 100.2	8 31.9	78 62 99.9	8 55.4	78 62 99.5	9 18.9	78 62 99.2	9 42.4	78 62 98.9	10 05.9	78 62 98.6	10 29.3	78 62 98.3	10 52.8	78 62 98.0	7
8	7 31.1	78 62 99.4	7 54.6	78 62 99.1	8 18.1	78 62 98.8	8 41.6	78 62 98.4	9 05.1	78 62 98.1	9 28.5	78 62 97.8	9 51.9	78 62 97.5	10 15.3	78 62 97.2	8
9	6 53.8	78 62 98.6	7 17.3	78 62 98.3	7 40.7	78 62 98.0	8 04.2	78 62 97.6	8 27.6	78 62 97.3	8 51.1	78 62 97.0	9 14.5	78 63 96.7	9 37.9	78 63 96.4	9
80	6 16.4	78 62 97.8	6 39.9	78 62 97.5	7 03.3	78 62 97.2	7 26.7	78 63 96.9	7 50.2	78 63 96.5	8 13.5	78 63 96.2	8 36.9	78 63 95.9	9 00.3	78 63 95.6	80
1	5 39.0	78 62 97.0	6 02.4	78 63 96.7	6 25.8	78 63 96.4	6 49.2	78 63 96.1	7 12.6	78 63 95.8	7 36.0	78 63 95.4	7 59.3	78 63 95.1	8 22.7	78 63 94.8	1
2	5 01.5	78 63 96.2	5 24.9	78 63 95.9	5 48.3	78 63 95.6	6 11.6	78 63 95.3	6 35.0	78 63 95.0	6 58.4	78 63 94.7	7 21.7	78 63 94.3	7 45.0	78 63 94.0	2
3					5 10.7	78 63 94.8	5 34.0	78 63 94.5	5 57.4	78 63 94.2	6 20.7	78 63 93.9	6 44.0	78 63 93.6	7 07.4	78 63 93.2	3
4									5 19.7	78 63 93.4	5 43.0	78 63 93.1	6 06.3	78 63 92.8	6 29.7	78 63 92.5	4
85											5 05.3	78 63 92.3	5 28.6	78 63 92.0	5 51.9	78 63 91.7	85
6															5 14.2	78 63 90.9	6

Digitized by Google

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		
00	39 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	38 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	37 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	36 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	00
1	38 59.6	1.0 02	178.7	38 29.6	1.0 02	178.7	37 59.6	1.0 02	178.7	37 29.6	1.0 02	178.7	36 59.6	1.0 02	178.7	36 29.6	1.0 02	178.8	35 59.6	1.0 02	178.8	35 29.6	1.0 02	178.8	1
2	38 58.3	1.0 04	177.4	38 28.3	1.0 04	177.4	37 58.3	1.0 04	177.5	37 28.3	1.0 03	177.5	36 58.4	1.0 03	177.5	36 28.4	1.0 03	177.5	35 58.4	1.0 03	177.5	35 28.4	1.0 03	177.5	2
3	38 56.2	1.0 05	176.1	38 26.2	1.0 05	176.2	37 56.2	1.0 05	176.2	37 26.3	1.0 05	176.2	36 56.3	1.0 05	176.2	36 26.3	1.0 05	176.3	35 56.3	1.0 05	176.3	35 26.4	1.0 05	176.3	3
4	38 53.2	1.0 06	174.9	38 23.3	1.0 06	174.9	37 53.3	1.0 06	174.9	37 23.4	1.0 06	175.0	36 53.4	1.0 06	175.0	36 23.5	1.0 06	175.0	35 53.5	1.0 06	175.1	35 23.5	1.0 06	175.1	4
05	38 49.4	1.0 08	173.6	38 19.5	1.0 08	173.6	37 49.6	1.0 08	173.7	37 19.6	1.0 08	173.7	36 49.7	1.0 08	173.8	36 19.8	1.0 07	173.8	35 49.8	1.0 07	173.8	35 19.9	1.0 07	173.9	05
6	38 44.8	1.0 09	172.3	38 14.9	1.0 09	172.4	37 45.0	1.0 09	172.4	37 15.1	1.0 09	172.5	36 45.2	1.0 09	172.5	36 15.3	1.0 09	172.6	35 45.4	1.0 09	172.6	35 15.5	1.0 09	172.7	6
7	38 39.3	1.0 10	171.0	38 09.4	1.0 10	171.1	37 39.6	1.0 10	171.1	37 09.7	1.0 10	171.2	36 39.9	1.0 10	171.3	36 10.0	1.0 10	171.3	35 40.1	1.0 10	171.4	35 10.3	1.0 10	171.4	7
8	38 33.0	99 12	169.7	38 03.2	99 12	169.8	37 33.4	99 12	169.9	37 03.5	99 12	170.0	36 33.7	99 12	170.0	36 03.9	99 11	170.1	35 34.1	99 11	170.2	35 04.3	99 11	170.2	8
9	38 25.9	99 13	168.5	37 56.1	99 13	168.6	37 26.3	99 13	168.6	36 56.6	99 13	168.7	36 26.8	99 13	168.8	35 57.0	99 13	168.9	35 27.2	99 13	168.9	34 57.5	99 13	169.0	9
10	38 17.9	99 15	167.2	37 48.2	99 14	167.3	37 18.5	99 14	167.4	36 48.8	99 14	167.5	36 19.1	99 14	167.6	35 49.3	99 14	167.6	35 19.6	99 14	167.7	34 49.9	99 14	167.8	10
1	38 09.2	99 16	166.0	37 39.5	99 16	166.1	37 09.8	99 16	166.1	36 40.2	99 16	166.2	36 10.5	99 16	166.3	35 40.9	99 15	166.4	35 11.2	99 15	166.5	34 41.5	99 15	166.6	1
2	37 59.6	99 17	164.7	37 30.0	99 17	164.8	37 00.4	99 17	164.9	36 30.8	99 17	165.0	36 01.2	99 17	165.1	35 31.6	99 17	165.2	35 02.0	99 17	165.3	34 32.4	99 16	165.4	2
3	37 49.2	98 19	163.5	37 19.7	98 18	163.6	36 50.2	98 18	163.7	36 20.7	98 18	163.8	35 51.1	98 18	163.9	35 21.6	98 18	164.0	34 52.0	99 18	164.1	34 22.5	99 18	164.2	3
4	37 38.1	98 20	162.2	37 08.6	98 20	162.3	36 39.2	98 20	162.5	36 09.7	98 19	162.6	35 40.3	98 19	162.7	35 10.8	98 19	162.8	34 41.3	98 19	162.9	34 11.8	98 19	163.0	4
15	37 26.2	98 21	161.0	36 56.8	98 21	161.1	36 27.4	98 21	161.2	35 58.0	98 21	161.4	35 28.7	98 21	161.5	34 59.3	98 20	161.6	34 29.9	98 20	161.7	34 00.4	98 20	161.8	15
6	37 13.5	98 22	159.7	36 44.2	98 22	159.9	36 14.9	98 22	160.0	35 45.6	98 22	160.2	35 16.3	98 22	160.3	34 47.0	98 22	160.4	34 17.6	98 22	160.5	33 48.3	98 21	160.7	6
7	37 00.0	97 24	158.5	36 30.8	97 24	158.7	36 01.6	97 23	158.8	35 32.4	97 23	159.0	35 03.2	97 23	159.1	34 33.9	97 23	159.2	34 04.7	98 23	159.4	33 35.4	98 23	159.5	7
8	36 45.8	97 25	157.3	36 16.7	97 25	157.5	35 47.6	97 25	157.6	35 18.5	97 24	157.8	34 49.3	97 24	157.9	34 20.2	97 24	158.0	33 51.0	97 24	158.2	33 21.9	97 24	158.3	8
9	36 30.9	97 26	156.1	36 01.9	97 26	156.3	35 32.9	97 26	156.4	35 03.8	97 26	156.6	34 34.8	97 25	156.7	34 05.7	97 25	156.9	33 36.6	97 25	157.0	33 07.6	97 25	157.2	9
20	36 15.2	96 27	154.9	35 46.3	96 27	155.1	35 17.4	96 27	155.2	34 48.5	97 27	155.4	34 19.5	97 27	155.6	33 50.5	97 26	155.7	33 21.5	97 26	155.9	32 52.6	97 26	156.0	20
1	35 58.9	96 28	153.7	35 30.1	96 28	153.9	35 01.2	96 28	154.1	34 32.4	96 28	154.2	34 03.5	96 28	154.4	33 34.6	96 28	154.5	33 05.8	96 27	154.7	32 36.9	96 27	154.9	1
2	35 41.8	96 30	152.5	35 13.1	96 29	152.7	34 44.4	96 29	152.9	34 15.6	96 29	153.1	33 46.9	96 29	153.2	33 18.1	96 29	153.4	32 49.3	96 29	153.6	32 20.5	96 28	153.7	2
3	35 24.0	95 31	151.4	34 55.4	95 31	151.5	34 26.8	95 30	151.7	33 58.2	96 30	151.9	33 29.5	96 30	152.1	33 00.8	96 30	152.3	32 32.1	96 30	152.4	32 03.4	96 30	152.6	3
4	35 05.6	95 32	150.2	34 37.1	95 32	150.4	34 08.6	95 31	150.6	33 40.0	95 31	150.8	33 11.5	95 31	150.9	32 42.9	95 31	151.1	32 14.3	95 31	151.3	31 45.7	95 31	151.5	4
25	34 46.5	95 33	149.0	34 18.1	95 33	149.2	33 49.7	95 33	149.4	33 21.3	95 32	149.6	32 52.8	95 32	149.8	32 24.4	95 32	150.0	31 55.9	95 32	150.2	31 27.4	95 32	150.4	25
6	34 26.8	94 34	147.9	33 58.5	94 34	148.1	33 30.2	94 34	148.3	33 01.9	94 33	148.5	32 33.5	94 33	148.7	32 05.2	95 33	148.9	31 36.8	95 33	149.1	31 08.4	95 33	149.3	6
7	34 06.4	94 35	146.7	33 38.2	94 35	147.0	33 10.0	94 35	147.2	32 41.8	94 34	147.4	32 13.6	94 34	147.6	31 45.3	94 34	147.8	31 17.1	94 34	148.0	30 48.8	94 34	148.2	7
8	33 45.4	93 36	145.6	33 17.3	94 36	145.8	32 49.2	94 36	146.0	32 21.1	94 35	146.3	31 53.0	94 35	146.5	31 24.9	94 35	146.7	30 56.7	94 35	146.9	30 28.6	94 35	147.1	8
9	33 23.7	93 37	144.5	32 55.8	93 37	144.7	32 27.8	93 37	144.9	31 59.9	93 36	145.1	31 31.9	93 36	145.4	31 03.8	93 36	145.6	30 35.8	94 36	145.8	30 07.7	94 36	146.0	9
30	33 01.5	93 38	143.4	32 33.7	93 38	143.6	32 05.8	93 38	143.8	31 38.0	93 37	144.1	31 10.1	93 37	144.3	30 42.2	93 37	144.5	30 14.3	93 37	144.7	29 46.3	93 37	144.9	30
1	32 38.7	92 39	142.3	32 11.0	92 39	142.5	31 43.3	92 39	142.7	31 15.5	93 38	143.0	30 47.8	93 38	143.2	30 20.0	93 38	143.4	29 52.1	93 38	143.6	29 24.3	93 38	143.8	1
2	32 15.3	92 40	141.2	31 47.7	92 40	141.4	31 20.1	92 40	141.7	30 52.5	92 39	141.9	30 24.8	92 39	142.1	29 57.2	92 39	142.3	29 29.5	92 39	142.6	29 01.8	92 39	142.8	2
3	31 51.4	91 41	140.1	31 23.9	92 41	140.4	30 56.4	92 40	140.6	30 28.9	92 40	140.8	30 01.4	92 40	141.0	29 33.8	92 40	141.3	29 06.2	92 40	141.5	28 38.6	92 39	141.7	3
4	31 26.9	91 42	139.0	30 59.6	91 42	139.3	30 32.2	91 41	139.5	30 04.8	91 41	139.8	29 37.4	91 41	140.0	29 09.9	92 41	140.2	28 42.5	92 40	140.5	28 15.0	92 40	140.7	4
35	31 01.9	91 43	138.0	30 34.7	91 42	138.2	30 07.4	91 42	138.5	29 40.1	91 42	138.7	29 12.8	91 42	138.9	28 45.5	91 42	139.2	28 18.2	91 41	139.4	27 50.8	91 41	139.6	35
6	30 36.4	90 43	136.9	30 09.3	90 43	137.2	29 42.1	90 43	137.4	29 15.0	91 43	137.7	28 47.8	91 43	137.9	28 20.6	91 42	138.1	27 53.3	91 42	138.4	27 26.1	91 42	138.6	6
7	30 10.3	90 44	135.9	29 43.3	90 44	136.1	29 16.3	90 44	136.4	28 49.3	90 44	136.6	28 22.2	90 43	136.9	27 55.1	90 43	137.1	27 28.0	90 43	137.4	27 00.9	91 43	137.6	7
8	29 43.8	89 45	134.8	29 16.9	90 45	135.1	28 50.0	90 45	135.4	28 23.1	90 44	135.6	27 56.2	90 44	135.9	27 29.2	90 44	136.1	27 02.2	90 44	136.4	26 35.2	90 44	136.6	8
9	29 16.8	89 46	133.8	28 50.0	89 46	134.1	28 23.3	89 45	134.3	27 56.5	89 45	134.6	27 29.6	89 45	134.8	27 02.8	90 45	135.1	26 35.9	90 45	135.3	26 09.0	90 44	135.6	9
40	28 49.3	89 47	132.8	28 22.7	89 46	133.1	27 56.0	89 46	133.3	27 29.3	89 46	133.6	27 02.6	89 46	133.8	26 35.9	89 46	134.1	26 09.1	89 45	134.3	25 42.3	89 45	134.6	40
1	28 21.4	88 47	131.8	27 54.9	88 47	132.1	27 28.3	89 47	132.3	27 01.8	89 47	132.6	26 35.2	89 46	132.8	26 08.5	89 46	133.1	25 41.9	89 46	133.4	25 15.2	89 46	133.6	1
2	27 53.0	88 48	130.8	27 26.6	88 48	131.1	27 00.2	88 48	131.3	26 33.7	88 47	131.6	26 07.3	88 47	131.9	25 40.8	88 47	132.1	25 14.2	89 47	132.4	24 47.7	89 47	132.6	2
3	27 24.2	88 49	129.8	26 57.9	88 48	130.1	26 31.6	88 48	130.3	26 05.3	88 48	130.6	25 38.9	88 48	130.9	25 12.5	88 48	131.1	24 46.1	88 48	131.4	24 19.7	88 47	131.7	3
4	26 55.0	87 49	128.8	26 28.8	87 49	129.1	26 02.6	87 49	129.4	25 36.4	87 49	129.6	25 10.2	88 49	129.9	24 43.9	88 48	130.2	24 17.6	88 48	130.4	23 51.2	88 48	130.7	4
45	26 25.4	87 50	127.9	25 59.3	87 50	128.1	25 33.3	87 50	128.4	25 07.1	87 49	128.7	24 41.0	87 49	128.9	24 14.8	87 49	129.2	23 48.6	87 49	129.5	23 22.4	87 49	129.7	45
6	25 55.4	86 51	126.9	25 29.4	87 50	127.2	25 03.5	87 50	127.4	24 37.5	87 50	127.7	24 11.4	87 50	128.0	23 45.4	87 50	128.3	23 19.3	87 50	128.5	22 53.2	87 49	128.8	6
7	25 25.0	86 51	125.9	24 59.2	86 51	126.2	24 33.3	86 51	126.5	24 07.4	86 51	126.8	23 41.5	86 51	127.0	23 15.5	87 50	127.3	22 49.6	87 50	127.6	22 23.6	87 50	127.9	7
8	24 54.2	86 52	125.0	24 28.5	86 52	125.3	24 02.8	86 52	125.5	23 37.0	86 51	125.8	23 11.2	86 51	126.1	22 45.3	86 51	126.4	22 19.5	86 51	126.7	21 53.6	86 51	126.9	8
9	24 23.1	85 52	124.0	23 57.5	85 52	124.3	23 31.9	86 52	124.6	23 06.2	86 52	124.9	22 40.5	86 52	125.2	22 14.7	86 52	125.5	21 49.0	86 51	125.7	21 23.2	86 51	126.0	9
50	23 51.7	85 53	123.1	23 26.2	85 53	123.4	23 00.6	85 53	123.7	22 35.0	85 52	124.0	22 09.4	85 52	124.2	21 43.8	85 52	124.5	21 18.2	86 52	124.8	20 52.5	86 52	125.1	50
1	23 19.9	85 54	122.2	22 54.5	85 53	122.5	22 29.0	85 53	122.8	22 03.6	85 53	123.0	21 38.1	85 53	123.3	21 12.5	85 53	123.6	20 47.0	85 53	123.9	20 21.4	85 52	124.2	1
2	22 47.7	84 54	121.3	22 22.4	84 54	121.6	21 57.1	85 54	121.8	21 31.7	85 54	122.1	21 06.3	85 53	122.4	20 40.9	85 53	122.7	20 15.5	85 53	123.0	19 50.0	85 53	123.3	2
3	22 15.3	84 55	120.4	21 50.1	84 54	120.6	21 24.9	84 54	120.9	20 59.6	84 54	121.2	20 34.3	84 54	121.5	20 09.0	84 54	121.8	19 43.6	85 54	122.1	19 18.3	85 53	122.4	3
4	21 42.6	84 55	119.4	21 17.5	84 55	119.7	20 52.3	84 55	120.0	20 27.2	84 55	120.3	20 02.0	84 54	120.6	19 36.7	84 54	120.9	19 11.5	84 54	121.2	18 46.2	84 54	121.5	4
55	21 09.6	83 56	118.6	20 44.5	83 55	118.8	20 19.5	84 55	119.1	19 54.4	84 55	119.4	19 29.3	84 55	119.7	19 04.2	84 55	120.0	18 39.0	84 55	120.3	18 13.9	84 54	120.6	55
6	20 36.3	83 56	117.7	20 11.3	83 56	118.0	19 46.4	83 56	118.3	19 21.4	83 56	118.6	18 56.4	83 55	118.8	18 31.4	84 55	119.1	18 06.3	84 55	119.4	17 41.2	84 55	119.7	6
7	20 02.7	83 56	116.8	19 37.8	83 56	117.1	19 13.0	83 56	117.4	18 48.1	83 56	117.7	18 23.2	83 56	118.0	17 58.2	83 56	118.3	17 33.3	83 56	118.5	17 08.3	83 55	118.8	7
8	19 28.8	82 57	115.9	19 04.1	83 57	116.2	18 39.3	83 57	116.5	18 14.5	83 56	116.8	17 49.7	83 56	117.1	17 24.8	83 56	117.4	17 00.0	83 56	117.7	16 35.0	83 56	118.0	8
9	18 54.8	82 57	115.0	18 30.1	82 57	115.3	18 05.4	82 57	115.6	17 40.7	82 57	115.9	17 15.9	83 57	116.2	16 51.2	83 57	116.5	16 26.4	83 56	116.8	16 01.6	83 56	117.1	9
60	18 20.4	82 58	114.2	17 55.8	82 58	114.5	17 31.2	82 57	114.8	17 06.6	82 57	115.1	16 42.0	82 57	115.4	16 17.3	82 57	115.7	15 52.6	82 57	116.0	15 27.8	82 57	116.2	60
1	17 45.9	82 58	113.3	17 21.4	82 58	113.6	16 56.8	82 58	113.9	16 32.3	82 58	114.2	16 07.7	82 57	114.5	15 43.1	82 57	114.8	15 18.5	82 57	115.1	14 53.8	82 57	115.4	1
2	17 11.1	81 58	112.5	16 46.6	81 58	112.8	16 22.2	82 58	113.1	15 57.7	82 58	113.4	15 33.2	82 58	113.7	15 08.7	82 58	114.0	14 44.2	82 58	114.3	14 19.6	82 57	114.6	2
3	16 36.1	81 59	111.6	16 11.7	81 59	111.9	15 47.4	81 58	112.2	15 23.0	81 58	112.5	14 58.5	81 58	112.8	14 34.1	82 58	113.1	14 09.6	82 58	113.4	13 45.2	82 58	113.7	3
4	16 00.9	81 59	110.8	15 36.6	81 59	111.1	15 12.3	81 59	111.4	14 48.0	81 59	111.7	14 23.6	81 59	112.0	13 59.3	81 58	112.3	13 34.9	81 58	112.6	13 10.5	81 58	112.9	4
65	15 25.4	81 59	109.9	15 01.3	81 59	110.2	14 37.0	81 59	110.5	14 12.8	81 59	110.8	13 48.5	81 59	111.1	13 24.2	81 59	111.4	12 59.9	81 59	111.7	12 35.6	81 59	112.0	65
6	14 49.9	80 60	109.1	14 25.7	80 60	109.4	14 01.6	81 59	109.7	13 37.4	81 59	110.0	13 13.2	81 59	110.3	12 49.0	81 59	110.6	12 24.7	81 59	110.9	12 00.5	81 59	111.2	6
7	14 14.1	80 60	108.3	13 50.0	80 60	108.6	13 25.9	80 60	108.9	13 01.8	80 60	109.2	12 37.7	80 59	109.5	12 13.5	81 59	109.8	11 49.4	81 59	110.1	11 25.2	81 59	110.4	7
8	13 38.1	80 60	107.4	13 14.1	80 60	107.7	12 50.1	80 60	108.0	12 26.1	80 60	108.4	12 02.0	80 60	108.7	11 37.9	80 60	109.0	11 13.8	80 60	109.3	10 49.7	80 59	109.6	8
9	13 02.0	80 60	106.6	12 38.1	80 60	106.9	12 14.1	80 60	107.2	11 50.1	80 60	107.5	11 26.1	80 60	107.8	11 02.1	80 60	108.1	10 38.1	80 60	108.5	10 14.0	80 60	108.8	9
70	12 25.8	80 61	105.8	12 01.9	80 61	106.1	11 38.0	80 60	106.4	11 14.1	80 60	106.7	10 50.1	80 60	107.0	10 26.2	80 60	107.3	10 02.2	80 60	107.6	9 38.2	80 60	107.9	70
1	11 49.4	79 61	105.0	11 25.5	79 61	105.3	11 01.7	80 61	105.6	10 37.8	80 61	105.9	10 13.9	80 61	106.2	9 50.0	80 60	106.5	9 26.1	80 60	106.8	9 02.2	80 60	107.1	1
2	11 12.8	79 61	104.2	10 49.1	79 61	104.5	10 25.3	79 61	104.8	10 01.4	79 61	105.1	9 37.6	79 61	105.4	9 13.8	80 61	105.7	8 49.9	80 61	106.0	8 26.0	80 60	106.3	2
3	10 36.2	79 61	103.4	10 12.4	79 61	103.7	9 48.7	79 61	104.0	9 24.9	79 61	104.3	9 01.1	79 61	104.6	8 37.3	79 61	104.9	8 13.5	79 61	105.2	7 49.7	79 61	105.5	3
4	9 59.4	79 62	102.6	9 35.7	79 61	102.9	9 12.0	79 61	103.2	8 48.3	79 61	103.5	8 24.5	79 61	103.8	8 00.8	79 61	104.1	7 37.0	79 61	104.4	7 13.3	79 61	104.7	4
75	9 22.4	79 62	101.8	8 58.8	79 62	102.1	8 35.2	79 62	102.4	8 11.5	79 61	102.7	7 47.8	79 61	103.0	7 24.1	79 61	103.3	7 00.4	79 61	103.6	6 36.7	79 61	103.9	75
6	8 45.4	79 62	101.0	8 21.8	79 62	101.3	7 58.2	79 62	101.6	7 34.6	79 62	101.9	7 11.0	79 62	102.2	6 47.3	79 62	102.5	6 23.6	79 61	102.8	6 00.0	79 61	103.1	6
7	8 08.3	79 62	100.2	7 44.8	79 62	100.5	7 21.2	79 62	100.8	6 57.6	79 62	101.1	6 34.0	79 62	101.4	6 10.4	79 62	101.7	5 46.8	79 62	102.0	5 23.1	79 62	102.3	7
8	7 31.1	78 62	99.4	7 07.6	78 62	99.7	6 44.0	78 62	100.0	6 20.5	79 62	100.3	5 56.9	79 62	100.6	5 33.4	79 62	100.9	5 09.8	79 62	101.2				8
9	6 53.8	78 62	98.6	6 30.3	78 62	98.9	6 06.8	78 62	99.2	5 43.3	78 62	99.5	5 19.8	78 62	99.8										9
80	6 16.4	78 62	97.8	5 53.0	78 62	98.1	5 29.5	78 62	98.4	5 06.0	78 62	98.7													80
1	5 39.0	78 62	97.0	5 15.6	78 62	97.3																			1
2	5 01.5	78 63	96.2																						2

Digitized by Google

Lat. 51°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	43 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	44 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	46 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0	00
1	42 59.6	1.0 02	178.6	43 29.5	1.0 02	178.6	43 59.5	1.0 02	178.6	44 29.5	1.0 02	178.6	44 59.5	1.0 02	178.6	45 29.5	1.0 02	178.6	45 59.5	1.0 02	178.6	46 29.5	1.0 02	178.6	1
2	42 58.2	1.0 04	177.3	43 28.2	1.0 04	177.3	43 58.2	1.0 04	177.2	44 28.2	1.0 04	177.2	44 58.1	1.0 04	177.2	45 28.1	1.0 04	177.2	45 58.1	1.0 04	177.1	46 28.1	1.0 04	177.1	2
3	42 56.0	1.0 05	175.9	43 25.9	1.0 05	175.9	43 55.9	1.0 05	175.8	44 25.9	1.0 05	175.8	44 55.8	1.0 05	175.8	45 25.8	1.0 05	175.8	45 55.8	1.0 05	175.7	46 25.7	1.0 06	175.7	3
4	42 52.8	1.0 07	174.6	43 22.8	1.0 07	174.5	43 52.7	1.0 07	174.5	44 22.7	1.0 07	174.4	44 52.6	1.0 07	174.4	45 22.5	1.0 07	174.3	45 52.5	1.0 07	174.3	46 22.4	1.0 07	174.2	4
05	42 48.8	1.0 08	173.2	43 18.7	1.0 08	173.1	43 48.6	1.0 08	173.1	44 18.5	1.0 08	173.0	44 48.4	1.0 08	173.0	45 18.4	1.0 09	172.9	45 48.3	1.0 09	172.9	46 18.2	1.0 09	172.8	05
6	42 43.9	1.0 10	171.8	43 13.7	1.0 10	171.8	43 43.6	1.0 10	171.7	44 13.5	1.0 10	171.7	44 43.4	1.0 10	171.6	45 13.2	1.0 10	171.5	45 43.1	1.0 10	171.5	46 13.0	1.0 10	171.4	6
7	42 38.1	99 11	170.5	43 07.9	99 11	170.4	43 37.7	99 11	170.3	44 07.6	99 11	170.3	44 37.4	99 11	170.2	45 07.2	99 12	170.1	45 37.0	99 12	170.0	46 06.9	99 12	170.0	7
8	42 31.4	99 13	169.1	43 01.2	99 13	169.1	43 31.0	99 13	169.0	44 00.7	99 13	168.9	44 30.5	99 13	168.8	45 00.3	99 13	168.7	45 30.1	99 13	168.6	45 59.8	99 13	168.5	8
9	42 23.8	99 14	167.8	42 53.6	99 14	167.7	43 23.3	99 14	167.6	43 53.0	99 14	167.5	44 22.7	99 14	167.4	44 52.4	99 15	167.3	45 22.2	99 15	167.2	45 51.9	99 15	167.1	9
10	42 15.4	99 16	166.5	42 45.1	99 16	166.4	43 14.8	99 16	166.3	43 44.4	99 16	166.2	44 14.1	99 16	166.1	44 43.7	99 16	165.9	45 13.4	99 16	165.8	45 43.0	99 16	165.7	10
1	42 06.2	99 17	165.1	42 35.8	99 17	165.0	43 05.4	99 17	164.9	43 35.0	99 17	164.8	44 04.5	99 17	164.7	44 34.1	99 17	164.6	45 03.7	99 18	164.4	45 33.2	99 18	164.3	1
2	41 56.1	98 18	163.8	42 25.6	98 18	163.7	42 55.1	98 18	163.6	43 24.6	98 19	163.4	43 54.1	98 19	163.3	44 23.6	98 19	163.2	44 53.1	98 19	163.1	45 22.6	98 19	162.9	2
3	41 45.1	98 20	162.5	42 14.6	98 20	162.4	42 44.0	98 20	162.2	43 13.4	98 20	162.1	43 42.9	98 20	162.0	44 12.3	98 20	161.8	44 41.7	98 20	161.7	45 11.1	98 21	161.6	3
4	41 33.4	98 21	161.2	42 02.7	98 21	161.0	42 32.1	98 21	160.9	43 01.4	98 21	160.8	43 30.8	98 22	160.6	44 00.1	98 22	160.5	44 29.4	98 22	160.3	44 58.7	98 22	160.2	4
15	41 20.8	98 22	159.9	41 50.1	98 22	159.7	42 19.3	98 23	159.6	42 48.6	98 23	159.4	43 17.8	97 23	159.3	43 47.1	97 23	159.1	44 16.3	97 23	159.0	44 45.5	97 23	158.8	15
6	41 07.4	97 24	158.6	41 36.6	97 24	158.4	42 05.7	97 24	158.3	42 34.9	97 24	158.1	43 04.1	97 24	158.0	43 33.2	97 24	157.8	44 02.3	97 25	157.6	44 31.4	97 25	157.5	6
7	40 53.2	97 25	157.3	41 22.3	97 25	157.1	41 51.4	97 25	157.0	42 20.4	97 25	156.8	42 49.5	97 26	156.6	43 18.5	97 26	156.5	43 47.5	97 26	156.3	44 16.5	97 26	156.1	7
8	40 38.3	97 26	156.0	41 07.2	97 26	155.9	41 36.2	97 27	155.7	42 05.2	97 27	155.5	42 34.1	96 27	155.3	43 03.1	96 27	155.2	43 32.0	96 27	155.0	44 00.9	96 27	154.8	8
9	40 22.5	96 27	154.8	40 51.4	96 28	154.6	41 20.3	96 28	154.4	41 49.1	96 28	154.2	42 18.0	96 28	154.0	42 46.8	96 28	153.9	43 15.6	96 29	153.7	43 44.4	96 29	153.5	9
20	40 06.1	96 29	153.5	40 34.8	96 29	153.3	41 03.6	96 29	153.1	41 32.3	96 29	152.9	42 01.1	96 29	152.8	42 29.8	96 30	152.6	42 58.5	96 30	152.4	43 27.1	96 30	152.2	20
1	39 48.9	96 30	152.3	40 17.5	96 30	152.1	40 46.2	95 30	151.9	41 14.8	95 30	151.7	41 43.4	95 31	151.5	42 12.0	95 31	151.3	42 40.6	95 31	151.1	43 09.1	95 31	150.9	1
2	39 30.9	95 31	151.0	39 59.5	95 31	150.8	40 28.0	95 31	150.6	40 56.5	95 32	150.4	41 25.0	95 32	150.2	41 53.5	95 32	150.0	42 21.9	95 32	149.8	42 50.3	95 32	149.6	2
3	39 12.3	95 32	149.8	39 40.7	95 32	149.6	40 09.1	95 33	149.4	40 37.5	95 33	149.2	41 05.9	95 33	149.0	41 34.2	94 33	148.7	42 02.6	94 33	148.5	42 30.9	94 34	148.3	3
4	38 52.9	94 33	148.6	39 21.3	94 34	148.4	39 49.6	94 34	148.2	40 17.8	94 34	147.9	40 46.1	94 34	147.7	41 14.3	94 34	147.5	41 42.5	94 35	147.3	42 10.7	94 35	147.0	4
25	38 32.9	94 34	147.4	39 01.1	94 35	147.2	39 29.3	94 35	146.9	39 57.4	94 35	146.7	40 25.6	94 35	146.5	40 53.7	94 36	146.3	41 21.7	94 36	146.0	41 49.8	93 36	145.8	25
6	38 12.2	94 36	146.2	38 40.3	94 36	146.0	39 08.4	93 36	145.7	39 36.4	93 36	145.5	40 04.4	93 36	145.3	40 32.4	93 37	145.0	41 00.3	93 37	144.8	41 28.2	93 37	144.5	6
7	37 50.9	93 37	145.0	38 18.9	93 37	144.8	38 46.8	93 37	144.5	39 14.7	93 37	144.3	39 42.5	93 37	144.1	40 10.4	93 38	143.8	40 38.2	93 38	143.6	41 06.0	93 38	143.3	7
8	37 28.9	93 38	143.8	37 56.8	93 38	143.6	38 24.6	93 38	143.4	38 52.3	93 38	143.1	39 20.1	92 38	142.9	39 47.8	92 39	142.6	40 15.5	92 39	142.4	40 43.1	92 39	142.1	8
9	37 06.3	92 39	142.7	37 34.0	92 39	142.4	38 01.7	92 39	142.2	38 29.4	92 39	141.9	38 57.0	92 40	141.7	39 24.5	92 40	141.4	39 52.1	92 40	141.2	40 19.6	92 40	140.9	9
30	36 43.1	92 40	141.5	37 10.7	92 40	141.3	37 38.3	92 40	141.0	38 05.8	92 40	140.8	38 33.3	92 40	140.5	39 00.7	91 41	140.3	39 28.1	91 41	140.0	39 55.5	91 41	139.7	30
1	36 19.4	92 41	140.4	36 46.8	91 41	140.1	37 14.2	91 41	139.9	37 41.6	91 41	139.6	38 09.0	91 41	139.4	38 36.3	91 42	139.1	39 03.5	91 42	138.8	39 30.8	91 42	138.6	1
2	35 55.0	91 42	139.3	36 22.3	91 42	139.0	36 49.6	91 42	138.7	37 16.9	91 42	138.5	37 44.1	91 42	138.2	38 11.3	91 43	137.9	38 38.4	90 43	137.7	39 05.5	90 43	137.4	2
3	35 30.1	91 42	138.1	35 57.3	91 43	137.9	36 24.4	90 43	137.6	36 51.5	90 43	137.3	37 18.6	90 43	137.1	37 45.7	90 44	136.8	38 12.7	90 44	136.5	38 39.7	90 44	136.3	3
4	35 04.6	90 43	137.0	35 31.7	90 44	136.8	35 58.7	90 44	136.5	36 25.7	90 44	136.2	36 52.6	90 44	136.0	37 19.6	90 44	135.7	37 46.5	90 45	135.4	38 13.3	89 45	135.1	4
35	34 38.6	90 44	135.9	35 05.5	90 44	135.7	35 32.4	90 45	135.4	35 59.3	89 45	135.1	36 26.1	89 45	134.8	36 52.9	89 45	134.6	37 19.7	89 45	134.3	37 46.4	89 46	134.0	35
6	34 12.1	89 45	134.8	34 38.9	89 45	134.6	35 05.7	89 45	134.3	35 32.4	89 46	134.0	35 59.1	89 46	133.7	36 25.8	89 46	133.5	36 52.4	89 46	133.2	37 19.0	89 47	132.9	6
7	33 45.1	89 46	133.8	34 11.7	89 46	133.5	34 38.4	89 46	133.2	35 05.0	89 46	132.9	35 31.6	89 47	132.7	35 58.1	88 47	132.4	36 24.6	88 47	132.1	36 51.1	88 47	131.8	7
8	33 17.6	89 47	132.7	33 44.1	88 47	132.4	34 10.6	88 47	132.2	34 37.1	88 47	131.9	35 03.6	88 47	131.6	35 30.0	88 48	131.3	35 56.3	88 48	131.0	36 22.7	88 48	130.7	8
9	32 49.6	88 47	131.7	33 16.0	88 48	131.4	33 42.4	88 48	131.1	34 08.8	88 48	130.8	34 35.1	88 48	130.5	35 01.4	88 48	130.2	35 27.6	87 49	129.9	35 53.8	87 49	129.6	9
40	32 21.1	88 48	130.6	32 47.5	88 48	130.3	33 13.7	88 49	130.0	33 40.0	87 49	129.8	34 06.2	87 49	129.5	34 32.3	87 49	129.2	34 58.4	87 49	128.9	35 24.5	87 50	128.6	40
1	31 52.3	87 49	129.6	32 18.5	87 49	129.3	32 44.6	87 49	129.0	33 10.7	87 49	128.7	33 36.8	87 50	128.4	34 02.8	87 50	128.1	34 28.8	87 50	127.8	34 54.8	86 50	127.5	1
2	31 22.9	87 50	128.6	31 49.0	87 50	128.3	32 15.1	87 50	128.0	32 41.1	87 50	127.7	33 07.0	86 50	127.4	33 32.9	86 51	127.1	33 58.8	86 51	126.8	34 24.6	86 51	126.5	2
3	30 53.2	87 50	127.6	31 19.2	86 50	127.3	31 45.1	86 51	127.0	32 11.0	86 51	126.7	32 36.8	86 51	126.4	33 02.6	86 51	126.1	33 28.3	86 51	125.8	33 54.0	86 52	125.4	3
4	30 23.1	86 51	126.6	30 48.9	86 51	126.3	31 14.7	86 51	126.0	31 40.5	86 51	125.7	32 06.2	86 52	125.4	32 31.9	86 52	125.1	32 57.5	85 52	124.7	33 23.1	85 52	124.4	4
45	29 52.6	86 52	125.6	30 18.3	86 52	125.3	30 44.0	86 52	125.0	31 09.6	85 52	124.7	31 35.2	85 52	124.4	32 00.8	85 52	124.0	32 26.3	85 53	123.7	32 51.8	85 53	123.4	45
6	29 21.7	85 52	124.6	29 47.3	85 52	124.3	30 12.8	85 52	124.0	30 38.4	85 53	123.7	31 03.9	85 53	123.4	31 29.3	85 53	123.1	31 54.7	85 53	122.7	32 20.1	84 53	122.4	6
7	28 50.4	85 53	123.6	29 15.9	85 53	123.3	29 41.4	85 53	123.0	30 06.8	85 53	122.7	30 32.2	85 53	122.4	30 57.5	84 54	122.1	31 22.8	84 54	121.8	31 48.0	84 54	121.4	7
8	28 18.8	85 53	122.6	28 44.2	85 53	122.3	29 09.5	84 54	122.0	29 34.8	84 54	121.7	30 00.1	84 54	121.4	30 25.3	84 54	121.1	30 50.5	84 54	120.8	31 15.6	84 55	120.5	8
9	27 46.8	84 54	121.7	28 12.1	84 54	121.4	28 37.3	84 54	121.1	29 02.5	84 54	120.8	29 27.7	84 55	120.5	29 52.8	84 55	120.1	30 17.9	84 55	119.8	30 42.9	83 55	119.5	9
50	27 14.5	84 54	120.7	27 39.7	84 55	120.4	28 04.8	84 55	120.1	28 29.9	84 55	119.8	28 55.0	83 55	119.5	29 20.0	83 55	119.2	29 45.0	83 55	118.9	30 09.9	83 56	118.5	50
1	26 41.9	84 55	119.8	27 07.0	84 55	119.5	27 32.0	83 55	119.2	27 57.0	83 55	118.9	28 22.0	83 56	118.6	28 46.9	83 56	118.2	29 11.8	83 56	117.9	29 36.6	83 56	117.6	1
2	26 09.0	83 55	118.9	26 34.0	83 56	118.6	26 58.9	83 56	118.2	27 23.8	83 56	117.9	27 48.7	83 56	117.6	28 13.5	83 56	117.3	28 38.3	83 56	117.0	29 03.0	82 56	116.7	2
3	25 35.8	83 56	117.9	26 00.7	83 56	117.6	26 25.5	83 56	117.3	26 50.3	83 56	117.0	27 15.1	82 56	116.7	27 39.8	82 57	116.4	28 04.5	82 57	116.1	28 29.1	82 57	115.7	3
4	25 02.3	83 56	117.0	25 27.1	83 56	116.7	25 51.8	82 57	116.4	26 16.5	82 57	116.1	26 41.2	82 57	115.8	27 05.8	82 57	115.5	27 30.4	82 57	115.1	27 55.0	82 57	114.8	4
55	24 28.5	82 57	116.1	24 53.2	82 57	115.8	25 17.9	82 57	115.5	25 42.5	82 57	115.2	26 07.1	82 57	114.9	26 31.6	82 57	114.5	26 56.1	82 58	114.2	27 20.6	81 58	113.9	55
6	23 54.5	82 57	115.2	24 19.1	82 57	114.9	24 43.7	82 57	114.6	25 08.2	82 58	114.3	25 32.7	82 58	114.0	25 57.1	81 58	113.6	26 21.6	81 58	113.3	26 45.9	81 58	113.0	6
7	23 20.2	82 58	114.3	23 44.7	82 58	114.0	24 09.2	82 58	113.7	24 33.7	81 58	113.4	24 58.1	81 58	113.1	25 22.4	81 58	112.7	25 46.8	81 58	112.4	26 11.0	81 58	112.1	7
8	22 45.7	82 58	113.4	23 10.1	81 58	113.1	23 34.5	81 58	112.8	23 58.9	81 58	112.5	24 23.2	81 58	112.2	24 47.5	81 59	111.9	25 11.7	81 59	111.5	25 36.0	81 59	111.2	8
9	22 10.9	81 58	112.6	22 35.3	81 58	112.3	22 59.6	81 59	111.9	23 23.9	81 59	111.6	23 48.1	81 59	111.3	24 12.3	81 59	111.0	24 36.5	80 59	110.6	25 00.6	80 59	110.3	9
60	21 35.9	81 59	111.7	22 00.2	81 59	111.4	22 24.5	81 59	111.1	22 48.7	81 59	110.7	23 12.9	81 59	110.4	23 37.0	80 59	110.1	24 01.1	80 59	109.8	24 25.1	80 60	109.4	60
1	21 00.7	81 59	110.8	21 25.0	81 59	110.5	21 49.1	81 59	110.2	22 13.3	80 59	109.9	22 37.4	80 59	109.6	23 01.4	80 60	109.2	23 25.5	80 60	108.9	23 49.4	80 60	108.6	1
2	20 25.3	81 59	110.0	20 49.5	80 59	109.7	21 13.6	80 60	109.3	21 37.7	80 60	109.0	22 01.7	80 60	108.7	22 25.7	80 60	108.4	22 49.6	80 60	108.0	23 13.6	80 60	107.7	2
3	19 49.8	80 60	109.1	20 13.8	80 60	108.8	20 37.9	80 60	108.5	21 01.9	80 60	108.2	21 25.8	80 60	107.8	21 49.8	80 60	107.5	22 13.7	80 60	107.2	22 37.5	79 60	106.9	3
4	19 14.0	80 60	108.3	19 38.0	80 60	107.9	20 02.0	80 60	107.6	20 25.9	80 60	107.3	20 49.8	80 60	107.0	21 13.7	79 60	106.7	21 37.5	79 61	106.3	22 01.3	79 61	106.0	4
65	18 38.1	80 60	107.4	19 02.0	80 60	107.1	19 25.9	80 60	106.8	19 49.8	80 60	106.5	20 13.6	79 61	106.1	20 37.4	79 61	105.8	21 01.2	79 61	105.5	21 24.9	79 61	105.2	65
6	18 01.9	80 60	106.6	18 25.8	80 61	106.3	18 49.7	79 61	105.9	19 13.5	79 61	105.6	19 37.3	79 61	105.3	20 01.0	79 61	105.0	20 24.7	79 61	104.7	20 48.4	79 61	104.3	6
7	17 25.7	79 61	105.8	17 49.5	79 61	105.4	18 13.3	79 61	105.1	18 37.1	79 61	104.8	19 00.8	79 61	104.5	19 24.5	79 61	104.1	19 48.1	79 61	103.8	20 11.7	79 61	103.5	7
8	16 49.3	79 61	104.9	17 13.0	79 61	104.6	17 36.8	79 61	104.3	18 00.5	79 61	104.0	18 24.1	79 61	103.6	18 47.8	79 61	103.3	19 11.4	79 61	103.0	19 35.0	79 62	102.7	8
9	16 12.7	79 61	104.1	16 36.4	79 61	103.8	17 00.1	79 61	103.5	17 23.8	79 61	103.1	17 47.4	79 61	102.8	18 11.0	79 62	102.5	18 34.5	78 62	102.2	18 58.1	78 62	101.8	9
70	15 36.0	79 61	103.3	15 59.7	79 61	103.0	16 23.3	79 62	102.6	16 46.9	79 62	102.3	17 10.5	79 62	102.0	17 34.1	78 62	101.7	17 57.6	78 62	101.3	18 21.1	78 62	101.0	70
1	14 59.2	79 62	102.5	15 22.8	79 62	102.1	15 46.4	79 62	101.8	16 10.0	78 62	101.5	16 33.5	78 62	101.2	16 57.0	78 62	100.9	17 20.5	78 62	100.5	17 43.9	78 62	100.2	1
2	14 22.3	79 62	101.7	14 45.9	79 62	101.3	15 09.4	78 62	101.0	15 32.9	78 62	100.7	15 56.4	78 62	100.4	16 19.9	78 62	100.0	16 43.3	78 62	99.7	17 06.7	78 62	99.4	2
3	13 45.3	78 62	100.8	14 08.8	78 62	100.5	14 32.3	78 62	100.2	14 55.8	78 62	99.9	15 19.2	78 62	99.6	15 42.7	78 62	99.2	16 06.1	78 62	98.9	16 29.4	78 62	98.6	3
4	13 08.1	78 62	100.0	13 31.6	78 62	99.7	13 55.1	78 62	99.4	14 18.5	78 62	99.1	14 42.0	78 62	98.8	15 05.4	78 62	98.4	15 28.7	78 62	98.1	15 52.1	78 62	97.8	4
75	12 30.9	78 62	99.2	12 54.4	78 62	98.9	13 17.8	78 62	98.6	13 41.2	78 62	98.3	14 04.6	78 62	98.0	14 28.0	78 62	97.6	14 51.3	78 62	97.3	15 14.6	78 62	97.0	75
6	11 53.6	78 62	98.4	12 17.0	78 62	98.1	12 40.4	78 62	97.8	13 03.8	78 62	97.5	13 27.2	78 62	97.2	13 50.5	78 63	96.8	14 13.8	78 63	96.5	14 37.1	78 63	96.2	6
7	11 16.2	78 62	97.6	11 39.6	78 62	97.3	12 03.0	78 63	97.0	12 26.3	78 63	96.7	12 49.7	78 63	96.4	13 13.0	78 63	96.0	13 36.3	78 63	95.7	13 59.5	78 63	95.4	7
8	10 38.7	78 63	96.9	11 02.1	78 63	96.5	11 25.5	78 63	96.2	11 48.8	78 63	95.9	12 12.1	78 63	95.6	12 35.4	78 63	95.3	12 58.7	78 63	94.9	13 21.9	77 63	94.6	8
9	10 01.2	78 63	96.1	10 24.6	78 63	95.7	10 47.9	78 63	95.4	11 11.2	78 63	95.1	11 34.5	78 63	94.8	11 57.8	78 63	94.5	12 21.0	77 63	94.1	12 44.3	77 63	83.8	9
80	9 23.6	78 63	95.3	9 47.0	78 63	95.0	10 10.3	78 63	94.6	10 33.6	78 63	94.3	10 56.9	78 63	94.0	11 20.1	77 63	93.7	11 43.4	77 63	93.4	12 06.6	77 63	93.0	80
1	8 46.0	78 63	94.5	9 09.3	78 63	94.2	9 32.6	78 63	93.9	9 55.9	78 63	93.5	10 19.2	78 63	93.2	10 42.4	77 63	92.9	11 05.7	77 63	92.6	11 28.9	77 63	92.2	1
2	8 08.4	78 63	93.7	8 31.7	78 63	93.4	8 55.0	78 63	93.1	9 18.2	78 63	92.8	9 41.5	77 63	92.4	10 04.7	77 63	92.1	10 27.9	77 63	91.8	10 51.1	77 63	91.5	2
3	7 30.7	78 63	92.9	7 54.0	78 63	92.6	8 17.2	78 63	92.3	8 40.5	78 63	92.0	9 03.7	77 63	91.6	9 27.0	77 63	91.3	9 50.2	77 63	91.0	10 13.4	77 63	90.7	3
4	6 52.9	78 63	92.1	7 16.2	78 63	91.8	7 39.5	78 63	91.5	8 02.8	77 63	91.2	8 26.0	77 63	90.9	8 49.2	77 63	90.6	9 12.4	77 63	90.2	9 35.6	77 63	89.9	4
85	6 15.2	78 63	91.4	6 38.5	78 63	91.0	7 01.7	78 63	90.7	7 25.0	77 63	90.4	7 48.2	77 63	90.1	8 11.5	77 63	89.8	8 34.7	77 63	89.5	8 57.9	77 63	89.1	85
6	5 37.5	78 63	90.6	6 00.7	78 63	90.3	6 24.0	78 63	90.0	6 47.2	77 63	89.6	7 10.5	77 63	89.3	7 33.7	77 63	89.0	7 56.9	77 63	88.7	8 20.1	77 63	88.4	6
7				5 23.0	78 63	89.5	5 46.2	78 63	89.2	6 09.5	77 63	88.9	6 32.7	77 63	88.5	6 55.9	77 63	88.2	7 19.2	77 63	87.9	7 42.4	77 63	87.6	7
8							5 08.5	78 63	88.4	5 31.7	78 63	88.1	5 55.0	77 63	87.8	6 18.2	77 63	87.4	6 41.4	77 63	87.1	7 04.7	77 63	86.8	8
9													5 17.3	78 63	87.0	5 40.5	77 63	86.7	6 03.7	77 63	86.4	6 27.0	77 63	86.0	9
90																5 02.8	78 63	85.9	5 26.1	77 63	85.6	5 49.3	77 63	85.3	90

Digitized by Google

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	35 00.0	1.0	01	180.0	34 30.0	1.0	01	180.0	34 00.0	1.0	01	180.0	33 30.0	1.0	01	180.0	33 00.0	1.0	01	180.0	32 30.0	1.0	01	180.0	32 00.0	1.0	01	180.0	31 30.0	1.0	01	180.0	00
1	34 59.6	1.0	02	178.8	34 29.6	1.0	02	178.8	33 59.6	1.0	02	178.8	33 29.6	1.0	02	178.8	32 59.6	1.0	02	178.8	32 29.6	1.0	02	178.8	31 59.6	1.0	02	178.8	31 29.6	1.0	02	178.8	1
2	34 58.4	1.0	03	177.6	34 28.4	1.0	03	177.6	33 58.4	1.0	03	177.6	33 28.4	1.0	03	177.6	32 58.4	1.0	03	177.6	32 28.4	1.0	03	177.6	31 58.5	1.0	03	177.7	31 28.5	1.0	03	177.7	2
3	34 56.4	1.0	05	176.3	34 26.4	1.0	05	176.4	33 56.4	1.0	05	176.4	33 26.5	1.0	05	176.4	32 56.5	1.0	05	176.4	32 26.5	1.0	05	176.5	31 56.5	1.0	04	176.5	31 26.6	1.0	04	176.5	3
4	34 53.6	1.0	06	175.1	34 23.6	1.0	06	175.2	33 53.7	1.0	06	175.2	33 23.7	1.0	06	175.2	32 53.8	1.0	06	175.3	32 23.8	1.0	06	175.3	31 53.8	1.0	06	175.3	31 23.9	1.0	06	175.4	4
05	34 50.0	1.0	07	173.9	34 20.1	1.0	07	174.0	33 50.1	1.0	07	174.0	33 20.2	1.0	07	174.0	32 50.2	1.0	07	174.1	32 20.3	1.0	07	174.1	31 50.4	1.0	07	174.2	31 20.4	1.0	07	174.2	05
6	34 45.6	1.0	09	172.7	34 15.7	1.0	09	172.8	33 45.8	1.0	09	172.8	33 15.9	1.0	08	172.9	32 46.0	1.0	08	172.9	32 16.1	1.0	08	172.9	31 46.1	1.0	08	173.0	31 16.2	1.0	08	173.0	6
7	34 40.4	1.0	10	171.5	34 10.5	1.0	10	171.6	33 40.7	1.0	10	171.6	33 10.8	1.0	10	171.7	32 40.9	1.0	10	171.7	32 11.0	1.0	10	171.8	31 41.2	1.0	10	171.8	31 11.3	1.0	10	171.9	7
8	34 34.4	99	11	170.3	34 04.6	99	11	170.4	33 34.8	99	11	170.4	33 04.9	99	11	170.5	32 35.1	99	11	170.5	32 05.3	99	11	170.6	31 35.4	99	11	170.7	31 05.6	99	11	170.7	8
9	34 27.7	99	13	169.1	33 57.9	99	12	169.2	33 28.1	99	12	169.2	32 58.3	99	12	169.3	32 28.5	99	12	169.4	31 58.7	99	12	169.4	31 28.9	99	12	169.5	30 59.1	99	12	169.6	9
10	34 20.1	99	14	167.9	33 50.4	99	14	168.0	33 20.7	99	14	168.0	32 50.9	99	14	168.1	32 21.2	99	14	168.2	31 51.4	99	13	168.3	31 21.7	99	13	168.4	30 51.9	99	13	168.4	10
1	34 11.8	99	15	166.7	33 42.1	99	15	166.8	33 12.5	99	15	166.9	32 42.8	99	15	167.0	32 13.1	99	15	167.0	31 43.4	99	15	167.1	31 13.7	99	15	167.2	30 44.0	99	14	167.3	1
2	34 02.8	99	16	165.5	33 33.1	99	16	165.6	33 03.5	99	16	165.7	32 33.9	99	16	165.8	32 04.2	99	16	165.9	31 34.6	99	16	166.0	31 04.9	99	16	166.1	30 35.3	99	16	166.1	2
3	33 52.9	99	18	164.3	33 23.4	99	18	164.4	32 53.8	99	17	164.5	32 24.2	99	17	164.6	31 54.6	99	17	164.7	31 25.1	99	17	164.8	30 55.5	99	17	164.9	30 25.9	99	17	165.0	3
4	33 42.3	98	19	163.1	33 12.9	98	19	163.2	32 43.3	98	19	163.4	32 13.8	98	18	163.5	31 44.3	98	18	163.6	31 14.8	98	18	163.7	30 45.3	98	18	163.8	30 15.8	98	18	163.9	4
15	33 31.0	98	20	162.0	33 01.6	98	20	162.1	32 32.2	98	20	162.2	32 02.7	98	20	162.3	31 33.3	98	20	162.4	31 03.8	98	19	162.5	30 34.4	98	19	162.6	30 04.9	98	19	162.7	15
6	33 19.0	98	21	160.8	32 49.6	98	21	160.9	32 20.3	98	21	161.0	31 50.9	98	21	161.2	31 21.5	98	21	161.3	30 52.1	98	21	161.4	30 22.8	98	21	161.5	29 53.4	98	20	161.6	6
7	33 06.2	98	23	159.6	32 36.9	98	22	159.8	32 07.6	98	23	159.9	31 38.3	98	22	160.0	31 09.0	98	22	160.1	30 39.7	98	22	160.3	30 10.4	98	22	160.4	29 41.1	98	22	160.5	7
8	32 52.7	97	24	158.5	32 23.5	97	24	158.6	31 54.3	97	23	158.7	31 25.1	97	23	158.9	30 55.9	97	23	159.0	30 26.6	97	23	159.1	29 57.4	97	23	159.3	29 28.2	97	23	159.4	8
9	32 38.5	97	25	157.3	32 09.4	97	25	157.5	31 40.2	97	25	157.6	31 11.1	97	24	157.7	30 42.0	97	24	157.9	30 12.9	97	24	158.0	29 43.7	97	24	158.2	29 14.5	97	24	158.3	9
20	32 23.6	97	26	156.2	31 54.5	97	26	156.3	31 25.5	97	26	156.5	30 56.5	97	26	156.6	30 27.4	97	25	156.8	29 58.4	97	25	156.9	29 29.3	97	25	157.0	29 00.2	97	25	157.2	20
1	32 08.0	96	27	155.0	31 39.0	96	27	155.2	31 10.1	96	27	155.3	30 41.1	96	27	155.5	30 12.2	97	26	155.6	29 43.2	97	26	155.8	29 14.3	97	26	155.9	28 45.3	97	26	156.1	1
2	31 51.7	96	28	153.9	31 22.8	96	28	154.1	30 54.0	96	28	154.2	30 25.2	96	28	154.4	29 56.3	96	28	154.5	29 27.4	96	27	154.7	28 58.5	96	27	154.8	28 29.6	96	27	155.0	2
3	31 34.7	96	29	152.8	31 06.0	96	29	152.9	30 37.3	96	29	153.1	30 08.5	96	29	153.3	29 39.7	96	29	153.4	29 11.0	96	29	153.6	28 42.2	96	28	153.8	28 13.4	96	28	153.9	3
4	31 17.1	95	30	151.7	30 48.5	95	30	151.8	30 19.8	96	30	152.0	29 51.2	96	30	152.2	29 22.5	96	30	152.3	28 53.8	96	30	152.5	28 25.1	96	29	152.7	27 56.4	96	29	152.8	4
25	30 58.9	95	31	150.5	30 30.3	95	31	150.7	30 01.8	95	31	150.9	29 33.2	95	31	151.1	29 04.7	95	31	151.3	28 36.1	95	31	151.4	28 07.5	95	30	151.6	27 38.9	95	30	151.8	25
6	30 40.0	95	33	149.4	30 11.6	95	32	149.6	29 43.1	95	32	149.8	29 14.7	95	32	150.0	28 46.2	95	32	150.2	28 17.7	95	32	150.4	27 49.2	95	31	150.5	27 20.7	95	31	150.7	6
7	30 20.5	94	34	148.3	29 52.2	94	33	148.5	29 23.8	94	33	148.7	28 55.5	95	33	148.9	28 27.1	95	33	149.1	27 58.7	95	33	149.3	27 30.3	95	32	149.5	27 01.9	95	32	149.6	7
8	30 00.4	94	35	147.3	29 32.2	94	34	147.5	29 03.9	94	34	147.7	28 35.7	94	34	147.8	28 07.4	94	34	148.0	27 39.2	94	34	148.2	27 10.9	94	33	148.4	26 42.6	94	33	148.6	8
9	29 39.6	94	36	146.2	29 11.5	94	35	146.4	28 43.4	94	35	146.6	28 15.3	94	35	146.8	27 47.1	94	35	147.0	27 19.0	94	35	147.2	26 50.8	94	34	147.4	26 22.6	94	34	147.6	9
30	29 18.3	93	36	145.1	28 50.4	93	36	145.3	28 22.3	93	36	145.5	27 54.3	93	36	145.7	27 26.3	94	36	145.9	26 58.2	94	36	146.1	26 30.1	94	35	146.3	26 02.0	94	35	146.5	30
1	28 56.5	93	37	144.0	28 28.6	93	37	144.3	28 00.7	93	37	144.5	27 32.8	93	37	144.7	27 04.8	93	37	144.9	26 36.9	93	36	145.1	26 08.9	93	36	145.3	25 40.9	93	36	145.5	1
2	28 34.0	93	38	143.0	28 06.2	93	38	143.2	27 38.5	93	38	143.4	27 10.7	93	38	143.6	26 42.8	93	38	143.8	26 15.0	93	37	144.1	25 47.1	93	37	144.3	25 19.3	93	37	144.5	2
3	28 11.0	92	39	141.9	27 43.4	92	39	142.2	27 15.7	92	39	142.4	26 48.0	92	39	142.6	26 20.3	92	38	142.8	25 52.6	92	38	143.0	25 24.8	93	38	143.2	24 57.0	93	38	143.4	3
4	27 47.5	92	40	140.9	27 19.9	92	40	141.1	26 52.4	92	40	141.4	26 24.8	92	40	141.6	25 57.2	92	39	141.8	25 29.6	92	39	142.0	25 01.9	92	39	142.2	24 34.3	92	39	142.4	4
35	27 23.4	91	41	139.9	26 56.0	91	41	140.1	26 28.5	92	41	140.3	26 01.1	92	40	140.6	25 33.6	92	40	140.8	25 06.1	92	40	141.0	24 38.6	92	40	141.2	24 11.0	92	40	141.4	35
6	26 58.8	91	42	138.9	26 31.5	91	42	139.1	26 04.2	91	41	139.3	25 36.8	91	41	139.5	25 09.4	91	41	139.8	24 42.1	91	41	140.0	24 14.6	91	41	140.2	23 47.2	91	40	140.4	6
7	26 33.7	91	43	137.8	26 06.5	91	42	138.1	25 39.3	91	42	138.3	25 12.1	91	42	138.5	24 44.8	91	42	138.8	24 17.5	91	42	139.0	23 50.2	91	42	139.2	23 22.9	91	41	139.5	7
8	26 08.1	90	43	136.8	25 41.0	90	43	137.1	25 13.9	90	43	137.3	24 46.8	90	43	137.5	24 19.7	91	43	137.8	23 52.5	91	42	138.0	23 25.3	91	42	138.2	22 58.1	91	42	138.5	8
9	25 42.0	90	44	135.8	25 15.1	90	44	136.1	24 48.1	90	44	136.3	24 21.1	90	44	136.6	23 54.1	90	43	136.8	23 27.0	90	43	137.0	23 00.0	90	43	137.3	22 32.9	90	43	137.5	9
40	25 15.5	89	45	134.8	24 48.7	90	45	135.1	24 21.8	90	45	135.3	23 54.9	90	44	135.6	23 28.0	90	44	135.8	23 01.1	90	44	136.1	22 34.1	90	44	136.3	22 07.1	90	44	136.5	40
1	24 48.5	89	46	133.9	24 21.8	89	46	134.1	23 55.0	89	45	134.4	23 28.2	89	45	134.6	23 01.4	89	45	134.9	22 34.6	89	45	135.1	22 07.8	90	45	135.3	21 40.9	90	44	135.6	1
2	24 21.1	89	46	132.9	23 54.4	89	46	133.1	23 27.8	89	46	133.4	23 01.1	89	46	133.6	22 34.5	89	46	133.9	22 07.7	89	46	134.1	21 41.0	89	45	134.4	21 14.3	89	45	134.6	2
3	23 53.2	88	47	131.9	23 26.7	88	47	132.2	23 00.2	88	47	132.4	22 33.6	89	47	132.7	22 07.0	89	46	132.9	21 40.4	89	46	133.2	21 13.8	89	46	133.4	20 47.2	89	46	133.7	3
4	23 24.9	88	48	131.0	22 58.5	88	48	131.2	22 32.1	88	48	131.5	22 05.6	88	47	131.7	21 39.2	88	47	132.0	21 12.7	88	47	132.2	20 46.2	88	47	132.5	20 19.6	88	47	132.7	4
45	22 56.2	88	49	130.0	22 29.9	88	48	130.3	22 03.6	88	48	130.5	21 37.2	88	48	130.8	21 10.9	88	48	131.0	20 44.5	88	48	131.3	20 18.1	88	47	131.6	19 51.7	88	47	131.8	45
6	22 27.0	87	49	129.1	22 00.9	87	49	129.3	21 34.7	87	49	129.6	21 08.5	87	49	129.9	20 42.2	88	48	130.1	20 16.0	88	48	130.4	19 49.7	88	48	130.6	19 23.4	88	48	130.9	6
7	21 57.5	87	50	128.1	21 31.5	87	50	128.4	21 05.4	87	49	128.7	20 39.3	87	49	128.9	20 13.1	87	49	129.2	19 47.0	87	49	129.4	19 20.8	87	49	129.7	18 54.6	87	49	130.0	7
8	21 27.6	86	50	127.2	21 01.7	87	50	127.5	20 35.7	87	50	127.7	20 09.7	87	50	128.0	19 43.7	87	50	128.3	19 17.6	87	50	128.5	18 51.6	87	49	128.8	18 25.5	87	49	129.0	8
9	20 57.4	86	51	126.3	20 31.5	86	51	126.5	20 05.7	86	51	126.8	19 39.8	86	50	127.1	19 13.9	86	50	127.4	18 47.9	87	50	127.6	18 22.0	87	50	127.9	17 56.0	87	50	128.1	9
50	20 26.8	86	52	125.4	20 01.0	86	51	125.6	19 35.3	86	51	125.9	19 09.5	86	51	126.2	18 43.7	86	51	126.4	18 17.8	86	51	126.7	17 52.0	86	51	127.0	17 26.1	86	50	127.2	50
1	19 55.8	85	52	124.4	19 30.2	85	52	124.7	19 04.5	86	52	125.0	18 38.8	86	52	125.3	18 13.1	86	51	125.5	17 47.4	86	51	125.8	17 21.6	86	51	126.1	16 55.9	86	51	126.3	1
2	19 24.5	85	53	123.5	18 59.0	85	53	123.8	18 33.4	85	52	124.1	18 07.8	85	52	124.4	17 42.2	85	52	124.6	17 16.6	85	52	124.9	16 50.9	86	52	125.2	16 25.3	86	52	125.5	2
3	18 52.8	85	53	122.6	18 27.4	85	53	122.9	18 02.0	85	53	123.2	17 36.5	85	53	123.5	17 11.0	85	53	123.8	16 45.5	85	52	124.0	16 19.9	85	52	124.3	15 54.3	85	52	124.6	3
4	18 20.9	84	54	121.8	17 55.6	84	54	122.0	17 30.2	85	53	122.3	17 04.8	85	53	122.6	16 39.4	85	53	122.9	16 14.0	85	53	123.2	15 48.6	85	53	123.4	15 23.1	85	53	123.7	4
55	17 48.6	84	54	120.9	17 23.4	84	54	121.2	16 58.2	84	54	121.4	16 32.9	84	54	121.7	16 07.6	84	54	122.0	15 42.2	84	53	122.3	15 16.9	85	53	122.6	14 51.5	85	53	122.8	55
6	17 16.1	84	55	120.0	16 50.9	84	55	120.3	16 25.8	84	54	120.6	16 00.6	84	54	120.8	15 35.4	84	54	121.1	15 10.2	84	54	121.4	14 44.9	84	54	121.7	14 19.6	84	54	122.0	6
7	16 43.2	83	55	119.1	16 18.2	84	55	119.4	15 53.1	84	55	119.7	15 28.0	84	55	120.0	15 02.9	84	55	120.3	14 37.8	84	54	120.5	14 12.6	84	54	120.8	13 47.5	84	54	121.1	7
8	16 10.1	83	56	118.3	15 45.2	83	56	118.5	15 20.2	83	55	118.8	14 55.2	83	55	119.1	14 30.2	83	55	119.4	14 05.1	84	55	119.7	13 40.1	84	55	120.0	13 15.0	84	55	120.3	8
9	15 36.7	83	56	117.4	15 11.9	83	56	117.7	14 47.0	83	56	118.0	14 22.1	83	56	118.3	13 57.1	83	56	118.6	13 32.2	83	55	118.8	13 07.2	83	55	119.1	12 42.2	83	55	119.4	9
60	15 03.1	83	56	116.5	14 38.3	83	56	116.8	14 13.5	83	56	117.1	13 48.7	83	56	117.4	13 23.8	83	56	117.7	12 59.0	83	56	118.0	12 34.1	83	56	118.3	12 09.2	83	55	118.6	60
1	14 29.2	82	57	115.7	14 04.5	82	57	116.0	13 39.8	82	57	116.3	13 15.0	82	56	116.6	12 50.3	83	56	116.9	12 25.5	83	56	117.1	12 00.7	83	56	117.4	11 35.9	83	56	117.7	1
2	13 55.0	82	57	114.8	13 30.4	82	57	115.1	13 05.8	82	57	115.4	12 41.1	82	57	115.7	12 16.5	82	57	116.0	11 51.8	82	57	116.3	11 27.1	82	56	116.6	11 02.4	82	56	116.9	2
3	13 20.6	82	58	114.0	12 56.1	82	58	114.3	12 31.6	82	57	114.6	12 07.0	82	57	114.9	11 42.4	82	57	115.2	11 17.8	82	57	115.5	10 53.2	82	57	115.8	10 28.6	82	57	116.1	3
4	12 46.0	81	58	113.2	12 21.6	82	58	113.5	11 57.1	82	58	113.8	11 32.6	82	58	114.1	11 08.1	82	58	114.4	10 43.6	82	57	114.6	10 19.1	82	57	114.9	9 54.5	82	57	115.2	4
65	12 11.2	81	58	112.3	11 46.8	81	58	112.6	11 22.5	81	58	112.9	10 58.0	81	58	113.2	10 33.6	81	58	113.5	10 09.2	82	58	113.8	9 44.7	82	58	114.1	9 20.2	82	58	114.4	65
6	11 36.2	81	59	111.5	11 11.9	81	59	111.8	10 47.6	81	58	112.1	10 23.2	81	58	112.4	9 58.9	81	58	112.7	9 34.5	81	58	113.0	9 10.1	81	58	113.3	8 45.8	81	58	113.6	6
7	11 01.0	81	59	110.7	10 36.7	81	59	111.0	10 12.5	81	59	111.3	9 48.2	81	59	111.6	9 24.0	81	59	111.9	8 59.7	81	58	112.2	8 35.4	81	58	112.5	8 11.0	81	58	112.8	7
8	10 25.5	80	59	109.9	10 01.4	81	59	110.2	9 37.2	81	59	110.5	9 13.0	81	59	110.8	8 48.8	81	59	111.1	8 24.6	81	59	111.4	8 00.4	81	59	111.7	7 36.1	81	59	112.0	8
9	9 49.9	80	60	109.1	9 25.9	80	60	109.4	9 01.7	80	59	109.7	8 37.6	80	59	110.0	8 13.5	80	59	110.3	7 49.3	81	59	110.6	7 25.2	81	59	110.9	7 01.0	81	59	111.2	9
70	9 14.2	80	60	108.2	8 50.1	80	60	108.5	8 26.1	80	60	108.9	8 02.0	80	60	109.2	7 38.0	80	60	109.5	7 13.9	80	59	109.8	6 49.8	80	59	110.1	6 25.7	80	59	110.4	70
1	8 38.2	80	60	107.4	8 14.3	80	60	107.7	7 50.3	80	60	108.0	7 26.3	80	60	108.3	7 02.3	80	60	108.7	6 38.3	80	60	109.0	6 14.2	80	60	109.3	5 50.2	80	59	109.6	1
2	8 02.1	80	60	106.6	7 38.2	80	60	106.9	7 14.3	80	60	107.2	6 50.4	80	60	107.5	6 26.4	80	60	107.9	6 02.5	80	60	108.2	5 38.5	80	60	108.5	5 14.5	80	60	108.8	2
3	7 25.9	79	61	105.8	7 02.0	80	61	106.1	6 38.2	80	60	106.4	6 14.3	80	60	106.7	5 50.4	80	60	107.1	5 26.5	80	60	107.4	5 02.6	80	60	107.7					3
4	6 49.5	79	61	105.0	6 25.7	79	61	105.3	6 01.9	79	61	105.6	5 38.1	79	61	106.0	5 14.2	79	61	106.3													4
75	6 12.9	79	61	104.2	5 49.2	79	61	104.5	5 25.4	79	61	104.9	5 01.7	79	61	105.2																	75
6	5 36.3	79	61	103.4	5 12.6	79	61	103.8																									6

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91																													5 11.7	78	63	84.5	91

Digitized by Google

Lat. 51°

H.A. (°)	8° 00′ Alt. (° ′)	Δd	Δt	Az. (°)	8° 30′ Alt. (° ′)	Δd	Δt	Az. (°)	9° 00′ Alt. (° ′)	Δd	Δt	Az. (°)	9° 30′ Alt. (° ′)	Δd	Δt	Az. (°)
00	47 00.0	1.0	01	180.0	47 30.0	1.0	01	180.0	48 00.0	1.0	01	180.0	48 30.0	1.0	01	180.0
1	46 59.5	1.0	02	178.5	47 29.5	1.0	02	178.5	47 59.5	1.0	02	178.5	48 29.5	1.0	02	178.5
2	46 58.1	1.0	04	177.1	47 28.1	1.0	04	177.1	47 58.1	1.0	04	177.0	48 28.0	1.0	04	177.0
3	46 55.7	1.0	06	175.6	47 25.7	1.0	06	175.6	47 55.6	1.0	06	175.6	48 25.6	1.0	06	175.5
4	46 52.4	1.0	07	174.2	47 22.3	1.0	07	174.2	47 52.2	1.0	07	174.1	48 22.2	1.0	07	174.1
05	46 48.1	1.0	09	172.8	47 18.0	1.0	09	172.7	47 47.9	1.0	09	172.6	48 17.8	1.0	09	172.6
6	46 42.8	1.0	10	171.3	47 12.7	1.0	10	171.2	47 42.6	1.0	10	171.2	48 12.4	1.0	11	171.1
7	46 36.7	99	12	169.9	47 06.5	99	12	169.8	47 36.3	99	12	169.7	48 06.1	99	12	169.6
8	46 29.6	99	13	168.5	46 59.3	99	13	168.4	47 29.1	99	14	168.3	47 58.8	99	14	168.2
9	46 21.6	99	15	167.0	46 51.2	99	15	166.9	47 20.9	99	15	166.8	47 50.6	99	15	166.7
10	46 12.6	99	16	165.6	46 42.2	99	17	165.5	47 11.9	99	17	165.4	47 41.5	99	17	165.3
1	46 02.8	98	18	164.2	46 32.3	98	18	164.1	47 01.9	98	18	163.9	47 31.4	98	18	163.8
2	45 52.1	98	19	162.8	46 21.5	98	20	162.7	46 51.0	98	20	162.5	47 20.4	98	20	162.4
3	45 40.5	98	21	161.4	46 09.8	98	21	161.3	46 39.2	98	21	161.1	47 08.5	98	21	161.0
4	45 28.0	98	22	160.0	45 57.3	98	22	159.9	46 26.5	98	23	159.7	46 55.8	97	23	159.5
15	45 14.7	97	24	158.7	45 43.9	97	24	158.5	46 13.0	97	24	158.3	46 42.2	97	24	158.1
6	45 00.5	97	25	157.3	45 29.6	97	25	157.1	45 58.6	97	25	156.9	46 27.7	97	26	156.8
7	44 45.5	97	26	155.9	45 14.5	97	26	155.8	45 43.4	96	27	155.6	46 12.4	96	27	155.4
8	44 29.7	96	28	154.6	44 58.6	96	28	154.4	45 27.4	96	28	154.2	45 56.2	96	28	154.0
9	44 13.1	96	29	153.3	44 41.9	96	29	153.1	45 10.6	96	29	152.9	45 39.3	96	30	152.7
20	43 55.8	95	30	151.9	44 24.4	95	30	151.7	44 53.0	95	31	151.5	45 21.5	95	31	151.3
1	43 37.6	95	31	150.6	44 06.1	95	32	150.4	44 34.6	95	32	150.2	45 03.0	95	32	150.0
2	43 18.7	95	33	149.3	43 47.1	95	33	149.1	44 15.5	94	33	148.9	44 43.8	94	33	148.7
3	42 59.1	94	34	148.1	43 27.4	94	34	147.8	43 55.6	94	34	147.6	44 23.8	94	35	147.4
4	42 38.8	94	35	146.8	43 06.9	94	35	146.6	43 35.0	94	35	146.3	44 03.0	93	36	146.1
25	42 17.8	93	36	145.5	42 45.8	93	36	145.3	43 13.7	93	37	145.0	43 41.6	93	37	144.8
6	41 56.1	93	37	144.3	42 23.9	93	37	144.0	42 51.7	93	38	143.8	43 19.5	93	38	143.5
7	41 33.7	92	38	143.1	42 01.4	92	39	142.8	42 29.1	92	39	142.6	42 56.7	92	39	142.3
8	41 10.7	92	39	141.9	41 38.3	92	40	141.6	42 05.8	92	40	141.3	42 33.3	92	40	141.1
9	40 47.1	92	40	140.6	41 14.5	91	41	140.4	41 41.9	91	41	140.1	42 09.3	91	41	139.8
30	40 22.8	91	41	139.5	40 50.1	91	42	139.2	41 17.4	91	42	138.9	41 44.6	91	42	138.6
1	39 58.0	91	42	138.3	40 25.2	90	43	138.0	40 52.3	90	43	137.7	41 19.4	90	43	137.4
2	39 32.6	90	43	137.1	39 59.6	90	44	136.8	40 26.6	90	44	136.5	40 53.5	90	44	136.3
3	39 06.6	90	44	136.0	39 33.5	90	44	135.7	40 00.4	89	45	135.4	40 27.2	89	45	135.1
4	38 40.1	89	45	134.8	39 06.9	89	45	134.5	39 33.6	89	46	134.2	40 00.2	89	46	133.9
35	38 13.1	89	46	133.7	38 39.7	89	46	133.4	39 06.3	89	46	133.1	39 32.8	88	47	132.8
6	37 45.5	88	47	132.6	38 12.0	88	47	132.3	38 38.4	88	47	132.0	39 04.8	88	47	131.7
7	37 17.5	88	48	131.5	37 43.8	88	48	131.2	38 10.1	88	48	130.9	38 36.4	87	48	130.6
8	36 48.9	88	48	130.4	37 15.2	87	48	130.1	37 41.4	87	49	129.8	38 07.5	87	49	129.5
9	36 20.0	87	49	129.3	36 46.1	87	49	129.0	37 12.1	87	49	128.7	37 38.1	87	50	128.4
40	35 50.5	87	50	128.3	36 16.5	86	50	127.9	36 42.4	86	50	127.6	37 08.3	86	50	127.3
1	35 20.7	86	50	127.2	35 46.5	86	51	126.9	36 12.3	86	51	126.6	36 38.1	86	51	126.3
2	34 50.4	86	51	126.2	35 16.1	86	51	125.8	35 41.8	86	52	125.5	36 07.4	85	52	125.2
3	34 19.7	85	52	125.1	34 45.3	85	52	124.8	35 10.9	85	52	124.5	35 36.4	85	52	124.2
4	33 48.6	85	52	124.1	34 14.1	85	53	123.8	34 39.6	85	53	123.5	35 04.9	85	53	123.2
45	33 17.2	85	53	123.1	33 42.6	84	53	122.8	34 07.9	84	53	122.5	34 33.1	84	54	122.1
6	32 45.4	84	54	122.1	33 10.6	84	54	121.8	33 35.8	84	54	121.5	34 01.0	84	54	121.1
7	32 13.2	84	54	121.1	32 38.4	84	54	120.8	33 03.5	84	54	120.5	33 28.5	83	55	120.1
8	31 40.7	84	55	120.1	32 05.8	83	55	119.8	32 30.8	83	55	119.5	32 55.7	83	55	119.2
9	31 07.9	83	55	119.2	31 32.9	83	55	118.9	31 57.7	83	56	118.5	32 22.6	83	56	118.2
50	30 34.8	83	56	118.2	30 59.6	83	56	117.9	31 24.4	83	56	117.6	31 49.1	82	56	117.2
1	30 01.4	83	56	117.3	30 26.1	82	56	116.9	30 50.8	82	56	116.6	31 15.4	82	57	116.3
2	29 27.7	82	57	116.3	29 52.3	82	57	116.0	30 16.9	82	57	115.7	30 41.4	82	57	115.3
3	28 53.7	82	57	115.4	29 18.2	82	57	115.1	29 42.7	82	57	114.7	30 07.2	81	58	114.4
4	28 19.5	82	57	114.5	28 43.9	81	58	114.2	29 08.3	81	58	113.8	29 32.7	81	58	113.5
55	27 45.0	81	58	113.6	28 09.3	81	58	113.2	28 33.7	81	58	112.9	28 57.9	81	58	112.6
6	27 10.2	81	58	112.7	27 34.5	81	58	112.3	27 58.8	81	59	112.0	28 22.9	81	59	111.7
7	26 35.3	81	59	111.8	26 59.5	81	59	111.4	27 23.6	80	59	111.1	27 47.7	80	59	110.8
8	26 00.1	80	59	110.9	26 24.2	80	59	110.5	26 48.3	80	59	110.2	27 12.3	80	59	109.9
9	25 24.7	80	59	110.0	25 48.8	80	59	109.7	26 12.8	80	60	109.3	26 36.7	80	60	109.0
60	24 49.2	80	60	109.1	25 13.1	80	60	108.8	25 37.0	80	60	108.4	26 00.9	80	60	108.1
1	24 13.4	80	60	108.2	24 37.3	80	60	107.9	25 01.1	79	60	107.6	25 24.9	79	60	107.2
2	23 37.4	80	60	107.4	24 01.3	79	60	107.1	24 25.1	79	60	106.7	24 48.8	79	61	106.4
3	23 01.3	79	60	106.5	23 25.1	79	61	106.2	23 48.8	79	61	105.9	24 12.5	79	61	105.5
4	22 25.0	79	61	105.7	22 48.7	79	61	105.3	23 12.4	79	61	105.0	23 36.0	79	61	104.7
65	21 48.6	79	61	104.8	22 12.3	79	61	104.5	22 35.9	79	61	104.2	22 59.4	78	61	103.8
6	21 12.0	79	61	104.0	21 35.6	79	61	103.7	21 59.2	78	61	103.3	22 22.7	78	61	103.0
7	20 35.3	79	61	103.2	20 58.9	78	61	102.8	21 22.4	78	62	102.5	21 45.9	78	62	102.2
8	19 58.5	78	62	102.3	20 22.0	78	62	102.0	20 45.5	78	62	101.7	21 08.9	78	62	101.3
9	19 21.6	78	62	101.5	19 45.0	78	62	101.2	20 08.4	78	62	100.8	20 31.8	78	62	100.5
70	18 44.5	78	62	100.7	19 07.9	78	62	100.4	19 31.3	78	62	100.0	19 54.6	78	62	99.7
1	18 07.4	78	62	99.9	18 30.7	78	62	99.5	18 54.1	78	62	99.2	19 17.4	78	62	98.9
2	17 30.1	78	62	99.1	17 53.4	78	62	98.7	18 16.8	78	62	98.4	18 40.0	78	62	98.1
3	16 52.8	78	62	98.3	17 16.1	78	62	97.9	17 39.4	78	62	97.6	18 02.6	77	62	97.3
4	16 15.4	78	62	97.5	16 38.7	78	62	97.1	17 01.9	77	63	96.8	17 25.1	77	63	96.5
75	15 37.9	78	63	96.7	16 01.2	77	63	96.3	16 24.4	77	63	96.0	16 47.6	77	63	95.7
6	15 00.4	77	63	95.9	15 23.6	77	63	95.5	15 46.8	77	63	95.2	16 10.0	77	63	94.9
7	14 22.8	77	63	95.1	14 46.0	77	63	94.7	15 09.2	77	63	94.4	15 32.3	77	63	94.1
8	13 45.1	77	63	94.3	14 08.3	77	63	93.9	14 31.5	77	63	93.6	14 54.6	77	63	93.3
9	13 07.5	77	63	93.5	13 30.7	77	63	93.2	13 53.8	77	63	92.8	14 16.9	77	63	92.5
80	12 29.8	77	63	92.7	12 52.9	77	63	92.4	13 16.1	77	63	92.1	13 39.2	77	63	91.7
1	11 52.0	77	63	91.9	12 15.2	77	63	91.6	12 38.3	77	63	91.3	13 01.5	77	63	90.9
2	11 14.3	77	63	91.1	11 37.5	77	63	90.8	12 00.6	77	63	90.5	12 23.7	77	63	90.2
3	10 36.5	77	63	90.4	10 59.7	77	63	90.0	11 22.8	77	63	89.7	11 45.9	77	63	89.4
4	9 58.8	77	63	89.6	10 21.9	77	63	89.3	10 45.1	77	63	88.9	11 08.2	77	63	88.6
85	9 21.0	77	63	88.8	9 44.2	77	63	88.5	10 07.3	77	63	88.2	10 30.4	77	63	87.8
6	8 43.3	77	63	88.0	9 06.4	77	63	87.7	9 29.6	77	63	87.4	9 52.7	77	63	87.1
7	8 05.6	77	63	87.3	8 28.7	77	63	86.9	8 51.9	77	63	86.6	9 15.0	77	63	86.3
8	7 27.9	77	63	86.5	7 51.0	77	63	86.2	8 14.2	77	63	85.8	8 37.4	77	63	85.5
9	6 50.2	77	63	85.7	7 13.4	77	63	85.4	7 36.6	77	63	85.1	7 59.7	77	63	84.8
90	6 12.5	77	63	84.9	6 35.8	77	63	84.6	6 59.0	77	63	84.3	7 22.2	77	63	84.0

10° 00′ Alt. (° ′)	Δd	Δt	Az. (°)	10° 30′ Alt. (° ′)	Δd	Δt	Az. (°)	11° 00′ Alt. (° ′)	Δd	Δt	Az. (°)	11° 30′ Alt. (° ′)	Δd	Δt	Az. (°)	H.A. (°)
49 00.0	1.0	01	180.0	49 30.0	1.0	01	180.0	50 00.0	1.0	01	180.0	50 30.0	1.0	01	180.0	00
48 59.5	1.0	02	178.5	49 29.5	1.0	02	178.5	49 59.5	1.0	03	178.5	50 29.5	1.0	03	178.5	1
48 58.0	1.0	04	177.0	49 28.0	1.0	04	177.0	49 58.0	1.0	04	176.9	50 28.0	1.0	04	176.9	2
48 55.6	1.0	06	175.5	49 25.5	1.0	06	175.5	49 55.5	1.0	06	175.4	50 25.4	1.0	06	175.4	3
48 52.1	1.0	07	174.0	49 22.0	1.0	07	174.0	49 52.0	1.0	08	173.9	50 21.9	1.0	08	173.8	4
48 47.7	1.0	09	172.5	49 17.6	1.0	09	172.4	49 47.5	1.0	09	172.4	50 17.3	1.0	09	172.3	05
48 42.3	1.0	11	171.0	49 12.1	99	11	170.9	49 42.0	99	11	170.9	50 11.8	99	11	170.8	6
48 35.9	99	12	169.5	49 05.7	99	12	169.5	49 35.5	99	12	169.4	50 05.3	99	13	169.3	7
48 28.6	99	14	168.1	48 58.3	99	14	168.0	49 28.0	99	14	167.9	49 57.7	99	14	167.8	8
48 20.3	99	15	166.6	48 49.9	99	16	166.5	49 19.6	99	16	166.4	49 49.3	99	16	166.3	9
48 11.1	99	17	165.1	48 40.7	99	17	165.0	49 10.2	99	17	164.9	49 39.8	99	17	164.8	10
48 00.9	98	18	163.7	48 30.4	98	19	163.5	48 59.9	98	19	163.4	49 29.4	98	19	163.3	1
47 49.9	98	20	162.2	48 19.3	98	20	162.1	48 48.7	98	20	161.9	49 18.1	98	20	161.8	2
47 37.9	98	21	160.8	48 07.2	98	22	160.7	48 36.5	98	22	160.5	49 05.8	98	22	160.3	3
47 25.0	97	23	159.4	47 54.3	97	23	159.2	48 23.5	97	23	159.0	48 52.7	97	23	158.9	4
47 11.3	97	24	158.0	47 40.4	97	24	157.8	48 09.5	97	25	157.6	48 38.6	97	25	157.4	15
46 56.7	97	26	156.6	47 25.7	97	26	156.4	47 54.7	97	26	156.2	48 23.7	97	26	156.0	6
46 41.3	96	27	155.2	47 10.2	96	27	155.0	47 39.0	96	28	154.8	48 07.9	96	28	154.6	7
46 25.0	96	28	153.8	46 53.8	96	29	153.6	47 22.5	96	29	153.4	47 51.3	96	29	153.2	8
46 08.0	96	30	152.4	46 36.6	95	30	152.2	47 05.2	95	30	152.0	47 33.8	95	30	151.8	9
45 50.1	95	31	151.1	46 18.6	95	31	150.9	46 47.1	95	32	150.6	47 15.6	95	32	150.4	20
45 31.4	95	32	149.8	45 59.8	95	33	149.5	46 28.2	94	33	149.3	46 56.5	94	33	149.0	1
45 12.1	94	34	148.4	45 40.3	94	34	148.2	46 08.5	94	34	147.9	46 36.7	94	34	147.7	2
44 51.9	94	35	147.1	45 20.0	94	35	146.9	45 48.1	94	35	146.6	46 16.2	93	35	146.4	3
44 31.1	93	36	145.8	44 59.0	93	36	145.6	45 27.0	93	36	145.3	45 54.9	93	37	145.0	4
44 09.5	93	37	144.5	44 37.3	93	37	144.3	45 05.2	93	38	144.0	45 32.9	93	38	143.7	25
43 47.3	92	38	143.3	44 15.0	92	38	143.0	44 42.6	92	39	142.7	45 10.3	92	39	142.5	6
43 24.3	92	39	142.0	43 51.9	92	40	141.7	44 19.4	92	40	141.5	44 46.9	92	40	141.2	7
43 00.8	91	40	140.8	43 28.2	91	41	140.5	43 55.6	91	41	140.2	44 22.9	91	41	139.9	8
42 36.6	91	41	139.6	43 03.9	91	42	139.3	43 31.1	91	42	139.0	43 58.3	91	42	138.7	9
42 11.8	91	42	138.3	42 38.9	90	43	138.1	43 06.0	90	43	137.8	43 33.1	90	43	137.5	30
41 46.4	90	43	137.1	42 13.4	90	44	136.9	42 40.4	90	44	136.6	43 07.3	90	44	136.3	1
41 20.4	90	44	136.0	41 47.3	89	44	135.7	42 14.1	89	45	135.4	42 40.9	89	45	135.1	2
40 53.9	89	45	134.8	41 20.6	89	45	134.5	41 47.3	89	46	134.2	42 13.9	89	46	133.9	3
40 26.9	89	46	133.6	40 53.4	89	46	133.3	41 20.0	88	46	133.0	41 46.4	88	47	132.7	4
39 59.3	88	47	132.5	40 25.7	88	47	132.2	40 52.1	88	47	131.9	41 18.4	88	48	131.6	35
39 31.2	88	48	131.4	39 57.5	88	48	131.1	40 23.7	87	48	130.7	40 49.9	87	48	130.4	6
39 02.6	87	48	130.3	39 28.8	87	49	129.9	39 54.9	87	49	129.6	40 21.0	87	49	129.3	7
38 33.6	87	49	129.2	38 59.6	87	49	128.8	39 25.6	87	50	128.5	39 51.5	86	50	128.2	8
38 04.1	86	50	128.1	38 30.0	86	50	127.8	38 55.8	86	50	127.4	39 21.6	86	51	127.1	9
37 34.1	86	51	127.0	37 59.9	86	51	126.7	38 25.6	86	51	126.3	38 51.3	85	51	126.0	40
37 03.8	86	51	125.9	37 29.4	85	52	125.6	37 55.0	85	52	125.3	38 20.5	85	52	124.9	1
36 33.0	85	52	124.9	36 58.5	85	52	124.6	37 24.0	85	52	124.2	37 49.4	85	53	123.9	2
36 01.8	85	53	123.8	36 27.2	85	53	123.5	36 52.6	84	53	123.2	37 17.9	84	53	122.8	3
35 30.3	84	53	122.8	35 55.6	84	53	122.5	36 20.8	84	54	122.2	36 45.9	84	54	121.8	4
34 58.4	84	54	121.8	35 23.5	84	54	121.5	35 48.6	84	54	121.1	36 13.7	83	54	120.8	45
34 26.1	84	54	120.8	34 51.2	83	54	120.5	35 16.1	83	55	120.1	35 41.1	83	55	119.8	6
33 53.5	83	55	119.8	34 18.4	83	55	119.5	34 43.3	83	55	119.1	35 08.2	83	55	118.8	7
33 20.6	83	55	118.8	33 45.4	83	56	118.5	34 10.2	82	56	118.2	34 34.9	82	56	117.8	8
32 47.3	83	56	117.9	33 12.1	82	56	117.5	33 36.7	82	56	117.2	34 01.4	82	56	116.8	9
32 13.8	82	56	116.9	32 38.4	82	57	116.6	33 03.0	82	57	116.2	33 27.5	82	57	115.9	50
31 40.0	82	57	115.9	32 04.5	82	57	115.6	32 29.0	81	57	115.3	32 53.4	81	57	114.9	1
31 05.9	82	57	115.0	31 30.3	81	57	114.7	31 54.7	81	58	114.3	32 19.0	81	58	114.0	2
30 31.6	81	58	114.1	30 55.9	81	58	113.7	31 20.2	81	58	113.4	31 44.4	81	58	113.0	3
29 57.0	81	58	113.1	30 21.2	81	58	112.8	30 45.4	81	58	112.5	31 09.6	80	58	112.1	4
29 22.1	81	58	112.2	29 46.3	80	59	111.9	30 10.4	80	59	111.5	30 34.5	80	59	111.2	55
28 47.1	80	59	111.3	29 11.1	80	59	111.0	29 35.2	80	59	110.6	29 59.1	80	59	110.3	6
28 11.8	80	59	110.4	28 35.8	80	59	110.1	28 59.7	80	59	109.7	29 23.6	80	60	109.4	7
27 36.3	80	59	109.5	28 00.2	80	60	109.2	28 24.1	79	60	108.8	28 47.9	79	60	108.5	8
27 00.6	80	60	108.7	27 24.5	79	60	108.3	27 48.3	79	60	108.0	28 12.0	79	60	107.6	9
26 24.7	79	60	107.8	26 48.5	79	60	107.4	27 12.3	79	60	107.1	27 35.9	79	60	106.7	60
25 48.7	79	60	106.9	26 12.4	79	60	106.6	26 36.1	79	61	106.2	26 59.7	79	61	105.9	1
25 12.5	79	61	106.0	25 36.1	79	61	105.7	25 59.8	79	61	105.4	26 23.3	78	61	105.0	2
24 36.1	79	61	105.2	24 59.7	79	61	104.8	25 23.3	78	61	104.5	25 46.8	78	61	104.2	3
23 59.6	79	61	104.3	24 23.2	78	61	104.0	24 46.6	78	61	103.7	25 10.1	78	61	103.3	4
23 23.0	78	61	103.5	23 46.4	78	61	103.2	24 09.9	78	61	102.8	24 33.3	78	62	102.5	65
22 46.2	78	62	102.7	23 09.6	78	62	102.3	23 33.0	78	62	102.0	23 56.4	78	62	101.6	6
22 09.3	78	62	101.8	22 32.7	78	62	101.5	22 56.0	78	62	101.1	23 19.3	78	62	100.8	7
21 32.3	78	62	101.0	21 55.6	78	62	100.7	22 18.9	78	62	100.3	22 42.2	77	62	100.0	8
20 55.2	78	62	100.2	21 18.5	78	62	99.8	21 41.7	77	62	99.5	22 04.9	77	62	99.2	9
20 17.9	78	62	99.4	20 41.2	77	62	99.0	21 04.4	77	62	98.7	21 27.6	77	62	98.3	70
19 40.6	78	62	98.5	20 03.9	77	62	98.2	20 27.1	77	62	97.9	20 50.2	77	62	97.5	1
19 03.3	77	62	97.7	19 26.5	77	62	97.4	19 49.6	77	62	97.1	20 12.8	77	63	96.7	2
18 25.8	77	63	96.9	18 49.0	77	63	96.6	19 12.1	77	63	96.3	19 35.2	77	63	95.9	3
17 48.3	77	63	96.1	18 11.5	77	63	95.8	18 34.6	77	63	95.5	18 57.6	77	63	95.1	4
17 10.7	77	63	95.3	17 33.9	77	63	95.0	17 57.0	77	63	94.7	18 20.0	77	63	94.3	75
16 33.1	77	63	94.5	16 56.2	77	63	94.2	17 19.3	77	63	93.9	17 42.3	77	63	93.5	6
15 55.5	77	63	93.7	16 18.5	77	63	93.4	16 41.6	77	63	93.1	17 04.6	77	63	92.7	7
15 17.8	77	63	93.0	15 40.8	77	63	92.6	16 03.9	77	63	92.3	16 26.9	77	63	92.0	8
14 40.0	77	63	92.2	15 03.1	77	63	91.8	15 26.2	77	63	91.5	15 49.2	77	63	91.2	9
14 02.3	77	63	91.4	14 25.4	77	63	91.1	14 48.4	77	63	90.7	15 11.4	77	63	90.4	80
13 24.5	77	63	90.6	13 47.6	77	63	90.3	14 10.6	77	63	90.0	14 33.7	77	63	89.6	1
12 46.8	77	63	89.8	13 09.8	77	63	89.5	13 32.9	77	63	89.2	13 55.9	77	63	88.9	2
12 09.0	77	63	89.1	12 32.1	77	63	88.7	12 55.1	77	63	88.4	13 18.2	77	63	88.1	3
11 31.3	77	63	88.3	11 54.4	77	63	88.0	12 17.4	77	63	87.6	12 40.4	77	63	87.3	4
10 53.5	77	63	87.5	11 16.6	77	63	87.2	11 39.7	77	63	86.9	12 02.7	77	63	86.5	85
10 15.8	77	63	86.7	10 38.9	77	63	86.4	11 02.0	77	63	86.1	11 25.0	77	63	85.8	6
9 38.2	77	63	86.0	10 01.3	77	63	85.6	10 24.3	77	63	85.3	10 47.4	77	63	85.0	7
9 00.5	77	63	85.2	9 23.6	77	63	84.9	9 46.7	77	63	84.6	10 09.8	77	63	84.2	8
8 22.9	77	63	84.4	8 46.0	77	63	84.1	9 09.2	77	63	83.8	9 32.3	77	62	83.5	9
7 45.3	77	62	83.7	8 08.5	77	62	83.3	8 31.7	77	62	83.0	8 54.8	77	62	82.7	90

Digitized by Google

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	31 00.0	1.0 01	180.0	30 30.0	1.0 01	180.0	30 00.0	1.0 01	180.0	29 30.0	1.0 01	180.0	29 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	28 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	00
1	30 59.6	1.0 02	178.8	30 29.6	1.0 02	178.9	29 59.6	1.0 02	178.9	29 29.6	1.0 02	178.9	28 59.6	1.0 02	178.9	28 29.6	1.0 02	178.9	27 59.6	1.0 02	178.9	27 29.6	1.0 02	178.9	1
2	30 58.5	1.0 03	177.7	30 28.5	1.0 03	177.7	29 58.5	1.0 03	177.7	29 28.5	1.0 03	177.7	28 58.5	1.0 03	177.7	28 28.5	1.0 03	177.8	27 58.5	1.0 03	177.8	27 28.5	1.0 03	177.8	2
3	30 56.6	1.0 04	176.5	30 26.6	1.0 04	176.6	29 56.6	1.0 04	176.6	29 26.6	1.0 04	176.6	28 56.7	1.0 04	176.6	28 26.7	1.0 04	176.6	27 56.7	1.0 04	176.7	27 26.7	1.0 04	176.7	3
4	30 53.9	1.0 06	175.4	30 24.0	1.0 06	175.4	29 54.0	1.0 06	175.4	29 24.0	1.0 06	175.5	28 54.1	1.0 06	175.5	28 24.1	1.0 06	175.5	27 54.1	1.0 06	175.6	27 24.2	1.0 05	175.6	4
05	30 50.5	1.0 07	174.2	30 20.6	1.0 07	174.3	29 50.6	1.0 07	174.3	29 20.7	1.0 07	174.3	28 50.7	1.0 07	174.4	28 20.8	1.0 07	174.4	27 50.9	1.0 07	174.4	27 20.9	1.0 07	174.5	05
6	30 46.3	1.0 08	173.1	30 16.4	1.0 08	173.1	29 46.5	1.0 08	173.2	29 16.6	1.0 08	173.2	28 46.7	1.0 08	173.3	28 16.8	1.0 08	173.3	27 46.8	1.0 08	173.3	27 16.9	1.0 08	173.4	6
7	30 41.4	1.0 09	171.9	30 11.5	1.0 09	172.0	29 41.6	1.0 09	172.0	29 11.8	1.0 09	172.1	28 41.9	1.0 09	172.1	28 12.0	1.0 09	172.2	27 42.1	1.0 09	172.2	27 12.2	1.0 09	172.3	7
8	30 35.7	99 11	170.8	30 05.9	99 11	170.8	29 36.0	99 11	170.9	29 06.2	99 10	171.0	28 36.3	1.0 10	171.0	28 06.5	1.0 10	171.1	27 36.6	1.0 10	171.1	27 06.8	1.0 10	171.2	8
9	30 29.3	99 12	169.6	29 59.5	99 12	169.7	29 29.7	99 12	169.8	28 59.9	99 12	169.8	28 30.1	99 12	169.9	28 00.3	99 12	170.0	27 30.5	99 11	170.0	27 00.6	99 11	170.1	9
10	30 22.2	99 13	168.5	29 52.4	99 13	168.6	29 22.6	99 13	168.6	28 52.9	99 13	168.7	28 23.1	99 13	168.8	27 53.3	99 13	168.9	27 23.6	99 13	168.9	26 53.8	99 13	169.0	10
1	30 14.3	99 14	167.4	29 44.6	99 14	167.4	29 14.8	99 14	167.5	28 45.1	99 14	167.6	28 15.4	99 14	167.7	27 45.7	99 14	167.8	27 16.0	99 14	167.8	26 46.2	99 14	167.9	1
2	30 05.6	99 16	166.2	29 36.0	99 15	166.3	29 06.3	99 15	166.4	28 36.7	99 15	166.5	28 07.0	99 15	166.6	27 37.3	99 15	166.7	27 07.6	99 15	166.7	26 38.0	99 15	166.8	2
3	29 56.3	99 17	165.1	29 26.7	99 17	165.2	28 57.1	99 17	165.3	28 27.5	99 16	165.4	27 57.9	99 16	165.5	27 28.3	99 16	165.6	26 58.6	99 16	165.7	26 29.0	99 16	165.7	3
4	29 46.2	98 18	164.0	29 16.7	98 18	164.1	28 47.1	98 18	164.2	28 17.6	98 18	164.3	27 48.1	99 18	164.4	27 18.5	99 17	164.5	26 48.9	99 17	164.6	26 19.4	99 17	164.7	4
15	29 35.5	98 19	162.9	29 06.0	98 19	163.0	28 36.5	98 19	163.1	28 07.0	98 19	163.2	27 37.5	98 19	163.3	27 08.0	98 19	163.4	26 38.6	98 18	163.5	26 09.0	98 18	163.6	15
6	29 24.0	98 20	161.7	28 54.6	98 20	161.9	28 25.2	98 20	162.0	27 55.7	98 20	162.1	27 26.3	98 20	162.2	26 56.9	98 20	162.3	26 27.5	98 20	162.4	25 58.0	98 19	162.5	6
7	29 11.8	98 21	160.6	28 42.5	98 21	160.8	28 13.1	98 21	160.9	27 43.8	98 21	161.0	27 14.4	98 21	161.1	26 45.1	98 21	161.2	26 15.7	98 21	161.3	25 46.4	98 21	161.4	7
8	28 58.9	97 23	159.5	28 29.7	98 22	159.7	28 00.4	98 22	159.8	27 31.1	98 22	159.9	27 01.9	98 22	160.0	26 32.6	98 22	160.1	26 03.3	98 22	160.3	25 34.0	98 22	160.4	8
9	28 45.4	97 24	158.4	28 16.2	97 24	158.6	27 47.0	97 23	158.7	27 17.8	97 23	158.8	26 48.6	97 23	158.9	26 19.4	97 23	159.1	25 50.2	97 23	159.2	25 21.0	97 23	159.3	9
20	28 31.2	97 25	157.3	28 02.1	97 25	157.5	27 33.0	97 25	157.6	27 03.9	97 24	157.7	26 34.7	97 24	157.9	26 05.6	97 24	158.0	25 36.5	97 24	158.1	25 07.4	97 24	158.3	20
1	28 16.3	97 26	156.2	27 47.3	97 26	156.4	27 18.3	97 26	156.5	26 49.2	97 25	156.7	26 20.2	97 25	156.8	25 51.2	97 25	156.9	25 22.1	97 25	157.1	24 53.1	97 25	157.2	1
2	28 00.7	96 27	155.2	27 31.8	96 27	155.3	27 02.9	96 27	155.5	26 34.0	96 27	155.6	26 05.0	96 26	155.7	25 36.1	97 26	155.9	25 07.1	97 26	156.0	24 38.1	97 26	156.2	2
3	27 44.5	96 28	154.1	27 15.7	96 28	154.2	26 46.9	96 28	154.4	26 18.0	96 28	154.5	25 49.2	96 27	154.7	25 20.3	96 27	154.8	24 51.4	96 27	155.0	24 22.6	96 27	155.1	3
4	27 27.7	96 29	153.0	26 59.0	96 29	153.2	26 30.2	96 29	153.3	26 01.5	96 29	153.5	25 32.7	96 28	153.6	25 04.0	96 28	153.8	24 35.2	96 28	154.0	24 06.4	96 28	154.1	4
25	27 10.3	95 30	151.9	26 41.6	95 30	152.1	26 13.0	96 30	152.3	25 44.3	96 30	152.4	25 15.7	96 29	152.6	24 47.0	96 29	152.8	24 18.3	96 29	152.9	23 49.6	96 29	153.1	25
6	26 52.2	95 31	150.9	26 23.7	95 31	151.1	25 55.1	95 31	151.2	25 26.6	95 31	151.4	24 58.0	95 30	151.6	24 29.4	95 30	151.7	24 00.8	95 30	151.9	23 32.2	95 30	152.1	6
7	26 33.5	95 32	149.8	26 05.1	95 32	150.0	25 36.6	95 32	150.2	25 08.2	95 32	150.4	24 39.7	95 31	150.5	24 11.2	95 31	150.7	23 42.7	95 31	150.9	23 14.2	95 31	151.0	7
8	26 14.2	94 33	148.8	25 45.9	94 33	149.0	25 17.6	95 33	149.1	24 49.2	95 33	149.3	24 20.8	95 32	149.5	23 52.4	95 32	149.7	23 24.0	95 32	149.9	22 55.6	95 32	150.0	8
9	25 54.4	94 34	147.7	25 26.2	94 34	147.9	24 57.9	94 34	148.1	24 29.7	94 34	148.3	24 01.4	94 33	148.5	23 33.1	94 33	148.7	23 04.8	94 33	148.8	22 36.5	94 33	149.0	9
30	25 33.9	94 35	146.7	25 05.8	94 35	146.9	24 37.7	94 35	147.1	24 09.5	94 34	147.3	23 41.4	94 34	147.5	23 13.2	94 34	147.7	22 45.0	94 34	147.8	22 16.8	94 34	148.0	30
1	25 12.9	93 36	145.7	24 44.9	93 36	145.9	24 16.9	93 36	146.1	23 48.8	94 35	146.3	23 20.8	94 35	146.5	22 52.7	94 35	146.7	22 24.6	94 35	146.8	21 56.5	94 35	147.0	1
2	24 51.4	93 37	144.7	24 23.5	93 37	144.9	23 55.5	93 36	145.1	23 27.6	93 36	145.3	22 59.6	93 36	145.5	22 31.7	93 36	145.7	22 03.7	93 36	145.9	21 35.7	93 36	146.0	2
3	24 29.3	93 38	143.7	24 01.5	93 38	143.9	23 33.6	93 37	144.1	23 05.8	93 37	144.3	22 38.0	93 37	144.5	22 10.1	93 37	144.7	21 42.2	93 37	144.9	21 14.3	93 36	145.1	3
4	24 06.6	92 39	142.7	23 38.9	92 38	142.9	23 11.2	92 38	143.1	22 43.5	92 38	143.3	22 15.8	92 38	143.5	21 48.0	93 38	143.7	21 20.2	93 38	143.9	20 52.5	93 37	144.1	4
35	23 43.5	92 39	141.7	23 15.9	92 39	141.9	22 48.3	92 39	142.1	22 20.7	92 39	142.3	21 53.0	92 39	142.5	21 25.4	92 39	142.7	20 57.7	92 38	142.9	20 30.1	92 38	143.1	35
6	23 19.8	92 40	140.7	22 52.3	92 40	140.9	22 24.8	92 40	141.1	21 57.3	92 40	141.3	21 29.8	92 40	141.5	21 02.3	92 39	141.7	20 34.7	92 39	142.0	20 07.1	92 39	142.2	6
7	22 55.6	91 41	139.7	22 28.2	91 41	139.9	22 00.9	91 41	140.1	21 33.5	91 41	140.3	21 06.1	91 40	140.6	20 38.6	91 40	140.8	20 11.2	91 40	141.0	19 43.7	92 40	141.2	7
8	22 30.9	91 42	138.7	22 03.7	91 42	138.9	21 36.4	91 42	139.2	21 09.1	91 41	139.4	20 41.8	91 41	139.6	20 14.5	91 41	139.8	19 47.2	91 41	140.0	19 19.8	91 41	140.3	8
9	22 05.7	90 43	137.7	21 38.6	90 43	138.0	21 11.5	91 42	138.2	20 44.3	91 42	138.4	20 17.1	91 42	138.6	19 49.9	91 42	138.9	19 22.7	91 42	139.1	18 55.5	91 41	139.3	9
40	21 40.1	90 43	136.8	21 13.1	90 43	137.0	20 46.1	90 43	137.2	20 19.0	90 43	137.5	19 51.9	90 43	137.7	19 24.8	90 43	137.9	18 57.7	90 42	138.1	18 30.6	90 42	138.4	40
1	21 14.0	90 44	135.8	20 47.1	90 44	136.1	20 20.2	90 44	136.3	19 53.2	90 44	136.5	19 26.3	90 43	136.8	18 59.3	90 43	137.0	18 32.3	90 43	137.2	18 05.3	90 43	137.4	1
2	20 47.5	89 45	134.9	20 20.7	89 45	135.1	19 53.9	89 45	135.3	19 27.0	89 44	135.6	19 00.2	90 44	135.8	18 33.3	90 44	136.1	18 06.4	90 44	136.3	17 39.5	90 44	136.5	2
3	20 20.5	89 46	133.9	19 53.8	89 46	134.2	19 27.1	89 45	134.4	19 00.4	89 45	134.6	18 33.7	89 45	134.9	18 06.9	89 45	135.1	17 40.1	89 45	135.4	17 13.3	89 44	135.6	3
4	19 53.1	89 46	133.0	19 26.5	89 46	133.2	18 59.9	89 46	133.5	18 33.3	89 46	133.7	18 06.7	89 46	134.0	17 40.0	89 45	134.2	17 13.4	89 45	134.4	16 46.7	89 45	134.7	4
45	19 25.3	88 47	132.1	18 58.8	88 47	132.3	18 32.3	88 47	132.6	18 05.8	88 46	132.8	17 39.3	88 46	133.0	17 12.8	88 46	133.3	16 46.2	89 46	133.5	16 19.6	89 46	133.8	45
6	18 57.0	88 48	131.1	18 30.7	88 48	131.4	18 04.3	88 47	131.6	17 37.9	88 47	131.9	17 11.5	88 47	132.1	16 45.1	88 47	132.4	16 18.6	88 47	132.6	15 52.2	88 46	132.9	6
7	18 28.4	87 48	130.2	18 02.1	88 48	130.5	17 35.9	88 48	130.7	17 09.6	88 48	131.0	16 43.3	88 48	131.2	16 17.0	88 47	131.5	15 50.7	88 47	131.7	15 24.3	88 47	132.0	7
8	17 59.4	87 49	129.3	17 33.2	87 49	129.6	17 07.1	87 49	129.8	16 40.9	87 48	130.1	16 14.7	87 48	130.3	15 48.5	87 48	130.6	15 22.3	87 48	130.8	14 56.0	88 48	131.1	8
9	17 30.0	87 50	128.4	17 03.9	87 49	128.7	16 37.9	87 49	128.9	16 11.8	87 49	129.2	15 45.7	87 49	129.4	15 19.6	87 49	129.7	14 53.5	87 49	130.0	14 27.4	87 48	130.2	9
50	17 00.2	86 50	127.5	16 34.3	86 50	127.8	16 08.3	86 50	128.0	15 42.4	87 50	128.3	15 16.4	87 50	128.6	14 50.4	87 49	128.8	14 24.4	87 49	129.1	13 58.4	87 49	129.3	50
1	16 30.1	86 51	126.6	16 04.2	86 51	126.9	15 38.4	86 50	127.1	15 12.6	86 50	127.4	14 46.7	86 50	127.7	14 20.8	86 50	127.9	13 54.9	86 50	128.2	13 29.0	86 50	128.5	1
2	15 59.6	86 51	125.7	15 33.9	86 51	126.0	15 08.1	86 51	126.3	14 42.4	86 51	126.5	14 16.6	86 51	126.8	13 50.8	86 51	127.1	13 25.0	86 50	127.3	12 59.2	86 50	127.6	2
3	15 28.8	85 52	124.9	15 03.2	85 52	125.1	14 37.5	85 52	125.4	14 11.9	86 51	125.7	13 46.2	86 51	125.9	13 20.5	86 51	126.2	12 54.8	86 51	126.5	12 29.1	86 51	126.7	3
4	14 57.6	85 52	124.0	14 32.1	85 52	124.2	14 06.6	85 52	124.5	13 41.0	85 52	124.8	13 15.5	85 52	125.1	12 49.9	85 52	125.3	12 24.3	85 51	125.6	11 58.7	85 51	125.9	4
55	14 26.1	85 53	123.1	14 00.7	85 53	123.4	13 35.3	85 53	123.7	13 09.9	85 52	123.9	12 44.4	85 52	124.2	12 18.9	85 52	124.5	11 53.4	85 52	124.7	11 27.9	85 52	125.0	55
6	13 54.4	84 53	122.2	13 29.0	84 53	122.5	13 03.7	84 53	122.8	12 38.4	85 53	123.1	12 13.0	85 53	123.3	11 47.6	85 53	123.6	11 22.3	85 52	123.9	10 56.8	85 52	124.2	6
7	13 22.3	84 54	121.4	12 57.1	84 54	121.7	12 31.8	84 54	121.9	12 06.6	84 53	122.2	11 41.3	84 53	122.5	11 16.0	84 53	122.8	10 50.8	84 53	123.0	10 25.4	84 53	123.3	7
8	12 49.9	84 54	120.5	12 24.8	84 54	120.8	11 59.6	84 54	121.1	11 34.5	84 54	121.4	11 09.3	84 54	121.7	10 44.1	84 54	121.9	10 19.0	84 53	122.2	9 53.7	84 53	122.5	8
9	12 17.2	83 55	119.7	11 52.2	83 55	120.0	11 27.2	83 55	120.3	11 02.1	84 54	120.5	10 37.0	84 54	120.8	10 12.0	84 54	121.1	9 46.9	84 54	121.4	9 21.7	84 54	121.6	9
60	11 44.3	83 55	118.8	11 19.4	83 55	119.1	10 54.4	83 55	119.4	10 29.5	83 55	119.7	10 04.5	83 55	120.0	9 39.5	83 55	120.3	9 14.5	83 54	120.5	8 49.5	83 54	120.8	60
1	11 11.1	83 56	118.0	10 46.2	83 56	118.3	10 21.4	83 55	118.6	9 56.5	83 55	118.9	9 31.6	83 55	119.1	9 06.7	83 55	119.4	8 41.8	83 55	119.7	8 16.9	83 55	120.0	1
2	10 37.6	82 56	117.2	10 12.9	83 56	117.5	9 48.1	83 56	117.7	9 23.3	83 56	118.0	8 58.5	83 56	118.3	8 33.7	83 55	118.6	8 08.9	83 55	118.9	7 44.1	83 55	119.2	2
3	10 03.9	82 57	116.3	9 39.2	82 56	116.6	9 14.6	82 56	116.9	8 49.9	82 56	117.2	8 25.2	82 56	117.5	8 00.4	82 56	117.8	7 35.7	82 56	118.1	7 11.0	82 56	118.4	3
4	9 29.9	82 57	115.5	9 05.4	82 57	115.8	8 40.8	82 57	116.1	8 16.2	82 57	116.4	7 51.5	82 56	116.7	7 26.9	82 56	117.0	7 02.3	82 56	117.3	6 37.6	82 56	117.5	4
65	8 55.8	82 57	114.7	8 31.3	82 57	115.0	8 06.7	82 57	115.3	7 42.2	82 57	115.6	7 17.7	82 57	115.9	6 53.1	82 57	116.2	6 28.6	82 57	116.4	6 04.0	82 56	116.7	65
6	8 21.3	81 58	113.9	7 56.9	81 58	114.2	7 32.5	81 57	114.5	7 08.0	82 57	114.8	6 43.6	82 57	115.1	6 19.1	82 57	115.3	5 54.6	82 57	115.6	5 30.2	82 57	115.9	6
7	7 46.7	81 58	113.1	7 22.4	81 58	113.4	6 58.0	81 58	113.7	6 33.6	81 58	114.0	6 09.3	81 58	114.2	5 44.9	81 57	114.5	5 20.5	81 57	114.8				7
8	7 11.9	81 58	112.3	6 47.6	81 58	112.6	6 23.3	81 58	112.9	5 59.0	81 58	113.2	5 34.7	81 58	113.4	5 10.4	81 58	113.7							8
9	6 36.8	81 59	111.5	6 12.6	81 59	111.8	5 48.4	81 58	112.1	5 24.2	81 58	112.3	5 00.0	81 58	112.6										9
70	6 01.6	80 59	110.7	5 37.5	80 59	111.0	5 13.3	80 59	111.3																70
1	5 26.2	80 59	109.9	5 02.1	80 59	110.2																			1

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	5 35.0	77 63	84.2																						91
2				5 58.2	77 63	83.9	6 21.4	77 62	83.5	6 44.6	77 62	83.2	7 07.8	77 62	82.9	7 31.0	77 62	82.6	7 54.2	77 62	82.3	8 17.4	77 62	81.9	2
3				5 20.7	78 62	83.1	5 43.9	77 62	82.8	6 07.2	77 62	82.5	6 30.4	77 62	82.1	6 53.6	77 62	81.8	7 16.8	77 62	81.5	7 40.0	77 62	81.2	3
4							5 06.5	78 62	82.0	5 29.8	78 62	81.7	5 53.0	78 62	81.4	6 16.3	77 62	81.0	6 39.5	77 62	80.7	7 02.7	77 62	80.4	4
													5 15.7	78 62	80.6	6 39.0	78 62	80.3	6 02.3	78 62	80.0	6 25.6	78 62	79.6	
95																5 01.9	78 62	79.5	5 25.2	78 62	79.2	5 48.5	78 62	78.9	95
6																						5 11.5	78 62	78.1	6

Digitized by Google

Lat. 51°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	51 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	54 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	00
1	50 59.5	1.0 03	178.4	51 29.5	1.0 03	178.4	51 59.5	1.0 03	178.4	52 29.5	1.0 03	178.4	52 59.5	1.0 03	178.4	53 29.5	1.0 03	178.4	53 59.5	1.0 03	178.4	54 29.5	1.0 03	178.3	1
2	50 58.0	1.0 04	176.9	51 27.9	1.0 04	176.9	51 57.9	1.0 04	176.8	52 27.9	1.0 04	176.8	52 57.9	1.0 04	176.8	53 27.9	1.0 04	176.7	53 57.8	1.0 04	176.7	54 27.8	1.0 05	176.7	2
3	50 55.4	1.0 06	175.3	51 25.4	1.0 06	175.3	51 55.3	1.0 06	175.3	52 25.3	1.0 06	175.2	52 55.2	1.0 06	175.2	53 25.2	1.0 06	175.1	53 55.1	1.0 06	175.1	54 25.1	1.0 06	175.0	3
4	50 51.8	1.0 08	173.8	51 21.7	1.0 08	173.7	51 51.7	1.0 08	173.7	52 21.6	1.0 08	173.6	52 51.5	1.0 08	173.6	53 21.4	1.0 08	173.5	53 51.4	1.0 08	173.4	54 21.3	1.0 08	173.4	4
05	50 47.2	1.0 09	172.3	51 17.1	1.0 09	172.2	51 47.0	1.0 10	172.1	52 16.9	1.0 10	172.0	52 46.8	1.0 10	172.0	53 16.6	1.0 10	171.9	53 46.5	1.0 10	171.8	54 16.4	1.0 10	171.7	05
6	50 41.6	99 11	170.7	51 11.5	99 11	170.6	51 41.3	99 11	170.5	52 11.1	99 11	170.5	52 41.0	99 11	170.4	53 10.8	99 12	170.3	53 40.6	99 12	170.2	54 10.4	99 12	170.1	6
7	50 35.0	99 13	169.2	51 04.8	99 13	169.1	51 34.6	99 13	169.0	52 04.4	99 13	168.9	52 34.1	99 13	168.8	53 03.9	99 13	168.7	53 33.6	99 13	168.6	54 03.4	99 13	168.5	7
8	50 27.5	99 14	167.7	50 57.2	99 14	167.5	51 26.9	99 15	167.4	51 56.6	99 15	167.3	52 26.3	99 15	167.2	52 56.0	99 15	167.1	53 25.6	99 15	167.0	53 55.3	99 15	166.8	8
9	50 18.9	99 16	166.1	50 48.5	99 16	166.0	51 18.2	99 16	165.9	51 47.8	99 16	165.8	52 17.4	99 16	165.6	52 47.0	99 17	165.5	53 16.6	99 17	165.4	53 46.2	99 17	165.2	9
10	50 09.4	99 17	164.6	50 38.9	99 18	164.5	51 08.5	98 18	164.4	51 38.0	98 18	164.2	52 07.5	98 18	164.1	52 37.1	98 18	163.9	53 06.6	98 18	163.8	53 36.1	98 19	163.6	10
1	49 58.9	98 19	163.1	50 28.4	98 19	163.0	50 57.8	98 19	162.8	51 27.3	98 20	162.7	51 56.7	98 20	162.5	52 26.1	98 20	162.4	52 55.5	98 20	162.2	53 24.9	98 20	162.0	1
2	49 47.5	98 21	161.6	50 16.8	98 21	161.5	50 46.2	98 21	161.3	51 15.5	98 21	161.2	51 44.9	98 21	161.0	52 14.2	98 21	160.8	52 43.5	98 22	160.6	53 12.8	98 22	160.5	2
3	49 35.1	98 22	160.2	50 04.4	98 22	160.0	50 33.6	97 22	159.8	51 02.9	97 23	159.6	51 32.1	97 23	159.5	52 01.3	97 23	159.3	52 30.5	97 23	159.1	52 59.6	97 23	158.9	3
4	49 21.8	97 24	158.7	49 51.0	97 24	158.5	50 20.1	97 24	158.3	50 49.3	97 24	158.1	51 18.4	97 24	157.9	51 47.5	97 25	157.7	52 16.5	97 25	157.5	52 45.6	97 25	157.3	4
15	49 07.7	97 25	157.2	49 36.7	97 25	157.0	50 05.7	97 25	156.9	50 34.7	97 26	156.7	51 03.7	97 26	156.4	51 32.7	97 26	156.2	52 01.6	96 26	156.0	52 30.6	96 27	155.8	15
6	48 52.6	96 26	155.8	49 21.6	96 27	155.6	49 50.5	96 27	155.4	50 19.3	96 27	155.2	50 48.2	96 27	155.0	51 17.0	96 28	154.7	51 45.8	96 28	154.5	52 14.6	96 28	154.3	6
7	48 36.7	96 28	154.4	49 05.5	96 28	154.2	49 34.3	96 28	153.9	50 03.1	96 29	153.7	50 31.8	96 29	153.5	51 00.5	96 29	153.3	51 29.2	96 29	153.0	51 57.8	95 30	152.8	7
8	48 20.0	96 29	153.0	48 48.6	96 30	152.7	49 17.3	95 30	152.5	49 45.9	95 30	152.3	50 14.5	95 30	152.0	50 43.1	95 30	151.8	51 11.6	95 31	151.6	51 40.1	95 31	151.3	8
9	48 02.4	95 31	151.6	48 30.9	95 31	151.3	48 59.4	95 31	151.1	49 27.9	95 31	150.8	49 56.4	95 32	150.6	50 24.8	95 32	150.4	50 53.2	95 32	150.1	51 21.6	94 32	149.8	9
20	47 44.0	95 32	150.2	48 12.4	95 32	149.9	48 40.8	95 32	149.7	49 09.1	94 33	149.4	49 37.4	94 33	149.2	50 05.7	94 33	148.9	50 34.0	94 33	148.7	51 02.2	94 34	148.4	20
1	47 24.8	94 33	148.8	47 53.1	94 33	148.6	48 21.3	94 34	148.3	48 49.5	94 34	148.0	49 17.7	94 34	147.8	49 45.8	94 34	147.5	50 13.9	94 35	147.2	50 42.0	93 35	147.0	1
2	47 04.9	94 34	147.4	47 33.0	94 35	147.2	48 01.1	94 35	146.9	48 29.2	93 35	146.7	48 57.2	93 35	146.4	49 25.2	93 36	146.1	49 53.1	93 36	145.8	50 21.0	93 36	145.5	2
3	46 44.2	93 36	146.1	47 12.2	93 36	145.8	47 40.1	93 36	145.6	48 08.0	93 36	145.3	48 35.9	93 37	145.0	49 03.7	93 37	144.7	49 31.5	93 37	144.4	49 59.3	92 37	144.2	3
4	46 22.8	93 37	144.8	46 50.6	93 37	144.5	47 18.4	93 37	144.2	47 46.2	92 38	144.0	48 13.9	92 38	143.7	48 41.6	92 38	143.4	49 09.2	92 38	143.1	49 36.8	92 39	142.8	4
25	46 00.7	92 38	143.5	46 28.3	92 38	143.2	46 56.0	92 39	142.9	47 23.6	92 39	142.6	47 51.2	92 39	142.3	48 18.7	92 39	142.0	48 46.2	91 40	141.7	49 13.6	91 40	141.4	25
6	45 37.8	92 39	142.2	46 05.4	92 39	141.9	46 32.9	92 40	141.6	47 00.3	91 40	141.3	47 27.8	91 40	141.0	47 55.1	91 40	140.7	48 22.4	91 41	140.4	48 49.7	91 41	140.1	6
7	45 14.4	91 40	140.9	45 41.8	91 40	140.6	46 09.1	91 41	140.3	46 36.4	91 41	140.0	47 03.7	91 41	139.7	47 30.9	91 42	139.4	47 58.0	90 42	139.1	48 25.1	90 42	138.8	7
8	44 50.2	91 41	139.6	45 17.5	91 42	139.3	45 44.7	91 42	139.0	46 11.8	90 42	138.7	46 38.9	90 42	138.4	47 06.0	90 43	138.1	47 33.0	90 43	137.8	47 59.9	90 43	137.5	8
9	44 25.5	90 42	138.4	44 52.6	90 43	138.1	45 19.6	90 43	137.8	45 46.6	90 43	137.5	46 13.6	90 43	137.2	46 40.5	90 44	136.8	47 07.3	89 44	136.5	47 34.1	89 44	136.2	9
30	44 00.1	90 43	137.2	44 27.0	90 44	136.9	44 53.9	90 44	136.5	45 20.8	89 44	136.2	45 47.6	89 44	135.9	46 14.3	89 45	135.6	46 41.0	89 45	135.3	47 07.6	89 45	134.9	30
1	43 34.1	89 44	135.9	44 00.9	89 44	135.6	44 27.7	89 45	135.3	44 54.4	89 45	135.0	45 21.0	89 45	134.7	45 47.6	89 45	134.3	46 14.1	88 46	134.0	46 40.6	88 46	133.7	1
2	43 07.6	89 45	134.7	43 34.2	89 45	134.4	44 00.8	89 46	134.1	44 27.4	88 46	133.8	44 53.9	88 46	133.5	45 20.3	88 46	133.1	45 46.7	88 47	132.8	46 13.0	88 47	132.4	2
3	42 40.5	88 46	133.6	43 07.0	88 46	133.2	43 33.5	88 47	132.9	43 59.9	88 47	132.6	44 26.2	88 47	132.3	44 52.5	88 47	131.9	45 18.7	87 48	131.6	45 44.9	87 48	131.2	3
4	42 12.9	88 47	132.4	42 39.2	88 47	132.1	43 05.5	88 47	131.7	43 31.8	87 48	131.4	43 58.0	87 48	131.1	44 24.1	87 48	130.7	44 50.2	87 48	130.4	45 16.2	87 49	130.0	4
35	41 44.7	88 48	131.2	42 11.0	87 48	130.9	42 37.1	87 48	130.6	43 03.2	87 48	130.2	43 29.3	87 49	129.9	43 55.3	87 49	129.6	44 21.2	86 49	129.2	44 47.1	86 49	128.9	35
6	41 16.1	87 49	130.1	41 42.2	87 49	129.8	42 08.2	87 49	129.4	42 34.2	86 49	129.1	43 00.1	86 49	128.8	43 25.9	86 50	128.4	43 51.7	86 50	128.1	44 17.4	86 50	127.7	6
7	40 47.0	87 49	129.0	41 12.9	86 50	128.6	41 38.8	86 50	128.3	42 04.6	86 50	128.0	42 30.4	86 50	127.6	42 56.1	86 50	127.3	43 21.8	85 51	126.9	43 47.3	85 51	126.6	7
8	40 17.4	86 50	127.9	40 43.2	86 50	127.5	41 08.9	86 50	127.2	41 34.6	86 51	126.8	42 00.3	85 51	126.5	42 25.8	85 51	126.1	42 51.3	85 51	125.8	43 16.8	85 52	125.4	8
9	39 47.3	86 51	126.8	40 13.0	85 51	126.4	40 38.6	85 51	126.1	41 04.2	85 51	125.7	41 29.7	85 52	125.4	41 55.1	85 52	125.0	42 20.5	84 52	124.7	42 45.8	84 52	124.3	9
40	39 16.9	85 51	125.7	39 42.4	85 52	125.3	40 07.9	85 52	125.0	40 33.3	85 52	124.6	40 58.7	84 52	124.3	41 24.0	84 53	123.9	41 49.2	84 53	123.6	42 14.4	84 53	123.2	40
1	38 46.0	85 52	124.6	39 11.4	85 52	124.3	39 36.8	84 53	123.9	40 02.1	84 53	123.6	40 27.3	84 53	123.2	40 52.5	84 53	122.9	41 17.6	84 53	122.5	41 42.6	83 54	122.1	1
2	38 14.7	84 53	123.6	38 40.0	84 53	123.2	39 05.3	84 53	122.9	39 30.4	84 53	122.5	39 55.5	84 54	122.2	40 20.6	83 54	121.8	40 45.5	83 54	121.4	41 10.4	83 54	121.1	2
3	37 43.1	84 53	122.5	38 08.3	84 54	122.2	38 33.4	84 54	121.8	38 58.4	83 54	121.5	39 23.4	83 54	121.1	39 48.3	83 54	120.7	40 13.1	83 55	120.4	40 37.9	82 55	120.0	3
4	37 11.1	84 54	121.5	37 36.1	83 54	121.1	38 01.1	83 54	120.8	38 26.0	83 55	120.4	38 50.9	83 55	120.1	39 15.7	83 55	119.7	39 40.4	82 55	119.3	40 05.1	82 55	119.0	4
45	36 38.7	83 55	120.5	37 03.6	83 55	120.1	37 28.5	83 55	119.8	37 53.3	83 55	119.4	38 18.0	82 55	119.0	38 42.7	82 55	118.7	39 07.3	82 56	118.3	39 31.9	82 56	117.9	45
6	36 00.0	83 55	119.4	36 30.8	83 55	119.1	36 55.5	82 55	118.7	37 20.2	82 56	118.4	37 44.9	82 56	118.0	38 09.4	82 56	117.7	38 33.9	82 56	117.3	38 58.3	81 56	116.9	6
7	35 32.9	82 56	118.4	35 57.6	82 56	118.1	36 22.3	82 56	117.7	36 46.9	82 56	117.4	37 11.4	82 56	117.0	37 35.8	81 56	116.7	38 00.2	81 57	116.3	38 24.5	81 57	115.9	7
8	34 59.6	82 56	117.5	35 24.2	82 56	117.1	35 48.7	82 56	116.8	36 13.2	81 57	116.4	36 37.6	81 57	116.0	37 01.9	81 57	115.7	37 26.2	81 57	115.3	37 50.4	81 57	114.9	8
9	34 25.9	82 57	116.5	34 50.4	82 57	116.1	35 14.8	81 57	115.8	35 39.2	81 57	115.4	36 03.5	81 57	115.1	36 27.8	81 57	114.7	36 52.0	80 58	114.3	37 16.1	80 58	114.0	9
50	33 52.0	81 57	115.5	34 16.4	81 57	115.2	34 40.7	81 57	114.8	35 05.0	81 58	114.5	35 29.2	81 58	114.1	35 53.3	80 58	113.7	36 17.4	80 58	113.4	36 41.4	80 58	113.0	50
1	33 17.8	81 57	114.6	33 42.1	81 58	114.2	34 06.3	81 58	113.9	34 30.5	80 58	113.5	34 54.6	80 58	113.1	35 18.6	80 58	112.8	35 42.6	80 58	112.4	36 06.5	80 59	112.0	1
2	32 43.3	81 58	113.6	33 07.5	81 58	113.3	33 31.7	80 58	112.9	33 55.7	80 58	112.6	34 19.8	80 58	112.2	34 43.7	80 59	111.8	35 07.6	80 59	111.5	35 31.4	79 59	111.1	2
3	32 08.6	80 58	112.7	32 32.7	80 58	112.3	32 56.8	80 59	112.0	33 20.7	80 59	111.6	33 44.7	80 59	111.3	34 08.5	79 59	110.9	34 32.4	79 59	110.5	34 56.1	79 59	110.2	3
4	31 33.6	80 59	111.8	31 57.7	80 59	111.4	32 21.6	80 59	111.1	32 45.5	80 59	110.7	33 09.4	79 59	110.3	33 33.2	79 59	110.0	33 56.9	79 59	109.6	34 20.5	79 60	109.2	4
55	30 58.5	80 59	110.8	31 22.4	80 59	110.5	31 46.3	80 59	110.1	32 10.1	79 59	109.8	32 33.9	79 60	109.4	32 57.6	79 60	109.1	33 21.2	79 60	108.7	33 44.8	78 60	108.3	55
6	30 23.1	80 59	109.9	30 46.9	79 59	109.6	31 10.7	79 60	109.2	31 34.5	79 60	108.9	31 58.2	79 60	108.5	32 21.8	79 60	108.2	32 45.4	78 60	107.8	33 08.8	78 60	107.4	6
7	29 47.5	79 60	109.0	30 11.3	79 60	108.7	30 35.0	79 60	108.3	30 58.7	79 60	108.0	31 22.3	79 60	107.6	31 45.8	78 60	107.3	32 09.3	78 60	106.9	32 32.7	78 60	106.5	7
8	29 11.7	79 60	108.2	29 35.4	79 60	107.8	29 59.1	79 60	107.4	30 22.7	79 60	107.1	30 46.2	78 60	106.7	31 09.7	78 60	106.4	31 33.1	78 61	106.0	31 56.5	78 61	105.6	8
9	28 35.7	79 60	107.3	28 59.4	79 60	106.9	29 22.9	79 60	106.6	29 46.5	78 61	106.2	30 10.0	78 61	105.8	30 33.4	78 61	105.5	30 56.7	78 61	105.1	31 20.0	78 61	104.8	9
60	27 59.6	79 60	106.4	28 23.2	79 61	106.0	28 46.7	78 61	105.7	29 10.1	78 61	105.3	29 33.6	78 61	105.0	29 56.9	78 61	104.6	30 20.2	78 61	104.3	30 43.4	77 61	103.9	60
1	27 23.3	78 61	105.5	27 46.8	78 61	105.2	28 10.2	78 61	104.8	28 33.7	78 61	104.5	28 57.0	78 61	104.1	29 20.3	78 61	103.7	29 43.5	77 61	103.4	30 06.7	77 61	103.0	1
2	26 46.8	78 61	104.7	27 10.3	78 61	104.3	27 33.7	78 61	104.0	27 57.0	78 61	103.6	28 20.3	78 61	103.3	28 43.6	77 61	102.9	29 06.7	77 62	102.5	29 29.9	77 62	102.2	2
3	26 10.2	78 61	103.8	26 33.6	78 61	103.5	26 57.0	78 61	103.1	27 20.3	78 61	102.8	27 43.5	77 62	102.4	28 06.7	77 62	102.0	28 29.8	77 62	101.7	28 52.9	77 62	101.3	3
4	25 33.5	78 61	103.0	25 56.8	78 62	102.6	26 20.1	78 62	102.3	26 43.4	77 62	101.9	27 06.6	77 62	101.6	27 29.7	77 62	101.2	27 52.8	77 62	100.8	28 15.8	77 62	100.5	4
65	24 56.6	78 62	102.1	25 19.9	78 62	101.8	25 43.2	77 62	101.4	26 06.4	77 62	101.1	26 29.5	77 62	100.7	26 52.6	77 62	100.4	27 15.6	77 62	100.0	27 38.6	77 62	99.6	65
6	24 19.7	78 62	101.3	24 42.9	77 62	100.9	25 06.1	77 62	100.6	25 29.3	77 62	100.2	25 52.4	77 62	99.9	26 15.4	77 62	99.5	26 38.4	77 62	99.2	27 01.4	76 62	98.8	6
7	23 42.6	77 62	100.5	24 05.8	77 62	100.1	24 28.9	77 62	99.8	24 52.1	77 62	99.4	25 15.1	77 62	99.1	25 38.1	77 62	98.7	26 01.1	76 62	98.3	26 24.0	76 62	98.0	7
8	23 05.4	77 62	99.6	23 28.6	77 62	99.3	23 51.7	77 62	98.9	24 14.8	77 62	98.6	24 37.8	77 62	98.2	25 00.8	77 62	97.9	25 23.7	76 62	97.5	25 46.6	76 62	97.2	8
9	22 28.1	77 62	98.8	22 51.3	77 62	98.5	23 14.3	77 62	98.1	23 37.4	77 62	97.8	24 00.4	77 62	97.4	24 23.3	76 63	97.1	24 46.2	76 63	96.7	25 09.1	76 63	96.4	9
70	21 50.8	77 62	98.0	22 13.9	77 62	97.7	22 36.9	77 62	97.3	22 59.9	77 63	97.0	23 22.9	76 63	96.6	23 45.8	76 63	96.3	24 08.7	76 63	95.9	24 31.5	76 63	95.5	70
1	21 13.3	77 62	97.2	21 36.4	77 63	96.8	21 59.4	77 63	96.5	22 22.4	77 63	96.2	22 45.4	76 63	95.8	23 08.3	76 63	95.5	23 31.1	76 63	95.1	23 53.9	76 63	94.7	1
2	20 35.8	77 63	96.4	20 58.9	77 63	96.0	21 21.9	77 63	95.7	21 44.9	76 63	95.4	22 07.8	76 63	95.0	22 30.7	76 63	94.7	22 53.5	76 63	94.3	23 16.3	76 63	93.9	2
3	19 58.3	77 63	95.6	20 21.3	77 63	95.2	20 44.3	77 63	94.9	21 07.2	76 63	94.6	21 30.1	76 63	94.2	21 53.0	76 63	93.9	22 15.8	76 63	93.5	22 38.6	76 63	93.2	3
4	19 20.7	77 63	94.8	19 43.7	77 63	94.4	20 06.7	76 63	94.1	20 29.6	76 63	93.8	20 52.5	76 63	93.4	21 15.3	76 63	93.1	21 38.1	76 63	92.7	22 00.9	76 63	92.4	4
75	18 43.0	77 63	94.0	19 06.0	77 63	93.7	19 29.0	76 63	93.3	19 51.9	76 63	93.0	20 14.8	76 63	92.6	20 37.6	76 63	92.3	21 00.4	76 63	91.9	21 23.1	76 63	91.6	75
6	18 05.4	77 63	93.2	18 28.3	77 63	92.9	18 51.3	76 63	92.5	19 14.2	76 63	92.2	19 37.0	76 63	91.8	19 59.8	76 63	91.5	20 22.7	76 63	91.1	20 45.4	76 63	90.8	6
7	17 27.6	77 63	92.4	17 50.6	76 63	92.1	18 13.5	76 63	91.7	18 36.4	76 63	91.4	18 59.3	76 63	91.1	19 22.1	76 63	90.7	19 44.9	76 63	90.4	20 07.6	76 63	90.0	7
8	16 49.9	77 63	91.6	17 12.9	76 63	91.3	17 35.8	76 63	91.0	17 58.7	76 63	90.6	18 21.5	76 63	90.3	18 44.3	76 63	89.9	19 07.1	76 63	89.6	19 29.9	76 63	89.2	8
9	16 12.2	77 63	90.8	16 35.1	76 63	90.5	16 58.0	76 63	90.2	17 20.9	76 63	89.8	17 43.8	76 63	89.5	18 06.6	76 63	89.2	18 29.4	76 63	88.8	18 52.1	76 63	88.5	9
80	15 34.4	77 63	90.1	15 57.3	76 63	89.7	16 20.3	76 63	89.4	16 43.2	76 63	89.1	17 06.0	76 63	88.7	17 28.8	76 63	88.4	17 51.6	76 63	88.0	18 14.4	76 63	87.7	80
1	14 56.6	77 63	89.3	15 19.6	76 63	89.0	15 42.5	76 63	88.6	16 05.4	76 63	88.3	16 28.3	76 63	88.0	16 51.1	76 63	87.6	17 13.9	76 63	87.3	17 36.7	76 63	86.9	1
2	14 18.9	77 63	88.5	14 41.8	76 63	88.2	15 04.8	76 63	87.9	15 27.7	76 63	87.5	15 50.5	76 63	87.2	16 13.4	76 63	86.8	16 36.2	76 63	86.5	16 59.0	76 63	86.2	2
3	13 41.1	77 63	87.7	14 04.1	77 63	87.4	14 27.0	76 63	87.1	14 50.0	76 63	86.7	15 12.8	76 63	86.4	15 35.7	76 63	86.1	15 58.5	76 63	85.7	16 21.3	76 63	85.4	3
4	13 03.4	77 63	87.0	13 26.4	77 63	86.6	13 49.4	76 63	86.3	14 12.3	76 63	86.0	14 35.2	76 63	85.6	14 58.0	76 63	85.3	15 20.9	76 63	85.0	15 43.7	76 63	84.6	4
85	12 25.7	77 63	86.2	12 48.7	77 63	85.9	13 11.7	77 63	85.5	13 34.6	76 63	85.2	13 57.5	76 63	84.9	14 20.4	76 63	84.6	14 43.3	76 63	84.2	15 06.1	76 63	83.9	85
6	11 48.1	77 63	85.4	12 11.1	77 63	85.1	12 34.1	77 63	84.8	12 57.0	76 63	84.5	13 20.0	76 63	84.1	13 42.9	76 63	83.8	14 05.7	76 62	83.5	14 28.6	76 62	83.1	6
7	11 10.5	77 63	84.7	11 33.5	77 63	84.3	11 56.5	77 63	84.0	12 19.5	77 62	83.7	12 42.4	76 62	83.4	13 05.4	76 62	83.0	13 28.3	76 62	82.7	13 51.1	76 62	82.4	7
8	10 32.9	77 63	83.9	10 55.9	77 62	83.6	11 19.0	77 62	83.3	11 42.0	77 62	82.9	12 04.9	77 62	82.6	12 27.9	76 62	82.3	12 50.8	76 62	81.9	13 13.8	76 62	81.6	8
9	9 55.4	77 62	83.1	10 18.4	77 62	82.8	10 41.5	77 62	82.5	11 04.5	77 62	82.2	11 27.5	77 62	81.8	11 50.5	77 62	81.5	12 13.5	77 62	81.2	12 36.4	76 62	80.9	9
	9 17.9	77 62	82.4	9 41.0	77 62	82.1	10 04.1	77 62	81.7	10 27.2	77 62	81.4	10 50.2	77 62	81.1	11 13.2	77 62	80.8	11 36.2	77 62	80.4	11 59.2	77 62	80.1	90

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	27 00.0	1.0	01	180.0	26 30.0	1.0	01	180.0	26 00.0	1.0	01	180.0	25 30.0	1.0	01	180.0	25 00.0	1.0	01	180.0	24 30.0	1.0	01	180.0	24 00.0	1.0	01	180.0	23 30.0	1.0	01	180.0	00
1	26 59.6	1.0	02	178.9	26 29.6	1.0	02	178.9	25 59.6	1.0	02	178.9	25 29.6	1.0	02	178.9	24 59.6	1.0	02	178.9	24 29.6	1.0	02	178.9	23 59.7	1.0	02	178.9	23 29.7	1.0	02	178.9	1
2	26 58.6	1.0	03	177.8	26 28.6	1.0	03	177.8	25 58.6	1.0	03	177.8	25 28.6	1.0	03	177.8	24 58.6	1.0	03	177.9	24 28.6	1.0	03	177.9	23 58.6	1.0	03	177.9	23 28.6	1.0	03	177.9	2
3	26 56.7	1.0	04	176.7	26 26.8	1.0	04	176.7	25 56.8	1.0	04	176.7	25 26.8	1.0	04	176.8	24 56.8	1.0	04	176.8	24 26.8	1.0	04	176.8	23 56.9	1.0	04	176.8	23 26.9	1.0	04	176.8	3
4	26 54.2	1.0	05	175.6	26 24.3	1.0	05	175.6	25 54.3	1.0	05	175.7	25 24.3	1.0	05	175.7	24 54.4	1.0	05	175.7	24 24.4	1.0	05	175.7	23 54.4	1.0	05	175.8	23 24.5	1.0	05	175.8	4
05	26 51.0	1.0	07	174.5	26 21.0	1.0	07	174.6	25 51.1	1.0	07	174.6	25 21.1	1.0	06	174.6	24 51.2	1.0	06	174.7	24 21.2	1.0	06	174.7	23 51.3	1.0	06	174.7	23 21.4	1.0	06	174.8	05
6	26 47.0	1.0	08	173.4	26 17.1	1.0	08	173.5	25 47.2	1.0	08	173.5	25 17.2	1.0	08	173.5	24 47.3	1.0	08	173.6	24 17.4	1.0	08	173.6	23 47.5	1.0	08	173.7	23 17.6	1.0	07	173.7	6
7	26 42.3	1.0	09	172.3	26 12.4	1.0	09	172.4	25 42.5	1.0	09	172.4	25 12.6	1.0	09	172.5	24 42.8	1.0	09	172.5	24 12.9	1.0	09	172.6	23 43.0	1.0	09	172.6	23 13.1	1.0	09	172.7	7
8	26 36.9	1.0	10	171.2	26 07.1	1.0	10	171.3	25 37.2	1.0	10	171.4	25 07.4	1.0	10	171.4	24 37.5	1.0	10	171.5	24 07.6	1.0	10	171.5	23 37.8	1.0	10	171.6	23 07.9	1.0	10	171.6	8
9	26 30.8	99	11	170.2	26 01.0	99	11	170.2	25 31.2	99	11	170.3	25 01.4	99	11	170.3	24 31.5	99	11	170.4	24 01.7	99	11	170.5	23 31.9	99	11	170.5	23 02.1	99	11	170.6	9
10	26 24.0	99	13	169.1	25 54.2	99	12	169.1	25 24.5	99	12	169.2	24 54.7	99	12	169.3	24 24.9	99	12	169.3	23 55.1	99	12	169.4	23 25.3	99	12	169.5	22 55.5	99	12	169.5	10
1	26 16.5	99	14	168.0	25 46.8	99	14	168.1	25 17.0	99	14	168.1	24 47.3	99	13	168.2	24 17.6	99	13	168.3	23 47.8	99	13	168.4	23 18.1	99	13	168.4	22 48.3	99	13	168.5	1
2	26 08.3	99	15	166.9	25 38.6	99	15	167.0	25 08.9	99	15	167.1	24 39.2	99	15	167.1	24 09.6	99	14	167.2	23 39.9	99	14	167.3	23 10.2	99	14	167.4	22 40.5	99	14	167.5	2
3	25 59.4	99	16	165.8	25 29.8	99	16	165.9	25 00.1	99	16	166.0	24 30.5	99	16	166.1	24 00.9	99	16	166.2	23 31.2	99	16	166.3	23 01.6	99	15	166.3	22 31.9	99	15	166.4	3
4	25 49.8	99	17	164.8	25 20.2	99	17	164.9	24 50.7	99	17	164.9	24 21.1	99	17	165.0	23 51.5	99	17	165.1	23 21.9	99	17	165.2	22 52.3	99	17	165.3	22 22.8	99	16	165.4	4
15	25 39.5	98	18	163.7	25 10.0	98	18	163.8	24 40.5	98	18	163.9	24 11.0	98	18	164.0	23 41.5	98	18	164.1	23 12.0	98	18	164.2	22 42.4	98	18	164.3	22 12.9	98	18	164.4	15
6	25 28.6	98	19	162.6	24 59.2	98	19	162.7	24 29.7	98	19	162.8	24 00.3	98	19	162.9	23 30.8	98	19	163.0	23 01.3	98	19	163.1	22 31.9	98	19	163.2	22 02.4	98	19	163.3	6
7	25 17.0	98	20	161.6	24 47.6	98	20	161.7	24 18.2	98	20	161.8	23 48.9	98	20	161.9	23 19.5	98	20	162.0	22 50.1	98	20	162.1	22 20.7	98	20	162.2	21 51.3	98	20	162.3	7
8	25 04.7	98	22	160.5	24 35.4	98	21	160.6	24 06.1	98	21	160.7	23 36.8	98	21	160.9	23 07.5	98	21	161.0	22 38.2	98	21	161.1	22 08.8	98	21	161.2	21 39.5	98	21	161.3	8
9	24 51.8	97	23	159.5	24 22.6	97	22	159.6	23 53.3	97	22	159.7	23 24.1	97	22	159.8	22 54.8	97	22	159.9	22 25.6	98	22	160.1	21 56.3	98	22	160.2	21 27.1	98	22	160.3	9
20	24 38.2	97	24	158.4	24 09.1	97	24	158.5	23 39.9	97	23	158.7	23 10.7	97	23	158.8	22 41.6	97	23	158.9	22 12.4	97	23	159.0	21 43.2	97	23	159.2	21 14.0	97	23	159.3	20
1	24 24.0	97	25	157.4	23 54.9	97	25	157.5	23 25.9	97	24	157.6	22 56.8	97	24	157.8	22 27.7	97	24	157.9	21 58.6	97	24	158.0	21 29.5	97	24	158.2	21 00.4	97	24	158.3	1
2	24 09.2	97	26	156.3	23 40.2	97	26	156.5	23 11.2	97	26	156.6	22 42.2	97	25	156.7	22 13.2	97	25	156.9	21 44.2	97	25	157.0	21 15.1	97	25	157.2	20 46.1	97	25	157.3	2
3	23 53.7	96	27	155.3	23 24.8	96	27	155.4	22 55.9	96	27	155.6	22 27.0	96	26	155.7	21 58.0	96	26	155.9	21 29.1	96	26	156.0	21 00.2	96	26	156.2	20 31.2	96	26	156.3	3
4	23 37.6	96	28	154.3	23 08.8	96	28	154.4	22 40.0	96	28	154.6	22 11.1	96	27	154.7	21 42.3	96	27	154.9	21 13.5	96	27	155.0	20 44.6	96	27	155.2	20 15.7	96	27	155.3	4
25	23 20.9	96	29	153.2	22 52.2	96	29	153.4	22 23.4	96	28	153.6	21 54.7	96	28	153.7	21 26.0	96	28	153.9	20 57.2	96	28	154.0	20 28.4	96	28	154.2	19 59.7	96	28	154.3	25
6	23 03.6	95	30	152.2	22 35.0	95	30	152.4	22 06.3	95	30	152.5	21 37.7	95	29	152.7	21 09.0	96	29	152.9	20 40.4	96	29	153.0	20 11.7	96	29	153.2	19 43.0	96	29	153.3	6
7	22 45.7	95	31	151.2	22 17.2	95	31	151.4	21 48.6	95	30	151.5	21 20.1	95	30	151.7	20 51.5	95	30	151.9	20 23.0	95	30	152.0	19 54.4	95	30	152.2	19 25.8	95	30	152.4	7
8	22 27.2	95	32	150.2	21 58.8	95	32	150.4	21 30.3	95	31	150.5	21 01.9	95	31	150.7	20 33.4	95	31	150.9	20 05.0	95	31	151.1	19 36.5	95	31	151.2	19 08.0	95	31	151.4	8
9	22 08.2	94	33	149.2	21 39.8	94	33	149.4	21 11.5	94	32	149.6	20 43.1	95	32	149.7	20 14.8	95	32	149.9	19 46.4	95	32	150.1	19 18.0	95	32	150.3	18 49.6	95	32	150.4	9
30	21 48.6	94	34	148.2	21 20.3	94	33	148.4	20 52.1	94	33	148.6	20 23.8	94	33	148.8	19 55.6	94	33	148.9	19 27.3	94	33	149.1	18 59.0	94	33	149.3	18 30.7	94	32	149.5	30
1	21 28.4	94	35	147.2	21 00.3	94	34	147.4	20 32.1	94	34	147.6	20 04.0	94	34	147.8	19 35.8	94	34	148.0	19 07.6	94	34	148.1	18 39.5	94	33	148.3	18 11.3	94	33	148.5	1
2	21 07.7	93	35	146.2	20 39.7	93	35	146.4	20 11.6	93	35	146.6	19 43.6	94	35	146.8	19 15.5	94	35	147.0	18 47.4	94	35	147.2	18 19.4	94	34	147.4	17 51.3	94	34	147.6	2
3	20 46.4	93	36	145.3	20 18.5	93	36	145.5	19 50.6	93	36	145.7	19 22.6	93	36	145.8	18 54.7	93	36	146.0	18 26.7	93	35	146.2	17 58.7	93	35	146.4	17 30.8	93	35	146.6	3
4	20 24.7	93	37	144.3	19 56.8	93	37	144.5	19 29.0	93	37	144.7	19 01.2	93	37	144.9	18 33.3	93	36	145.1	18 05.5	93	36	145.3	17 37.6	93	36	145.5	17 09.7	93	36	145.7	4
35	20 02.4	92	38	143.3	19 34.7	92	38	143.5	19 06.9	92	38	143.7	18 39.2	92	37	143.9	18 11.5	93	37	144.1	17 43.7	93	37	144.3	17 15.9	93	37	144.5	16 48.2	93	37	144.7	35
6	19 39.6	92	39	142.4	19 12.0	92	39	142.6	18 44.4	92	38	142.8	18 16.7	92	38	143.0	17 49.1	92	38	143.2	17 21.4	92	38	143.4	16 53.8	92	38	143.6	16 26.1	92	38	143.8	6
7	19 16.3	92	40	141.4	18 48.8	92	39	141.6	18 21.3	92	39	141.8	17 53.8	92	39	142.1	17 26.2	92	39	142.3	16 58.7	92	39	142.5	16 31.1	92	39	142.7	16 03.6	92	38	142.9	7
8	18 52.5	91	40	140.5	18 25.1	91	40	140.7	17 57.7	91	40	140.9	17 30.3	91	40	141.1	17 02.9	91	40	141.3	16 35.4	91	40	141.5	16 08.0	92	39	141.8	15 40.5	92	39	142.0	8
9	18 28.2	91	41	139.5	18 00.9	91	41	139.8	17 33.7	91	41	140.0	17 06.4	91	41	140.2	16 39.0	91	40	140.4	16 11.7	91	40	140.6	15 44.4	91	40	140.8	15 17.0	91	40	141.0	9
40	18 03.5	90	42	138.6	17 36.3	91	42	138.8	17 09.1	91	42	139.0	16 41.9	91	41	139.3	16 14.7	91	41	139.5	15 47.5	91	41	139.7	15 20.3	91	41	139.9	14 53.1	91	41	140.1	40
1	17 38.3	90	43	137.7	17 11.2	90	43	137.9	16 44.2	90	42	138.1	16 17.1	90	42	138.3	15 50.0	90	42	138.6	15 22.9	90	42	138.8	14 55.8	90	42	139.0	14 28.6	90	41	139.2	1
2	17 12.6	90	44	136.7	16 45.7	90	43	137.0	16 18.7	90	43	137.2	15 51.8	90	43	137.4	15 24.8	90	43	137.7	14 57.8	90	43	137.9	14 30.8	90	42	138.1	14 03.8	90	42	138.3	2
3	16 46.5	89	44	135.8	16 19.7	89	44	136.1	15 52.9	89	44	136.3	15 26.0	90	44	136.5	14 59.1	90	43	136.8	14 32.2	90	43	137.0	14 05.4	90	43	137.2	13 38.4	90	43	137.4	3
4	16 20.0	89	45	134.9	15 53.3	89	45	135.2	15 26.6	89	45	135.4	14 59.8	89	44	135.6	14 33.1	89	44	135.9	14 06.3	89	44	136.1	13 39.5	89	44	136.3	13 12.7	89	44	136.6	4
45	15 53.1	89	46	134.0	15 26.5	89	45	134.3	14 59.8	89	45	134.5	14 33.2	89	45	134.7	14 06.5	89	45	135.0	13 39.9	89	45	135.2	13 13.2	89	44	135.4	12 46.5	89	44	135.7	45
6	15 25.7	88	46	133.1	14 59.2	88	46	133.4	14 32.7	88	46	133.6	14 06.2	88	46	133.8	13 39.6	88	46	134.1	13 13.1	89	45	134.3	12 46.5	89	45	134.6	12 19.9	89	45	134.8	6
7	14 57.9	88	47	132.2	14 31.6	88	47	132.5	14 05.2	88	47	132.7	13 38.7	88	46	133.0	13 12.3	88	46	133.2	12 45.9	88	46	133.4	12 19.4	88	46	133.7	11 52.9	88	46	133.9	7
8	14 29.8	88	48	131.3	14 03.5	88	47	131.6	13 37.2	88	47	131.8	13 10.9	88	47	132.1	12 44.6	88	47	132.3	12 18.3	88	47	132.6	11 51.9	88	46	132.8	11 25.6	88	46	133.1	8
9	14 01.2	87	48	130.5	13 35.1	87	48	130.7	13 08.9	87	48	131.0	12 42.7	87	48	131.2	12 16.5	87	47	131.5	11 50.3	87	47	131.7	11 24.0	87	47	132.0	10 57.8	88	47	132.2	9
50	13 32.3	87	49	129.6	13 06.3	87	49	129.8	12 40.2	87	48	130.1	12 14.1	87	48	130.3	11 48.0	87	48	130.6	11 21.9	87	48	130.8	10 55.8	87	48	131.1	10 29.6	87	48	131.3	50
1	13 03.0	86	49	128.7	12 37.1	87	49	129.0	12 11.1	87	49	129.2	11 45.1	87	49	129.5	11 19.1	87	49	129.7	10 53.1	87	49	130.0	10 27.1	87	48	130.2	10 01.1	87	48	130.5	1
2	12 33.4	86	50	127.8	12 07.5	86	50	128.1	11 41.7	86	50	128.4	11 15.8	86	49	128.6	10 49.9	86	49	128.9	10 24.0	86	49	129.1	9 58.1	86	49	129.4	9 32.2	86	49	129.6	2
3	12 03.4	86	51	127.0	11 37.7	86	50	127.2	11 11.9	86	50	127.5	10 46.1	86	50	127.8	10 20.4	86	50	128.0	9 54.6	86	50	128.3	9 28.8	86	50	128.5	9 02.9	86	49	128.8	3
4	11 33.1	85	51	126.1	11 07.4	85	51	126.4	10 41.8	86	51	126.7	10 16.1	86	51	126.9	9 50.4	86	50	127.2	9 24.7	86	50	127.4	8 59.0	86	50	127.7	8 33.3	86	50	128.0	4
55	11 02.4	85	52	125.3	10 36.9	85	51	125.5	10 11.3	85	51	125.8	9 45.8	85	51	126.1	9 20.2	85	51	126.3	8 54.6	85	51	126.6	8 29.0	85	51	126.9	8 03.4	85	50	127.1	55
6	10 31.4	85	52	124.4	10 06.0	85	52	124.7	9 40.5	85	52	125.0	9 15.1	85	52	125.2	8 49.6	85	52	125.5	8 24.1	85	51	125.8	7 58.6	85	51	126.0	7 33.1	85	51	126.3	6
7	10 00.1	84	53	123.6	9 34.8	84	53	123.9	9 09.4	85	52	124.1	8 44.1	85	52	124.4	8 18.7	85	52	124.7	7 53.3	85	52	124.9	7 27.9	85	52	125.2	7 02.5	85	52	125.5	7
8	9 28.5	84	53	122.8	9 03.3	84	53	123.0	8 38.0	84	53	123.3	8 12.8	84	53	123.6	7 47.5	84	53	123.8	7 22.2	84	52	124.1	6 56.9	84	52	124.4	6 31.6	84	52	124.7	8
9	8 56.6	84	54	121.9	8 31.5	84	54	122.2	8 06.3	84	53	122.5	7 41.2	84	53	122.8	7 16.0	84	53	123.0	6 50.8	84	53	123.3	6 25.6	84	53	123.6	6 00.4	84	53	123.8	9
60	8 24.4	83	54	121.1	7 59.4	83	54	121.4	7 34.3	84	54	121.7	7 09.3	84	54	121.9	6 44.2	84	54	122.2	6 19.1	84	53	122.5	5 54.0	84	53	122.8	5 28.9	84	53	123.0	60
1	7 52.0	83	55	120.3	7 27.0	83	54	120.6	7 02.0	83	54	120.8	6 37.1	83	54	121.1	6 12.1	83	54	121.4	5 47.1	83	54	121.7	5 22.1	83	54	121.9					1
2	7 19.2	83	55	119.5	6 54.4	83	55	119.7	6 29.5	83	55	120.0	6 04.6	83	55	120.3	5 39.7	83	54	120.6	5 14.8	83	54	120.9									2
3	6 46.2	83	55	118.6	6 21.4	83	55	118.9	5 56.7	83	55	119.2	5 31.9	83	55	119.5	5 07.1	83	55	119.8													3
4	6 12.9	82	56	117.8	5 48.3	82	56	118.1	5 23.6	82	56	118.4																					4
65	5 39.4	82	56	117.0	5 14.8	82	56	117.3																									65
6	5 05.7	82	57	116.2																													6

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	8 40.5	77	62	81.6	9 03.6	77	62	81.3	9 26.8	77	62	81.0	9 49.9	77	62	80.6	10 12.9	77	62	80.3	10 36.0	77	62	80.0	10 59.0	77	62	79.7	11 22.0	77	62	79.3	91
2	8 03.2	77	62	80.9	8 26.4	77	62	80.5	8 49.5	77	62	80.2	9 12.6	77	62	79.9	9 35.8	77	62	79.6	9 58.8	77	62	79.2	10 21.9	77	62	78.9	10 45.0	77	62	78.6	2
3	7 26.0	77	62	80.1	7 49.2	77	62	79.8	8 12.3	77	62	79.5	8 35.5	77	62	79.1	8 58.7	77	62	78.8	9 21.8	77	62	78.5	9 44.9	77	62	78.2	10 08.0	77	61	77.8	3
4	6 48.8	77	62	79.3	7 12.0	77	62	79.0	7 35.3	77	62	78.7	7 58.5	77	62	78.4	8 21.7	77	61	78.1	8 44.9	77	61	77.7	9 08.0	77	61	77.4	9 31.2	77	61	77.1	4
95	6 11.8	78	62	78.6	6 35.0	78	62	78.2	6 58.3	78	61	77.9	7 21.5	77	61	77.6	7 44.8	77	61	77.3	8 08.0	77	61	77.0	8 31.2	77	61	76.7	8 54.4	77	61	76.3	95
6	5 34.8	78	61	77.8	5 58.1	78	61	77.5	6 21.4	78	61	77.2	6 44.7	78	61	76.9	7 08.0	78	61	76.5	7 31.3	78	61	76.2	7 54.5	78	61	75.9	8 17.8	77	61	75.6	6
7					5 21.3	78	61	76.7	5 44.7	78	61	76.4	6 08.0	78	61	76.1	6 31.3	78	61	75.8	6 54.7	78	61	75.5	7 18.0	78	61	75.1	7 41.3	78	61	74.8	7
8									5 08.0	78	61	75.6	5 31.4	78	61	75.3	5 54.8	78	61	75.0	6 18.2	78	61	74.7	6 41.5	78	60	74.4	7 04.9	78	60	74.1	8
9																	5 18.4	78	60	74.3	5 41.8	78	60	73.9	6 05.3	78	60	73.6	6 28.7	78	60	73.3	9
100																					5 05.6	78	60	73.2	5 29.1	78	60	72.9	5 52.6	78	60	72.6	100
1																													5 16.6	78	60	71.8	1

Digitized by Google

Lat. 51°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	55 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	56 00.0	1.0 01	180.0	56 30.0	1.0 01	180.0	57 00.0	1.0 01	180.0	57 30.0	1.0 01	180.0	58 00.0	1.0 01	180.0	58 30.0	1.0 01	180.0	00
1	54 59.4	1.0 03	178.3	55 29.4	1.0 03	178.3	55 59.4	1.0 03	178.3	56 29.4	1.0 03	178.3	56 59.4	1.0 03	178.3	57 29.4	1.0 03	178.2	57 59.4	1.0 03	178.2	58 29.4	1.0 03	178.2	1
2	54 57.8	1.0 05	176.6	55 27.8	1.0 05	176.6	55 57.7	1.0 05	176.6	56 27.7	1.0 06	176.5	56 57.7	1.0 05	176.5	57 27.7	1.0 05	176.5	57 57.6	1.0 05	176.4	58 27.6	1.0 05	176.4	2
3	54 55.0	1.0 06	175.0	55 25.0	1.0 06	174.9	55 54.9	1.0 07	174.9	56 24.9	1.0 07	174.8	56 54.8	1.0 07	174.8	57 24.8	1.0 07	174.7	57 54.7	1.0 07	174.7	58 24.7	1.0 07	174.6	3
4	54 51.2	1.0 08	173.3	55 21.1	1.0 08	173.2	55 51.0	1.0 08	173.2	56 20.9	1.0 08	173.1	56 50.8	1.0 09	173.0	57 20.7	1.0 09	173.0	57 50.6	1.0 09	172.9	58 20.5	1.0 09	172.8	4
05	54 46.2	1.0 10	171.6	55 16.1	1.0 10	171.6	55 46.0	1.0 10	171.5	56 15.8	1.0 10	171.4	56 45.7	99 10	171.3	57 15.5	99 11	171.2	57 45.4	99 11	171.1	58 15.2	99 11	171.0	05
6	54 40.2	99 12	170.0	55 10.0	99 12	169.9	55 39.8	99 12	169.8	56 09.6	99 12	169.7	56 39.4	99 12	169.6	57 09.2	99 12	169.5	57 39.0	99 13	169.4	58 08.7	99 13	169.2	6
7	54 33.1	99 14	168.3	55 02.9	99 14	168.2	55 32.6	99 14	168.1	56 02.3	99 14	168.0	56 32.0	99 14	167.9	57 01.7	99 14	167.7	57 31.4	99 14	167.6	58 01.1	99 15	167.5	7
8	54 25.0	99 15	166.7	54 54.6	99 15	166.6	55 24.3	99 16	166.4	55 53.9	99 16	166.3	56 23.5	99 16	166.2	56 53.1	99 16	166.0	57 22.8	99 16	165.9	57 52.4	99 16	165.7	8
9	54 15.8	99 17	165.1	54 45.3	99 17	164.9	55 14.9	98 17	164.8	55 44.4	98 18	164.6	56 14.0	98 18	164.5	56 43.5	98 18	164.3	57 13.0	98 18	164.1	57 42.5	98 18	164.0	9
10	54 05.5	98 19	163.5	54 35.0	98 19	163.3	55 04.5	98 19	163.1	55 33.9	98 19	163.0	56 03.3	98 19	162.8	56 32.7	98 20	162.6	57 02.1	98 20	162.4	57 31.5	98 20	162.3	10
1	53 54.3	98 20	161.9	54 23.6	98 21	161.7	54 53.0	98 21	161.5	55 22.3	98 21	161.3	55 51.6	98 21	161.1	56 20.9	98 21	160.9	56 50.2	98 22	160.7	57 19.5	97 22	160.5	1
2	53 42.0	98 22	160.3	54 11.3	97 22	160.1	54 40.5	97 22	159.9	55 09.7	97 23	159.7	55 38.9	97 23	159.5	56 08.1	97 23	159.3	56 37.2	97 23	159.1	57 06.4	97 24	158.8	2
3	53 28.8	97 24	158.7	53 57.9	97 24	158.5	54 27.0	97 24	158.3	54 56.1	97 24	158.1	55 25.2	97 25	157.9	55 54.2	97 25	157.6	56 23.2	97 25	157.4	56 52.2	97 25	157.2	3
4	53 14.6	97 25	157.1	53 43.6	97 25	156.9	54 12.6	97 26	156.7	54 41.5	96 26	156.5	55 10.5	96 26	156.2	55 39.4	96 26	156.0	56 08.2	96 27	155.8	56 37.1	96 27	155.5	4
15	52 59.5	96 27	155.6	53 28.3	96 27	155.4	53 57.2	96 27	155.1	54 26.0	96 27	154.9	54 54.8	96 28	154.6	55 23.5	96 28	154.4	55 52.2	96 28	154.1	56 20.9	96 28	153.9	15
6	52 43.4	96 28	154.1	53 12.1	96 29	153.8	53 40.8	96 29	153.6	54 09.5	96 29	153.3	54 38.1	96 29	153.1	55 06.7	95 30	152.8	55 35.3	96 30	152.5	56 03.8	95 30	152.3	6
7	52 26.4	95 30	152.5	52 55.0	95 30	152.3	53 23.6	95 30	152.0	53 52.1	95 30	151.8	54 20.6	95 31	151.5	54 49.0	95 31	151.2	55 17.4	95 31	151.0	55 45.8	95 32	150.7	7
8	52 08.6	95 31	151:1	52 37.0	95 31	150.8	53 05.4	95 32	150.5	53 33.8	94 32	150.3	54 02.1	94 32	150.0	54 30.4	94 32	149.7	54 58.6	94 33	149.4	55 26.8	94 33	149.1	8
9	51 49.9	94 33	149.6	52 18.2	94 33	149.3	52 46.4	94 33	149.0	53 14.6	94 33	148.7	53 42.8	94 34	148.5	54 10.9	94 34	148.2	54 39.0	94 34	147.9	55 07.0	93 34	147.5	9
20	51 30.3	94 34	148.1	51 58.5	94 34	147.8	52 26.6	94 34	147.5	52 54.6	93 35	147.3	53 22.6	93 35	147.0	53 50.6	93 35	146.7	54 18.5	93 36	146.3	54 46.3	93 36	146.0	20
1	51 10.0	93 35	146.7	51 38.0	93 36	146.4	52 05.9	93 36	146.1	52 33.8	93 36	145.8	53 01.6	93 36	145.5	53 29.4	93 37	145.2	53 57.1	92 37	144.8	54 24.8	92 37	144.5	1
2	50 48.9	93 36	145.3	51 16.7	93 37	145.0	51 44.4	92 37	144.7	52 12.2	92 37	144.3	52 39.8	92 38	144.0	53 07.4	92 38	143.7	53 35.0	92 38	143.4	54 02.5	92 38	143.0	2
3	50 27.0	92 38	143.9	50 54.6	92 38	143.5	51 22.2	92 38	143.2	51 49.8	92 39	142.9	52 17.3	92 39	142.6	52 44.7	91 39	142.3	53 12.1	91 39	141.9	53 39.4	91 40	141.6	3
4	50 04.3	92 39	142.5	50 31.8	92 39	142.2	50 59.2	91 40	141.8	51 26.6	91 40	141.5	51 53.9	91 40	141.2	52 21.2	91 40	140.8	52 48.4	91 41	140.5	53 15.6	90 41	140.1	4
25	49 41.0	91 40	141.1	50 08.3	91 40	140.8	50 35.6	91 41	140.5	51 02.8	91 41	140.1	51 29.9	90 41	139.8	51 57.0	90 42	139.4	52 24.0	90 42	139.1	52 51.0	90 42	138.7	25
6	49 16.9	91 41	139.8	49 44.1	90 41	139.4	50 11.2	90 42	139.1	50 38.2	90 42	138.8	51 05.2	90 42	138.4	51 32.1	90 43	138.1	51 59.0	89 43	137.7	52 25.8	89 43	137.3	6
7	48 52.2	90 42	138.4	49 19.2	90 43	138.1	49 46.1	90 43	137.8	50 13.0	89 43	137.4	50 39.8	89 43	137.1	51 06.6	89 44	136.7	51 33.2	89 44	136.3	51 59.8	89 44	136.0	7
8	48 26.8	90 43	137.1	48 53.6	89 44	136.8	49 20.4	89 44	136.4	49 47.1	89 44	136.1	50 13.8	89 44	135.7	50 40.3	88 45	135.4	51 06.8	88 45	135.0	51 33.3	88 45	134.6	8
9	48 00.8	89 44	135.8	48 27.5	89 45	135.5	48 54.1	89 45	135.1	49 20.6	88 45	134.8	49 47.1	88 45	134.4	50 13.5	88 46	134.1	50 39.8	88 46	133.7	51 06.1	87 46	133.3	9
30	47 34.2	88 45	134.6	48 00.7	88 46	134.2	48 27.2	88 46	133.9	48 53.5	88 46	133.5	49 19.8	88 46	133.1	49 46.1	87 47	132.8	50 12.2	87 47	132.4	50 38.3	87 47	132.0	30
1	47 07.0	88 46	133.3	47 33.4	88 46	133.0	47 59.7	87 47	132.6	48 25.9	87 47	132.2	48 52.0	87 47	131.9	49 18.1	87 48	131.5	49 44.1	87 48	131.1	50 10.0	86 48	130.7	1
2	46 39.3	87 47	132.1	47 05.5	87 47	131.7	47 31.6	87 48	131.4	47 57.6	87 48	131.0	48 23.6	86 48	130.6	48 49.5	86 48	130.2	49 15.4	86 49	129.9	49 41.1	86 49	129.5	2
3	46 11.0	87 48	130.9	46 37.0	87 48	130.5	47 03.0	86 49	130.1	47 28.9	86 49	129.8	47 54.7	86 49	129.4	48 20.4	86 49	129.0	48 46.1	85 50	128.6	49 11.7	85 50	128.2	3
4	45 42.2	86 49	129.7	46 08.1	86 49	129.3	46 33.9	86 49	128.9	46 59.6	86 50	128.6	47 25.3	85 50	128.2	47 50.8	85 50	127.8	48 16.4	85 50	127.4	48 41.8	85 51	127.0	4
35	45 12.9	86 50	128.5	45 38.6	86 50	128.1	46 04.3	85 50	127.8	46 29.8	85 50	127.4	46 55.3	85 51	127.0	47 20.8	85 51	126.6	47 46.1	84 51	126.2	48 11.4	84 51	125.8	35
6	44 43.1	85 50	127.3	45 08.7	85 51	127.0	45 34.2	85 51	126.6	45 59.6	85 51	126.2	46 25.0	84 51	125.8	46 50.2	84 52	125.4	47 15.4	84 52	125.0	47 40.5	84 52	124.6	6
7	44 12.8	85 51	126.2	44 38.3	85 51	125.8	45 03.6	84 52	125.4	45 28.9	84 52	125.1	45 54.1	84 52	124.7	46 19.2	84 52	124.3	46 44.3	83 53	123.9	47 09.2	83 53	123.5	7
8	43 42.1	84 52	125.1	44 07.4	84 52	124.7	44 32.6	84 52	124.3	44 57.8	84 53	123.9	45 22.8	83 53	123.5	45 47.8	83 53	123.1	46 12.7	83 53	122.7	46 37.5	83 54	122.3	8
9	43 11.0	84 53	123.9	43 36.2	84 53	123.6	44 01.2	83 53	123.2	44 26.2	83 53	122.8	44 51.2	83 53	122.4	45 16.0	83 54	122.0	45 40.8	82 54	121.6	46 05.4	82 54	121.2	9
40	42 39.5	84 53	122.8	43 04.5	83 53	122.5	43 29.4	83 54	122.1	43 54.3	83 54	121.7	44 19.1	82 54	121.3	44 43.8	82 54	120.9	45 08.4	82 55	120.5	45 33.0	82 55	120.1	40
1	42 07.6	83 54	121.8	42 32.5	83 54	121.4	42 57.3	83 54	121.0	43 22.0	82 54	120.6	43 46.6	82 55	120.2	44 11.2	82 55	119.8	44 35.7	81 55	119.4	45 00.1	81 55	119.0	1
2	41 35.3	83 54	120.7	42 00.0	82 55	120.3	42 24.7	82 55	119.9	42 49.3	82 55	119.5	43 13.8	82 55	119.1	43 38.3	81 55	118.7	44 02.6	81 56	118.3	44 26.9	81 56	117.9	2
3	41 02.6	82 55	119.6	41 27.3	82 55	119.3	41 51.8	82 55	118.9	42 16.3	81 56	118.5	42 40.7	81 56	118.1	43 05.0	81 56	117.7	43 29.2	81 56	117.3	43 53.4	80 56	116.9	3
4	40 29.6	82 56	118.6	40 54.2	82 56	118.2	41 18.6	81 56	117.8	41 42.9	81 56	117.4	42 07.2	81 56	117.0	42 31.4	81 56	116.6	42 55.5	80 57	116.2	43 19.5	80 57	115.8	4
45	39 56.3	81 56	117.6	40 20.7	81 56	117.2	40 45.0	81 56	116.8	41 09.3	81 57	116.4	41 33.4	80 57	116.0	41 57.5	80 57	115.6	42 21.5	80 57	115.2	42 45.4	80 57	114.8	45
6	39 22.7	81 57	116.5	39 47.0	81 57	116.2	40 11.2	81 57	115.8	40 35.3	80 57	115.4	40 59.4	80 57	115.0	41 23.3	80 57	114.6	41 47.2	79 58	114.2	42 11.0	79 58	113.8	6
7	38 48.8	81 57	115.5	39 12.9	80 57	115.2	39 37.0	80 57	114.8	40 01.1	80 58	114.4	40 25.0	80 58	114.0	40 48.9	79 58	113.6	41 12.6	79 58	113.2	41 36.3	79 58	112.8	7
8	38 14.6	80 57	114.6	38 38.6	80 58	114.2	39 02.6	80 58	113.8	39 26.5	80 58	113.4	39 50.4	79 58	113.0	40 14.1	79 58	112.6	40 37.8	79 58	112.2	41 01.4	78 59	111.8	8
9	37 40.1	80 58	113.6	38 04.1	80 58	113.2	38 27.9	80 58	112.8	38 51.8	79 58	112.4	39 15.5	79 59	112.0	39 39.1	79 59	111.6	40 02.7	78 59	111.2	40 26.2	78 59	110.8	9
50	37 05.4	80 58	112.6	37 29.2	79 58	112.2	37 53.0	79 59	111.8	38 16.7	79 59	111.5	38 40.4	79 59	111.1	39 03.9	78 59	110.7	39 27.4	78 59	110.3	39 50.8	78 59	109.9	50
1	36 30.4	79 59	111.7	36 54.2	79 59	111.3	37 17.9	79 59	110.9	37 41.5	79 59	110.5	38 05.0	78 59	110.1	38 28.5	78 59	109.7	38 51.9	78 60	109.3	39 15.2	78 60	108.9	1
2	35 55.2	79 59	110.7	36 18.9	79 59	110.3	36 42.5	79 59	110.0	37 06.0	78 59	109.6	37 29.5	78 60	109.2	37 52.8	78 60	108.8	38 16.1	78 60	108.4	38 39.4	77 60	108.0	2
3	35 19.8	79 59	109.8	35 43.3	79 60	109.4	36 06.9	78 60	109.0	36 30.3	78 60	108.6	36 53.7	78 60	108.2	37 17.0	78 60	107.8	37 40.2	77 60	107.4	38 03.3	77 60	107.0	3
4	34 44.1	78 60	108.9	35 07.6	78 60	108.5	35 31.1	78 60	108.1	35 54.4	78 60	107.7	36 17.7	78 60	107.3	36 41.0	77 60	106.9	37 04.1	77 60	106.5	37 27.2	77 61	106.1	4
55	34 08.3	78 60	107.9	34 31.7	78 60	107.6	34 55.1	78 60	107.2	35 18.4	78 60	106.8	35 41.6	77 60	106.4	36 04.7	77 61	106.0	36 27.8	77 61	105.6	36 50.8	76 61	105.2	55
6	33 32.3	78 60	107.0	33 55.6	78 60	106.7	34 18.9	78 61	106.3	34 42.2	77 61	105.9	35 05.3	77 61	105.5	35 28.4	77 61	105.1	35 51.4	77 61	104.7	36 14.3	76 61	104.3	6
7	32 56.1	78 61	106.1	33 19.4	78 61	105.8	33 42.6	77 61	105.4	34 05.8	77 61	105.0	34 28.8	77 61	104.6	34 51.8	77 61	104.2	35 14.8	76 61	103.8	35 37.6	76 61	103.4	7
8	32 19.7	78 61	105.3	32 43.0	77 61	104.9	33 06.1	77 61	104.5	33 29.2	77 61	104.1	33 52.2	77 61	103.7	34 15.2	76 61	103.4	34 38.0	76 61	103.0	35 00.8	76 62	102.6	8
9	31 43.2	77 61	104.4	32 06.4	77 61	104.0	32 29.5	77 61	103.6	32 52.5	77 61	103.3	33 15.5	76 61	102.9	33 38.4	76 62	102.5	34 01.2	76 62	102.1	34 23.9	76 62	101.7	9
60	31 06.6	77 61	103.5	31 29.7	77 61	103.1	31 52.7	77 61	102.8	32 15.7	76 62	102.4	32 38.6	76 62	102.0	33 01.4	76 62	101.6	33 24.2	76 62	101.2	33 46.9	76 62	100.8	60
1	30 29.8	77 62	102.7	30 52.9	77 62	102.3	31 15.8	77 62	101.9	31 38.8	76 62	101.5	32 01.6	76 62	101.1	32 24.4	76 62	100.8	32 47.1	76 62	100.4	33 09.8	75 62	100.0	1
2	29 52.9	77 62	101.8	30 15.9	77 62	101.4	30 38.8	76 62	101.1	31 01.7	76 62	100.7	31 24.5	76 62	100.3	31 47.3	76 62	99.9	32 09.9	75 62	99.5	32 32.5	75 62	99.1	2
3	29 15.9	77 62	100.9	29 38.8	76 62	100.6	30 01.7	76 62	100.2	30 24.6	76 62	99.8	30 47.3	76 62	99.5	31 10.0	76 62	99.1	31 32.6	75 62	98.7	31 55.2	75 62	98.3	3
4	28 38.8	76 62	100.1	29 01.7	76 62	99.7	29 24.5	76 62	99.4	29 47.3	76 62	99.0	30 10.0	76 62	98.6	30 32.7	75 62	98.2	30 55.3	75 62	97.9	31 17.8	75 62	97.5	4
65	28 01.6	76 62	99.3	28 24.4	76 62	98.9	28 47.2	76 62	98.5	29 10.0	76 62	98.2	29 32.7	76 62	97.8	29 55.3	75 62	97.4	30 17.8	75 62	97.0	30 40.3	75 63	96.6	65
6	27 24.2	76 62	98.4	27 47.1	76 62	98.1	28 09.8	76 62	97.7	28 32.6	76 62	97.3	28 55.2	75 63	97.0	29 17.8	75 63	96.6	29 40.3	75 63	96.2	30 02.8	75 63	95.8	6
7	26 46.9	76 62	97.6	27 09.7	76 62	97.3	27 32.4	76 63	96.9	27 55.1	76 63	96.5	28 17.7	75 63	96.2	28 40.3	75 63	95.8	29 02.8	75 63	95.4	29 25.2	75 63	95.0	7
8	26 09.4	76 63	96.8	26 32.2	76 63	96.4	26 54.9	76 63	96.1	27 17.5	75 63	95.7	27 40.1	75 63	95.3	28 02.7	75 63	95.0	28 25.1	75 63	94.6	28 47.6	75 63	94.2	8
9	25 31.9	76 63	96.0	25 54.6	76 63	95.6	26 17.3	76 63	95.3	26 39.9	75 63	94.9	27 02.5	75 63	94.5	27 25.0	75 63	94.2	27 47.5	75 63	93.8	28 09.9	75 63	93.4	9
70	24 54.3	76 63	95.2	25 17.0	76 63	94.8	25 39.7	75 63	94.5	26 02.3	75 63	94.1	26 24.9	75 63	93.7	26 47.4	75 63	93.4	27 09.8	75 63	93.0	27 32.2	75 63	92.6	70
1	24 16.7	76 63	94.4	24 39.4	76 63	94.0	25 02.0	75 63	93.7	25 24.6	75 63	93.3	25 47.2	75 63	92.9	26 09.6	75 63	92.6	26 32.1	75 63	92.2	26 54.4	74 63	91.8	1
2	23 39.0	76 63	93.6	24 01.7	76 63	93.2	24 24.3	75 63	92.9	24 46.9	75 63	92.5	25 09.4	75 63	92.1	25 31.9	75 63	91.8	25 54.3	75 63	91.4	26 16.7	74 63	91.0	2
3	23 01.3	76 63	92.8	23 24.0	75 63	92.4	23 46.6	75 63	92.1	24 09.2	75 63	91.7	24 31.7	75 63	91.4	24 54.2	75 63	91.0	25 16.6	75 63	90.6	25 38.9	74 63	90.3	3
4	22 23.6	76 63	92.0	22 46.2	75 63	91.7	23 08.9	75 63	91.3	23 31.4	75 63	90.9	23 53.9	75 63	90.6	24 16.4	75 63	90.2	24 38.8	75 63	89.9	25 01.2	74 63	89.5	4
75	21 45.8	76 63	91.2	22 08.5	75 63	90.9	22 31.1	75 63	90.5	22 53.7	75 63	90.2	23 16.2	75 63	89.8	23 38.6	75 63	89.4	24 01.1	75 63	89.1	24 23.4	74 63	88.7	75
6	21 08.1	76 63	90.4	21 30.7	75 63	90.1	21 53.3	75 63	89.7	22 15.9	75 63	89.4	22 38.4	75 63	89.0	23 00.9	75 63	88.7	23 23.3	75 63	88.3	23 45.7	74 63	87.9	6
7	20 30.3	76 63	89.7	20 53.0	75 63	89.3	21 15.6	75 63	89.0	21 38.2	75 63	88.6	22 00.7	75 63	88.3	22 23.2	75 63	87.9	22 45.6	75 63	87.5	23 08.0	75 63	87.2	7
8	19 52.6	76 63	88.9	20 15.2	75 63	88.5	20 37.8	75 63	88.2	21 00.4	75 63	87.8	21 22.9	75 63	87.5	21 45.4	75 63	87.1	22 07.9	75 63	86.8	22 30.3	75 63	86.4	8
9	19 14.8	76 63	88.1	19 37.5	75 63	87.8	20 00.1	75 63	87.4	20 22.7	75 63	87.1	20 45.2	75 63	86.7	21 07.7	75 63	86.4	21 30.2	75 63	86.0	21 52.6	75 63	85.7	9
80	18 37.1	76 63	87.4	18 59.8	76 63	87.0	19 22.4	75 63	86.7	19 45.0	75 63	86.3	20 07.6	75 63	86.0	20 30.1	75 63	85.6	20 52.5	75 63	85.3	21 15.0	75 63	84.9	80
1	17 59.4	76 63	86.6	18 22.1	76 63	86.2	18 44.7	75 63	85.9	19 07.3	75 63	85.6	19 29.9	75 63	85.2	19 52.4	75 63	84.9	20 14.9	75 63	84.5	20 37.4	75 63	84.1	1
2	17 21.7	76 63	85.8	17 44.4	76 63	85.5	18 07.1	75 63	85.1	18 29.7	75 63	84.8	18 52.3	75 63	84.4	19 14.9	75 63	84.1	19 37.4	75 62	83.7	19 59.8	75 62	83.4	2
3	16 44.1	76 63	85.1	17 06.8	76 63	84.7	17 29.5	76 63	84.4	17 52.1	75 63	84.0	18 14.7	75 62	83.7	18 37.3	75 62	83.3	18 59.9	75 62	83.0	19 22.4	75 62	82.6	3
4	16 06.5	76 63	84.3	16 29.2	76 63	84.0	16 51.9	76 62	83.6	17 14.6	76 62	83.3	17 37.2	75 62	82.9	17 59.8	75 62	82.6	18 22.4	75 62	82.2	18 44.9	75 62	81.9	4
85	15 28.9	76 62	83.5	15 51.7	76 62	83.2	16 14.4	76 62	82.9	16 37.1	76 62	82.5	16 59.8	76 62	82.2	17 22.4	75 62	81.8	17 45.0	75 62	81.5	18 07.6	75 62	81.1	85
6	14 51.4	76 62	82.8	15 14.2	76 62	82.5	15 37.0	76 62	82.1	15 59.7	76 62	81.8	16 22.4	76 62	81.4	16 45.1	76 62	81.1	17 07.7	75 62	80.7	17 30.3	75 62	80.4	6
7	14 14.0	76 62	82.0	14 36.8	76 62	81.7	14 59.6	76 62	81.4	15 22.4	76 62	81.0	15 45.1	76 62	80.7	16 07.8	76 62	80.3	16 30.5	76 62	80.0	16 53.1	75 62	79.7	7
8	13 36.6	76 62	81.3	13 59.5	76 62	80.9	14 22.3	76 62	80.6	14 45.1	76 62	80.3	15 07.9	76 62	79.9	15 30.6	76 62	79.6	15 53.4	76 62	79.3	16 16.0	76 62	78.9	8
9	12 59.4	76 62	80.5	13 22.2	76 62	80.2	13 45.1	76 62	79.9	14 08.0	76 62	79.5	14 30.8	76 62	79.2	14 53.6	76 62	78.9	15 16.3	76 62	78.5	15 39.0	76 62	78.2	9
90	12 22.2	76 62	79.8	12 45.1	76 62	79.4	13 08.0	76 62	79.1	13 30.9	76 62	78.8	13 53.7	76 62	78.4	14 16.6	76 61	78.1	14 39.4	76 61	77.8	15 02.1	76 61	77.4	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	16° 00′		16° 30′		17° 00′		17° 30′		18° 00′		18° 30′		19° 00′		19° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	23 00.0 1.0 01	180.0	22 30.0 1.0 01	180.0	22 00.0 1.0 01	180.0	21 30.0 1.0 01	180.0	21 00.0 1.0 01	180.0	20 30.0 1.0 01	180.0	20 00.0 1.0 01	180.0	19 30.0 1.0 01	180.0	00
1	22 59.7 1.0 02	179.0	22 29.7 1.0 02	179.0	21 59.7 1.0 02	179.0	21 29.7 1.0 02	179.0	20 59.7 1.0 02	179.0	20 29.7 1.0 02	179.0	19 59.7 1.0 02	179.0	19 29.7 1.0 02	179.0	1
2	22 58.6 1.0 03	177.9	22 28.6 1.0 03	177.9	21 58.6 1.0 03	177.9	21 28.6 1.0 03	178.0	20 58.7 1.0 03	178.0	20 28.7 1.0 03	178.0	19 58.7 1.0 03	178.0	19 28.7 1.0 03	178.0	2
3	22 56.9 1.0 04	176.9	22 26.9 1.0 04	176.9	21 56.9 1.0 04	176.9	21 27.0 1.0 04	176.9	20 57.0 1.0 04	176.9	20 27.0 1.0 04	177.0	19 57.0 1.0 04	177.0	19 27.0 1.0 04	177.0	3
4	22 54.5 1.0 05	175.8	22 24.5 1.0 05	175.9	21 54.6 1.0 05	175.9	21 24.6 1.0 05	175.9	20 54.6 1.0 05	175.9	20 24.7 1.0 05	176.0	19 54.7 1.0 05	176.0	19 24.7 1.0 05	176.0	4
05	22 51.4 1.0 06	174.8	22 21.5 1.0 06	174.8	21 51.5 1.0 06	174.8	21 21.6 1.0 06	174.9	20 51.6 1.0 06	174.9	20 21.7 1.0 06	174.9	19 51.7 1.0 06	175.0	19 21.8 1.0 06	175.0	05
6	22 47.6 1.0 07	173.7	22 17.7 1.0 07	173.8	21 47.8 1.0 07	173.8	21 17.9 1.0 07	173.9	20 47.9 1.0 07	173.9	20 18.0 1.0 07	173.9	19 48.1 1.0 07	174.0	19 18.2 1.0 07	174.0	6
7	22 43.2 1.0 09	172.7	22 13.3 1.0 08	172.7	21 43.4 1.0 08	172.8	21 13.5 1.0 08	172.8	20 43.6 1.0 08	172.9	20 13.7 1.0 08	172.9	19 43.8 1.0 08	173.0	19 13.9 1.0 08	173.0	7
8	22 38.0 1.0 10	171.7	22 08.2 1.0 10	171.7	21 38.3 1.0 10	171.8	21 08.4 1.0 10	171.8	20 38.6 1.0 09	171.9	20 08.7 1.0 09	171.9	19 38.8 1.0 09	172.0	19 09.0 1.0 09	172.0	8
9	22 32.2 99 11	170.6	22 02.4 99 11	170.7	21 32.6 99 11	170.7	21 02.7 99 11	170.8	20 32.9 99 11	170.9	20 03.1 99 10	170.9	19 33.2 99 10	171.0	19 03.4 99 10	171.0	9
10	22 25.7 99 12	169.6	21 56.0 99 12	169.7	21 26.2 99 12	169.7	20 56.4 99 12	169.8	20 26.6 99 12	169.8	19 56.8 99 12	169.9	19 27.0 99 12	170.0	18 57.2 99 11	170.0	10
1	22 18.6 99 13	168.6	21 48.8 99 13	168.6	21 19.1 99 13	168.7	20 49.3 99 13	168.8	20 19.6 99 13	168.8	19 49.8 99 13	168.9	19 20.1 99 13	169.0	18 50.3 99 12	169.0	1
2	22 10.8 99 14	167.5	21 41.1 99 14	167.6	21 11.4 99 14	167.7	20 41.7 99 14	167.8	20 12.0 99 14	167.8	19 42.3 99 14	167.9	19 12.5 99 14	168.0	18 42.8 99 14	168.1	2
3	22 02.3 99 15	166.5	21 32.6 99 15	166.6	21 03.0 99 15	166.7	20 33.3 99 15	166.8	20 03.7 99 15	166.8	19 34.0 99 15	166.9	19 04.4 99 15	167.0	18 34.7 99 15	167.1	3
4	21 53.2 99 16	165.5	21 23.6 99 16	165.6	20 54.0 99 16	165.7	20 24.4 99 16	165.7	19 54.8 99 16	165.8	19 25.2 99 16	165.9	18 55.6 99 16	166.0	18 25.9 99 16	166.1	4
15	21 43.4 98 17	164.5	21 13.8 98 17	164.6	20 44.3 98 17	164.7	20 14.8 98 17	164.7	19 45.2 98 17	164.8	19 15.7 99 17	164.9	18 46.1 99 17	165.0	18 16.6 99 17	165.1	15
6	21 32.9 98 18	163.4	21 03.5 98 18	163.5	20 34.0 98 18	163.6	20 04.5 98 18	163.7	19 35.0 98 18	163.8	19 05 5 98 18	163.9	18 36.0 98 18	164.0	18 06.5 98 18	164.1	6
7	21 21.9 98 20	162.4	20 52.5 98 19	162.5	20 23.0 98 19	162.6	19 53.6 98 19	162.8	19 24.2 98 19	162.9	18 54.8 98 19	163.0	18 25.3 98 19	163.1	17 55.9 98 19	163.2	7
8	21 10.2 98 21	161.4	20 40.8 98 20	161.5	20 11.5 98 20	161.6	19 42.1 98 20	161.8	19 12.8 98 20	161.9	18 43.4 98 20	162.0	18 14.0 98 20	162.1	17 44.7 98 20	162.2	8
9	20 57.8 98 22	160.4	20 28.5 98 21	160.5	19 59.3 98 21	160.7	19 30.0 98 21	160.8	19 00.7 98 21	160.9	18 31.4 98 21	161.0	18 02.1 98 21	161.1	17 32.8 98 21	161.2	9
20	20 44.8 97 23	159.4	20 15.6 97 23	159.5	19 46.4 97 22	159.7	19 17.2 97 22	159.8	18 48.0 97 22	159.9	18 18.8 97 22	160.0	17 49.6 97 22	160.1	17 20.4 97 22	160.3	20
1	20 31.3 97 24	158.4	20 02.1 97 24	158.5	19 33.0 97 23	158.7	19 03.9 97 23	158.8	18 34.7 97 23	158.9	18 05.6 97 23	159.1	17 36.5 97 23	159.2	17 07.3 97 23	159.3	1
2	20 17.1 97 25	157.4	19 48.0 97 25	157.6	19 19.0 97 24	157.7	18 49.9 97 24	157.8	18 20.9 97 24	158.0	17 51.8 97 24	158.1	17 22.7 97 24	158.2	16 53.7 97 24	158.3	2
3	20 02.3 97 26	156.4	19 33.3 97 26	156.6	19 04.4 97 25	156.7	18 35.4 97 25	156.8	18 06.4 97 25	157.0	17 37.4 97 25	157.1	17 08.4 97 25	157.3	16 39.4 97 25	157.4	3
4	19 46.9 96 27	155.4	19 18.0 96 26	155.6	18 49.1 96 26	155.7	18 20.2 96 26	155.9	17 51.4 96 26	156.0	17 22.5 96 26	156.2	16 53.5 96 26	156.3	16 24.6 96 26	156.4	4
25	19 30.9 96 28	154.5	19 02.1 96 27	154.6	18 33.3 96 27	154.8	18 04.5 96 27	154.9	17 35.7 96 27	155.1	17 06.9 96 27	155.2	16 38.1 96 27	155.4	16 09.3 96 27	155.5	25
6	19 14.3 96 29	153.5	18 45.6 96 28	153.6	18 16.9 96 28	153.8	17 48.2 96 28	154.0	17 19.5 96 28	154.1	16 50.8 96 28	154.3	16 22.1 96 28	154.4	15 53.3 96 28	154.6	6
7	18 57.2 95 30	152.5	18 28.6 95 29	152.7	18 00.0 95 29	152.8	17 31.4 95 29	153.0	17 02.7 95 29	153.2	16 34.1 95 29	153.3	16 05.5 95 29	153.5	15 36.8 95 28	153.6	7
8	18 39.5 95 30	151.6	18 11.0 95 30	151.7	17 42.5 95 30	151.9	17 13.9 95 30	152.0	16 45.4 95 30	152.2	16 16.9 95 30	152.4	15 48.3 95 29	152.5	15 19.8 95 29	152.7	8
9	18 21.2 95 31	150.6	17 52.8 95 31	150.8	17 24.4 95 31	150.9	16 56.0 95 31	151.1	16 27.5 95 31	151.3	15 59.1 95 31	151.4	15 30.6 95 30	151.6	15 02.2 95 30	151.8	9
30	18 02.4 94 32	149.6	17 34.1 94 32	149.8	17 05.8 94 32	150.0	16 37.4 94 32	150.2	16 09.1 94 32	150.3	15 40.8 95 31	150.5	15 12.4 95 31	150.7	14 44.0 95 31	150.8	30
1	17 43.1 94 33	148.7	17 14.8 94 33	148.9	16 46.6 94 33	149.0	16 18.4 94 33	149.2	15 50.1 94 32	149.4	15 21.9 94 32	149.6	14 53.6 94 32	149.7	14 25.4 94 32	149.9	1
2	17 23.2 94 34	147.7	16 55.1 94 34	147.9	16 26.9 94 34	148.1	15 58.8 94 34	148.3	15 30.7 94 33	148.5	15 02.5 94 33	148.6	14 34.3 94 33	148.8	14 06.2 94 33	149.0	2
3	17 02.7 93 35	146.8	16 34.7 93 35	147.0	16 06.7 93 35	147.2	15 38.7 93 34	147.4	15 10.6 93 34	147.5	14 42.6 94 34	147.7	14 14.5 94 34	147.9	13 46.5 94 34	148.1	3
4	16 41.8 93 36	145.9	16 13.9 93 36	146.1	15 46.0 93 35	146.2	15 18.1 93 35	146.4	14 50.1 93 35	146.6	14 22.2 93 35	146.8	13 54.2 93 35	147.0	13 26.3 93 35	147.2	4
35	16 20.4 93 37	144.9	15 52.6 93 36	145.1	15 24.8 93 36	145.3	14 56.9 93 36	145.5	14 29.1 93 36	145.7	14 01.3 93 36	145.9	13 33.4 93 36	146.1	13 05.5 93 35	146.3	35
6	15 58.4 92 37	144.0	15 30.7 92 37	144.2	15 03.0 92 37	144.4	14 35.3 92 37	144.6	14 07.6 92 37	144.8	13 39.8 92 37	145.0	13 12.1 93 36	145.2	12 44.3 93 36	145.4	6
7	15 36.0 92 38	143.1	15 08.4 92 38	143.3	14 40.8 92 38	143.5	14 13.2 92 38	143.7	13 45.6 92 37	143.9	13 17.9 92 37	144.1	12 50.3 92 37	144.3	12 22.7 92 37	144.5	7
8	15 13.1 92 39	142.2	14 45.6 92 39	142.4	14 18.1 92 39	142.6	13 50.6 92 38	142.8	13 23.1 92 38	143.0	12 55.6 92 38	143.2	12 28.0 92 38	143.4	12 00.5 92 38	143.6	8
9	14 49.7 91 40	141.3	14 22.3 91 40	141.5	13 54.9 91 39	141.7	13 27.5 91 39	141.9	13 00.1 91 39	142.1	12 32.7 91 39	142.3	12 05.3 91 39	142.5	11 37.8 91 38	142.7	9
40	14 25.8 91 41	140.4	13 58.6 91 40	140.6	13 31.3 91 40	140.8	13 04.0 91 40	141.0	12 36.7 91 40	141.2	12 09.4 91 40	141.4	11 42.1 91 39	141.6	11 14.7 91 39	141.8	40
1	14 01.5 90 41	139.5	13 34.3 91 41	139.7	13 07.2 91 41	139.9	12 40.0 91 41	140.1	12 12.8 91 41	140.3	11 45.6 91 40	140.5	11 18.4 91 40	140.8	10 51.2 91 40	141.0	1
2	13 36.7 90 42	138.6	13 09.7 90 42	138.8	12 42.6 90 42	139.0	12 15.6 90 41	139.2	11 48.5 90 41	139.4	11 21.4 90 41	139.7	10 54.3 90 41	139.9	10 27.2 90 41	140.1	2
3	13 11.5 90 43	137.7	12 44.6 90 43	137.9	12 17.6 90 42	138.1	11 50.7 90 42	138.3	11 23.7 90 42	138.6	10 56.7 90 42	138.8	10 29.8 90 42	139.0	10 02.8 90 41	139.2	3
4	12 45.9 89 43	136.8	12 19.1 89 43	137.0	11 52.2 89 43	137.2	11 25.4 90 43	137.5	10 58.5 90 43	137.7	10 31.7 90 42	137.9	10 04.8 90 42	138.2	9 37.9 90 42	138.4	4
45	12 19.8 89 44	135.9	11 53.1 89 44	136.1	11 26.4 89 44	136.4	10 59.6 89 44	136.6	10 32.9 89 43	136.8	10 06.1 89 43	137.1	9 39.4 89 43	137.3	9 12.6 89 43	137.5	45
6	11 53.3 89 45	135.0	11 26.7 89 45	135.3	11 00.1 89 44	135.5	10 33.5 89 44	135.7	10 06.9 89 44	136.0	9 40.2 89 44	136.2	9 13.6 89 44	136.4	8 46.9 89 44	136.7	6
7	11 26.5 88 45	134.2	11 00.0 88 45	134.4	10 33.5 88 45	134.6	10 06.9 88 45	134.9	9 40.4 88 45	135.1	9 13.9 88 45	135.4	8 47.3 88 44	135.6	8 20.8 89 44	135.8	7
8	10 59.2 88 46	133.3	10 32.8 88 46	133.5	10 06.4 88 46	133.8	9 40.0 88 46	134.0	9 13.6 88 45	134.3	8 47.2 88 45	134.5	8 20.7 88 45	134.8	7 54.3 88 45	135.0	8
9	10 31.5 88 47	132.4	10 05.2 88 47	132.7	9 39.0 88 46	132.9	9 12.7 88 46	133.2	8 46.4 88 46	133.4	8 20.0 88 46	133.7	7 53.7 88 46	133.9	7 27.4 88 45	134.2	9
50	10 03.5 87 47	131.6	9 37.3 87 47	131.8	9 11.1 87 47	132.1	8 44.9 87 47	132.3	8 18.7 87 47	132.6	7 52.5 87 46	132.8	7 26.3 87 46	133.1	7 00.1 87 46	133.3	50
1	9 35.0 87 48	130.7	9 09.0 87 48	131.0	8 42.9 87 48	131.2	8 16.8 87 47	131.5	7 50.8 87 47	131.7	7 24.7 87 47	132.0	6 58.6 87 47	132.2	6 32.4 87 47	132.5	1
2	9 06.2 86 49	129.9	8 40.3 87 48	130.2	8 14.3 87 48	130.4	7 48.4 87 48	130.7	7 22.4 87 48	130.9	6 56.4 87 48	131.2	6 30.4 87 47	131.4	6 04.4 87 47	131.7	2
3	8 37.1 86 49	129.1	8 11.3 86 49	129.3	7 45.4 86 49	129.6	7 19.6 86 49	129.8	6 53.7 86 48	130.1	6 27.8 86 48	130.3	6 01.9 86 48	130.6	5 36.0 86 48	130.8	3
4	8 07.6 86 50	128.2	7 41.9 86 50	128.5	7 16.1 86 49	128.7	6 50.4 86 49	129.0	6 24.6 86 49	129.3	5 58.9 86 49	129.5	5 33.1 86 49	129.8	5 07.3 86 48	130.0	4
55	7 37.8 85 50	127.4	7 12.2 85 50	127.7	6 46.5 85 50	127.9	6 20.9 85 50	128.2	5 55.2 86 50	128.4	5 29.6 86 49	128.7	5 03.9 86 49	129.0			55
6	7 07.6 85 51	126.6	6 42.1 85 51	126.8	6 16.6 85 50	127.1	5 51.0 85 50	127.4	5 25.5 85 50	127.6							6
7	6 37.1 85 51	125.7	6 11.7 85 51	126.0	5 46.3 85 51	126.3	5 20.9 85 51	126.5									7
8	6 06.3 84 52	124.9	5 41.0 84 52	125.2	5 15.7 84 52	125.5											8
9	5 35.2 84 52	124.1	5 10.0 84 52	124.4													9
60	5 03.8 84 53	123.3															60

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′		16° 30′		17° 00′		17° 30′		18° 00′		18° 30′		19° 00′		19° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	11 45.0 77 62	79.0	12 08.0 77 62	78.7	12 31.0 76 62	78.4	12 53.9 76 61	78.0	13 16.8 76 61	77.7	13 39.7 76 61	77.4	14 02.5 76 61	77.0	14 25.3 76 61	76.7	91
2	11 08.0 77 62	78.3	11 31.0 77 61	77.9	11 54.0 77 61	77.6	12 17.0 77 61	77.3	12 39.9 76 61	77.0	13 02.9 76 61	76.6	13 25.8 76 61	76.3	13 48.6 76 61	76.0	2
3	10 31.1 77 61	77.5	10 54.2 77 61	77.2	11 17.2 77 61	76.9	11 40.2 77 61	76.5	12 03.2 77 61	76.2	12 26.2 77 61	75.9	12 49.1 76 61	75.5	13 12.1 76 61	75.2	3
4	9 54.3 77 61	76.8	10 17.4 77 61	76.4	10 40.5 77 61	76.1	11 03.6 77 61	75.8	11 26.6 77 61	75.5	11 49.6 77 61	75.1	12 12.6 77 61	74.8	12 35.6 77 61	74.5	4
95	9 17.6 77 61	76.0	9 40.8 77 61	75.7	10 03.9 77 61	75.4	10 27.0 77 61	75.0	10 50.1 77 61	74.7	11 13.2 77 60	74.4	11 36.3 77 60	74.1	11 59.3 77 60	73.7	95
6	8 41.0 77 61	75.3	9 04.2 77 61	74.9	9 27.4 77 61	74.6	9 50.6 77 60	74.3	10 13.8 77 60	74.0	10 36.9 77 60	73.6	11 00.0 77 60	73.3	11 23.1 77 60	73.0	6
7	8 04.6 78 61	74.5	8 27.8 78 60	74.2	8 51.1 77 60	73.9	9 14.3 77 60	73.5	9 37.5 77 60	73.2	10 00.7 77 60	72.9	10 23.9 77 60	72.6	10 47.1 77 60	72.3	7
8	7 28.2 78 60	73.8	7 51.6 78 60	73.4	8 14.9 78 60	73.1	8 38.2 78 60	72.8	9 01.5 78 60	72.5	9 24.7 78 60	72.2	9 48.0 77 60	71.8	10 11.2 77 60	71.5	8
9	6 52.1 78 60	73.0	7 15.4 78 60	72.7	7 38.8 78 60	72.4	8 02.2 78 60	72.0	8 25.5 78 60	71.7	8 48.9 78 60	71.4	9 12.2 78 59	71.1	9 35.5 78 59	70.8	9
100	6 16.0 78 60	72.2	6 39.5 78 60	71.9	7 02.9 78 60	71.6	7 26.3 78 59	71.3	7 49.7 78 59	71.0	8 13.1 78 59	70.7	8 36.5 78 59	70.4	8 59.9 78 59	70.0	100
1	5 40.1 78 60	71.5	6 03.7 78 59	71.2	6 27.2 78 59	70.9	6 50.7 78 59	70.5	7 14.1 78 59	70.2	7 37.6 78 59	69.9	8 01.1 78 59	69.6	8 24.5 78 59	69.3	1
2	5 04.4 79 59	70.7	5 28.0 79 59	70.4	5 51.6 79 59	70.1	6 15.1 79 59	69.8	6 38.7 78 59	69.5	7 02.2 78 59	69.2	7 25.7 78 59	68.9	7 49.3 78 58	68.5	2
3					5 16.2 79 59	69.4	5 39.8 79 59	69.0	6 03.4 79 58	68.7	6 27.0 79 58	68.4	6 50.6 79 58	68.1	7 14.2 79 58	67.8	3
4							5 04.6 79 58	68.3	5 28.3 79 58	68.0	5 52.0 79 58	67.7	6 15.7 79 58	67.4	6 39.3 79 58	67.0	4
105											5 17.2 79 58	66.9	5 40.9 79 58	66.6	6 04.7 79 57	66.3	105
6													5 06.4 79 57	65.9	5 30.2 79 57	65.5	6

Digitized by Google

Lat. 51°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	59 00.0	1.0 01	180.0	59 30.0	1.0 01	180.0	60 00.0	1.0 01	180.0	60 30.0	1.0 01	180.0
1	58 59.4	1.0 03	178.2	59 29.4	1.0 03	178.2	59 59.4	1.0 03	178.1	60 29.4	1.0 03	178.1
2	58 57.6	1.0 05	176.4	59 27.6	1.0 05	176.3	59 57.5	1.0 05	176.3	60 27.5	1.0 05	176.2
3	58 54.6	1.0 07	174.5	59 24.5	1.0 07	174.5	59 54.5	1.0 07	174.4	60 24.4	1.0 07	174.3
4	58 50.4	1.0 09	172.7	59 20.3	1.0 09	172.6	59 50.2	1.0 09	172.6	60 20.1	1.0 09	172.5
05	58 45.0	99 11	170.9	59 14.9	99 11	170.8	59 44.7	99 11	170.7	60 14.5	99 11	170.6
6	58 38.5	99 13	169.1	59 08.2	99 13	169.0	59 38.0	99 13	168.9	60 07.7	99 13	168.7
7	58 30.8	99 15	167.3	59 00.5	99 15	167.2	59 30.1	99 15	167.0	59 59.8	99 15	166.9
8	58 21.9	99 17	165.6	58 51.5	99 17	165.4	59 21.1	99 17	165.2	59 50.6	98 17	165.1
9	58 12.0	98 18	163.8	58 41.4	98 19	163.6	59 10.9	98 19	163.4	59 40.3	98 19	163.2
10	58 00.9	98 20	162.1	58 30.2	98 20	161.9	58 59.6	98 21	161.7	59 28.9	98 21	161.4
1	57 48.7	97 22	160.3	58 17.9	97 22	160.1	58 47.1	97 23	159.9	59 16.3	97 23	159.7
2	57 35.5	97 24	158.6	58 04.5	97 24	158.4	58 33.6	97 24	158.2	59 02.6	97 25	157.9
3	57 21.2	96 26	156.9	57 50.1	96 26	156.7	58 19.0	96 26	156.4	58 47.9	96 26	156.2
4	57 05.9	96 27	155.3	57 34.7	96 27	155.0	58 03.4	96 28	154.7	58 32.1	96 28	154.5
15	56 49.6	95 29	153.6	57 18.2	95 29	153.3	57 46.8	95 29	153.1	58 15.3	95 30	152.8
6	56 32.3	95 30	152.0	57 00.8	95 31	151.7	57 29.2	95 31	151.4	57 57.6	95 31	151.1
7	56 14.1	94 32	150.4	56 42.4	94 32	150.1	57 10.6	94 32	149.8	57 38.8	94 33	149.4
8	55 55.0	94 33	148.8	56 23.1	94 34	148.5	56 51.2	93 34	148.2	57 19.2	93 34	147.8
9	55 35.0	93 35	147.2	56 02.9	93 35	146.9	56 30.8	93 35	146.6	56 58.6	93 36	146.2
20	55 14.1	93 36	145.7	55 41.9	92 36	145.4	56 09.6	92 37	145.0	56 37.2	92 37	144.7
1	54 52.4	92 37	144.2	55 20.0	92 38	143.8	55 47.5	92 38	143.5	56 15.0	91 38	143.1
2	54 29.9	91 30	142.7	54 57.3	91 39	142.3	55 24.7	91 39	142.0	55 51.9	91 40	141.6
3	54 06.7	91 40	141.2	54 33.9	91 40	140.9	55 01.0	90 41	140.5	55 28.1	90 41	140.1
4	53 42.7	90 41	139.8	54 09.7	90 42	139.4	54 36.6	90 42	139.0	55 03.5	89 42	138.6
25	53 17.9	90 42	138.4	53 44.7	89 43	138.0	54 11.5	89 43	137.6	54 38.2	89 43	137.2
6	52 52.5	89 44	137.0	53 19.1	89 44	136.6	53 45.7	88 44	136.2	54 12.2	88 44	135.8
7	52 26.4	88 45	135.6	52 52.8	88 45	135.2	53 19.2	88 45	134.8	53 45.5	88 45	134.4
8	51 59.6	88 46	134.2	52 25.9	87 46	133.8	52 52.1	87 46	133.4	53 18.2	87 47	133.0
9	51 32.3	87 47	132.9	51 58.4	87 47	132.5	52 24.4	87 47	132.1	52 50.3	86 47	131.7
30	51 04.3	87 48	131.6	51 30.3	86 48	131.2	51 56.1	86 48	130.8	52 21.9	86 48	130.4
1	50 35.8	86 48	130.3	51 01.6	86 49	129.9	51 27.2	85 49	129.5	51 52.8	85 49	129.1
2	50 06.8	85 49	129.1	50 32.3	85 50	128.6	50 57.8	85 50	128.2	51 23.2	85 50	127.8
3	49 37.2	85 50	127.8	50 02.6	85 50	127.4	50 27.9	84 51	127.0	50 53.2	84 51	126.6
4	49 07.1	84 51	126.6	49 32.4	84 51	126.2	49 57.5	84 51	125.8	50 22.6	83 52	125.3
35	48 36.6	84 52	125.4	49 01.7	83 52	125.0	49 26.7	83 52	124.6	49 51.6	83 52	124.1
6	48 05.6	83 52	124.2	48 30.5	83 53	123.8	48 55.3	83 53	123.4	49 20.1	82 53	122.9
7	47 34.1	83 53	123.1	47 58.9	82 53	122.6	48 23.6	82 54	122.2	48 48.2	82 54	121.8
8	47 02.3	82 54	121.9	47 26.9	82 54	121.5	47 51.4	82 54	121.1	48 15.9	81 54	120.6
9	46 30.0	82 54	120.8	46 54.5	81 55	120.4	47 18.9	81 55	119.9	47 43.2	81 55	119.5
40	45 57.4	81 55	119.7	46 21.7	81 55	119.3	46 46.0	81 55	118.8	47 10.2	80 56	118.4
1	45 24.4	81 56	118.6	45 48,6	81 56	118.2	46 12.8	80 56	117.7	46 36.8	80 56	117.3
2	44 51.1	80 56	117.5	45 15.2	80 56	117.1	45 39.2	80 56	116.7	46 03.1	79 57	116.2
3	44 17.4	80 57	116.5	44 41.4	80 57	116.0	45 05.3	79 57	115.6	45 29.0	79 57	115.2
4	43 43.5	80 57	115.4	44 07.3	79 57	115.0	44 31.1	79 57	114.6	44 54.7	79 58	114.1
45	43 09.2	79 58	114.4	43 33.0	79 58	114.0	43 56.6	79 58	113.5	44 20.1	78 58	113.1
6	42 34.7	79 58	113.4	42 58.3	79 58	112.9	43 21.8	78 58	112.5	43 45.3	78 59	112.1
7	41 59.9	79 58	112.4	42 23.4	78 59	111.9	42 46.8	78 59	111.5	43 10.2	78 59	111.1
8	41 24.9	78 59	111.4	41 48.3	78 59	111.0	42 11.6	78 59	110.5	42 34.8	77 59	110.1
9	40 49.6	78 59	110.4	41 12.9	78 59	110.0	41 36.1	77 59	109.6	41 59.2	77 60	109.1
50	40 14.1	78 60	109.4	40 37.3	77 60	109.0	41 00.4	77 60	108.6	41 23.5	77 60	108.2
1	39 38.4	77 60	108.5	40 01.5	77 60	108.1	40 24.6	77 60	107.7	40 47.5	76 60	107.2
2	39 02.5	77 60	107.6	39 25.5	77 60	107.1	39 48.5	76 60	106.7	40 11.4	76 61	106.3
3	38 26.4	77 60	106.6	38 49.4	76 61	106.2	39 12.2	76 61	105.8	39 35.0	76 61	105.4
4	37 50.1	76 61	105.7	38 13.0	76 61	105.3	38 35.8	76 61	104.9	38 58.5	76 61	104.5
55	37 13.7	76 61	104.8	37 36.5	76 61	104.4	37 59.3	76 61	104.0	38 21.9	75 61	103.6
6	36 37.1	76 61	103.9	36 59.9	76 61	103.5	37 22.6	75 61	103.1	37 45.1	75 62	102.7
7	36 00.4	76 61	103.0	36 23.1	76 62	102.6	36 45.7	75 62	102.2	37 08.2	75 62	101.8
8	35 23.6	76 62	102.2	35 46.2	75 62	101.8	36 08.8	75 62	101.4	36 31.2	75 62	100.9
9	34 46.6	75 62	101.3	35 09.2	75 62	100.9	35 31.7	75 62	100.5	35 54.1	75 62	100.1
60	34 09.5	75 62	100.4	34 32.0	75 62	100.0	34 54.5	75 62	99.6	35 16.9	74 62	99.2
1	33 32.3	75 62	99.6	33 54.8	75 62	99.2	34 17.2	75 62	98.8	34 39.6	74 62	98.4
2	32 55.0	75 62	98.7	33 17.5	75 62	98.3	33 39.9	74 62	97.9	34 02.2	74 62	97.5
3	32 17.7	75 62	97.9	32 40.1	75 62	97.5	33 02.4	74 62	97.1	33 24.7	74 63	96.7
4	31 40.2	75 62	97.1	32 02.6	74 63	96.7	32 24.9	74 63	96.3	32 47.2	74 63	95.9
65	31 02.7	75 63	96.3	31 25.1	74 63	95.9	31 47.4	74 63	95.5	32 09.6	74 63	95.1
6	30 25.2	75 63	95.4	30 47.5	74 63	95.1	31 09.8	74 63	94.7	31 31.9	74 63	94.3
7	29 47.6	74 63	94.6	30 09.9	74 63	94.2	30 32.1	74 63	93.9	30 54.3	74 63	93.5
8	29 09.9	74 63	93.8	29 32.2	74 63	93.4	29 54.4	74 63	93.1	30 16.6	74 63	92.7
9	28 32.2	74 63	93.0	28 54.5	74 63	92.7	29 16.7	74 63	92.3	29 38.8	74 63	91.9
70	27 54.5	74 63	92.2	28 16.8	74 63	91.9	28 39.0	74 63	91.5	29 01.1	74 63	91.1
1	27 16.8	74 63	91.5	27 39.0	74 63	91.1	28 01.2	74 63	90.7	28 23.3	74 63	90.3
2	26 39.0	74 63	90.7	27 01.3	74 63	90.3	27 23.5	74 63	89.9	27 45.6	74 63	89.5
3	26 01.3	74 63	89.9	26 23.5	74 63	89.5	26 45.7	74 63	89.1	27 07.8	74 63	88.8
4	25 23.5	74 63	89.1	25 45.7	74 63	88.7	26 07.9	74 63	88.4	26 30.1	74 63	88.0
75	24 45.7	74 63	88.3	25 08.0	74 63	88.0	25 30.2	74 63	87.6	25 52.4	74 63	87.2
6	24 08.0	74 63	87.6	24 30.3	74 63	87.2	24 52.5	74 63	86.8	25 14.7	74 63	86.5
7	23 30.3	74 63	86.8	23 52.6	74 63	86.4	24 14.8	74 63	86.1	24 37.0	74 63	85.7
8	22 52.6	74 63	86.1	23 14.9	74 63	85.7	23 37.2	74 63	85.3	23 59.3	74 63	85.0
9	22 15.0	74 63	85.3	22 37.3	74 63	84.9	22 59.5	74 63	84.6	23 21.8	74 63	84.2
80	21 37.3	75 63	84.5	21 59.7	74 63	84.2	22 22.0	74 63	83.8	22 44.2	74 62	83.5
1	20 59.8	75 62	83.8	21 22.1	74 62	83.4	21 44.5	74 62	83.1	22 06.7	74 62	82.7
2	20 22.3	75 62	83.0	20 44.7	75 62	82.7	21 07.0	74 62	82.3	21 29.3	74 62	82.0
3	19 44.8	75 62	82.3	20 07.2	75 62	81.9	20 29.6	75 62	81.6	20 52.0	74 62	81.2
4	19 07.4	75 62	81.5	19 29.9	75 62	81.2	19 52.3	75 62	80.8	20 14.7	74 62	80.5
85	18 30.1	75 62	80.8	18 52.6	75 62	80.5	19 15.1	75 62	80.1	19 37.5	75 62	79.8
6	17 52.9	75 62	80.1	18 15.4	75 62	79.7	18 37.9	75 62	79.4	19 00.4	75 62	79.0
7	17 15.7	75 62	79.3	17 38.3	75 62	79.0	18 00.9	75 62	78.6	18 23.3	75 62	78.3
8	16 38.7	75 62	78.6	17 01.3	75 62	78.2	17 23.9	75 61	77.9	17 46.4	75 61	77.5
9	16 01.7	76 61	77.8	16 24.4	75 61	77.5	16 47.0	75 61	77.2	17 09.6	75 61	76.8
90	15 24.9	76 61	77.1	15 47.6	76 61	76.8	16 10.3	76 61	76.4	16 32.9	75 61	76.1

H.A.	22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	61 00.0	1.0 01	180.0	61 30.0	1.0 01	180.0	62 00.0	1.0 01	180.0	62 30.0	1.0 01	180.0
1	60 59.4	1.0 03	178.1	61 29.4	1.0 03	178.1	61 59.4	1.0 03	178.0	62 29.3	1.0 03	178.0
2	60 57.5	1.0 05	176.2	61 27.4	1.0 05	176.1	61 57.4	1.0 05	176.1	62 27.4	1.0 05	176.0
3	60 54.3	1.0 07	174.3	61 24.3	1.0 07	174.2	61 54.2	1.0 08	174.1	62 24.1	1.0 08	174.1
4	60 49.9	1.0 09	172.4	61 19.8	1.0 09	172.3	61 49.7	1.0 10	172.2	62 19.6	1.0 10	172.1
05	60 44.3	99 11	170.5	61 14.1	99 12	170.4	61 43.9	99 12	170.2	62 13.7	99 12	170.1
6	60 37.5	99 13	168.6	61 07.2	99 14	168.5	61 36.9	99 14	168.3	62 06.6	99 14	168.2
7	60 29.4	99 15	166.7	60 59.0	99 16	166.6	61 28.6	99 16	166.4	61 58.3	99 16	166.2
8	60 20.2	98 17	164.9	60 49.7	98 18	164.7	61 19.2	98 18	164.5	61 48.7	98 18	164.3
9	60 09.7	98 19	163.1	60 39.1	98 20	162.8	61 08.5	98 20	162.6	61 37.9	98 20	162.4
10	59 58.1	98 21	161.2	60 27.4	98 21	161.0	60 56.6	97 22	160.8	61 25.9	97 22	160.5
1	59 45.4	97 23	159.4	60 14.6	97 23	159.2	60 43.7	97 24	158.9	61 12.7	97 24	158.7
2	59 31.6	97 25	157.7	60 00.6	97 25	157.4	60 29.5	96 25	157.1	60 58.4	96 26	156.9
3	59 16.7	96 27	155.9	59 45.5	96 27	155.6	60 14.3	96 27	155.3	60 43.1	96 27	155.1
4	59 00.8	96 28	154.2	59 29.4	95 29	153.9	59 58.0	95 29	153.6	60 26.6	95 29	153.3
15	58 43.8	95 30	152.5	59 12.3	95 30	152.2	59 40.7	95 31	151.8	60 09.1	94 31	151.5
6	58 25.9	94 32	150.8	58 54.2	94 32	150.5	59 22.4	94 32	150.1	59 50.6	94 32	149.8
7	58 07.0	94 33	149.1	58 35.1	94 33	148.8	59 03.1	93 34	148.4	59 31.1	93 34	148.1
8	57 47.1	93 35	147.5	58 15.1	93 35	147.1	58 42.9	93 35	146.8	59 10.7	93 36	146.4
9	57 26.4	92 36	145.9	57 54.1	92 36	145.5	58 21.8	92 37	145.2	58 49.4	92 37	144.8
20	57 04.8	92 37	144.3	57 32.3	92 38	143.9	57 59.8	91 38	143.6	58 27.1	91 38	143.2
1	56 42.4	91 39	142.7	57 09.7	91 39	142.4	57 36.9	91 39	142.0	58 04.1	90 40	141.6
2	56 19.1	91 40	141.2	56 46.2	90 40	140.8	57 13.3	90 41	140.4	57 40.2	90 41	140.0
3	55 55.1	90 41	139.7	56 22.0	90 42	139.3	56 48.8	89 42	138.9	57 15.6	89 42	138.5
4	55 30.3	89 42	138.2	55 57.0	89 43	137.8	56 23.7	89 43	137.4	56 50.2	88 43	137.0
25	55 04.8	89 44	136.8	55 31.3	88 44	136.4	55 57.8	88 44	136.0	56 24.1	88 45	135.5
6	54 38.6	88 45	135.4	55 04.9	88 45	135.0	55 31.2	87 45	134.5	55 57.3	87 46	134.1
7	54 11.8	87 46	134.0	54 37.9	87 46	133.6	55 03.9	87 46	133.1	55 29.9	86 47	132.7
8	53 44.3	87 47	132.6	54 10.2	86 47	132.2	54 36.1	86 47	131.8	55 01.8	86 48	131.3
9	53 16.2	86 48	131.3	53 41.9	86 48	130.8	54 07.6	85 48	130.4	54 33.2	85 49	129.9
30	52 47.5	85 49	129.9	53 13.1	85 49	129.5	53 38.6	85 49	129.1	54 03.9	84 50	128.6
1	52 18.3	85 50	128.6	52 43.7	84 50	128.2	53 09.0	84 50	127.8	53 34.2	84 50	127.3
2	51 48.6	84 50	127.4	52 13.8	84 51	126.9	52 38.9	84 51	126.5	53 03.9	83 51	126.0
3	51 18.3	84 51	126.1	51 43.3	83 52	125.7	52 08.3	83 52	125.2	52 33.1	83 52	124.8
4	50 47.6	83 52	124.9	51 12.4	83 52	124.5	51 37.2	82 53	124.0	52 01.9	82 53	123.5
35	50 16.4	83 53	123.7	50 41.1	82 53	123.2	51 05.7	82 53	122.8	51 30.2	81 54	122.3
6	49 44.7	82 53	122.5	50 09.3	82 54	122.1	50 33.7	81 54	121.6	50 58.1	81 54	121.1
7	49 12.7	81 54	121.3	49 37.1	81 54	120.9	50 01.4	81 55	120.4	50 25.5	80 55	120.0
8	48 40.2	81 55	120.2	49 04.5	81 55	119.7	49 28.6	80 55	119.3	49 52.6	80 55	118.8
9	48 07.4	80 55	119.1	48 31.5	80 56	118.6	48 55.5	80 56	118.2	49 19.4	79 56	117.7
40	47 34.2	80 56	118.0	47 58.2	80 56	117.5	48 22.0	79 56	117.0	48 45.8	79 57	116.6
1	47 00.7	80 56	116.9	47 24.5	79 57	116.4	47 48.2	79 57	116.0	48 11.9	79 57	115.5
2	46 26.9	79 57	115.8	46 50.6	79 57	115.3	47 14.1	78 57	114.9	47 37.6	78 58	114.4
3	45 52.7	79 57	114.7	46 16.3	78 58	114.3	46 39.7	78 58	113.8	47 03.1	78 58	113.4
4	45 [illegible]8.3	78 58	113.7	45 41.7	78 58	113.2	46 05.1	78 58	112.8	46 28.3	77 58	112.3
45	44 43.6	78 58	112.7	45 06.9	78 58	112.2	45 30.1	77 59	111.8	45 53.3	77 59	111.3
6	44 08.6	78 59	111.7	44 31.8	77 59	111.2	44 54.9	77 59	110.8	45 18.0	77 59	110.3
7	43 33.4	77 59	110.7	43 56.5	77 59	110.2	44 19.5	77 59	109.8	44 42.4	76 60	109.3
8	42 57.9	77 59	109.7	43 21.0	77 60	109.2	43 43.9	76 60	108.8	44 06.7	76 60	108.3
9	42 22.3	77 60	108.7	42 45.2	76 60	108.3	43 08.0	76 60	107.8	43 30.8	76 60	107.4
50	41 46.4	76 60	107.8	42 09.3	76 60	107.3	42 32.0	76 60	106.9	42 54.6	75 60	106.4
1	41 10.4	76 60	106.8	41 33.1	76 61	106.4	41 55.8	75 61	105.9	42 18.3	75 61	105.5
2	40 34.1	76 61	105.9	40 56.8	75 61	105.4	41 19.4	75 61	105.0	41 41.9	75 61	104.6
3	39 57.7	75 61	105.0	40 20.3	75 61	104.5	40 42.8	75 61	104.1	41 05.2	75 61	103.7
4	39 21.2	75 61	104.1	39 43.7	75 61	103.6	40 06.1	75 61	103.2	40 28.5	74 62	102.8
55	38 44.5	75 61	103.2	39 06.9	75 61	102.7	39 29.3	74 62	102.3	39 51.6	74 62	101.9
6	38 07.6	75 62	102.3	38 30.0	75 62	101.8	38 52.4	74 62	101.4	39 14.6	74 62	101.0
7	37 30.7	75 62	101.4	37 53.0	74 62	101.0	38 15.3	74 62	100.5	38 37.5	74 62	100.1
8	36 53.6	74 62	100.5	37 15.9	74 62	100.1	37 38.1	74 62	99.7	38 00.2	74 62	99.3
9	36 16.4	74 62	99.7	36 38.7	74 62	99.2	37 00.9	74 62	98.8	37 22.9	73 62	98.4
60	35 39.2	74 62	98.8	36 01.4	74 62	98.4	36 23.5	74 62	98.0	36 45.5	73 62	97.6
1	35 01.8	74 62	98.0	35 24.0	74 62	97.6	35 46.1	73 62	97.1	36 08.1	73 63	96.7
2	34 24.4	74 62	97.1	34 46.5	74 63	96.7	35 08.6	73 63	96.3	35 30.5	73 63	95.9
3	33 46.9	74 63	96.3	34 09.0	74 63	95.9	34 31.0	73 63	95.5	34 53.0	73 63	95.1
4	33 09.3	74 63	95.5	33 31.4	73 63	95.1	33 53.4	73 63	94.7	34 15.3	73 63	94.3
65	32 31.7	74 63	94.7	32 53.8	73 63	94.3	33 15.7	73 63	93.9	33 37.6	73 63	93.5
6	31 54.1	74 63	93.9	32 16.1	73 63	93.5	32 38.1	73 63	93.1	32 59.9	73 63	92.7
7	31 16.4	74 63	93.1	31 38.4	73 63	92.7	32 00.3	73 63	92.3	32 22.2	73 63	91.9
8	30 38.7	73 63	92.3	31 00.7	73 63	91.9	31 22.6	73 63	91.5	31 44.5	73 63	91.1
9	30 00.9	73 63	91.5	30 22.9	73 63	91.1	30 44.8	73 63	90.7	31 06.7	73 63	90.3
70	29 23.2	73 63	90.7	29 45.2	73 63	90.3	30 07.1	73 63	89.9	30 28.9	73 63	89.5
1	28 45.4	73 63	89.9	29 07.4	73 63	89.5	29 29.3	73 63	89.1	29 51.2	73 63	88.8
2	28 07.6	73 63	89.2	28 29.6	73 63	88.8	28 51.6	73 63	88.4	29 13.4	73 63	88.0
3	27 29.9	73 63	88.4	27 51.9	73 63	88.0	28 13.8	73 63	87.6	28 35.7	73 63	87.2
4	26 52.2	73 63	87.6	27 14.2	73 63	87.2	27 36.1	73 63	86.8	27 58.0	73 63	86.5
75	26 14.4	74 63	86.9	26 36.5	73 63	86.5	26 58.4	73 63	86.1	27 20.4	73 63	85.7
6	25 36.8	74 63	86.1	25 58.8	73 63	85.7	26 20.8	73 63	85.3	26 42.7	73 63	85.0
7	24 59.1	74 63	85.3	25 21.2	73 63	85.0	25 43.2	73 63	84.6	26 05.1	73 63	84.2
8	24 21.5	74 63	84.6	24 43.6	74 63	84.2	25 05.6	73 63	83.8	25 27.6	73 62	83.5
9	23 43.9	74 62	83.8	24 06.0	74 62	83.5	24 28.1	73 62	83.1	24 50.1	73 62	82.7
80	23 06.4	74 62	83.1	23 28.6	74 62	82.7	23 50.6	74 62	82.4	24 12.7	73 62	82.0
1	22 29.0	74 62	82.3	22 51.1	74 62	82.0	23 13.3	74 62	81.6	23 35.3	73 62	81.2
2	21 51.6	74 62	81.6	22 13.8	74 62	81.2	22 35.9	74 62	80.9	22 58.0	74 62	80.5
3	21 14.2	74 62	80.9	21 36.5	74 62	80.5	21 58.7	74 62	80.1	22 20.8	74 62	79.8
4	20 37.0	74 62	80.1	20 59.3	74 62	79.8	21 21.5	74 62	79.4	21 43.7	74 62	79.1
85	19 59.8	74 62	79.4	20 22.2	74 62	79.0	20 44.5	74 62	78.7	21 06.7	74 62	78.3
6	19 22.8	75 62	78.7	19 45.2	75 62	78.3	20 07.5	74 61	78.0	20 29.8	74 61	77.6
7	18 45.8	75 61	77.9	19 08.2	75 61	77.6	19 30.6	75 61	77.2	19 52.9	74 61	76.9
8	18 08.9	75 61	77.2	18 31.4	75 61	76.8	18 53.8	75 61	76.5	19 16.2	75 61	76.1
9	17 32.2	75 61	76.5	17 54.7	75 61	76.1	18 17.2	75 61	75.8	18 39.6	75 61	75.4
90	16 55.5	75 61	75.7	17 18.1	75 61	75.4	17 40.6	75 61	75.0	18 03.1	75 61	74.7

Digitized by Google

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	19 00.0	1.0	01	180.0	18 30.0	1.0	01	180.0	18 00.0	1.0	01	180.0	17 30.0	1.0	01	180.0	17 00.0	1.0	01	180.0	16 30.0	1.0	01	180.0	16 00.0	1.0	01	180.0	15 30.0	1.0	01	180.0	00
1	18 59.7	1.0	02	179.0	18 29.7	1.0	02	179.0	17 59.7	1.0	02	179.0	17 29.7	1.0	02	179.0	16 59.7	1.0	02	179.0	16 29.7	1.0	02	179.0	15 59.7	1.0	02	179.0	15 29.7	1.0	02	179.0	1
2	18 58.7	1.0	03	178.0	18 28.7	1.0	03	178.0	17 58.7	1.0	03	178.0	17 28.7	1.0	03	178.0	16 58.7	1.0	03	178.1	16 28.7	1.0	03	178.1	15 58.7	1.0	03	178.1	15 28.7	1.0	03	178.1	2
3	18 57.1	1.0	04	177.0	18 27.1	1.0	04	177.0	17 57.1	1.0	04	177.1	17 27.1	1.0	04	177.1	16 57.1	1.0	04	177.1	16 27.1	1.0	04	177.1	15 57.2	1.0	04	177.1	15 27.2	1.0	04	177.1	3
4	18 54.8	1.0	05	176.0	18 24.8	1.0	05	176.1	17 54.8	1.0	05	176.1	17 24.9	1.0	05	176.1	16 54.9	1.0	05	176.1	16 24.9	1.0	05	176.1	15 55.0	1.0	05	176.2	15 25.0	1.0	05	176.2	4
05	18 51.8	1.0	06	175.0	18 21.9	1.0	06	175.1	17 51.9	1.0	06	175.1	17 22.0	1.0	06	175.1	16 52.0	1.0	06	175.2	16 22.1	1.0	06	175.2	15 52.1	1.0	06	175.2	15 22.2	1.0	06	175.2	05
6	18 48.2	1.0	07	174.0	18 18.3	1.0	07	174.1	17 48.4	1.0	07	174.1	17 18.4	1.0	07	174.2	16 48.5	1.0	07	174.2	16 18.6	1.0	07	174.2	15 48.7	1.0	07	174.3	15 18.7	1.0	07	174.3	6
7	18 44.0	1.0	08	173.1	18 14.1	1.0	08	173.1	17 44.2	1.0	08	173.1	17 14.3	1.0	08	173.2	16 44.4	1.0	08	173.2	16 14.5	1.0	08	173.3	15 44.6	1.0	08	173.3	15 14.7	1.0	08	173.3	7
8	18 39.1	1.0	09	172.1	18 09.2	1.0	09	172.1	17 39.4	1.0	09	172.2	17 09.5	1.0	09	172.2	16 39.6	1.0	09	172.3	16 09.7	1.0	09	172.3	15 39.9	1.0	09	172.4	15 10.0	1.0	09	172.4	8
9	18 33.6	99	10	171.1	18 03.7	99	10	171.1	17 33.9	99	10	171.2	17 04.0	99	10	171.2	16 34.2	99	10	171.3	16 04.4	99	10	171.3	15 34.5	99	10	171.4	15 04.7	99	10	171.5	9
10	18 27.4	99	11	170.1	17 57.6	99	11	170.2	17 27.8	99	11	170.2	16 58.0	99	11	170.3	16 28.2	99	11	170.3	15 58.4	99	11	170.4	15 28.6	99	11	170.5	14 58.8	99	11	170.5	10
1	18 20.6	99	12	169.1	17 50.8	99	12	169.2	17 21.1	99	12	169.2	16 51.3	99	12	169.3	16 21.5	99	12	169.4	15 51.8	99	12	169.4	15 22.0	99	12	169.5	14 52.2	99	12	169.6	1
2	18 13.1	99	13	168.1	17 43.4	99	13	168.2	17 13.7	99	13	168.3	16 44.0	99	13	168.3	16 14.3	99	13	168.4	15 44.5	99	13	168.5	15 14.8	99	13	168.6	14 45.1	99	13	168.6	2
3	18 05.0	99	14	167.2	17 35.4	99	14	167.2	17 05.7	99	14	167.3	16 36.0	99	14	167.4	16 06.4	99	14	167.5	15 36.7	99	14	167.5	15 07.0	99	14	167.6	14 37.3	99	14	167.7	3
4	17 56.3	99	16	166.2	17 26.7	99	15	166.3	16 57.1	99	15	166.3	16 27.5	99	15	166.4	15 57.9	99	15	166.5	15 28.2	99	15	166.6	14 58.6	99	15	166.7	14 29.0	99	15	166.8	4
15	17 47.0	99	17	165.2	17 17.4	99	16	165.3	16 47.9	99	16	165.4	16 18.3	99	16	165.5	15 48.7	99	16	165.6	15 19.2	99	16	165.6	14 49.6	99	16	165.7	14 20.0	99	16	165.8	15
6	17 37.0	98	18	164.2	17 07.5	98	18	164.3	16 38.0	98	17	164.4	16 08.5	98	17	164.5	15 39.0	98	17	164.6	15 09.5	98	17	164.7	14 40.0	98	17	164.8	14 10.5	98	17	164.9	6
7	17 26.5	98	19	163.3	16 57.0	98	18	163.4	16 27.6	98	18	163.5	15 58.2	98	18	163.6	15 28.7	98	18	163.7	14 59.3	98	18	163.8	14 29.8	98	18	163.9	14 00.4	98	18	164.0	7
8	17 15.3	98	20	162.3	16 45.9	98	20	162.4	16 16.5	98	19	162.5	15 47.2	98	19	162.6	15 17.8	98	19	162.7	14 48.4	98	19	162.8	14 19.0	98	19	162.9	13 49.6	98	19	163.0	8
9	17 03.5	98	21	161.3	16 34.2	98	21	161.4	16 04.9	98	20	161.6	15 35.6	98	20	161.7	15 06.3	98	20	161.8	14 37.0	98	20	161.9	14 07.6	98	20	162.0	13 38.3	98	20	162.1	9
20	16 51.1	97	22	160.4	16 21.9	97	22	160.5	15 52.7	97	21	160.6	15 23.4	97	21	160.7	14 54.2	97	21	160.8	14 24.9	97	21	161.0	13 55.7	98	21	161.1	13 26.4	98	21	161.2	20
1	16 38.2	97	23	159.4	16 09.0	97	22	159.5	15 39.8	97	22	159.7	15 10.7	97	22	159.8	14 41.5	97	22	159.9	14 12.3	97	22	160.0	13 43.1	97	22	160.1	13 14.0	97	22	160.3	1
2	16 24.6	97	24	158.5	15 55.5	97	23	158.6	15 26.4	97	23	158.7	14 57.3	97	23	158.9	14 28.2	97	23	159.0	13 59.1	97	23	159.1	13 30.0	97	23	159.2	13 00.9	97	23	159.4	2
3	16 10.4	97	25	157.5	15 41.4	97	24	157.7	15 12.4	97	24	157.8	14 43.4	97	24	157.9	14 14.4	97	24	158.1	13 45.4	97	24	158.2	13 16.4	97	24	158.3	12 47.3	97	24	158.4	3
4	15 55.7	96	25	156.6	15 26.8	96	25	156.7	14 57.9	96	25	156.9	14 28.9	96	25	157.0	14 00.0	96	25	157.1	13 31.1	96	25	157.3	13 02.1	96	25	157.4	12 33.2	97,	24	157.5	4
25	15 40.4	96	26	155.6	15 11.6	96	26	155.8	14 42.8	96	26	155.9	14 13.9	96	26	156.1	13 45.1	96	26	156.2	13 16.2	96	26	156.3	12 47.3	96	26	156.5	12 18.5	96	25	156.6	25
6	15 24.6	96	27	154.7	14 55.8	96	27	154.9	14 27.1	96	27	155.0	13 58.3	96	27	155.1	13 29.6	96	27	155.3	13 00.8	96	27	155.4	12 32.0	96	26	155.6	12 03.2	96	26	155.7	6
7	15 08.2	96	28	153.8	14 39.5	96	28	153.9	14 10.8	96	28	154.1	13 42.2	96	28	154.2	13 13.5	96	28	154.4	12 44.8	96	28	154.5	12 16.1	96	27	154.7	11 47.4	96	27	154.8	7
8	14 51.2	95	29	152.8	14 22.6	95	29	153.0	13 54.1	95	29	153.2	13 25.5	95	29	153.3	12 56.9	95	29	153.5	12 28.3	95	28	153.6	11 59.7	95	28	153.8	11 31.1	95	28	153.9	8
9	14 33.7	95	30	151.9	14 05.2	95	30	152.1	13 36.7	95	30	152.2	13 08.3	95	30	152.4	12 39.8	95	29	152.6	12 11.3	95	29	152.7	11 42.8	95	29	152.9	11 14.3	95	29	153.0	9
30	14 15.7	95	31	151.0	13 47.3	95	31	151.2	13 18.9	95	31	151.3	12 50.5	95	30	151.5	12 22.1	95	30	151.7	11 53.7	95	30	151.8	11 25.3	95	30	152.0	10 56.9	95	30	152.2	30
1	13 57.1	94	32	150.1	13 28.8	94	32	150.3	13 00.5	94	31	150.4	12 32.2	94	31	150.6	12 03.9	94	31	150.8	11 35.6	94	31	150.9	11 07.3	94	31	151.1	10 39.0	94	31	151.3	1
2	13 38.0	94	33	149.2	13 09.8	94	32	149.4	12 41.6	94	32	149.5	12 13.4	94	32	149.7	11 45.2	94	32	149.9	11 17.0	94	32	150.1	10 48.8	94	32	150.2	10 20.6	94	32	150.4	2
3	13 18.4	94	34	148.3	12 50.3	94	33	148.5	12 22.2	94	33	148.6	11 54.1	94	33	148.8	11 26.0	94	33	149.0	10 57.9	94	33	149.2	10 29.8	94	32	149.3	10 01.7	94	32	149.5	3
4	12 58.3	93	34	147.4	12 30.3	93	34	147.6	12 02.3	93	34	147.7	11 34.3	93	34	147.9	11 06.3	93	34	148.1	10 38.3	93	33	148.3	10 10.3	93	33	148.5	9 42.3	93	33	148.7	4
35	12 37.7	93	35	146.5	12 09.8	93	35	146.7	11 41.9	93	35	146.8	11 14.0	93	35	147.0	10 46.1	93	34	147.2	10 18.2	93	34	147.4	9 50.3	93	34	147.6	9 22.4	93	34	147.8	35
6	12 16.6	93	36	145.6	11 48.8	93	36	145.8	11 21.0	93	36	146.0	10 53.2	93	35	146.2	10 25.4	93	35	146.3	9 57.6	93	35	146.5	9 29.8	93	35	146.7	9 02.0	93	35	146.9	6
7	11 55.0	92	37	144.7	11 27.3	92	37	144.9	10 59.7	92	36	145.1	10 32.0	92	36	145.3	10 04.3	92	36	145.5	9 36.6	92	36	145.7	9 08.9	92	36	145.9	8 41.2	92	36	146.1	7
8	11 32.9	92	38	143.8	11 05.4	92	37	144.0	10 37.8	92	37	144.2	10 10.2	92	37	144.4	9 42.7	92	37	144.6	9 15.1	92	37	144.8	8 47.5	92	36	145.0	8 19.9	92	36	145.2	8
9	11 10.4	91	38	142.9	10 43.0	92	38	143.1	10 15.5	92	38	143.3	9 48.0	92	38	143.5	9 20.6	92	38	143.7	8 53.1	92	37	144.0	8 25.6	92	37	144.2	7 58.1	92	37	144.4	9
40	10 47.4	91	39	142.1	10 20.1	91	39	142.3	9 52.7	91	39	142.5	9 25.4	91	39	142.7	8 58.0	91	38	142.9	8 30.6	91	38	143.1	8 03.2	91	38	143.3	7 35.9	91	38	143.5	40
1	10 24.0	91	40	141.2	9 56.7	91	40	141.4	9 29.5	91	39	141.6	9 02.2	91	39	141.8	8 35.0	91	39	142.0	8 07.7	91	39	142.2	7 40.5	91	39	142.5	7 13.2	91	39	142.7	1
2	10 00.1	90	41	140.3	9 33.0	90	40	140.5	9 05.8	90	40	140.8	8 38.7	90	40	141.0	8 11.5	90	40	141.2	7 44.4	91	40	141.4	7 17.2	91	39	141.6	6 50.1	91	39	141.8	2
3	9 35.8	90	41	139.5	9 08.7	90	41	139.7	8 41.7	90	41	139.9	8 14.7	90	41	140.1	7 47.7	90	41	140.3	7 20.6	90	40	140.6	6 53.6	90	40	140.8	6 26.5	90	40	141.0	3
4	9 11.0	90	42	138.6	8 44.1	90	42	138.8	8 17.2	90	42	139.1	7 50.3	90	41	139.3	7 23.3	90	41	139.5	6 56.4	90	41	139.7	6 29.5	90	41	139.9	6 02.5	90	41	140.2	4
45	8 45.8	89	43	137.8	8 19.0	89	42	138.0	7 52.2	89	42	138.2	7 25.4	89	42	138.4	6 58.6	89	42	138.7	6 31.8	89	42	138.9	6 05.0	89	42	139.1	5 38.1	89	41	139.3	45
6	8 20.2	89	43	136.9	7 53.6	89	43	137.1	7 26.9	89	43	137.4	7 00.2	89	43	137.6	6 33.5	89	43	137.8	6 06.8	89	42	138.1	5 40.1	89	42	138.3	5 13.3	89	42	138.5	6
7	7 54.2	89	44	136.1	7 27.7	89	44	136.3	7 01.1	89	44	136.5	6 34.5	89	43	136.8	6 07.9	89	43	137.0	5 41.3	89	43	137.2	5 14.7	89	43	137.5					7
8	7 27.8	88	45	135.2	7 01.4	88	44	135.5	6 34.9	88	44	135.7	6 08.4	88	44	135.9	5 42.0	88	44	136.2	5 15.5	88	44	136.4									8
9	7 01.1	88	45	134.4	6 34.7	88	45	134.6	6 08.4	88	45	134.9	5 42.0	88	45	135.1	5 15.6	88	45	135.4													9
50	6 33.9	87	46	133.6	6 07.6	87	46	133.8	5 41.4	87	46	134.1	5 15.2	87	45	134.3																	50
1	6 06.3	87	47	132.7	5 40.2	87	46	133.0	5 14.1	87	46	133.2																					1
2	5 38.4	87	47	131.9	5 12.4	87	47	132.2																									2
3	5 10.1	86	48	131.1																													3

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	14 48.1	76	61	76.4	15 10.9	76	61	76.0	15 33.6	76	61	75.7	15 56.3	76	61	75.3	16 19.0	76	61	75.0	16 41.6	75	61	74.7	17 04.2	75	60	74.3	17 26.8	75	60	74.0	91
2	14 11.5	76	61	75.6	14 34.3	76	61	75.3	14 57.1	76	61	75.0	15 19.8	76	61	74.6	15 42.6	76	60	74.3	16 05.3	76	60	73.9	16 27.9	75	60	73.6	16 50.6	75	60	73.3	2
3	13 35.0	76	61	74.9	13 57.8	76	61	74.6	14 20.7	76	60	74.2	14 43.5	76	60	73.9	15 06.3	76	60	73.5	15 29.1	76	60	73.2	15 51.8	76	60	72.9	16 14.5	76	60	72.5	3
4	12 58.6	76	60	74.1	13 21.5	76	60	73.8	13 44.4	76	60	73.5	14 07.3	76	60	73.2	14 30.1	76	60	72.8	14 53.0	76	60	72.5	15 15.8	76	60	72.1	15 38.5	76	60	71.8	4
95	12 22.3	77	60	73.4	12 45.3	77	60	73.1	13 08.3	77	60	72.8	13 31.2	76	60	72.4	13 54.1	76	60	72.1	14 17.0	76	60	71.8	14 39.9	76	60	71.4	15 02.7	76	59	71.1	95
6	11 46.2	77	60	72.7	12 09.3	77	60	72.3	12 32.3	77	60	72.0	12 55.3	77	60	71.7	13 18.3	77	60	71.4	13 41.3	76	59	71.0	14 04.2	76	59	70.7	14 27.1	76	59	70.4	6
7	11 10.2	77	60	71.9	11 33.4	77	60	71.6	11 56.5	77	59	71.3	12 19.5	77	59	71.0	12 42.6	77	59	70.6	13 05.6	77	59	70.3	13 28.6	77	59	70.0	13 51.6	77	59	69.6	7
8	10 34.4	77	59	71.2	10 57.6	77	59	70.9	11 20.8	77	59	70.5	11 43.9	77	59	70.2	12 07.0	77	59	69.9	12 30.2	77	59	69.6	12 53.2	77	59	69.2	13 16.3	77	59	68.9	8
9	9 58.7	78	59	70.5	10 22.0	78	59	70.1	10 45.3	77	59	69.8	11 08.5	77	59	69.5	11 31.7	77	59	69.2	11 54.9	77	59	68.8	12 18.0	77	58	68.5	12 41.1	77	58	68.2	9
100	9 23.2	78	59	69.7	9 46.6	78	59	69.4	10 09.9	78	59	69.1	10 33.2	78	59	68.8	10 56.5	78	58	68.4	11 19.7	77	58	68.1	11 43.0	77	58	67.8	12 06.2	77	58	67.5	100
1	8 47.9	78	59	69.0	9 11.3	78	58	68.7	9 34.7	78	58	68.3	9 58.1	78	58	68.0	10 21.4	78	58	67.7	10 44.8	78	58	67.4	11 08.1	78	58	67.1	11 31.4	78	58	66.7	1
2	8 12.8	78	58	68.2	8 36.2	78	58	67.9	8 59.7	78	58	67.6	9 23.2	78	58	67.3	9 46.6	78	58	67.0	10 10.0	78	58	66.7	10 33.4	78	57	66.3	10 56.8	78	57	66.0	2
3	7 37.8	79	58	67.5	8 01.3	79	58	67.2	8 24.9	78	58	66.9	8 48.4	78	58	66.5	9 11.9	78	57	66.2	9 35.4	78	57	65.9	9 58.9	78	57	65.6	10 22.4	78	57	65.3	3
4	7 03.0	79	58	66.7	7 26.6	79	58	66.4	7 50.3	79	57	66.1	8 13.9	79	57	65.8	8 37.5	79	57	65.5	9 01.1	79	57	65.2	9 24.6	79	57	64.9	9 48.2	78	57	64.6	4
105	6 28.4	79	57	66.0	6 52.1	79	57	65.7	7 15.8	79	57	65.4	7 39.5	79	57	65.1	8 03.2	79	57	64.8	8 26.9	79	57	64.4	8 50.6	79	56	64.1	9 14.2	79	56	63.8	105
6	5 54.0	79	57	65.2	6 17.8	79	57	64.9	6 41.6	79	57	64.6	7 05.4	79	57	64.3	7 29.2	79	56	64.0	7 52.9	79	56	63.7	8 16.7	79	56	63.4	8 40.4	79	56	63.1	6
7	5 19.8	80	57	64.5	5 43.7	80	56	64.2	6 07.6	80	56	63.9	6 31.5	80	56	63.6	6 55.3	80	56	63.3	7 19.2	79	56	63.0	7 43.0	79	56	62.7	8 06.9	79	56	62.4	7
8					5 09.8	80	56	63.4	5 33.8	80	56	63.1	5 57.8	80	56	62.8	6 21.7	80	56	62.5	6 45.7	80	56	62.2	7 09.6	80	55	61.9	7 33.5	80	55	61.6	8
9									5 00.2	80	56	62.4	5 24.3	80	56	62.1	5 48.3	80	55	61.8	6 12.4	80	55	61.5	6 36.4	80	55	61.2	7 00.4	80	55	60.9	9
110																	5 15.2	80	55	61.0	5 39.3	80	55	60.7	6 03.4	80	55	60.4	6 27.6	80	54	60.1	110
1																					5 06.5	81	54	60.0	5 30.7	81	54	59.7	5 54.9	81	54	59.4	1
2																													5 22.6	81	54	58.7	2

Digitized by Google

Lat. 51°

H.A.	24° 00′ Alt.	Δd Δt	Az.	24° 30′ Alt.	Δd Δt	Az.	25° 00′ Alt.	Δd Δt	Az.	25° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	63 00.0	1.0 01	180.0	63 30.0	1.0 01	180.0	64 00.0	1.0 01	180.0	64 30.0	1.0 01	180.0
1	62 59.3	1.0 03	178.0	63 29.3	1.0 03	178.0	63 59.3	1.0 03	177.9	64 29.3	1.0 03	177.9
2	62 57.4	1.0 06	176.0	63 27.3	1.0 06	175.9	63 57.3	1.0 06	175.9	64 27.2	1.0 06	175.8
3	62 54.0	1.0 08	174.0	63 24.0	1.0 08	173.9	63 53.9	1.0 08	173.8	64 23.8	1.0 08	173.7
4	62 49.4	1.0 10	172.0	63 19.3	1.0 10	171.9	63 49.1	1.0 10	171.8	64 19.0	99 10	171.6
05	62 43.5	99 12	170.0	63 13.3	99 12	169.9	63 43.1	99 12	169.7	64 12.8	99 12	169.6
6	62 36.3	99 14	168.0	63 06.0	99 14	167.9	63 35.7	99 14	167.7	64 05.3	99 15	167.5
7	62 27.8	99 16	166.1	62 57.4	99 16	165.9	63 27.0	99 17	165.7	63 56.5	98 17	165.5
8	62 18.1	98 18	164.1	62 47.6	98 18	163.9	63 17.0	98 19	163.7	63 46.4	98 19	163.5
9	62 07.2	98 20	162.2	62 36.5	98 20	162.0	63 05.8	98 21	161.7	63 35.1	98 21	161.5
10	61 55.1	97 22	160.3	62 24.2	97 22	160.1	62 53.4	97 23	159.8	63 22.5	97 23	159.5
1	61 41.8	97 24	158.4	62 10.8	97 24	158.2	62 39.7	97 25	157.9	63 08.7	96 25	157.6
2	61 27.3	96 26	156.6	61 56.1	96 26	156.3	62 24.9	96 27	156.0	62 53.7	96 27	155.7
3	61 11.7	96 28	154.8	61 40.4	95 28	154.4	62 09.0	95 28	154.1	62 37.6	95 29	153.8
4	60 55.1	96 30	153.0	61 23.6	95 30	152.6	61 52.0	95 30	152.3	62 20.4	94 30	151.9
15	60 37.4	94 31	151.2	61 05.7	94 32	150.8	61 33.9	94 32	150.5	62 02.1	94 32	150.1
6	60 18.7	94 33	149.4	60 46.8	93 33	149.1	61 14.8	93 34	148.7	61 42.8	93 34	148.3
7	59 59.0	93 34	147.7	60 26.9	93 35	147.4	60 54.7	93 35	147.0	61 22.4	92 35	146.6
8	59 38.4	92 36	146.0	60 06.1	92 36	145.7	60 33.7	92 37	145.3	61 01.2	92 37	144.9
9	59 16.9	92 37	144.4	59 44.3	91 38	144.0	60 11.7	91 38	143.6	60 39.0	91 38	143.2
20	58 54.5	91 39	142.8	59 21.7	91 39	142.4	59 48.8	90 39	141.9	60 15.9	90 40	141.5
1	58 31.2	90 40	141.2	58 58.2	90 40	140.8	59 25.1	90 41	140.3	59 52.0	89 41	139.9
2	58 07.1	89 41	139.6	58 33.9	89 42	139.2	59 00.6	89 42	138.7	59 27.3	89 42	138.3
3	57 42.3	89 43	138.1	58 08.9	88 43	137.6	58 35.4	88 43	137.2	59 01.8	88 44	136.7
4	57 16.7	88 44	136.6	57 43.1	88 44	136.1	58 09.3	87 45	135.7	58 35.5	87 45	135.2
25	56 50.4	87 45	135.1	57 16.5	87 45	134.7	57 42.6	87 46	134.2	58 08.6	86 46	133.7
6	56 23.4	87 46	133.7	56 49.3	86 46	133.2	57 15.2	86 47	132.7	57 41.0	86 47	132.3
7	55 55.7	86 47	132.2	56 21.5	86 47	131.8	56 47.1	85 48	131.3	57 12.7	85 48	130.8
8	55 27.5	85 48	130.9	55 53.0	85 48	130.4	56 18.5	85 49	129.9	56 43.8	84 49	129.4
9	54 58.6	85 49	129.5	55 24.0	84 49	129.0	55 49.2	84 50	128.5	56 14.4	84 50	128.1
30	54 29.2	84 50	128.2	54 54.4	84 50	127.7	55 19.4	83 51	127.2	55 44.4	83 51	126.7
1	53 59.3	83 51	126.8	54 24.2	83 51	126.4	54 49.1	83 51	125.9	55 13.8	82 52	125.4
2	53 28.8	83 52	125.6	53 53.6	82 52	125.1	54 18.3	82 52	124.6	54 42.8	82 52	124.1
3	52 57.8	82 52	124.3	53 22.4	82 53	123.8	53 46.9	81 53	123.3	54 11.3	81 53	122.8
4	52 26.4	82 53	123.1	52 50.9	81 53	122.6	53 15.2	81 54	122.1	53 39.4	80 54	121.6
35	51 54.6	81 54	121.9	52 18.8	81 54	121.4	52 43.0	80 54	120.9	53 07.0	80 55	120.4
6	51 22.3	81 54	120.7	51 46.4	80 55	120.2	52 10.4	80 55	119.7	52 34.2	79 55	119.2
7	50 49.6	80 55	119.5	51 13.6	80 55	119.0	51 37.4	79 56	118.5	52 01.1	79 56	118.0
8	50 16.6	80 56	118.4	50 40.4	79 56	117.9	51 04.0	79 56	117.4	51 27.6	78 56	116.9
9	49 43.2	79 56	117.2	50 06.8	79 56	116.7	50 30.3	78 57	116.3	50 53.8	78 57	115.8
40	49 09.4	79 57	116.1	49 32.9	78 57	115.6	49 56.3	78 57	115.2	50 19.6	77 57	114.7
1	48 35.3	78 57	115.0	48 58.7	78 58	114.6	49 22.0	77 58	114.1	49 45.1	77 58	113.6
2	48 01.0	78 58	114.0	48 24.2	77 58	113.5	48 47.4	77 58	113.0	49 10.4	76 58	112.5
3	47 26.3	77 58	112.9	47 49.5	77 58	112.4	48 12.5	77 59	112.0	48 35.4	76 59	111.5
4	46 51.4	77 59	111.9	47 14.4	77 59	111.4	47 37.3	76 59	110.9	48 00.1	76 59	110.4
45	46 16.3	77 59	110.9	46 39.2	76 59	110.4	47 01.9	76 59	109.9	47 24.6	75 60	109.4
6	45 40.9	76 59	109.8	46 03.7	76 60	109.4	46 26.3	75 60	108.9	46 48.9	75 60	108.4
7	45 05.2	76 60	108.9	45 27.9	75 60	108.4	45 50.5	75 60	107.9	46 13.0	75 60	107.4
8	44 29.4	76 60	107.9	44 52.0	75 60	107.4	45 14.5	75 60	107.0	45 36.9	74 60	106.5
9	43 53.4	75 60	106.9	44 15.9	75 60	106.5	44 38.3	74 61	106.0	45 00.6	74 61	105.5
50	43 17.2	75 61	106.0	43 39.6	75 61	105.5	44 01.9	74 61	105.1	44 24.1	74 61	104.6
1	42 40.8	75 61	105.0	43 03.1	74 61	104.6	43 25.4	74 61	104.1	43 47.5	74 61	103.7
2	42 04.2	74 61	104.1	42 26.5	74 61	103.7	42 48.7	74 61	103.2	43 10.7	73 61	102.7
3	41 27.5	74 61	103.2	41 49.7	74 62	102.8	42 11.8	73 62	102.3	42 33.8	73 62	101.8
4	40 50.7	74 62	102.3	41 12.9	74 62	101.9	41 34.9	73 62	101.4	41 56.8	73 62	101.0
55	40 13.8	74 62	101.4	40 35.8	73 62	101.0	40 57.8	73 62	100.5	41 19.7	73 62	100.1
6	39 36.7	74 62	100.5	39 58.7	73 62	100.1	40 20.6	73 62	99.7	40 42.5	73 62	99.2
7	38 59.5	73 62	99.7	39 21.5	73 62	99.2	39 43.4	73 62	98.8	40 05.1	72 62	98.4
8	38 22.3	73 62	98.8	38 44.2	73 62	98.4	39 06.0	73 62	97.9	39 27.7	72 62	97.5
9	37 44.9	73 62	98.0	38 06.8	73 62	97.5	38 28.6	72 62	97.1	38 50.3	72 63	96.7
60	37 07.5	73 63	97.1	37 29.3	73 63	96.7	37 51.1	72 63	96.3	38 12.7	72 63	95.8
1	36 30.0	73 63	96.3	36 51.8	73 63	95.9	37 13.5	72 63	95.4	37 35.2	72 63	95.0
2	35 52.4	73 63	95.5	36 14.2	72 63	95.1	36 35.9	72 63	94.6	36 57.5	72 63	94.2
3	35 14.8	73 63	94.7	35 36.6	72 63	94.2	35 58.3	72 63	93.8	36 19.8	72 63	93.4
4	34 37.1	73 63	93.8	34 58.9	72 63	93.4	35 20.6	72 63	93.0	35 42.1	72 63	92.6
65	33 59.5	73 63	93.0	34 21.2	72 63	92.6	34 42.8	72 63	92.2	35 04.4	72 63	91.8
6	33 21.7	73 63	92.3	33 43.5	72 63	91.8	34 05.1	72 63	91.4	34 26.6	72 63	91.0
7	32 44.0	73 63	91.5	33 05.7	72 63	91.0	33 27.3	72 63	90.6	33 48.9	72 63	90.2
8	32 06.2	73 63	90.7	32 28.0	72 63	90.3	32 49.6	72 63	89.9	33 11.1	72 63	89.4
9	31 28.5	72 63	89.9	31 50.2	72 63	89.5	32 11.8	72 63	89.1	32 33.4	72 63	88.7
70	30 50.7	72 63	89.1	31 12.4	72 63	88.7	31 34.1	72 63	88.3	31 55.6	72 63	87.9
1	30 13.0	73 63	88.4	30 34.7	72 63	88.0	30 56.3	72 63	87.6	31 17.9	72 63	87.1
2	29 35.2	73 63	87.6	29 57.0	72 63	87.2	30 18.6	72 63	86.8	30 40.2	72 63	86.4
3	28 57.5	73 63	86.8	29 19.3	72 63	86.4	29 40.9	72 63	86.0	30 02.5	72 63	85.6
4	28 19.8	73 63	86.1	28 41.6	72 63	85.7	29 03.3	72 63	85.3	29 24.9	72 63	84.9
75	27 42.2	73 63	85.3	28 04.0	72 63	84.9	28 25.7	72 63	84.5	28 47.3	72 63	84.1
6	27 04.6	73 63	84.6	27 26.4	73 63	84.2	27 48.1	72 62	83.8	28 09.8	72 62	83.4
7	26 27.0	73 63	83.8	26 48.8	73 62	83.4	27 10.6	72 62	83.1	27 32.3	72 62	82.7
8	25 49.5	73 62	83.1	26 11.4	73 62	82.7	26 33.2	73 62	82.3	26 54.9	72 62	81.9
9	25 12.0	73 62	82.3	25 33.9	73 62	82.0	25 55.8	73 62	81.6	26 17.5	72 62	81.2
80	24 34.7	73 62	81.6	24 56.6	73 62	81.2	25 18.5	73 62	80.9	25 40.3	73 62	80.5
1	23 57.3	73 62	80.9	24 19.3	73 62	80.5	24 41.2	73 62	80.1	25 03.1	73 62	79.8
2	23 20.1	73 62	80.1	23 42.1	73 62	79.8	24 04.1	73 62	79.4	24 26.0	73 62	79.0
3	22 42.9	74 62	79.4	23 05.0	73 62	79.0	23 27.0	73 62	78.7	23 48.9	73 62	78.3
4	22 05.9	74 62	78.7	22 28.0	74 62	78.3	22 50.0	73 61	78.0	23 12.0	73 61	77.6
85	21 28.9	74 61	78.0	21 51.0	74 61	77.6	22 13.1	74 61	77.2	22 35.2	73 61	76.9
6	20 52.0	74 61	77.2	21 14.2	74 61	76.9	21 36.4	74 61	76.5	21 58.5	74 61	76.1
7	20 15.2	74 61	76.5	20 37.5	74 61	76.2	20 59.7	74 61	75.8	21 21.9	74 61	75.4
8	19 38.6	74 61	75.8	20 00.9	74 61	75.4	20 23.2	74 61	75.1	20 45.4	74 61	74.7
9	19 02.0	75 61	75.1	19 24.4	74 61	74.7	19 46.7	74 60	74.4	20 09.0	74 60	74.0
90	18 25.6	75 60	74.3	18 48.0	75 60	74.0	19 10.4	75 60	73.6	19 32.8	74 60	73.3

H.A.	26° 00′ Alt.	Δd Δt	Az.	26° 30′ Alt.	Δd Δt	Az.	27° 00′ Alt.	Δd Δt	Az.	27° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	65 00.0	1.0 01	180.0	65 30.0	1.0 01	180.0	66 00.0	1.0 01	180.0	66 30.0	1.0 01	180.0
1	64 59.3	1.0 04	177.9	65 29.3	1.0 04	177.8	65 59.3	1.0 04	177.8	66 29.3	1.0 04	177.8
2	64 57.2	1.0 06	175.8	65 27.2	1.0 06	175.7	65 57.1	1.0 06	175.6	66 27.1	1.0 06	175.6
3	64 53.7	1.0 08	173.6	65 23.6	1.0 08	173.5	65 53.5	1.0 08	173.4	66 23.4	1.0 08	173.3
4	64 48.8	99 10	171.5	65 18.7	99 11	171.4	65 48.5	99 11	171.3	66 18.3	99 11	171.1
05	64 42.6	99 13	169.4	65 12.3	99 13	169.3	65 42.1	99 13	169.1	66 11.8	99 13	169.0
6	64 35.0	99 15	167.4	65 04.6	99 15	167.2	65 34.3	99 15	167.0	66 03.9	99 16	166.8
7	64 26.1	98 17	165.3	64 55.6	98 17	165.1	65 25.1	98 18	164.9	65 54.5	98 18	164.6
8	64 15.8	98 19	163.3	64 45.2	98 19	163.0	65 14.6	98 20	162.8	65 43.9	98 20	162.5
9	64 04.3	97 21	161.2	64 33.5	97 22	161.0	65 02.7	97 22	160.7	65 31.9	97 22	160.4
10	63 51.6	97 23	159.3	64 20.6	97 24	159.0	64 49.6	97 24	158.7	65 18.6	97 24	158.4
1	63 37.6	96 25	157.3	64 06.4	96 26	157.0	64 35.3	96 26	156.7	65 04.0	96 26	156.3
2	63 22.4	96 27	155.4	63 51.1	96 28	155.0	64 19.7	96 28	154.7	64 48.3	95 28	154.3
3	63 06.1	95 29	153.5	63 34.6	95 29	153.1	64 03.0	95 30	152.7	64 31.3	94 30	152.4
4	62 48.7	94 31	151.6	63 16.9	94 31	151.2	63 45.1	94 32	150.8	64 13.3	94 32	150.4
15	62 30.2	94 33	149.7	62 58.2	93 33	149.4	63 26.2	93 33	149.0	63 54.1	93 34	148.5
6	62 10.6	93 34	147.9	62 38.5	93 35	147.5	63 06.2	92 35	147.1	63 33.9	92 35	146.7
7	61 50.1	92 36	146.2	62 17.7	92 36	145.8	62 45.2	92 37	145.3	63 12.6	91 37	144.9
8	61 28.6	91 37	144.4	61 56.0	91 38	144.0	62 23.2	91 38	143.6	62 50.4	90 39	143.1
9	61 06.2	91 39	142.7	61 33.3	90 39	142.3	62 00.4	90 40	141.8	62 27.3	90 40	141.4
20	60 42.9	90 40	141.1	61 09.8	89 41	140.6	61 36.6	89 41	140.1	62 03.3	89 41	139.7
1	60 18.7	89 42	139.4	60 45.4	89 42	139.0	61 12.0	88 42	138.5	61 38.4	88 43	138.0
2	59 53.8	88 43	137.8	60 20.2	88 43	137.4	60 46.5	88 44	136.9	61 12.8	87 44	136.4
3	59 28.1	88 44	136.3	59 54.3	87 44	135.8	60 20.4	87 45	135.3	60 46.3	86 45	134.8
4	59 01.6	87 45	134.7	59 27.6	86 46	134.2	59 53.4	86 46	133.7	60 19.2	86 46	133.2
25	58 34.4	86 46	133.2	59 00.2	86 47	132.7	59 25.8	85 47	132.2	59 51.3	85 48	131.7
6	58 06.6	85 47	131.8	58 32.1	85 48	131.3	58 57.5	84 48	130.8	59 22.8	84 49	130.2
7	57 38.1	85 48	130.3	58 03.4	84 49	129.8	58 28.6	84 49	129.3	58 53.7	83 50	128.8
8	57 09.0	84 49	128.9	57 34.1	83 50	128.4	57 59.1	83 50	127.9	58 24.0	83 50	127.4
9	56 39.4	83 50	127.6	57 04.3	83 51	127.0	57 29.0	82 51	126.5	57 53.7	82 51	126.0
30	56 09.2	83 51	126.2	56 33.9	82 52	125.7	56 58.4	82 52	125.2	57 22.9	81 52	124.6
1	55 38.5	82 52	124.9	56 03.0	81 52	124.4	56 27.3	81 53	123.9	56 51.5	81 53	123.3
2	55 07.2	81 53	123.6	55 31.6	81 53	123.1	55 55.7	80 53	122.6	56 19.8	80 54	122.0
3	54 35.6	81 54	122.3	54 59.7	80 54	121.8	55 23.7	80 54	121.3	55 47.5	79 54	120.8
4	54 03.4	80 54	121.1	54 27.4	80 55	120.6	54 51.2	79 55	120.1	55 14.9	79 55	119.5
35	53 30.9	79 55	119.9	53 54.7	79 55	119.4	54 18.3	79 55	118.8	54 41.8	78 56	118.3
6	52 58.0	79 56	118.7	53 21.6	78 56	118.2	53 45.1	78 56	117.7	54 08.4	78 56	117.1
7	52 24.7	78 56	117.5	52 48.1	78 56	117.0	53 11.4	77 57	116.5	53 34.6	77 57	116.0
8	51 51.0	78 57	116.4	52 14.3	77 57	115.9	52 37.5	77 57	115.4	53 00.5	77 57	114.8
9	51 17.0	77 57	115.3	51 40.2	77 57	114.8	52 03.2	76 58	114.2	52 26.1	76 58	113.7
40	50 42.7	77 58	114.2	51 05.8	76 58	113.7	51 28.6	76 58	113.1	51 51.4	76 58	112.6
1	50 08.1	76 58	113.1	50 31.0	76 58	112.6	50 53.8	76 59	112.1	51 16.4	75 59	111.5
2	49 33.3	76 59	112.0	49 56.0	76 59	111.5	50 18.6	75 59	111.0	50 41.1	75 59	110.5
3	48 58.1	76 59	111.0	49 20.8	75 59	110.5	49 43.3	75 59	110.0	50 05.6	74 60	109.4
4	48 22.8	75 50	109.9	48 45.3	75 60	109.4	49 07.7	74 60	108.9	49 29.9	74 60	108.4
45	47 47.2	75 60	108.9	48 09.6	74 60	108.4	48 31.8	74 60	107.9	48 54.0	74 60	107.4
6	47 11.3	75 60	107.9	47 33.6	74 60	107.4	47 55.8	74 60	106.9	48 17.9	73 61	106.4
7	46 35.3	74 60	107.0	46 57.5	74 60	106.5	47 19.6	73 61	106.0	47 41.6	73 61	105.5
8	45 59.1	74 61	106.0	46 21.2	74 61	105.5	46 43.2	73 61	105.0	47 05.1	73 61	104.5
9	45 22.7	74 61	105.0	45 44.8	73 61	104.6	46 06.7	73 61	104.1	46 28.5	72 61	103.6
50	44 46.2	73 61	104.1	45 08.1	73 61	103.6	45 30.0	73 61	103.1	45 51.7	72 62	102.7
1	44 09.5	73 61	103.2	44 31.4	73 61	102.7	44 53.1	72 62	102.2	45 14.8	72 62	101.7
2	43 32.7	73 62	102.3	43 54.5	73 62	101.8	44 16.2	72 62	101.3	44 37.8	72 62	100.8
3	42 55.7	73 62	101.4	43 17.5	72 62	100.9	43 39.1	72 62	100.4	44 00.6	72 62	99.9
4	42 18.6	73 62	100.5	42 40.3	72 62	100.0	43 01.9	72 62	99.6	43 23.4	71 62	99.1
55	41 41.4	72 62	99.6	42 03.1	72 62	99.2	42 24.6	72 62	98.7	42 46.0	71 62	98.2
6	41 04.2	72 62	98.8	41 25.8	72 62	98.3	41 47.3	71 62	97.8	42 08.6	71 62	97.4
7	40 26.8	72 62	97.9	40 48.4	72 62	97.4	41 09.8	71 63	97.0	41 31.2	71 63	96.5
8	39 49.4	72 62	97.1	40 10.9	72 63	96.6	40 32.3	71 63	96.1	40 53.6	71 63	95.7
9	39 11.9	72 63	96.2	39 33.4	71 63	95.8	39 54.7	71 63	95.3	40 16.0	71 63	94.8
60	38 34.3	72 63	95.4	38 55.8	71 63	94.9	39 17.1	71 63	94.5	39 38.4	71 63	94.0
1	37 56.7	72 63	94.6	38 18.1	71 63	94.1	38 39.4	71 63	93.7	39 00.7	71 63	93.2
2	37 19.0	72 63	93.8	37 40.4	71 63	93.3	38 01.8	71 63	92.9	38 23.0	71 63	92.4
3	36 41.3	71 63	92.9	37 02.7	71 63	92.5	37 24.0	71 63	92.1	37 45.2	71 63	91.6
4	36 03.6	71 63	92.2	36 25.0	71 63	91.7	36 46.3	71 63	91.3	37 07.5	70 63	90.8
65	35 25.9	71 63	91.4	35 47.2	71 63	90.9	36 08.5	71 63	90.5	36 29.7	70 63	90.1
6	34 48.1	71 63	90.6	35 09.5	71 63	90.1	35 30.8	71 63	89.7	35 52.0	70 63	89.3
7	34 10.4	71 63	89.8	34 31.7	71 63	89.4	34 53.0	71 63	88.9	35 14.2	70 63	88.5
8	33 32.6	71 63	89.0	33 54.0	71 63	88.6	34 15.3	71 63	88.2	34 36.5	71 63	87.7
9	32 54.8	71 63	88.3	33 16.2	71 63	87.8	33 37.5	71 63	87.4	33 58.8	71 63	87.0
70	32 17.1	71 63	87.5	32 38.5	71 63	87.1	32 59.8	71 63	86.7	33 21.1	71 63	86.2
1	31 39.4	72 63	86.7	32 00.8	71 63	86.3	32 22.1	71 63	85.9	32 43.4	71 63	85.5
2	31 01.7	72 63	86.0	31 23.2	71 63	85.6	31 44.5	71 63	85.2	32 05.8	71 63	84.7
3	30 24.1	72 63	85.2	30 45.5	71 63	84.8	31 06.9	71 63	84.4	31 28.2	71 63	84.0
4	29 46.5	72 63	84.5	30 07.9	71 63	84.1	30 29.3	71 62	83.7	30 50.7	71 62	83.3
75	29 08.9	72 62	83.7	29 30.4	72 62	83.3	29 51.8	71 62	82.9	30 13.2	71 62	82.5
6	28 31.4	72 62	83.0	28 52.9	72 62	82.6	29 14.4	71 62	82.2	29 35.8	71 62	81.8
7	27 54.0	72 62	82.3	28 15.5	72 62	81.9	28 37.0	72 62	81.5	28 58.5	71 62	81.1
8	27 16.6	72 62	81.5	27 38.2	72 62	81.2	27 59.7	72 62	80.8	28 21.2	71 62	80.4
9	26 39.3	72 62	80.8	27 00.9	72 62	80.4	27 22.5	72 62	80.0	27 44.0	72 62	79.6
80	26 02.0	72 62	80.1	26 23.7	72 62	79.7	26 45.3	72 62	79.3	27 06.9	72 62	78.9
1	25 24.9	73 62	79.4	25 46.6	72 62	79.0	26 08.3	72 62	78.6	26 29.9	72 62	78.2
2	24 47.8	73 62	78.7	25 09.6	73 62	78.3	25 31.3	72 61	77.9	25 53.0	72 61	77.5
3	24 10.8	73 61	77.9	24 32.7	73 61	77.6	24 54.4	73 61	77.2	25 16.2	72 61	76.8
4	23 34.0	73 61	77.2	23 55.8	73 61	76.8	24 17.7	73 61	76.5	24 39.5	73 61	76.1
85	22 57.2	73 61	76.5	23 19.1	73 61	76.1	23 41.0	73 61	75.8	24 02.9	73 61	75.4
6	22 20.5	73 61	75.8	22 42.5	73 61	75.4	23 04.5	73 61	75.0	23 26.4	73 61	74.7
7	21 44.0	74 61	75.1	22 06.0	73 61	74.7	22 28.1	73 60	74.3	22 50.0	73 60	74.0
8	21 07.6	74 60	74.4	21 29.7	74 60	74.0	21 51.8	74 60	73.6	22 13.8	73 60	73.3
9	20 31.3	74 60	73.6	20 53.5	74 60	73.3	21 15.6	74 60	72.9	21 37.7	74 60	72.6
90	19 55.1	74 60	72.9	20 17.4	74 60	72.6	20 39.6	74 60	72.2	21 01.8	74 60	71.9

Digitized by Google

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	15 00.0	1.0 01	180.0	14 30.0	1.0 01	180.0	14 00.0	1.0 00	180.0	13 30.0	1.0 00	180.0	13 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	00
1	14 59.7	1.0 02	179.1	14 29.7	1.0 02	179.1	13 59.7	1.0 02	179.1	13 29.7	1.0 02	179.1	12 59.7	1.0 02	179.1	12 29.7	1.0 02	179.1	11 59.7	1.0 02	179.1	11 29.7	1.0 02	179.1	1
2	14 58.8	1.0 03	178.1	14 28.8	1.0 03	178.1	13 58.8	1.0 03	178.1	13 28.8	1.0 03	178.1	12 58.8	1.0 03	178.2	12 28.8	1.0 02	178.2	11 58.8	1.0 02	178.2	11 28.8	1.0 02	178.2	2
3	14 57.2	1.0 04	177.2	14 27.2	1.0 04	177.2	13 57.2	1.0 04	177.2	13 27.2	1.0 04	177.2	12 57.3	1.0 04	177.2	12 27.3	1.0 04	177.3	11 57.3	1.0 04	177.3	11 27.3	1.0 03	177.3	3
4	14 55.0	1.0 05	176.2	14 25.0	1.0 05	176.2	13 55.1	1.0 05	176.3	13 25.1	1.0 05	176.3	12 55.1	1.0 05	176.3	12 25.2	1.0 05	176.3	11 55.2	1.0 04	176.4	11 25.2	1.0 04	176.4	4
05	14 52.2	1.0 06	175.3	14 22.3	1.0 06	175.3	13 52.3	1.0 06	175.3	13 22.4	1.0 06	175.4	12 52.4	1.0 06	175.4	12 22.5	1.0 06	175.4	11 52.5	1.0 06	175.4	11 22.5	1.0 05	175.5	05
6	14 48.8	1.0 07	174.3	14 18.9	1.0 07	174.4	13 48.9	1.0 07	174.4	13 19.0	1.0 07	174.4	12 49.1	1.0 07	174.5	12 19.1	1.0 07	174.5	11 49.2	1.0 06	174.5	11 19.3	1.0 06	174.6	6
7	14 44.8	1.0 08	173.4	14 14.9	1.0 08	173.4	13 44.9	1.0 08	173.5	13 15.0	1.0 08	173.5	12 45.1	1.0 08	173.6	12 15.2	1.0 08	173.6	11 45.3	1.0 07	173.6	11 15.4	1.0 07	173.7	7
8	14 40.1	1.0 09	172.4	14 10.2	1.0 09	172.5	13 40.3	1.0 09	172.5	13 10.5	1.0 09	172.6	12 40.6	1.0 09	172.6	12 10.7	1.0 09	172.7	11 40.8	1.0 08	172.7	11 11.0	1.0 08	172.8	8
9	14 34.8	99 10	171.5	14 05.0	99 10	171.6	13 35.1	99 10	171.6	13 05.3	99 10	171.7	12 35.4	99 10	171.7	12 05.6	99 10	171.8	11 35.8	99 09	171.8	11 05.9	99 09	171.9	9
10	14 29.0	99 11	170.6	13 59.1	99 11	170.6	13 29.3	99 11	170.7	12 59.5	99 11	170.7	12 29.7	99 11	170.8	11 59.9	99 10	170.9	11 30.1	99 10	170.9	11 00.3	99 10	171.0	10
1	14 22.5	99 12	169.6	13 52.7	99 12	169.7	13 22.9	99 12	169.8	12 53.2	99 12	169.8	12 23.4	99 12	169.9	11 53.6	99 11	170.0	11 23.8	99 11	170.0	10 54.1	99 11	170.1	1
2	14 15.4	99 13	168.7	13 45.6	99 13	168.8	13 15.9	99 13	168.8	12 46.2	99 13	168.9	12 16.5	99 13	169.0	11 46.7	99 12	169.0	11 17.0	99 12	169.1	10 47.3	99 12	169.2	2
3	14 07.7	99 14	167.8	13 38.0	99 14	167.8	13 08.3	99 14	167.9	12 38.6	99 14	168.0	12 08.9	99 14	168.1	11 39.3	99 13	168.1	11 09.6	99 13	168.2	10 39.9	99 13	168.3	3
4	13 59.4	99 15	166.8	13 29.7	99 15	166.9	13 00.1	99 15	167.0	12 30.5	99 15	167.1	12 00.8	99 14	167.2	11 31.2	99 14	167.2	11 01.6	99 14	167.3	10 31.9	99 14	167.4	4
15	13 50.5	99 16	165.9	13 20.9	99 16	166.0	12 51.3	99 16	166.1	12 21.7	99 16	166.2	11 52.2	99 15	166.2	11 22.6	99 15	166.3	10 53.0	99 15	166.4	10 23.4	99 15	166.5	15
6	13 41.0	98 17	165.0	13 11.5	98 17	165.1	12 41.9	98 17	165.2	12 12.4	98 16	165.3	11 42.9	98 16	165.3	11 13.4	98 16	165.4	10 43.8	98 16	165.5	10 14.3	98 16	165.6	6
7	13 30.9	98 18	164.1	13 01.4	98 18	164.2	12 32.0	98 18	164.2	12 02.5	98 17	164.3	11 33.0	98 17	164.4	11 03.6	98 17	164.5	10 34.1	98 17	164.6	10 04.6	98 17	164.7	7
8	13 20.2	98 19	163.1	12 50.8	98 19	163.2	12 21.4	98 19	163.3	11 52.0	98 18	163.4	11 22.6	98 18	163.5	10 53.2	98 18	163.6	10 23.8	98 18	163.7	9 54.4	98 18	163.8	8
9	13 09.0	98 20	162.2	12 39.7	98 20	162.3	12 10.3	98 19	162.4	11 41.0	98 19	162.5	11 11.7	98 19	162.6	10 42.3	98 19	162.8	10 13.0	98 19	162.9	9 43.6	98 19	163.0	9
20	12 57.2	98 21	161.3	12 27.9	98 21	161.4	11 58.6	98 20	161.5	11 29.4	98 20	161.6	11 00.1	98 20	161.8	10 30.8	98 20	161.9	10 01.6	98 20	162.0	9 32.3	98 20	162.1	20
1	12 44.8	97 22	160.4	12 15.6	97 21	160.5	11 46.4	97 21	160.6	11 17.2	97 21	160.7	10 48.0	97 21	160.9	10 18.8	97 21	161.0	9 49.6	97 21	161.1	9 20.4	97 21	161.2	1
2	12 31.8	97 23	159.5	12 02.7	97 22	159.6	11 33.6	97 22	159.7	11 04.5	97 22	159.8	10 35.3	97 22	160.0	10 06.2	97 22	160.1	9 37.1	97 22	160.2	9 08.0	97 22	160.3	2
3	12 18.3	97 23	158.6	11 49.3	97 23	158.7	11 20.2	97 23	158.8	10 51.2	97 23	159.0	10 22.1	97 23	159.1	9 53.1	97 23	159.2	9 24.0	97 23	159.3	8 55.0	97 23	159.5	3
4	12 04.2	97 24	157.7	11 35.3	97 24	157.8	11 06.3	97 24	157.9	10 37.4	97 24	158.1	10 08.4	97 24	158.2	9 39.4	97 24	158.3	9 10.4	97 24	158.5	8 41.5	97 23	158.6	4
25	11 49.6	96 25	156.8	11 20.7	96 25	156.9	10 51.9	96 25	157.0	10 23.0	96 25	157.2	9 54.1	96 25	157.3	9 25.2	96 25	157.5	8 56.3	96 24	157.6	8 27.4	96 24	157.7	25
6	11 34.4	96 26	155.9	11 05.7	96 26	156.0	10 36.9	96 26	156.2	10 08.1	96 26	156.3	9 39.3	96 26	156.4	9 10.5	96 25	156.6	8 41.7	96 25	156.7	8 12.8	96 25	156.9	6
7	11 18.7	96 27	155.0	10 50.0	96 27	155.1	10 21.3	96 27	155.3	9 52.6	96 27	155.4	9 23.9	96 26	155.6	8 55.2	96 26	155.7	8 26.5	96 26	155.9	7 57.8	96 26	156.0	7
8	11 02.5	95 28	154.1	10 33.9	95 28	154.2	10 05.3	95 28	154.4	9 36.7	95 28	154.5	9 08.0	95 27	154.7	8 39.4	95 27	154.9	8 10.8	95 27	155.0	7 42.1	95 27	155.2	8
9	10 45.7	96 29	153.2	10 17.2	95 29	153.4	9 48.7	95 28	153.5	9 20.2	95 28	153.7	8 51.6	95 28	153.8	8 23.1	95 28	154.0	7 54.6	95 28	154.1	7 26.0	95 28	154.3	9
30	10 28.5	95 30	152.3	10 00.0	95 30	152.5	9 31.6	95 29	152.6	9 03.2	95 29	152.8	8 34.7	95 29	153.0	8 06.3	95 29	153.1	7 37.8	95 29	153.3	7 09.4	95 29	153.4	30
1	10 10.7	94 30	151.4	9 42.3	94 30	151.6	9 14.0	94 30	151.8	8 45.7	94 30	151.9	8 17.3	94 30	152.1	7 49.0	94 30	152.3	7 20.6	95 30	152.4	6 52.3	95 29	152.6	1
2	9 52.4	94 31	150.6	9 24.1	94 31	150.7	8 55.9	94 31	150.9	8 27.7	94 31	151.1	7 59.4	94 31	151.3	7 31.2	94 30	151.4	7 02.9	94 30	151.6	6 34.6	94 30	151.8	2
3	9 33.6	94 32	149.7	9 05.4	94 32	149.9	8 37.3	94 32	150.0	8 09.1	94 32	150.2	7 41.0	94 32	150.4	7 12.9	94 31	150.6	6 44.7	94 31	150.7	6 16.5	94 31	150.9	3
4	9 14.3	93 33	148.8	8 46.2	93 33	149.0	8 18.2	93 33	149.2	7 50.2	93 32	149.4	7 22.1	93 32	149.6	6 54.1	94 32	149.7	6 26.0	94 32	149.9	5 57.9	94 32	150.1	4
35	8 54.5	93 34	148.0	8 26.5	93 34	148.2	7 58.6	93 33	148.3	7 30.7	93 33	148.5	7 02.7	93 33	148.7	6 34.8	93 33	148.9	6 06.8	93 33	149.1	5 38.9	93 33	149.3	35
6	8 34.2	93 35	147.1	8 06.4	93 34	147.3	7 38.6	93 34	147.5	7 10.7	93 34	147.7	6 42.9	93 34	147.9	6 15.0	93 34	148.0	5 47.2	93 34	148.2	5 19.3	93 33	148.4	6
7	8 13.5	92 35	146.3	7 45.7	92 35	146.4	7 18.0	92 35	146.6	6 50.3	92 35	146.8	6 22.6	92 35	147.0	5 54.8	92 34	147.2	5 27.1	92 34	147.4				7
8	7 52.3	92 36	145.4	7 24.6	92 36	145.6	6 57.0	92 36	145.8	6 29.4	92 36	146.0	6 01.8	92 35	146.2	5 34.1	92 35	146.4	5 06.5	92 35	146.6				8
9	7 30.6	92 37	144.6	7 03.1	92 37	144.8	6 35.6	92 37	145.0	6 08.1	92 36	145.2	5 40.5	92 36	145.4	5 13.0	92 36	145.6							9
40	7 08.5	91 38	143.7	6 41.1	91 37	143.9	6 13.7	91 37	144.1	5 46.3	91 37	144.3	5 18.9	91 37	144.5										40
1	6 45.9	91 38	142.9	6 18.6	91 38	143.1	5 51.3	91 38	143.3	5 24.0	91 38	143.5													1
2	6 22.9	91 39	142.0	5 55.7	91 39	142.3	5 28.5	91 39	142.5	5 01.4	91 39	142.7													2
3	5 59.5	90 40	141.2	5 32.4	90 40	141.4	5 05.3	90 39	141.6																3
4	5 35.6	90 40	140.4	5 08.6	90 40	140.6																			4
45	5 11.3	89 41	139.6																						45

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	17 49.3	75 60	73.6	18 11.8	75 60	73.3	18 34.3	75 60	72.9	18 56.7	75 60	72.6	19 19.1	75 60	72.2	19 41.4	74 60	71.9	20 03.7	74 60	71.5	20 26.0	74 59	71.2	91
2	17 13.2	75 60	72.9	17 35.7	75 60	72.6	17 58.2	75 60	72.2	18 20.7	75 60	71.9	18 43.2	75 60	71.5	19 05.6	75 59	71.2	19 28.0	75 59	70.8	19 50.3	74 59	70.5	2
3	16 37.1	75 60	72.2	16 59.8	75 60	71.8	17 22.4	75 60	71.5	17 44.9	75 59	71.2	18 07.4	75 59	70.8	18 29.9	75 59	70.5	18 52.4	75 59	70.1	19 14.8	75 59	69.8	3
4	16 01.3	76 60	71.5	16 24.0	76 59	71.1	16 46.6	76 59	70.8	17 09.3	75 59	70.4	17 31.9	75 59	70.1	17 54.4	75 59	69.8	18 16.9	75 59	69.4	18 39.4	75 59	69.1	4
95	15 25.5	76 59	70.7	15 48.3	76 59	70.4	16 11.1	76 59	70.1	16 33.8	76 59	69.7	16 56.4	76 59	69.4	17 19.1	75 59	69.0	17 41.7	75 58	68.7	18 04.3	75 58	68.4	95
6	14 50.0	76 59	70.0	15 12.8	76 59	69.7	15 35.6	76 59	69.4	15 58.4	76 59	69.0	16 21.2	76 58	68.7	16 43.9	76 58	68.3	17 06.6	76 58	68.0	17 29.2	75 58	67.7	6
7	14 14.6	76 59	69.3	14 37.5	76 59	69.0	15 00.4	76 58	68.6	15 23.3	76 58	68.3	15 46.1	76 58	68.0	16 08.9	76 58	67.6	16 31.7	76 58	67.3	16 54.4	76 58	67.0	7
8	13 39.3	77 58	68.6	14 02.3	77 58	68.3	14 25.3	77 58	67.9	14 48.3	76 58	67.6	15 11.2	76 58	67.3	15 34.1	76 58	66.9	15 56.9	76 58	66.6	16 19.8	76 57	66.2	8
9	13 04.3	77 58	67.9	13 27.3	77 58	67.5	13 50.4	77 58	67.2	14 13.4	77 58	66.9	14 36.4	77 58	66.5	14 59.4	77 57	66.2	15 22.4	76 57	65.9	15 45.3	76 57	65.5	9
100	12 29.4	77 58	67.1	12 52.5	77 58	66.8	13 15.7	77 58	66.5	13 38.8	77 57	66.2	14 01.9	77 57	65.8	14 25.0	77 57	65.5	14 48.0	77 57	65.2	15 11.0	77 57	64.8	100
1	11 54.7	78 58	66.4	12 17.9	77 57	66.1	12 41.2	77 57	65.8	13 04.4	77 57	65.4	13 27.5	77 57	65.1	13 50.7	77 57	64.8	14 13.8	77 57	64.5	14 36.9	77 56	64.1	1
2	11 20.2	78 57	65.7	11 43.5	78 57	65.4	12 06.8	78 57	65.1	12 30.1	78 57	64.7	12 53.4	78 57	64.4	13 16.6	77 56	64.1	13 39.9	77 56	63.8	14 03.1	77 56	63.4	2
3	10 45.8	78 57	65.0	11 09.3	78 57	64.7	11 32.7	78 57	64.3	11 56.1	78 56	64.0	12 19.4	78 56	63.7	12 42.8	78 56	63.4	13 06.1	78 56	63.0	13 29.4	78 56	62.7	3
4	10 11.7	78 56	64.2	10 35.3	78 56	63.9	10 58.8	78 56	63.6	11 22.2	78 56	63.3	11 45.7	78 56	63.0	12 09.1	78 56	62.7	12 32.6	78 56	62.3	12 55.9	78 55	62.0	4
105	9 37.8	79 56	63.5	10 01.4	79 56	63.2	10 25.0	79 56	62.9	10 48.6	79 56	62.6	11 12.2	78 56	62.3	11 35.7	78 55	61.9	11 59.2	78 55	61.6	12 22.7	78 55	61.3	105
6	9 04.1	79 56	62.8	9 27.9	79 56	62.5	9 51.5	79 55	62.2	10 15.2	79 55	61.8	10 38.9	79 55	61.5	11 02.5	79 55	61.2	11 26.1	79 55	60.9	11 49.7	79 55	60.6	6
7	8 30.7	79 55	62.0	8 54.5	79 55	61.7	9 18.3	79 55	61.4	9 42.0	79 55	61.1	10 05.8	79 55	60.8	10 29.5	79 55	60.5	10 53.2	79 54	60.2	11 16.9	79 54	59.9	7
8	7 57.4	80 55	61.3	8 21.3	80 55	61.0	8 45.2	80 55	60.7	9 09.1	80 55	60.4	9 32.9	79 54	60.1	9 56.8	79 54	59.8	10 20.6	79 54	59.5	10 44.4	79 54	59.2	8
9	7 24.4	80 55	60.6	7 48.4	80 54	60.3	8 12.4	80 54	60.0	8 36.4	80 54	59.7	9 00.3	80 54	59.4	9 24.3	80 54	59.1	9 48.2	80 54	58.8	10 12.1	80 53	58.4	9
110	6 51.7	80 54	59.8	7 15.8	80 54	59.5	7 39.8	80 54	59.2	8 03.9	80 54	58.9	8 28.0	80 54	58.6	8 52.0	80 53	58.3	9 16.0	80 53	58.0	9 40.0	80 53	57.7	110
1	6 19.1	81 54	59.1	6 43.3	81 54	58.8	7 07.5	81 53	58.5	7 31.7	81 53	58.2	7 55.8	81 53	57.9	8 20.0	80 53	57.6	8 44.1	80 53	57.3	9 08.2	80 53	57.0	1
2	5 46.9	81 53	58.4	6 11.2	81 53	58.1	6 35.4	81 53	57.8	6 59.7	81 53	57.5	7 24.0	81 53	57.2	7 48.2	81 52	56.9	8 12.5	81 52	56.6	8 36.7	81 52	56.3	2
3	5 14.8	81 53	57.6	5 39.2	81 53	57.3	6 03.6	81 53	57.0	6 28.0	81 52	56.7	6 52.4	81 52	56.4	7 16.7	81 52	56.1	7 41.1	81 52	55.9	8 05.4	81 52	55.6	3
4				5 07.6	82 52	56.6	5 32.1	82 52	56.3	5 56.6	82 52	56.0	6 21.0	82 52	55.7	6 45.5	82 52	55.4	7 10.0	82 51	55.1	7 34.4	81 51	54.8	4
115																									115
6							5 00.8	82 52	55.5	5 25.4	82 52	55.3	5 50.0	82 51	55.0	6 14.6	82 51	54.7	6 39.1	82 51	54.4	7 03.7	82 51	54.1	6
7													5 19.2	82 51	54.2	5 43.9	82 51	53.9	6 08.6	82 50	53.7	6 33.2	82 50	53.4	7
8																5 13.5	83 50	53.2	5 38.3	83 50	52.9	6 03.1	83 50	52.6	8
9																			5 08.3	83 50	52.2	5 33.2	83 49	51.9	9
																						5 03.7	83 49	51.2	

Digitized by Google

Lat. 51°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	
00	67 00.0	1.0 01	180.0	67 30.0	1.0 01	180.0	68 00.0	1.0 01	180.0	69 00.0	1.0 01	180.0	71 00.0	1.0 01	180.0	73 00.0	1.0 02	180.0	73 30.0	1.0 02	180.0	74 30.0	1.0 02	180.0	00
1	66 59.3	1.0 04	177.7	67 29.2	1.0 04	177.7	67 59.2	1.0 04	177.7	68 59.2	1.0 04	177.6	70 59.1	1.0 04	177.4	72 59.1	1.0 05	177.2	73 29.0	1.0 05	177.1	74 29.0	1.0 05	177.0	1
2	66 57.0	1.0 06	175.5	67 27.0	1.0 06	175.4	67 56.9	1.0 06	175.3	68 56.8	1.0 07	175.2	70 56.6	1.0 07	174.8	72 56.3	1.0 08	174.3	73 26.2	1.0 08	174.2	74 26.0	1.0 08	173.9	2
3	66 53.3	1.0 09	173.2	67 23.2	1.0 09	173.1	67 53.1	1.0 09	173.0	68 52.9	1.0 09	172.8	70 52.3	99 10	172.2	72 51.6	99 11	171.5	73 21.4	99 11	171.3	74 21.0	99 12	170.9	3
4	66 48.1	99 11	171.0	67 17.9	99 11	170.9	67 47.7	99 11	170.7	68 47.3	99 12	170.4	70 46.4	99 13	169.7	72 45.2	99 14	168.8	73 14.8	99 14	168.5	74 14.1	99 15	167.9	4
05	66 41.5	99 13	168.8	67 11.2	99 14	168.6	67 40.9	99 14	168.4	68 40.3	99 14	168.0	70 38.7	99 15	167.1	72 36.9	98 17	166.0	73 06.4	98 17	165.7	74 05.2	98 18	165.0	05
6	66 33.5	99 16	166.6	67 03.0	99 16	166.4	67 32.6	99 16	166.2	68 31.7	98 17	165.7	70 29.5	98 18	164.6	72 26.9	98 19	163.3	72 56.2	97 20	162.9	73 54.6	97 21	162.1	6
7	66 24.0	98 18	164.4	66 53.4	98 18	164.2	67 22.8	98 19	163.9	68 21.6	98 19	163.4	70 18.7	97 21	162.1	72 15.2	97 22	160.6	72 44.2	97 23	160.2	73 42.1	96 24	159.3	7
8	66 13.2	98 20	162.3	66 42.4	98 21	162.0	67 11.7	97 21	161.7	68 10.1	97 22	161.1	70 06.4	97 23	159.7	72 01.9	96 25	158.0	72 30.6	96 25	157.6	73 27.9	95 26	156.5	8
9	66 01.0	97 22	160.1	66 30.1	97 23	159.8	66 59.1	97 23	159.5	67 57.1	96 24	158.8	69 52.5	96 25	157.3	71 47.0	95 27	155.5	72 15.4	95 28	155.0	73 12.0	94 29	153.9	9
10	65 47.5	96 25	158.0	66 16.4	96 25	157.7	66 45.3	96 25	157.4	67 42.8	96 26	156.6	69 37.3	95 28	155.0	71 30.6	94 30	153.0	71 58.7	94 30	152.4	72 54.6	93 32	151.2	10
1	65 32.8	96 27	156.0	66 01.5	96 27	155.6	66 30.1	96 27	155.3	67 27.2	95 28	154.5	69 20.6	94 30	152.7	71 12.7	93 32	150.6	71 40.5	92 33	150.0	72 35.7	92 34	148.7	1
2	65 16.8	95 29	154.0	65 45.3	95 29	153.6	66 13.7	95 29	153.2	67 10.3	94 30	152.3	69 02.6	93 32	150.5	70 53.5	92 34	148.2	71 21.0	91 35	147.6	72 15.4	90 36	146.3	2
3	64 59.6	94 30	152.0	65 27.9	94 31	151.6	65 56.0	94 31	151.2	66 52.2	93 32	150.3	68 43.4	92 34	148.3	70 33.0	91 36	145.9	71 00.1	90 37	145.3	71 53.8	89 38	143.9	3
4	64 41.3	93 32	150.0	65 09.3	93 33	149.6	65 37.3	93 33	149.2	66 32.9	92 34	148.2	68 23.0	91 36	146.2	70 11.3	89 38	143.7	70 38.0	89 39	143.0	71 31.0	88 40	141.6	4
15	64 21.9	93 34	148.1	64 49.7	92 35	147.7	65 17.3	92 35	147.2	66 12.4	91 36	146.2	68 01.4	90 38	144.1	69 48.3	88 40	141.6	70 14.7	88 41	140.9	71 06.9	86 42	139.4	15
6	64 01.5	92 36	146.2	64 29.0	92 36	145.8	64 56.4	91 37	145.3	65 50.9	91 38	144.3	67 38.7	89 40	142.1	69 24.3	87 42	139.5	69 50.3	86 42	138.8	70 41.8	85 44	137.2	6
7	63 40.0	91 37	144.4	64 07.2	91 38	143.9	64 34.4	90 38	143.4	65 28.4	90 39	142.4	67 15.0	88 41	140.1	68 59.3	86 43	137.5	69 25.0	85 44	136.7	70 15.7	84 45	135.2	7
8	63 17.5	90 39	142.6	63 44.5	90 39	142.1	64 11.4	89 40	141.6	65 04.9	89 41	140.6	66 50.3	87 43	138.2	68 33.3	85 45	135.5	68 58.6	84 45	134.8	69 48.6	83 47	133.2	8
9	62 54.1	89 40	140.9	63 20.9	89 41	140.4	63 47.5	89 41	139.9	64 40.4	88 42	138.8	66 24.7	86 44	136.4	68 06.4	84 46	133.6	68 31.4	83 47	132.9	69 20.7	81 48	131.3	9
20	62 29.9	88 42	139.2	62 56.4	88 42	138.6	63 22.7	88 43	138.1	64 15.1	87 44	137.0	65 58.2	85 45	134.6	67 38.7	82 48	131.8	68 03.3	82 48	131.0	68 51.9	80 49	129.4	20
1	62 04.8	88 43	137.5	62 31.0	87 44	137.0	62 57.1	87 44	136.4	63 49.0	86 45	135.3	65 30.9	84 47	132.8	67 10.1	81 49	130.0	67 34.4	81 49	129.3	68 22.4	79 50	127.7	1
2	61 38.9	87 44	135.9	62 04.8	86 45	135.3	62 30.7	86 45	134.8	63 22.0	85 46	133.6	65 02.8	83 48	131.1	66 40.9	80 50	128.3	67 04.8	80 50	127.6	67 52.1	78 51	125.9	2
3	61 12.2	86 46	134.3	61 37.9	86 46	133.7	62 03.5	85 46	133.2	62 54.3	84 47	132.0	64 34.1	82 49	129.5	66 10.9	79 51	126.7	66 34.6	79 52	125.9	67 21.2	77 52	124.3	3
4	60 44.8	85 47	132.7	61 10.3	85 47	132.2	61 35.6	84 48	131.6	62 25.9	83 48	130.4	64 04.6	81 50	127.9	65 40.3	78 52	125.1	66 03.7	78 52	124.3	66 49.8	76 53	122.7	4
25	60 16.7	84 48	131.2	60 42.0	84 48	130.6	61 07.1	83 49	130.1	61 56.9	82 49	128.9	63 34.5	80 51	126.4	65 09.1	77 53	123.5	65 32.2	77 53	122.7	66 17.7	75 54	121.1	25
6	59 48.0	84 49	129.7	60 13.0	83 49	129.1	60 37.9	83 50	128.6	61 27.2	82 50	127.4	63 03.8	79 52	124.9	64 37.3	77 54	122.0	65 00.2	76 54	121.2	65 45.1	74 55	119.7	6
7	59 18.6	83 50	128.2	59 43.4	82 50	127.7	60 08.0	82 51	127.1	60 56.9	81 51	125.9	62 32.5	78 53	123.4	64 05.1	76 55	120.6	64 27.7	75 55	119.8	65 12.1	73 56	118.2	7
8	58 48.7	82 51	126.8	59 13.2	82 51	126.3	59 37.6	81 52	125.7	60 26.0	80 52	124.5	62 00.7	78 54	122.0	63 32.3	75 55	119.1	63 54.7	74 56	118.4	64 38.6	72 56	116.8	8
9	58 18.2	81 52	125.4	58 42.5	81 52	124.9	59 06.7	80 52	124.3	59 54.7	79 53	123.1	61 28.5	77 55	120.6	62 59.1	74 56	117.8	63 21.2	73 56	117.0	64 04.7	72 57	115.5	9
30	57 47.1	81 53	124.1	58 11.3	80 53	123.5	58 35.3	80 53	123.0	59 22.8	79 54	121.8	60 55.7	76 55	119.2	62 25.5	73 57	116.4	62 47.4	73 57	115.7	63 30.4	71 58	114.1	30
1	57 15.6	80 53	122.8	57 39.6	80 54	122.2	58 03.4	79 54	121.6	58 50.5	78 55	120.5	60 22.6	76 56	117.9	61 51.5	73 57	115.1	62 13.2	72 58	114.4	62 55.8	70 58	112.9	1
2	56 43.7	79 54	121.5	57 07.4	79 54	120.9	57 31.0	78 55	120.3	58 17.7	77 55	119.2	59 49.0	75 57	116.6	61 17.1	72 58	113.9	61 38.6	71 58	113.1	62 20.9	70 59	111.6	2
3	56 11.2	79 55	120.2	56 34.8	78 55	119.7	56 58.2	78 55	119.1	57 44.5	77 56	117.9	59 15.1	74 57	115.4	60 42.5	71 58	112.7	61 03.8	71 59	111.9	61 45.6	69 59	110.4	3
4	55 38.4	78 55	119.0	56 01.8	78 56	118.4	56 25.0	77 56	117.8	57 11.0	76 57	116.7	58 40.8	74 58	114.2	60 07.5	71 59	111.5	60 28.6	70 59	110.7	61 10.1	68 60	109.3	4
35	55 05.2	78 56	117.8	55 28.4	77 56	117.2	55 51.4	77 57	116.6	56 37.1	75 57	115.5	58 06.2	73 58	113.0	59 32.2	70 59	110.3	59 53.1	69 60	109.6	60 34.3	68 60	108.1	35
6	54 31.6	77 57	116.6	54 54.6	77 57	116.0	55 17.5	76 57	115.5	56 02.8	75 58	114.3	57 31.3	72 59	111.8	58 56.6	70 60	109.2	59 17.4	69 60	108.5	59 58.3	67 60	107.0	6
7	53 57.7	77 57	115.4	54 20.5	76 57	114.9	54 43.3	75 58	114.3	55 28.2	74 58	113.2	56 56.1	72 59	110.7	58 20.9	69 60	108.1	58 41.5	68 60	107.4	59 22.1	67 61	105.9	7
8	53 23.4	76 58	114.3	53 46.1	76 58	113.7	54 08.7	75 58	113.2	54 53.4	74 59	112.0	56 20.6	72 59	109.6	57 44.8	69 60	107.0	58 05.4	68 61	106.3	58 45.7	66 61	104.9	8
9	52 48.8	76 58	113.2	53 11.4	75 58	112.6	53 33.8	75 59	112.1	54 18.2	73 59	110.9	55 45.0	71 60	108.5	57 08.6	68 61	105.9	57 29.0	68 61	105.2	58 09.1	66 61	103.8	9
40	52 14.0	75 59	112.1	52 36.4	75 59	111.5	52 58.7	74 59	111.0	53 42.8	73 59	109.8	55 09.0	71 60	107.5	56 32.2	68 61	104.9	56 52.5	67 61	104.2	57 32.4	66 61	102.8	40
1	51 38.8	75 59	111.0	52 01.2	74 59	110.5	52 23.3	74 59	109.9	53 07.2	73 60	108.8	54 32.9	70 61	106.4	55 55.6	68 61	103.9	56 15.8	67 61	103.2	56 55.5	65 62	101.8	1
2	51 03.5	74 59	110.0	51 25.7	74 60	109.4	51 47.7	73 60	108.9	52 31.4	72 60	107.8	53 56.6	70 61	105.4	55 18.9	67 61	102.9	55 39.0	67 62	102.2	56 18.5	65 62	100.9	2
3	50 27.9	74 60	108.9	50 49.9	73 60	108.4	51 11.9	73 60	107.8	51 55.3	72 60	106.7	53 20.1	70 61	104.4	54 42.0	67 62	101.9	55 02.0	66 62	101.3	55 41.4	65 62	99.9	3
4	49 52.0	73 60	107.9	50 14.0	73 60	107.4	50 35.8	73 60	106.8	51 19.0	71 61	105.7	52 43.5	69 61	103.4	54 05.0	67 62	101.0	54 24.9	66 62	100.3	55 04.1	65 62	99.0	4
45	49 16.9	73 60	106.9	49 37.9	73 61	106.4	49 59.6	72 61	105.8	50 42.6	71 61	104.8	52 06.7	69 62	102.5	53 27.9	66 62	100.0	53 47.7	66 62	99.4	54 26.8	64 62	98.1	45
6	48 39.8	73 61	105.9	49 01.6	72 61	105.4	49 23.2	72 61	104.9	50 06.0	71 61	103.8	51 29.7	69 62	101.5	52 50.7	66 62	99.1	53 10.4	66 62	98.5	53 49.3	64 62	97.2	6
7	48 03.4	73 61	105.0	48 25.1	72 61	104.4	48 46.6	72 61	103.9	49 29.3	71 61	102.8	50 52.7	68 62	100.6	52 13.3	66 62	98.2	52 33.0	65 62	97.6	53 11.9	64 63	96.3	7
8	47 26.8	72 61	104.0	47 48.4	72 61	103.5	48 09.9	71 61	103.0	48 52.4	70 62	101.9	50 15.5	68 62	99.7	51 35.9	66 62	97.3	51 55.6	65 63	96.7	52 34.3	64 63	95.5	8
9	46 50.1	72 61	103.1	47 11.6	72 62	102.6	47 33.0	71 62	102.0	48 15.4	70 62	101.0	49 38.2	68 62	98.8	50 58.4	66 63	96.5	51 18.0	65 63	95.9	51 56.7	64 63	94.6	9
50	46 13.3	72 62	102.2	46 34.7	71 62	101.6	46 56.0	71 62	101.1	47 38.3	70 62	100.1	49 00.9	68 62	97.9	50 20.9	66 63	95.6	50 40.5	65 63	95.0	51 19.0	64 63	93.8	50
1	45 36.3	72 62	101.2	45 57.7	71 62	100.7	46 18.9	71 62	100.2	47 01.0	70 62	99.2	48 23.4	68 62	97.0	49 43.3	65 63	94.8	50 02.8	65 63	94.2	50 41.3	64 63	93.0	1
2	44 59.2	71 62	100.3	45 20.5	71 62	99.8	45 41.7	70 62	99.3	46 23.7	69 62	98.3	47 45.9	68 63	96.2	49 05.6	65 63	93.9	49 25.1	65 63	93.3	50 03.6	64 63	92.1	2
3	44 22.0	71 62	99.5	44 43.3	71 62	99.0	45 04.4	70 62	98.5	45 46.3	69 62	97.4	47 08.4	67 63	95.3	48 27.9	65 63	93.1	48 47.4	65 63	92.5	49 25.9	63 63	91.3	3
4	43 44.7	71 62	98.6	44 05.9	71 62	98.1	44 27.0	70 62	97.6	45 08.8	69 63	96.6	46 30.7	67 63	94.5	47 50.2	65 63	92.3	48 09.7	65 63	91.7	48 48.1	63 63	90.6	4
55	43 07.3	71 62	97.7	43 28.5	70 62	97.2	43 49.6	70 63	96.7	44 31.3	69 63	95.7	45 53.1	67 63	93.7	47 12.5	65 63	91.5	47 31.9	65 63	90.9	48 10.4	63 63	89.8	55
6	42 29.9	71 63	96.9	42 51.0	70 63	96.4	43 12.0	70 63	95.9	43 53.7	69 63	94.9	45 15.4	67 63	92.9	46 34.7	65 63	90.7	46 54.2	65 63	90.1	47 32.6	63 63	89.0	6
7	41 52.4	71 63	96.0	42 13.5	70 63	95.6	42 34.5	70 63	95.1	43 16.0	69 63	94.1	44 37.7	67 63	92.1	45 57.0	65 63	89.9	46 16.4	65 63	89.4	46 54.8	63 63	88.2	7
8	41 14.8	70 63	95.2	41 35.9	70 63	94.7	41 56.8	70 63	94.2	42 38.4	69 63	93.3	43 59.9	67 63	91.3	45 19.2	65 63	89.1	45 38.7	65 63	88.6	46 17.1	64 63	87.5	8
9	40 37.2	70 63	94.4	40 58.2	70 63	93.9	41 19.2	70 63	93.4	42 00.7	69 63	92.5	43 22.2	67 63	90.5	44 41.5	65 63	88.4	45 00.9	65 63	87.8	45 39.4	64 63	86.8	9
60	39 59.5	70 63	93.6	40 20.5	70 63	93.1	40 41.4	70 63	92.6	41 22.9	69 63	91.7	42 44.4	67 63	89.7	44 03.7	65 63	87.6	44 23.2	65 63	87.1	45 01.7	64 63	86.0	60
1	39 21.8	70 63	92.8	39 42.8	70 63	92.3	40 03.7	69 63	91.8	40 45.2	69 63	90.9	42 06.6	67 63	88.9	43 26.0	65 63	86.9	43 45.5	65 63	86.4	44 24.1	64 63	85.3	1
2	38 44.1	70 63	92.0	39 05.1	70 63	91.5	39 26.0	69 63	91.0	40 07.4	69 63	90.1	41 28.9	67 63	88.2	42 48.3	65 63	86.1	43 07.9	65 63	85.6	43 46.5	64 63	84.6	2
3	38 06.3	70 63	91.2	38 27.3	70 63	90.7	38 48.2	69 63	90.3	39 29.7	69 63	89.3	40 51.2	67 63	87.4	42 10.7	65 63	85.4	42 30.2	65 63	84.9	43 08.9	64 63	83.8	3
4	37 28.6	70 63	90.4	37 49.6	70 63	89.9	38 10.5	69 63	89.5	38 51.9	69 63	88.6	40 13.5	67 63	86.7	41 33.1	65 63	84.7	41 52.6	65 63	84.2	42 31.4	64 62	83.1	4
65	36 50.8	70 63	89.6	37 11.8	70 63	89.2	37 32.7	69 63	88.7	38 14.2	69 63	87.8	39 35.8	67 63	85.9	40 55.5	66 63	84.0	41 15.1	65 62	83.4	41 53.9	64 62	82.4	65
6	36 13.1	70 63	88.8	36 34.1	70 63	88.4	36 55.0	69 63	87.9	37 36.4	69 63	87.0	38 58.1	67 63	85.2	40 18.0	66 62	83.2	40 37.6	65 62	82.7	41 16.5	64 62	81.7	6
7	35 35.3	70 63	88.1	35 56.3	70 63	87.6	36 17.2	70 63	87.2	36 58.7	69 63	86.3	38 20.5	67 63	84.4	39 40.5	66 62	82.5	40 00.2	65 62	82.0	40 39.2	65 62	81.0	7
8	34 57.6	70 63	87.3	35 18.6	70 63	86.9	35 39.5	70 63	86.4	36 21.1	69 63	85.5	37 43.0	68 62	83.7	39 03.1	66 62	81.8	39 22.8	66 62	81.3	40 01.9	65 62	80.3	8
9	34 19.9	70 63	86.6	34 40.9	70 63	86.1	35 01.9	70 63	85.7	35 43.5	69 63	84.8	37 05.5	68 62	83.0	38 25.7	66 62	81.1	38 45.5	66 62	80.6	39 24.7	65 62	79.7	9
70	33 42.2	70 63	85.8	34 03.3	70 63	85.4	34 24.2	70 63	85.0	35 05.9	69 63	84.1	36 28.0	68 62	82.3	37 48.5	66 62	80.4	38 08.3	66 62	79.9	38 47.6	65 62	79.0	70
1	33 04.6	70 63	85.1	33 25.6	70 63	84.6	33 46.6	70 63	84.2	34 28.3	69 62	83.3	35 50.6	68 62	81.6	37 11.3	66 62	79.7	37 31.2	66 62	79.3	38 10.6	65 62	78.3	1
2	32 27.0	70 63	84.3	32 48.1	70 63	83.9	33 09.1	70 62	83.5	33 50.9	69 62	82.6	35 13.3	68 62	80.9	36 34.2	67 62	79.0	36 54.1	66 62	78.6	37 33.7	66 61	77.6	2
3	31 49.4	71 62	83.6	32 10.6	70 62	83.2	32 31.6	70 62	82.8	33 13.5	69 62	81.9	34 36.1	68 62	80.2	35 57.1	67 62	78.3	36 17.2	67 61	77.9	36 56.9	66 61	76.9	3
4	31 11.9	71 62	82.9	31 33.1	70 62	82.4	31 54.2	70 62	82.0	32 36.1	70 62	81.2	33 58.9	68 62	79.4	35 20.2	67 61	77.7	35 40.3	67 61	77.2	36 20.1	66 61	76.3	4
75	30 34.5	71 62	82.1	30 55.7	71 62	81 7	31 16.8	70 62	81.3	31 58.8	70 62	80.5	33 21.8	69 62	78.8	34 43.4	67 61	77.0	35 03.5	67 61	76.5	35 43.5	66 61	75.6	75
6	29 57.1	71 62	81.4	30 18.4	71 62	81.0	30 39.5	70 62	80.6	31 21.6	70 62	79.8	32 44.8	69 62	78.1	34 06.6	68 61	76.3	34 26.8	67 61	75.9	35 07.0	67 61	75.0	6
7	29 19.8	71 62	80.7	29 41.1	71 62	80.3	30 02.3	71 62	79.9	30 44.5	70 62	79.0	32 08.0	69 61	77.4	33 30.0	68 61	75.6	33 50.3	67 61	75.2	34 30.6	67 60	74.3	7
8	28 42.6	71 62	80.0	29 03.9	71 62	79.6	29 25.2	71 62	79.2	30 07.5	70 62	78.3	31 31.2	69 61	76.7	32 53.5	68 61	75.0	33 13.8	68 61	74.5	33 54.3	67 60	73.6	8
9	28 05.5	71 62	79.3	28 26.8	71 62	78.9	28 48.2	71 62	78.5	29 30.6	70 61	77.6	30 54.5	69 61	76.0	32 17.1	68 60	74.3	32 37.5	68 60	73.9	33 18.1	67 60	73.0	9
80	27 28.4	72 62	78.5	27 49.8	71 62	78.1	28 11.2	71 61	77.7	28 53.7	71 61	76.9	30 17.9	70 61	75.3	31 40.8	69 60	73.6	32 01.3	68 60	73.2	32 42.1	68 60	72.3	80
1	26 51.4	72 61	77.8	27 12.9	72 61	77.4	27 34.4	71 61	77.0	28 17.0	71 61	76.2	29 41.4	70 61	74.6	31 04.6	69 60	73.0	31 25.2	69 60	72.5	32 06.2	68 60	71.7	1
2	26 14.6	72 61	77.1	26 36.1	72 61	76.7	26 57.6	71 61	76.3	27 40.4	71 61	75.6	29 05.1	70 60	73.9	30 28.6	69 60	72.3	30 49.3	69 60	71.9	31 30.4	68 59	71.0	2
3	25 37.8	72 61	76.4	25 59.4	72 61	76.0	26 21.0	72 61	75.6	27 03.9	71 61	74.9	28 28.9	70 60	73.3	29 52.7	69 60	71.6	30 13.5	69 59	71.2	30 54.8	69 59	70.4	3
4	25 01.2	72 61	75.7	25 22.8	72 61	75.3	25 44.5	72 61	74.9	26 27.5	72 60	74.2	27 52.8	71 60	72.6	29 16.9	70 59	71.0	29 37.8	69 59	70.5	30 19.3	69 59	69.7	4
85	24 24.6	73 61	75.0	24 46.4	72 61	74.6	25 08.1	72 60	74.2	25 51.2	72 60	73.5	27 16.8	71 60	71.9	28 41.3	70 59	70.3	29 02.3	70 59	69.9	29 43.9	69 59	69.1	85
6	23 48.2	73 60	74.3	24 10.0	73 60	73.9	24 31.8	72 60	73.5	25 15.1	72 60	72.8	26 41.0	71 59	71.2	28 05.8	70 59	69.6	28 26.9	70 59	69.2	29 08.7	70 58	68.4	6
7	23 12.0	73 60	73.6	23 33.8	73 60	73.2	23 55.6	73 60	72.9	24 39.1	72 60	72.1	26 05.3	71 59	70.6	27 30.5	71 59	69.0	27 51.6	70 58	68.6	28 33.7	70 58	67.8	7
8	22 35.8	73 60	72.9	22 57.7	73 60	72.5	23 19.6	73 60	72.2	24 03.2	72 60	71.4	25 29.8	72 59	69.9	26 55.3	71 58	68.3	27 16.6	71 58	67.9	27 58.8	70 58	67.1	8
9	21 59.8	73 60	72.2	22 21.8	73 60	71.8	22 43.7	73 60	71.5	23 27.5	73 59	70.7	24 54.4	72 59	69.2	26 20.3	71 58	67.7	26 41.7	71 58	67.3	27 24.1	71 58	66.5	9
	21 23.9	74 60	71.5	21 46.0	74 59	71.1	22 08.0	73 59	70.8	22 51.9	73 59	70.0	24 19.2	72 58	68.5	25 45.5	72 58	67.0	26 06.9	71 58	66.6	26 49.6	71 57	65.8	90

Digitized by Google

H.A.	28° 00′ Alt.	Az.	28° 30′ Alt.	Az.	29° 00′ Alt.	Az.	30° 00′ Alt.	Az.	32° 00′ Alt.	Az.	34° 00′ Alt.	Az.	34° 30′ Alt.	Az.	35° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	11 00.0 1.0 00	180.0	10 30.0 1.0 00	180.0	10 00.0 1.0 00	180.0	9 00.0 1.0 00	180.0	7 00.0 1.0 00	180.0	5 00.0 1.0 00	180.0					00
1	10 59.7 1.0 01	179.1	10 29.7 1.0 01	179.1	9 59.7 1.0 01	179.1	8 59.7 1.0 01	179.1	6 59.7 1.0 01	179.1							1
2	10 58.8 1.0 02	178.2	10 28.8 1.0 02	178.2	9 58.8 1.0 02	178.2	8 58.8 1.0 02	178.2	6 58.9 1.0 02	178.3							2
3	10 57.3 1.0 03	177.3	10 27.4 1.0 03	177.3	9 57.4 1.0 03	177.3	8 57.4 1.0 03	177.4	6 57.5 1.0 03	177.4							3
4	10 55.3 1.0 04	176.4	10 25.3 1.0 04	176.4	9 55.3 1.0 04	176.4	8 55.4 1.0 04	176.5	6 55.5 1.0 04	176.6							4
05	10 52.6 1.0 05	175.5	10 22.6 1.0 05	175.5	9 52.7 1.0 05	175.6	8 52.8 1.0 05	175.6	6 53.0 1.0 05	175.7							05
6	10 49.3 1.0 06	174.6	10 19.4 1.0 06	174.6	9 49.5 1.0 06	174.7	8 49.6 1.0 06	174.7	6 49.9 1.0 06	174.9							6
7	10 45.5 1.0 07	173.7	10 15.6 1.0 07	173.8	9 45.7 1.0 07	173.8	8 45.9 1.0 07	173.9	6 46.2 1.0 07	174.0							7
8	10 41.1 1.0 08	172.8	10 11.2 1.0 08	172.9	9 41.3 1.0 08	172.9	8 41.5 1.0 08	173.0	6 42.0 1.0 08	173.2							8
9	10 36.1 99 09	171.9	10 06.2 99 09	172.0	9 36.4 1.0 09	172.0	8 36.7 1.0 09	172.1	6 37.3 1.0 09	172.3							9
10	10 30.5 99 10	171.0	10 00.6 99 10	171.1	9 30.8 99 10	171.1	8 31.2 99 10	171.3	6 31.9 99 10	171.5							10
1	10 24.3 99 11	170.1	9 54.5 99 11	170.2	9 24.7 99 11	170.3	8 25.2 99 11	170.4	6 26.1 99 11	170.6							1
2	10 17.5 99 12	169.2	9 47.8 99 12	169.3	9 18.1 99 12	169.4	8 18.6 99 12	169.5	6 19.6 99 12	169.8							2
3	10 10.2 99 13	168.4	9 40.5 99 13	168.4	9 10.8 99 13	168.5	8 11.4 99 13	168.6	6 12.7 99 13	168.9							3
4	10 02.3 99 14	167.5	9 32.6 99 14	167.6	9 03.0 99 14	167.6	8 03.7 99 14	167.8	6 05.1 99 13	168.1							4
15	9 53.8 99 15	166.6	9 24.2 99 15	166.7	8 54.6 99 15	166.8	7 55.5 99 15	166.9	5 57.1 99 14	167.3							15
6	9 44.8 98 16	165.7	9 15.2 98 16	165.8	8 45.7 98 16	165.9	7 46.6 98 16	166.1	5 48.5 98 15	166.4							6
7	9 35.2 98 17	164.8	9 05.7 98 17	164.9	8 36.2 98 17	165.0	7 37.3 98 17	165.2	5 39.3 98 16	165.6							7
8	9 25.0 98 18	163.9	8 55.6 98 18	164.0	8 26.2 98 18	164.1	7 27.3 98 17	164.3	5 29.7 98 17	164.7							8
9	9 14.3 98 19	163.1	8 44.9 98 19	163.2	8 15.6 98 19	163.3	7 16.9 98 18	163.5	5 19.5 98 18	163.9							9
20	9 03.0 98 20	162.2	8 33.7 98 20	162.3	8 04.4 98 19	162.4	7 05.9 98 19	162.6	5 08.7 98 19	163.1							20
1	8 51.2 97 21	161.3	8 22.0 97 20	161.4	7 52.8 97 20	161.6	6 54.3 97 20	161.8									1
2	8 38.8 97 22	160.5	8 09.7 97 21	160.6	7 40.6 97 21	160.7	6 42.3 97 21	160.9									2
3	8 25.9 97 22	159.6	7 56.9 97 22	159.7	7 27.8 97 22	159.8	6 29.7 97 22	160.1									3
4	8 12.5 97 23	158.7	7 43.5 97 23	158.9	7 14.5 97 23	159.0	6 16.6 97 23	159.2									4
25	7 58.5 96 24	157.9	7 29.6 96 24	158.0	7 00.7 96 24	158.1	6 02.9 96 24	158.4									25
6	7 44.0 96 25	157.0	7 15.2 96 25	157.1	6 46.4 96 25	157.3	5 48.8 96 24	157.6									6
7	7 29.0 96 26	156.2	7 00.3 96 26	156.3	6 31.6 96 26	156.4	5 34.1 96 25	156.7									7
8	7 13.5 95 27	155.3	6 44.9 95 27	155.5	6 16.2 95 26	155.6	5 18.9 95 26	155.9									8
9	6 57.5 95 28	154.5	6 28.9 95 27	154.6	6 00.4 95 27	154.8	5 03.3 95 27	155.1									9
30	6 40.9 95 28	153.6	6 12.5 95 28	153.8	5 44.0 95 28	153.9											30
1	6 23.9 95 29	152.8	5 55.5 95 29	152.9	5 27.2 95 29	153.1											1
2	6 06.4 94 30	151.9	5 38.1 94 30	152.1	5 09.9 94 30	152.3											2
3	5 48.4 94 31	151.1	5 20.2 94 31	151.3													3
4	5 29.9 94 32	150.3	5 01.8 94 31	150.4													4
35	5 10.9 93 32	149.4															35

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′ Alt.	Az.	28° 30′ Alt.	Az.	29° 00′ Alt.	Az.	30° 00′ Alt.	Az.	32° 00′ Alt.	Az.	34° 00′ Alt.	Az.	34° 30′ Alt.	Az.	35° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	20 48.2 74 59	70.8	21 10.3 74 59	70.4	21 32.4 74 59	70.1	22 16.5 73 59	69.3	23 44.1 73 58	67.9	25 10.8 72 58	66.3	25 32.4 72 57	66.0	26 15.2 71 57	65.2	91
2	20 12.6 74 59	70.1	20 34.8 74 59	69.7	20 57.0 74 59	69.4	21 41.3 74 58	68.7	23 09.2 73 58	67.2	24 36.3 72 57	65.7	24 58.0 72 57	65.3	25 41.1 72 57	64.5	2
3	19 37.2 74 59	69.4	19 59.5 74 59	69.0	20 21.8 74 58	68.7	21 06.2 74 58	68.0	22 34.5 73 58	66.5	24 02.0 73 57	65.0	24 23.7 72 57	64.6	25 07.1 72 56	63.9	3
4	19 01.9 75 58	68.7	19 24.3 75 58	68.4	19 46.7 74 58	68.0	20 31.3 74 58	67.3	22 00.0 74 57	65.8	23 27.9 73 57	64.4	23 49.7 73 56	64.0	24 33.2 72 56	63.2	4
95	18 26.8 75 58	68.0	18 49.3 75 58	67.7	19 11.7 75 58	67.3	19 56.5 75 58	66.6	21 25.6 74 57	65.2	22 53.9 73 56	63.7	23 15.9 73 56	63.3	23 59.6 73 56	62.6	95
6	17 51.9 75 58	67.3	18 14.4 75 58	67.0	18 37.0 75 58	66.6	19 22.0 75 57	65.9	20 51.4 74 57	64.5	22 20.2 74 56	63.0	22 42.2 73 56	62.7	23 26.2 73 55	61.9	6
7	17 17.1 76 58	66.6	17 39.8 76 57	66.3	18 02.4 75 57	65.9	18 47.6 75 57	65.2	20 17.4 75 56	63.8	21 46.6 74 56	62.4	22 08.8 74 55	62.0	22 53.0 74 55	61.3	7
8	16 42.6 76 57	65.9	17 05.3 76 57	65.6	17 28.0 76 57	65.2	18 13.4 75 57	64.5	19 43.7 75 56	63.1	21 13.3 74 55	61.7	21 35.5 74 55	61.4	22 20.0 74 55	60.6	8
9	16 08.2 76 57	65.2	16 31.0 76 57	64.9	16 53.9 76 57	64.5	17 39.4 76 56	63.9	19 10.1 75 56	62.5	20 40.1 75 55	61.1	21 02.5 75 55	60.7	21 47.2 74 54	60.0	9
100	15 34.0 77 57	64.5	15 57.0 76 56	64.2	16 19.9 76 56	63.8	17 05.6 76 56	63.2	18 36.7 76 55	61.8	20 07.2 75 55	60.4	20 29.7 75 54	60.0	21 14.6 75 54	59.3	100
1	15 00.0 77 56	63.8	15 23.1 77 56	63.5	15 46.1 77 56	63.1	16 32.0 76 56	62.5	18 03.5 76 55	61.1	19 34.4 76 54	59.7	19 57.1 75 54	59.4	20 42.2 75 54	58.7	1
2	14 26.2 77 56	63.1	14 49.4 77 56	62.8	15 12.5 77 56	62.4	15 58.6 77 55	61.8	17 30.6 76 55	60.4	19 01.9 76 54	59.1	19 24.7 76 54	58.7	20 10.1 75 53	58.0	2
3	13 52.7 78 56	62.4	14 15.9 77 55	62.1	14 39.1 77 55	61.7	15 25.5 77 55	61.1	16 57.8 77 54	59.8	18 29.7 76 53	58.4	18 52.5 76 53	58.1	19 38.1 76 53	57.4	3
4	13 19.3 78 55	61.7	13 42.7 78 55	61.4	14 06.0 78 55	61.0	14 52.5 78 55	60.4	16 25.3 77 54	59.1	17 57.6 77 53	57.7	18 20.6 77 53	57.4	19 06.5 76 52	56.7	4
105	12 46.2 78 55	61.0	13 09.6 78 55	60.7	13 33.1 78 54	60.3	14 19.8 78 54	59.7	15 53.1 77 53	58.4	17 25.8 77 53	57.1	17 48.9 77 52	56.7	18 35.0 77 52	56.1	105
6	12 13.3 79 54	60.3	12 36.8 78 54	60.0	13 00.4 78 54	59.6	13 47.3 78 54	59.0	15 21.0 78 53	57.7	16 54.2 77 52	56.4	17 17.5 77 52	56.1	18 03.8 77 52	55.4	6
7	11 40.6 79 54	59.6	12 04.3 79 54	59.3	12 27.9 79 54	58.9	13 15.1 79 53	58.3	14 49.2 78 53	57.0	16 22.9 78 52	55.7	16 46.3 78 52	55.4	17 32.9 78 51	54.7	7
8	11 08.2 79 54	58.9	11 31.9 79 53	58.5	11 55.7 79 53	58.2	12 43.1 79 53	57.6	14 17.7 79 52	56.3	15 51.8 78 51	55.1	16 15.3 78 51	54.7	17 02.1 78 51	54.1	8
9	10 36.0 80 53	58.1	10 59.8 80 53	57.8	11 23.7 79 53	57.5	12 11.3 79 52	56.9	13 46.4 79 52	55.6	15 21.0 79 51	54.4	15 44.6 79 51	54.1	16 31.7 78 50	53.4	9
110	10 04.0 80 53	57.4	10 28.0 80 53	57.1	10 52.0 80 52	56.8	11 39.8 80 52	56.2	13 15.3 79 51	55.0	14 50.4 79 50	53.7	15 14.2 79 50	53.4	16 01.5 79 50	52.7	110
1	9 32.3 80 52	56.7	9 56.4 80 52	56.4	10 20.5 80 52	56.1	11 08.6 80 52	55.5	12 44.5 80 51	54.3	14 20.1 80 50	53.0	14 44.0 79 50	52.7	15 31.6 79 49	52.1	1
2	9 00.9 81 52	56.0	9 25.1 81 52	55.7	9 49.3 81 52	55.4	10 37.6 80 51	54.8	12 14.0 80 50	53.6	13 50.1 80 50	52.3	14 14.1 80 49	52.0	15 01.9 80 49	51.4	2
3	8 29.7 81 52	55.3	8 54.1 81 51	55.0	9 18.3 81 51	54.7	10 06.9 81 51	54.1	11 43.8 81 50	52.9	13 20.4 80 49	51.7	13 44.5 80 49	51.3	14 32.6 80 48	50.7	3
4	7 58.8 81 51	54.5	8 23.3 81 51	54.2	8 47.7 81 51	54.0	9 36.5 81 50	53.4	11 13.8 81 49	52.2	12 50.9 81 49	51.0	13 15.1 81 48	50.7	14 03.5 81 48	50.1	4
115	7 28.2 82 51	53.8	7 52.8 82 50	53.5	8 17.3 82 50	53.2	9 06.3 82 50	52.6	10 44.1 81 49	51.5	12 21.7 81 48	50.3	12 46.0 81 48	50.0	13 34.7 81 48	49.4	115
6	6 57.9 82 50	53.1	7 22.6 82 50	52.8	7 47.2 82 50	52.5	8 36.4 82 49	51.9	10 14.7 82 48	50.8	11 52.8 82 48	49.6	12 17.3 82 47	49.3	13 06.2 81 47	48.7	6
7	6 27.9 83 50	52.3	6 52.6 83 49	52.1	7 17.4 82 49	51.8	8 06.8 82 49	51.2	9 45.6 82 48	50.1	11 24.2 82 47	48.9	11 48.8 82 47	48.6	12 37.9 82 47	48.0	7
8	5 58.1 83 49	51.6	6 23.0 83 49	51.3	6 47.9 83 49	51.1	7 37.6 83 48	50.5	9 16.8 83 47	49.4	10 55.9 82 47	48.2	11 20.6 82 46	47.9	12 10.0 82 46	47.3	8
9	5 28.7 83 49	50.9	5 53.7 83 48	50.6	6 18.6 83 48	50.3	7 08.6 83 48	49.8	8 48.3 83 47	48.6	10 27.9 83 46	47.5	10 52.8 83 46	47.2	11 42.4 83 46	46.6	9
120			5 24.6 84 48	49.9	5 49.7 84 48	49.6	6 39.9 84 47	49.0	8 20.2 83 46	47.9	10 00.2 83 46	46.8	10 25.2 83 45	46.5	11 15.1 83 45	46.0	120
1					5 21.1 84 47	48.8	6 11.6 84 47	48.3	7 52.3 84 46	47.2	9 32.8 84 45	46.1	9 58.0 84 45	45.8	10 48.1 84 44	45.3	1
2							5 43.5 84 46	47.6	7 24.7 84 45	46.5	9 05.8 84 45	45.4	9 31.0 84 44	45.1	10 21.5 84 44	44.6	2
3							5 15.8 85 46	46.8	6 57.5 85 45	45.8	8 39.1 85 44	44.7	9 04.4 85 44	44.4	9 55.1 84 43	43.9	3
4									6 30.6 85 44	45.0	8 12.7 85 43	44.0	8 38.2 85 43	43.7	9 29.1 85 43	43.2	4
125									6 04.1 86 44	44.3	7 46.6 85 43	43.3	8 12.2 85 43	43.0	9 03.4 85 42	42.5	125
6									5 37.9 86 43	43.6	7 20.9 86 42	42.6	7 46.7 86 42	42.3	8 38.1 86 42	41.8	6
7									5 12.0 86 43	42.9	6 55.6 86 42	41.8	7 21.4 86 41	41.6	8 13.1 86 41	41.1	7
8											6 30.6 87 41	41.1	6 56.6 87 41	40.9	7 48.5 87 40	40.4	8
9											6 05.9 87 40	40.4	6 32.0 87 40	40.1	7 24.2 87 40	39.6	9
130											5 41.6 87 40	39.7	6 07.9 87 40	39.4	7 00.3 87 39	38.9	130
1											5 17.7 88 39	38.9	5 44.1 88 39	38.7	6 36.8 88 39	38.2	1
2													5 20.7 88 38	38.0	6 13.6 88 38	37.5	2
3															5 50.8 89 37	36.8	3
4															5 28.4 89 37	36.0	4
135															5 06.4 89 36	35.3	135

Digitized by Google

Lat. 51°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	75 00.0	1.0 02	180.0	76 00.0	1.0 02	180.0	77 30.0	1.0 02	180.0	79 00.0	1.0 02	180.0	81 00.0	1.0 03	180.0	81 30.0	1.0 03	180.0	82 00.0	1.0 03	180.0	84 00.0	1.0 04	180.0	00
1	74 59.0	1.0 05	176.9	75 58.9	1.0 05	176.7	77 28.8	1.0 06	176.4	78 58.7	1.0 07	176.0	80 58.4	1.0 08	175.3	81 28.4	1.0 08	175.0	81 58.3	1.0 09	174.8	83 57.8	99 11	173.3	1
2	74 55.9	1.0 08	173.8	75 55.7	1.0 09	173.4	77 25.2	99 10	172.8	78 54.7	99 11	172.0	80 53.8	99 13	170.6	81 23.5	99 13	170.1	81 53.1	99 14	169.6	83 51.2	98 18	166.7	2
3	74 50.8	99 12	170.7	75 50.3	99 12	170.2	77 19.4	99 14	169.2	78 48.2	99 15	168.1	80 46.1	98 18	166.0	81 15.4	98 18	165.3	81 44.7	97 19	164.5	83 40.5	96 24	160.4	3
4	74 43.7	99 15	167.6	75 42.8	98 16	167.0	77 11.2	98 17	165.8	78 39.2	97 19	164.2	80 35.5	96 22	161.5	81 04.4	96 23	160.6	81 33.1	95 24	159.7	83 26.0	92 30	154.5	4
05	74 34.6	98 18	164.6	75 33.2	98 19	163.8	77 00.8	97 21	162.3	78 27.7	96 23	160.5	80 22.2	94 26	157.2	80 50.5	94 28	156.2	81 18.5	93 29	155.1	83 08.0	89 35	149.0	05
6	74 23.7	97 21	161.7	75 21.7	97 22	160.7	76 48.3	96 24	159.0	78 14.0	95 26	156.9	80 06.3	92 30	153.1	80 33.9	92 32	152.0	81 01.3	91 33	150.7	82 47.2	85 39	143.9	6
7	74 10.9	96 24	158.8	75 08.3	96 25	157.7	76 33.8	94 27	155.8	77 58.1	93 30	153.4	79 48.1	90 34	149.2	80 15.0	89 35	148.0	80 41.6	88 36	146.6	82 23.7	81 43	139.4	7
8	73 56.4	95 27	156.0	74 53.1	94 28	154.8	76 17.3	93 30	152.6	77 40.2	91 33	150.0	79 27.8	88 37	145.6	79 53.9	87 38	144.2	80 19.7	85 40	142.7	81 58.1	78 46	135.2	8
9	73 40.2	94 30	153.2	74 36.2	93 31	151.9	75 59.1	91 33	149.6	77 20.5	89 36	146.9	79 05.5	85 40	142.1	79 30.9	84 41	140.7	79 55.9	83 43	139.1	81 30.6	75 48	131.5	9
10	73 22.4	92 32	150.6	74 17.6	91 34	149.2	75 39.2	90 36	146.7	76 59.0	87 38	143.8	78 41.4	83 43	138.8	79 06.2	82 44	137.4	79 30.4	80 45	135.8	81 01.6	71 51	128.1	10
1	73 03.1	91 34	148.0	73 57.5	90 36	146.5	75 17.7	88 38	144.0	76 35.9	86 41	140.9	78 15.8	81 45	135.8	78 39.8	79 46	134.3	79 03.3	77 47	132.7	80 31.3	68 52	125.0	1
2	72 42.5	90 37	145.5	73 36.0	89 38	144.0	74 54.8	86 40	141.3	76 11.4	84 43	138.1	77 48.9	78 47	132.9	78 12.2	77 48	131.4	78 34.9	75 49	129.8	79 59.8	66 54	122.2	2
3	72 20.4	88 39	143.1	73 13.1	87 40	141.5	74 30.5	85 42	138.8	75 45.6	82 45	135.5	77 20.6	76 49	130.3	77 43.3	75 50	128.8	78 05.4	73 51	127.1	79 27.4	63 55	119.6	3
4	71 57.2	87 41	140.8	72 49.0	86 42	139.2	74 05.1	83 44	136.3	75 18.5	80 47	133.1	76 51.3	74 51	127.8	77 13.3	73 52	126.3	77 34.8	71 52	124.7	78 54.2	61 56	117.3	4
15	71 32.8	86 42	138.6	72 23.8	84 44	136.9	73 38.4	82 46	134.0	74 50.4	78 48	130.7	76 21.0	73 52	125.4	76 42.4	71 53	123.9	77 03.3	69 54	122.3	78 20.3	59 57	115.1	15
6	71 07.2	84 44	136.4	71 57.4	83 46	134.7	73 10.8	80 48	131.8	74 21.3	77 50	128.5	75 49.8	71 53	123.2	76 10.7	69 54	121.7	76 31.0	67 55	120.2	77 45.8	57 58	113.1	6
7	70 40.7	83 46	134.4	71 30.1	81 47	132.6	72 42.2	79 49	129.7	73 51.3	75 51	126.3	75 17.8	69 54	121.1	75 38.2	67 55	119.7	75 58.0	65 56	118.1	77 10.9	56 59	111.3	7
8	70 13.3	82 47	132.4	71 01.9	80 48	130.6	72 12.7	77 50	127.7	73 20.5	73 53	124.3	74 45.1	67 55	119.2	75 05.1	66 56	117.7	75 24.4	64 57	116.2	76 35.5	54 60	109.6	8
9	69 45.0	81 49	130.5	70 32.8	79 50	128.7	71 42.4	76 52	125.7	72 49.0	72 54	122.4	74 11.9	66 56	117.3	74 31.4	64 57	115.9	74 50.3	62 58	114.4	75 59.7	53 60	108.0	9
20	69 15.8	79 50	128.6	70 02.9	78 51	126.8	71 11.4	74 53	123.9	72 16.8	71 55	120.6	73 38.1	65 57	115.6	73 57.2	63 58	114.2	74 15.7	61 58	112.8	75 23.7	52 61	106.4	20
1	68 46.0	78 51	126.8	69 32.4	76 52	125.0	70 39.7	73 54	122.1	71 44.0	69 56	118.9	73 03.8	63 58	113.9	73 22.5	62 58	112.6	73 40.7	60 59	111.2	74 47.3	51 61	105.0	1
2	68 15.4	77 52	125.1	69 01.1	75 53	123.3	70 07.5	72 55	120.4	71 10.7	68 56	117.2	72 29.1	62 59	112.3	72 47.4	60 59	111.0	73 05.3	59 60	109.6	74 10.8	50 61	103.7	2
3	67 44.2	76 53	123.5	68 29.3	74 54	121.7	69 34.6	71 56	118.8	70 36.8	67 57	115.6	71 53.9	61 59	110.8	72 12.0	59 60	109.5	72 29.6	58 60	108.2	73 34.0	49 62	102.4	3
4	67 12.4	75 54	121.9	67 56.9	73 55	120.1	69 01.3	70 56	117.2	70 02.6	66 58	114.1	71 18.5	60 60	109.4	71 36.3	58 60	108.1	71 53.6	57 60	106.8	72 57.0	49 62	101.2	4
25	66 40.1	74 55	120.3	67 24.0	72 56	118.6	68 27.5	69 57	115.7	69 27.9	65 58	112.6	70 42.7	59 60	108.0	71 00.3	58 60	106.8	71 17.3	56 61	105.5	72 19.9	48 62	100.1	25
6	66 07.2	73 56	118.8	66 50.6	71 56	117.1	67 53.3	68 58	114.3	68 52.9	64 59	111.2	70 06.7	59 60	106.7	70 24.0	57 61	105.5	70 40.8	55 61	104.3	71 42.7	48 62	99.0	6
7	65 33.9	72 56	117.4	66 16.7	70 57	115.7	67 18.7	67 58	112.9	68 17.5	64 59	109.9	69 30.4	58 61	105.5	69 47.5	56 61	104.3	70 04.1	55 61	103.1	71 05.3	47 62	97.9	7
8	65 00.2	71 57	116.0	65 42.5	70 58	114.3	66 43.7	66 59	111.6	67 41.9	63 60	108.6	68 53.9	57 61	104.3	69 10.8	56 61	103.1	69 27.3	54 62	101.9	70 27.9	47 63	96.9	8
9	64 26.1	71 57	114.7	65 07.9	69 58	113.0	66 08.5	66 59	110.3	67 06.0	62 60	107.4	68 17.2	57 61	103.1	68 34.0	55 62	102.0	68 50.3	53 62	100.8	69 50.3	47 63	95.9	9
30	63 51.6	70 58	113.3	64 33.0	68 59	111.7	65 32.9	65 60	109.0	66 29.8	61 61	106.2	67 40.4	56 62	102.0	67 57.0	55 62	100.9	68 13.1	53 62	99.8	69 12.8	46 63	95.0	30
1	63 16.7	69 59	112.1	63 57.8	67 59	110.4	64 57.1	64 60	107.8	65 53.5	61 61	105.0	67 03.4	56 62	100.9	67 19.8	54 62	99.9	67 35.8	53 62	98.8	68 35.1	46 63	94.1	1
2	62 41.6	69 59	110.9	63 22.2	67 60	109.2	64 21.0	64 60	106.6	65 16.9	60 61	103.9	66 26.2	55 62	99.9	66 42.6	54 62	98.8	66 58.5	52 62	97.8	67 57.4	46 63	93.2	2
3	62 06.2	68 59	109.7	62 46.5	66 60	108.1	63 44.7	63 61	105.5	64 40.2	60 62	102.8	65 49.0	55 62	98.9	66 05.2	53 62	97.9	66 21.0	52 63	96.8	67 19.7	46 63	92.4	3
4	61 30.5	68 60	108.5	62 10.4	66 60	106.9	63 08.3	63 61	104.4	64 03.3	59 62	101.7	65 11.6	54 62	97.9	65 27.8	53 63	96.9	65 43.5	52 63	95.9	66 42.0	46 63	91.5	4
35	60 54.6	67 60	107.4	61 34.2	65 61	105.8	62 31.6	62 61	103.3	63 26.2	59 62	100.7	64 34.2	54 63	97.0	64 50.2	53 63	96.0	65 05.9	51 63	95.0	66 04.2	46 63	90.7	35
6	60 18.4	67 61	106.3	60 57.8	65 61	104.7	61 54.8	62 62	102.3	62 49.1	59 62	99.7	63 56.7	54 63	96.0	64 12.7	53 63	95.1	64 28.3	51 63	94.1	65 26.5	46 63	89.9	6
7	59 42.1	66 61	105.2	60 21.2	64 61	103.7	61 17.8	61 62	101.3	62 11.8	58 62	98.7	63 19.1	54 63	95.1	63 35.0	52 63	94.2	63 50.6	51 63	93.2	64 48.7	46 63	89.2	7
8	59 05.5	66 61	104.1	59 44.4	64 62	102.6	60 40.7	61 62	100.3	61 34.4	58 62	97.8	62 41.5	54 63	94.3	62 57.4	52 63	93.3	63 12.9	51 63	92.4	64 11.0	46 63	88.4	8
9	58 28.8	65 61	103.1	59 07.5	64 62	101.6	60 03.5	61 62	99.3	60 57.0	58 63	96.9	62 03.8	53 63	93.4	62 19.6	52 63	92.5	62 35.1	51 63	91.6	63 33.2	46 63	87.7	9
40	57 52.0	65 62	102.1	58 30.5	63 62	100.7	59 26.2	61 62	98.4	60 19.4	58 63	96.0	61 26.1	53 63	92.6	61 41.9	52 63	91.7	61 57.4	51 63	90.8	62 55.5	46 63	87.0	40
1	57 15.0	65 62	101.1	57 53.3	63 62	99.7	58 48.8	60 62	97.5	59 41.9	57 63	95.1	60 48.4	53 63	91.7	61 04.2	52 63	90.9	61 19.6	51 63	90.0	62 17.8	46 63	86.3	1
2	56 37.9	64 62	100.2	57 16.0	63 62	98.8	58 11.3	60 63	96.6	59 04.2	57 63	94.2	60 10.6	53 63	90.9	60 26.4	52 63	90.1	60 41.9	51 63	89.2	61 40.2	46 63	85.6	2
3	56 00.7	64 62	99.3	56 38.7	63 62	97.9	57 33.8	60 63	95.7	58 26.6	57 63	93.4	59 32.8	53 63	90.1	59 48.6	52 63	89.3	60 04.1	51 63	88.4	61 02.5	46 63	84.9	3
4	55 23.4	64 62	98.3	56 01.2	62 62	97.0	56 56.2	60 63	94.8	57 48.8	57 63	92.6	58 55.1	53 63	89.4	59 10.9	52 63	88.5	59 26.4	51 63	87.7	60 24.9	46 63	84.2	4
45	54 46.0	64 62	97.4	55 23.7	62 63	96.1	56 18.6	60 63	94.0	57 11.1	57 63	91.7	58 17.3	53 63	88.6	58 33.1	52 63	87.8	58 48.6	51 63	87.0	59 47.4	47 62	83.6	45
6	54 08.5	63 63	96.6	54 46.1	62 63	95.2	55 40.9	60 63	93.1	56 33.4	57 63	90.9	57 39.6	53 63	87.9	57 55.4	52 63	87.1	58 11.0	51 63	86.3	59 09.9	47 62	82.9	6
7	53 31.0	63 63	95.7	54 08.5	62 63	94.4	55 03.1	60 63	92.3	55 55.6	57 63	90.2	57 01.9	53 63	87.1	57 17.7	52 63	86.4	57 33.3	51 63	85.6	58 32.4	47 62	82.3	7
8	52 53.4	63 63	94.8	53 30.8	62 63	93.5	54 25.4	59 63	91.5	55 17.8	57 63	89.4	56 24.2	53 63	86.4	56 40.1	52 63	85.6	56 55.7	52 63	84.9	57 55.1	47 62	81.6	8
9	52 15.7	63 63	94.0	52 53.1	62 63	92.7	53 47.7	59 63	90.7	54 40.1	57 63	88.6	55 46.5	54 63	85.7	56 02.4	53 63	84.9	56 18.1	52 63	84.2	57 17.7	48 62	81.0	9
50	51 38.0	63 63	93.2	52 15.4	62 63	91.9	53 09.9	59 63	89.9	54 02.4	57 63	87.9	55 08.9	54 63	85.0	55 24.8	53 63	84.3	55 40.5	52 62	83.5	56 40.5	48 62	80.4	50
1	51 00.3	63 63	92.3	51 37.7	62 63	91.1	52 32.1	59 63	89.2	53 24.6	57 63	87.1	54 31.3	54 63	84.3	54 47.3	53 62	83.6	55 03.0	52 62	82.8	56 03.3	48 62	79.8	1
2	50 22.6	63 63	91.5	50 59.9	62 63	90.3	51 54.4	59 63	88.4	52 46.9	57 63	86.4	53 53.7	54 62	83.6	54 09.8	53 62	82.9	54 25.6	52 62	82.2	55 26.2	49 62	79.2	2
3	49 44.8	63 63	90.8	50 22.1	62 63	89.5	51 16.7	60 63	87.6	52 09.3	57 63	85.7	53 16.2	54 62	82.9	53 32.4	53 62	82.2	53 48.2	53 62	81.5	54 49.1	49 62	78.6	3
4	49 07.1	63 63	90.0	49 44.4	62 63	88.8	50 38.9	60 63	86.9	51 31.6	57 63	85.0	52 38.8	54 62	82.3	52 55.0	54 62	81.6	53 10.9	53 62	80.9	54 12.1	49 61	78.0	4
55	48 29.3	63 63	89.2	49 06.6	62 63	88.0	50 01.2	60 63	86.2	50 54.0	58 63	84.3	52 01.4	55 62	81.6	52 17.7	54 62	80.9	52 33.7	53 62	80.2	53 35.3	50 61	77.4	55
6	47 51.5	63 63	88.4	48 28.9	62 63	87.3	49 23.6	60 63	85.4	50 16.5	58 62	83.6	51 24.1	55 62	80.9	51 40.4	54 62	80.3	51 56.5	53 62	79.6	52 58.4	50 61	76.8	6
7	47 13.8	63 63	87.7	47 51.2	62 63	86.5	48 46.0	60 63	84.7	49 39.0	58 62	82.9	50 46.8	55 62	80.3	51 03.2	54 62	79.6	51 19.4	54 62	79.0	52 21.7	50 61	76.2	7
8	46 36.1	63 63	86.9	47 13.5	62 63	85.8	48 08.4	60 63	84.0	49 01.6	58 62	82.2	50 09.6	55 62	79.7	50 26.1	55 62	79.0	50 42.4	54 62	78.3	51 45.1	51 61	75.6	8
9	45 58.4	63 63	86.2	46 35.9	62 63	85.1	47 30.9	60 62	83.3	48 24.2	58 62	81.5	49 32.5	56 62	79.0	49 49.1	55 62	78.4	50 05.4	54 61	77.7	51 08.6	51 61	75.0	9
60	45 20.7	63 63	85.5	45 58.3	62 63	84.4	46 53.4	60 62	82.6	47 46.9	58 62	80.9	48 55.5	56 62	78.4	49 12.2	55 61	77.7	49 28.6	54 61	77.1	50 32.2	51 61	74.5	60
1	44 43.1	63 63	84.7	45 20.8	62 62	83.6	46 16.0	61 62	81.9	47 09.6	59 62	80.2	48 18.6	56 61	77.8	48 35.3	55 61	77.1	48 51.8	55 61	76.5	49 55.8	52 60	73.9	1
2	44 05.5	63 63	84.0	44 43.3	62 62	82.9	45 38.6	61 62	81.3	46 32.5	59 62	79.5	47 41.7	56 61	77.1	47 58.5	56 61	76.5	48 15.2	55 61	75.9	49 19.6	52 60	73.3	2
3	43 28.0	63 62	83.3	44 05.8	62 62	82.2	45 01.3	61 62	80.6	45 55.4	59 62	78.9	47 04.9	57 61	76.5	47 21.9	56 61	75.9	47 38.6	55 61	75.3	48 43.5	53 60	72.8	3
4	42 50.5	64 62	82.6	43 28.4	63 62	81.5	44 24.1	61 62	79.9	45 18.4	59 62	78.2	46 28.3	57 61	75.9	46 45.3	56 61	75.3	47 02.1	56 61	74.7	48 07.5	53 60	72.2	4
65	42 13.1	64 62	81.9	42 51.1	63 62	80.9	43 47.8	61 62	79.2	44 41.4	60 61	77.6	45 51.7	57 61	75.3	46 08.8	57 61	74.7	46 25.8	56 60	74.1	47 31.6	54 60	71.6	65
6	41 35.8	64 62	81.2	42 13.9	63 62	80.2	43 09.9	62 62	78.6	44 04.6	60 61	76.9	45 15.2	58 61	74.7	45 32.5	57 60	74.1	45 49.5	57 60	73.5	46 55.8	54 59	71.1	6
7	40 58.5	64 62	80.5	41 36.7	63 62	79.5	42 33.0	62 61	77.9	43 27.9	60 61	76.3	44 38.9	58 60	74.1	44 56.2	57 60	73.5	45 13.4	57 60	72.9	46 20.2	54 59	70.5	7
8	40 21.3	64 62	79.8	40 59.6	63 62	78.8	41 56.1	62 61	77.3	42 51.2	61 61	75.7	44 02.6	58 60	73.5	44 20.1	58 60	72.9	44 37.3	57 60	72.3	45 44.6	55 59	70.0	8
9	39 44.2	65 62	79.2	40 22.6	64 62	78.2	41 19.3	62 61	76.6	42 14.7	61 61	75.0	43 26.5	59 60	72.8	43 44.0	58 60	72.3	44 01.4	58 60	71.7	45 09.2	55 59	69.4	9
70	39 07.1	65 62	78.5	39 45.7	64 61	77.5	40 42.6	63 61	76.0	41 38.3	61 61	74.4	42 50.5	59 60	72.2	43 08.1	59 60	71.7	43 25.6	58 59	71.1	44 33.9	56 59	68.9	70
1	38 30.2	65 61	77.8	39 08.9	64 61	76.8	40 06.0	63 61	75.3	41 02.0	61 60	73.8	42 14.6	59 60	71.6	42 32.3	59 59	71.1	42 49.9	58 59	70.6	43 58.8	56 58	68.3	1
2	37 53.3	65 61	77.1	38 32.2	64 61	76.2	39 29.6	63 61	74.7	40 25.8	62 60	73.2	41 38.8	60 59	71.1	41 56.7	59 59	70.5	42 14.4	58 59	70.0	43 23.8	57 58	67.7	2
3	37 16.5	65 61	76.5	37 55.6	65 61	75.5	38 53.2	63 60	74.0	39 49.7	62 60	72.5	41 03.1	60 59	70.5	41 21.1	60 59	69.9	41 39.0	59 59	69.4	42 48.9	57 58	67.2	3
4	36 39.9	66 61	75.8	37 19.1	65 61	74.9	38 16.9	64 60	73.4	39 13.7	62 60	71.9	40 27.6	61 59	69.9	40 45.7	60 59	69.3	41 03.7	60 59	68.8	42 14.1	58 58	66.6	4
75	36 03.3	66 61	75.2	36 42.7	65 60	74.2	37 40.8	64 60	72.8	38 37.9	63 60	71.3	39 52.2	61 59	69.3	40 10.5	61 59	68.8	40 28.6	60 58	68.2	41 39.6	58 57	66.1	75
6	35 26.9	66 61	74.5	36 06.4	65 60	73.6	37 04.8	64 60	72.1	38 02.2	63 59	70.7	39 17.0	61 58	68.7	39 35.4	61 58	68.2	39 53.6	61 58	67.7	41 05.1	59 57	65.5	6
7	34 50.6	66 60	73.8	35 30.2	66 60	72.9	36 28.9	65 60	71.5	37 26.6	64 59	70.1	38 41.9	62 58	68.1	39 00.4	61 58	67.6	39 18.7	61 58	67.1	40 30.8	59 57	65.0	7
8	34 14.4	67 60	73.2	34 54.2	66 60	72.3	35 53.2	65 59	70.9	36 51.2	64 59	69.5	38 06.9	62 58	67.5	38 25.5	62 58	67.0	38 44.0	61 58	66.5	39 56.7	60 57	64.4	8
9	33 38.3	67 60	72.5	34 18.3	66 60	71.6	35 17.6	65 59	70.3	36 15.9	64 59	68.9	37 32.1	63 58	66.9	37 50.9	62 58	66.4	38 09.5	62 57	65.9	39 22.7	60 56	63.9	9
80	33 02.3	67 60	71.9	33 42.5	67 59	71.0	34 42.1	66 59	69.6	35 40.8	65 58	68.2	36 57.5	63 58	66.3	37 16.3	63 57	65.8	37 35.1	62 57	65.4	38 48.9	61 56	63.3	80
1	32 26.5	68 59	71.2	33 06.9	67 59	70.4	34 06.8	66 59	69.0	35 05.8	65 58	67.6	36 22.9	64 57	65.7	36 42.0	63 57	65.3	37 00.8	63 57	64.8	38 15.2	61 56	62.8	1
2	31 50.8	68 59	70.6	32 31.4	67 59	69.7	33 31.6	66 58	68.4	34 30.9	65 58	67.0	35 48.6	64 57	65.2	36 07.7	64 57	64.7	36 26.8	63 57	64.2	37 41.7	62 56	62.2	2
3	31 15.3	68 59	69.9	31 56.1	68 59	69.1	32 56.6	67 58	67.8	33 56.3	66 58	66.4	35 14.4	64 57	64.6	35 33.7	64 56	64.1	35 52.9	64 56	63.6	37 08.4	62 55	61.7	3
4	30 39.9	69 59	69.3	31 20.9	68 58	68.4	32 21.7	67 58	67.1	33 21.7	66 57	65.8	34 40.4	65 56	64.0	34 59.8	65 56	63.5	35 19.1	64 56	63.1	36 35.2	63 55	61.1	4
85	30 04.6	69 58	68.6	30 45.8	68 58	67.8	31 47.0	68 56	66.5	32 47.4	67 57	65.2	34 06.6	65 56	63.4	34 26.1	65 56	62.9	34 45.5	65 56	62.5	36 02.2	63 55	60.6	85
6	29 29.6	69 58	68.0	30 11.0	69 58	67.2	31 12.5	68 57	65.9	32 13.2	67 57	64.6	33 32.9	66 56	62.8	33 52.6	65 56	62.4	34 12.1	65 55	61.9	35 29.4	64 54	60.0	6
7	28 54.6	70 58	67.4	29 36.2	69 58	66.5	30 38.1	68 57	65.3	31 39.2	67 56	64.0	32 59.4	66 56	62.2	33 19.2	66 55	61.8	33 38.9	66 55	61.3	34 56.8	64 54	59.5	7
8	28 19.9	70 58	66.7	29 01.7	69 57	65.9	30 03.9	69 57	64.7	31 05.3	68 56	63.4	32 26.1	67 55	61.6	32 46.0	66 55	61.2	33 05.9	66 55	60.7	34 24.4	65 54	58.9	8
9	27 45.3	70 57	66.1	28 27.3	70 57	65.3	29 29.8	69 56	64.0	30 31.7	68 56	62.8	31 52.9	67 55	61.1	32 13.0	67 55	60.6	32 33.0	67 54	60.2	33 52.1	65 53	58.4	9
90	27 10.8	71 57	65.4	27 53.1	70 57	64.6	28 56.0	69 56	63.4	29 58.2	69 55	62.2	31 20.0	68 55	60.5	31 40.2	67 54	60.0	32 00.4	67 54	59.6	33 20.1	66 53	57.8	90

Lat. 51°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	26 36.6	71 57	64.8	27 19.1	71 56	64.0	28 22.3	70 56	62.8	29 24.9	69 55	61.6	30 47.2	68 54	59.9	31 07.6	68 54	59.4	31 27.9	68 54	59.0	32 48.2	66 53	57.3	91
2	26 02.5	71 56	64.1	26 45.2	71 56	63.4	27 48.8	70 56	62.2	28 51.8	70 55	60.9	30 14.7	69 54	59.3	30 35.2	68 54	58.9	30 55.6	68 53	58.4	32 16.5	67 52	56.7	2
3	25 28.6	72 56	63.5	26 11.6	71 56	62.7	27 15.5	71 55	61.5	28 18.9	70 55	60.3	29 42.3	69 54	58.7	30 03.0	69 53	58.3	30 23.6	68 53	57.9	31 45.1	67 52	56.1	3
4	24 54.9	72 56	62.9	25 38.1	72 55	62.1	26 42.4	71 55	60.9	27 46.2	70 54	59.7	29 10.1	70 53	58.1	29 31.0	69 53	57.7	29 51.7	69 53	57.3	31 13.8	68 52	55.6	4
95	24 21.4	73 56	62.2	25 04.8	72 55	61.5	26 09.5	72 54	60.3	27 13.6	71 54	59.1	28 38.2	70 53	57.5	28 59.2	70 53	57.1	29 20.0	69 52	56.7	30 42.8	68 51	55.0	95
6	23 48.1	73 55	61.6	24 31.8	73 55	60.8	25 36.8	72 54	59.7	26 41.3	71 53	58.5	28 06.4	70 53	56.9	28 27.6	70 52	56.5	28 48.6	70 52	56.1	30 12.0	69 51	54.5	6
7	23 15.0	73 55	60.9	23 58.9	73 54	60.2	25 04.3	72 54	59.0	26 09.3	72 53	57.9	27 34.9	71 52	56.3	27 56.2	71 52	55.9	28 17.3	70 52	55.5	29 41.3	69 51	53.9	7
8	22 42.1	74 54	60.3	23 26.3	73 54	59.5	24 32.1	73 53	58.4	25 37.4	72 53	57.3	27 03.6	71 52	55.7	27 25.0	71 52	55.3	27 46.3	71 51	54.9	29 11.0	70 50	53.3	8
9	22 09.4	74 54	59.6	22 53.8	74 54	58.9	24 00.0	73 53	57.8	25 05.7	73 52	56.7	26 32.5	72 51	55.1	26 54.1	72 51	54.7	27 15.5	71 51	54.3	28 40.8	71 50	52.8	9
100	21 37.0	75 54	59.0	22 21.6	74 53	58.3	23 28.2	74 53	57.2	24 34.3	73 52	56.1	26 01.6	72 51	54.5	26 23.3	72 51	54.1	26 45.0	72 51	53.8	28 10.8	71 50	52.2	100
1	21 04.7	75 53	58.3	21 49.6	75 53	57.6	22 56.6	74 52	56.5	24 03.1	74 52	55.4	25 31.0	73 51	53.9	25 52.8	73 50	53.6	26 14.6	72 50	53.2	27 41.1	72 49	51.6	1
2	20 32.7	75 53	57.7	21 17.8	75 53	57.0	22 25.2	75 52	55.9	23 32.1	74 51	54.8	25 00.6	73 50	53.3	25 22.6	73 50	53.0	25 44.5	73 50	52.6	27 11.6	72 49	51.0	2
3	20 00.9	76 53	57.0	20 46.3	75 52	56.3	21 54.0	75 52	55.3	23 01.4	75 51	54.2	24 30.4	74 50	52.7	24 52.6	74 50	52.4	25 14.7	74 49	52.0	26 42.4	73 48	50.5	3
4	19 29.3	76 52	56.4	20 15.0	76 52	55.7	21 23.1	75 51	54.6	22 30.9	75 50	53.6	24 00.5	74 49	52.1	24 22.8	74 49	51.8	24 45.0	74 49	51.4	26 13.4	73 48	49.9	4
105	18 58.0	77 52	55.7	19 43.9	76 51	55.0	20 52.4	76 51	54.0	22 00.6	76 50	53.0	23 30.8	75 49	51.5	23 53.3	75 49	51.2	24 15.6	75 49	50.8	25 44.6	74 48	49.3	105
6	18 26.9	77 51	55.1	19 13.1	77 51	54.4	20 22.0	76 50	53.4	21 30.6	76 50	52.3	23 01.4	75 49	50.9	23 24.0	75 48	50.6	23 46.5	75 48	50.2	25 16.1	74 47	48.7	6
7	17 56.1	77 51	54.4	18 42.5	77 51	53.7	19 51.8	77 50	52.7	21 00.8	76 49	51.7	22 32.2	76 48	50.3	22 54.9	76 48	49.9	23 17.6	76 48	49.6	24 47.9	75 47	48.2	7
8	17 25.5	78 51	53.7	18 12.2	78 50	53.1	19 21.9	77 49	52.1	20 31.3	77 49	51.1	22 03.3	76 48	49.7	22 26.2	76 48	49.3	22 49.0	76 47	49.0	24 19.9	75 46	47.6	8
9	16 55.2	78 50	53.1	17 42.1	78 50	52.4	18 52.3	78 49	51.4	20 02.1	77 48	50.4	21 34.6	77 47	49.1	21 57.7	77 47	48.7	22 20.6	77 47	48.4	23 52.1	76 46	47.0	9
110	16 25.1	79 50	52.4	17 12.3	79 49	51.8	18 22.9	78 49	50.8	19 33.1	78 48	49.8	21 06.2	77 47	48.5	21 29.4	77 47	48.1	21 52.5	77 46	47.8	23 24.7	76 45	46.4	110
1	15 55.4	79 49	51.8	16 42.8	79 49	51.1	17 53.7	79 48	50.2	19 04.4	78 47	49.2	20 38.1	78 46	47.8	21 01.4	78 46	47.5	21 24.7	78 46	47.2	22 57.5	77 45	45.8	1
2	15 25.8	80 49	51.1	16 13.5	79 48	50.5	17 24.9	79 48	49.5	18 36.0	79 47	48.5	20 10.2	78 46	47.2	20 33.7	78 46	46.9	20 57.2	78 45	46.6	22 30.5	78 44	45.2	2
3	14 56.6	80 48	50.4	15 44.6	80 48	49.8	16 56.3	80 47	48.9	18 07.8	79 46	47.9	19 42.7	79 46	46.6	20 06.3	79 45	46.3	20 29.9	79 45	45.9	22 03.9	78 44	44.6	3
4	14 27.6	80 48	49.8	15 15.9	80 47	49.1	16 28.0	80 47	48.2	17 39.9	80 46	47.3	19 15.4	79 45	46.0	19 39.1	79 45	45.7	20 02.9	79 44	45.3	21 37.5	79 44	44.0	4
115	13 59.0	81 47	49.1	14 47.4	81 47	48.5	16 00.0	80 46	47.6	17 12.3	80 46	46.6	18 48.4	80 45	45.4	19 12.3	80 44	45.0	19 36.2	80 44	44.7	21 11.4	79 43	43.4	115
6	13 30.6	81 47	48.4	14 19.3	81 46	47.8	15 32.3	81 46	46.9	16 45.0	81 45	46.0	18 21.6	80 44	44.7	18 45.7	80 44	44.4	19 09.8	80 44	44.1	20 45.6	80 43	42.8	6
7	13 02.5	82 46	47.7	13 51.5	82 46	47.1	15 04.9	81 45	46.2	16 18.0	81 44	45.3	17 55.2	81 44	44.1	18 19.4	81 43	43.8	18 43.6	81 43	43.5	20 20.1	80 42	42.2	7
8	12 34.7	82 46	47.0	13 24.0	82 45	46.5	14 37.8	82 45	45.6	15 51.3	82 44	44.7	17 29.1	81 43	43.5	17 53.5	81 43	43.2	18 17.8	81 43	42.9	19 54.8	81 42	41.6	8
9	12 07.2	83 45	46.4	12 56.8	83 45	45.8	14 10.9	82 44	44.9	15 24.9	82 43	44.0	17 03.3	82 43	42.8	17 27.8	82 42	42.5	17 52.3	82 42	42.2	19 29.9	81 41	41.0	9
120	11 40.0	83 45	45.7	12 29.9	83 44	45.1	13 44.4	83 44	44.2	14 58.9	83 43	43.4	16 37.7	82 42	42.2	17 02.4	82 42	41.9	17 27.0	82 42	41.6	19 05.3	82 41	40.4	120
1	11 13.2	84 44	45.0	12 03.3	83 44	44.4	13 18.3	83 43	43.6	14 33.1	83 42	42.7	16 12.5	83 41	41.6	16 37.3	83 41	41.3	17 02.1	83 41	41.0	18 41.0	82 40	39.8	1
2	10 46.7	84 44	44.3	11 37.0	84 43	43.7	12 52.4	84 43	42.9	14 07.6	83 42	42.1	15 47.6	83 41	40.9	16 12.6	83 41	40.6	16 37.5	83 40	40.3	18 17.0	83 39	39.2	2
3	10 20.4	84 43	43.6	11 11.1	84 43	43.1	12 26.8	84 42	42.2	13 42.5	84 41	41.4	15 23.1	84 40	40.3	15 48.2	84 40	40.0	16 13.2	84 40	39.7	17 53.3	83 39	38.5	3
4	9 54.6	85 43	42.9	10 45.4	85 42	42.4	12 01.6	85 41	41.6	13 17.7	84 41	40.7	14 58.8	84 40	39.6	15 24.1	84 40	39.3	15 49.3	84 39	39.1	17 29.9	84 38	37.9	4
125	9 29.0	85 42	42.2	10 20.2	85 42	41.7	11 36.8	85 41	40.9	12 53.2	85 40	40.1	14 34.9	85 39	39.0	15 00.3	85 39	38.7	15 25.7	84 39	38.4	17 06.9	84 38	37.3	125
6	9 03.8	86 41	41.5	9 55.2	86 41	41.0	11 12.2	85 40	40.2	12 29.1	85 40	39.4	14 11.3	85 39	38.3	14 36.9	85 38	38.1	15 02.4	85 38	37.8	16 44.2	85 37	36.7	6
7	8 39.0	86 41	40.8	9 30.6	86 40	40.3	10 48.0	86 40	39.5	12 05.3	86 39	38.7	13 48.1	86 38	37.7	14 13.7	86 38	37.4	14 39.4	85 38	37.1	16 21.8	85 37	36.1	7
8	8 14.5	87 40	40.1	9 06.4	86 40	39.6	10 24.2	86 39	38.8	11 41.8	86 38	38.1	13 25.2	86 38	37.0	13 51.0	86 37	36.8	14 16.8	86 37	36.5	15 59.7	86 36	35.4	8
9	7 50.3	87 40	39.4	8 42.5	87 39	38.9	10 00.7	87 39	38.1	11 18.7	87 38	37.4	13 02.6	86 37	36.4	13 28.6	86 37	36.1	13 54.5	86 37	35.8	15 38.0	86 36	34.8	9
130	7 26.6	87 39	38.7	8 19.0	87 39	38.2	9 37.5	87 38	37.4	10 56.0	87 37	36.7	12 40.4	87 36	35.7	13 06.5	87 36	35.4	13 32.5	87 36	35.2	15 16.6	87 35	34.2	130
1	7 03.1	88 38	38.0	7 55.8	88 38	37.5	9 14.7	88 37	36.8	10 33.6	88 37	36.0	12 18.6	87 36	35.0	12 44.8	87 36	34.8	13 11.0	87 35	34.5	14 55.6	87 34	33.5	1
2	6 40.1	88 38	37.3	7 33.0	88 37	36.8	8 52.3	88 37	36.1	10 11.6	88 36	35.3	11 57.1	88 35	34.4	12 23.4	88 35	34.1	12 49.7	88 35	33.9	14 34.9	88 34	32.9	2
3	6 17.4	89 37	36.5	7 10.6	89 37	36.1	8 30.3	89 36	35.4	9 49.9	88 35	34.7	11 35.9	88 35	33.7	12 02.4	88 34	33.5	12 28.9	88 34	33.2	14 14.6	88 33	32.2	3
4	5 55.1	89 36	35.8	6 48.6	89 36	35.4	8 08.6	89 35	34.7	9 28.6	89 35	34.0	11 15.2	89 34	33.0	11 41.8	89 34	32.8	12 08.4	89 34	32.6	13 54.6	88 33	31.6	4
135	5 33.2	89 36	35.1	6 26.9	89 35	34.6	7 47.3	89 35	34.0	9 07.7	89 34	33.3	10 54.8	89 33	32.4	11 21.5	89 33	32.1	11 48.2	89 33	31.9	13 35.0	89 32	31.0	135
6	5 11.7	90 35	34.4	6 05.6	90 35	33.9	7 26.4	90 34	33.2	8 47.2	90 34	32.6	10 34.8	90 33	31.7	11 01.6	90 33	31.5	11 28.5	89 32	31.2	13 15.8	89 31	30.3	6
7				5 44.8	90 34	33.2	7 05.9	90 34	32.5	8 27.1	90 33	31.9	10 15.1	90 32	31.0	10 42.1	90 32	30.8	11 09.1	90 32	30.6	12 56.9	90 31	29.7	7
8				5 24.3	91 33	32.5	6 45.8	91 33	31.8	8 07.3	91 32	31.2	9 55.9	90 31	30.3	10 23.0	90 31	30.1	10 50.1	90 31	29.9	12 38.4	90 30	29.0	8
9				5 04.2	91 33	31.7	6 26.1	91 32	31.1	7 48.0	91 32	30.5	9 37.0	91 31	29.6	10 04.2	91 31	29.4	10 31.5	91 30	29.2	12 20.3	91 30	28.4	9
140							6 06.8	91 32	30.4	7 29.0	91 31	29.8	9 18.5	91 30	29.0	9 45.9	91 30	28.7	10 13.2	91 30	28.5	12 02.6	91 29	27.7	140
1							5 47.9	92 31	29.7	7 10.5	92 30	29.1	9 00.4	92 29	28.3	9 27.9	92 29	28.1	9 55.4	92 29	27.9	11 45.2	91 28	27.0	1
2							5 29.4	92 30	28.9	6 52.3	92 30	28.4	8 42.8	92 29	27.6	9 10.4	92 29	27.4	9 37.9	92 28	27.2	11 28.2	92 28	26.4	2
3							5 11.4	92 29	28.2	6 34.6	92 29	27.7	8 25.5	92 28	26.9	8 53.2	92 28	26.7	9 20.9	92 28	26.5	11 11.7	92 27	25.7	3
4										6 17.3	93 28	26.9	8 08.6	93 27	26.2	8 36.4	93 27	26.0	9 04.3	93 27	25.8	10 55.5	93 26	25.0	4
145										6 00.4	93 27	26.2	7 52.2	93 27	25.5	8 20.1	93 27	25.3	8 48.0	93 26	25.1	10 39.7	93 26	24.4	145
6										5 43.9	94 27	25.5	7 36.1	93 26	24.8	8 04.2	93 26	24.6	8 32.2	93 26	24.4	10 24.3	93 25	23.7	6
7										5 27.9	94 26	24.8	7 20.5	94 25	24.1	7 48.6	94 25	23.9	8 16.8	94 25	23.7	10 09.3	94 24	23.0	7
8										5 12.3	94 25	24.1	7 05.3	94 25	23.4	7 33.6	94 24	23.2	8 01.8	94 24	23.0	9 54.8	94 24	22.4	8
9													6 50.5	95 24	22.7	7 18.9	95 24	22.5	7 47.2	94 24	22.3	9 40.6	94 23	21.7	9
150													6 36.2	95 23	22.0	7 04.6	95 23	21.8	7 33.1	95 23	21.6	9 26.9	95 22	21.0	150
1													6 22.3	95 22	21.3	6 50.8	95 22	21.1	7 19.4	95 22	20.9	9 13.5	95 22	20.3	1
2													6 08.8	95 22	20.5	6 37.5	95 22	20.4	7 06.1	95 21	20.2	9 00.6	95 21	19.6	2
3													5 55.8	96 21	19.8	6 24.5	96 21	19.7	6 53.3	96 21	19.5	8 48.2	96 20	19.0	3
4													5 43.2	96 20	19.1	6 12.0	96 20	19.0	6 40.8	96 20	18.8	8 36.1	96 19	18.3	4
155													5 31.1	96 20	18.4	6 00.0	96 19	18.3	6 28.9	96 19	18.1	8 24.5	96 19	17.6	155
6													5 19.4	97 19	17.7	5 48.4	97 19	17.5	6 17.4	97 18	17.4	8 13.3	97 18	16.9	6
7													5 08.1	97 18	17.0	5 37.2	97 18	16.8	6 06.3	97 18	16.7	8 02.5	97 17	16.2	7
8																5 26.5	97 17	16.1	5 55.7	97 17	16.0	7 52.2	97 16	15.5	8
9																5 16.3	97 16	15.4	5 45.5	97 16	15.3	7 42.3	97 16	14.8	9
160																5 06.5	98 16	14.7	5 35.8	98 15	14.6	7 32.9	98 15	14.1	160
1																			5 26.5	98 15	13.8	7 23.9	98 14	13.4	1
2																			5 17.7	98 14	13.1	7 15.4	98 14	12.7	2
3																			5 09.4	98 13	12.4	7 07.3	98 13	12.0	3
4																			5 01.5	98 12	11.7	6 59.6	98 12	11.3	4
165																						6 52.5	99 11	10.6	165
6																						6 45.7	99 10	09.9	6
7																						6 39.4	99 10	09.2	7
8																						6 33.6	99 09	08.5	8
9																						6 28.3	99 08	07.8	9
170																						6 23.4	99 07	07.1	170
1																						6 18.9	1.0 07	06.4	1
2																						6 15.0	1.0 06	05.7	2
3																						6 11.5	1.0 05	05.0	3
4																						6 08.4	1.0 04	04.3	4
175																						6 05.9	1.0 04	03.6	175
6																						6 03.7	1.0 03	02.8	6
7																						6 02.1	1.0 02	02.1	7
8																						6 00.9	1.0 01	01.4	8
9																						6 00.2	1.0 00	00.7	9
180																						6 00.0	1.0 00	00.0	180

Digitized by Google

Lat. 51°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	85 00.0	1.0 04	180.0	86 00.0	1.0 06	180.0	87 30.0	1.0 08	180.0	88 30.0	1.0 13	180.0
1	84 57.4	90 13	172.1	85 56.8	99 16	170.3	87 25.1	97 23	165.1	88 22.2	92 34	156.5
2	84 49.7	97 21	164.4	85 47.4	95 25	161.1	87 11.2	89 35	151.9	88 01.7	77 46	138.8
3	84 37.2	94 28	157.2	85 32.6	91 32	152.7	86 50.2	80 43	141.1	87 33.9	63 53	126.9
4	84 29.6	90 34	150.6	85 13.1	85 39	145.2	86 24.3	71 49	132.5	87 02.1	53 57	118.8
05	84 00.3	85 39	144.6	84 49.8	79 44	138.7	85 55.0	64 53	125.8	86 28.2	45 59	113.2
6	83 37.0	81 43	139.2	84 23.5	74 48	133.2	85 23.4	57 55	120.5	85 52.9	40 60	109.0
7	83 11.2	76 47	134.5	83 54.9	69 51	128.4	84 50.1	52 57	116.2	85 16.9	36 61	105.8
8	82 43.2	72 49	130.3	83 24.4	65 53	124.2	84 15.7	48 59	112.7	84 40.3	33 62	103.2
9	82 13.6	69 52	126.5	82 52.6	61 55	120.7	83 40.5	45 60	109.8	84 03.4	31 62	101.1
10	81 42.6	65 54	123.2	82 19.6	57 56	117.5	83 04.7	42 60	107.3	83 26.3	29 62	99.3
1	81 10.5	62 55	120.2	81 45.6	55 58	114.8	82 28.5	40 61	105.1	82 48.9	28 62	97.8
2	80 37.5	60 56	117.6	81 11.0	52 59	112.3	81 51.9	38 61	103.2	82 11.4	27 63	96.4
3	80 03.6	57 58	115.1	80 35.8	50 59	110.1	81 15.0	37 62	101.5	81 33.9	26 63	95.2
4	79 29.1	55 58	112.9	80 00.1	48 60	108.1	80 37.9	35 62	100.0	80 56.2	26 63	94.1
15	78 54.1	53 59	110.9	79 24.1	46 61	106.3	80 00.6	34 62	98.6	80 18.6	25 63	93.1
6	78 18.6	52 60	109.1	78 47.7	45 61	104.7	79 23.2	34 62	97.4	79 40.8	25 63	92.1
7	77 42.8	50 60	107.4	78 11.0	44 61	103.2	78 45.7	33 63	96.2	79 03.1	25 63	91.2
8	77 06.6	49 61	105.8	77 34.2	43 62	101.7	78 08.2	32 63	95.1	78 25.3	25 63	90.4
9	76 30.1	48 61	104.3	76 57.1	42 62	100.4	77 30.5	32 63	94.1	77 47.6	25 63	89.6
20	75 53.4	47 62	102.9	76 19.9	41 62	99.2	76 52.8	32 63	93.2	77 09.8	25 63	88.9
1	75 16.5	46 62	101.6	75 42.6	41 62	98.0	76 15.1	32 63	92.3	76 32.1	25 63	88.2
2	74 39.5	45 62	100.4	75 05.1	40 63	97.0	75 37.4	31 63	91.4	75 54.3	25 63	87.5
3	74 02.3	45 62	99.3	74 27.6	40 63	95.9	74 59.6	31 63	90.6	75 16.6	25 63	86.9
4	73 24.9	44 62	98.2	73 50.0	39 63	94.9	74 21.9	31 63	89.8	74 38.9	26 63	86.2
25	72 47.5	44 62	97.1	73 12.4	39 63	94.0	73 44.1	31 63	89.1	74 01.3	26 63	85.6
6	72 10.0	43 63	96.1	72 34.7	39 63	93.1	73 06.4	31 63	88.3	73 23.6	26 63	85.0
7	71 32.4	43 63	95.1	71 57.0	39 63	92.2	72 28.6	32 63	87.6	72 46.0	26 63	84.4
8	70 54.8	43 63	94.2	71 19.2	39 63	91.4	71 50.9	32 63	86.9	72 08.5	27 63	83.8
9	70 17.1	43 63	93.3	70 41.5	39 63	90.6	71 13.2	32 63	86.3	71 31.0	27 62	83.3
30	69 39.4	43 63	92.4	70 03.7	39 63	89.8	70 35.6	32 63	85.6	70 53.5	28 62	82.7
1	69 01.7	42 63	91.6	69 26.0	39 63	89.0	69 57.9	32 63	85.0	70 16.1	28 62	82.2
2	68 23.9	42 63	90.8	68 48.2	39 63	88.3	69 20.3	33 63	84.4	69 38.7	28 62	81.6
3	67 46.2	42 63	90.0	68 10.5	39 63	87.6	68 42.8	33 63	83.8	69 01.3	29 62	81.1
4	67 08.4	42 63	89.2	67 32.8	39 63	86.9	68 05.3	33 62	83.2	68 24.1	29 62	80.6
35	66 30.6	42 63	88.5	66 55.1	39 63	86.2	67 27.8	34 62	82.6	67 46.8	30 62	80.1
6	65 52.9	42 63	87.8	66 17.4	39 63	85.5	66 50.4	34 62	82.0	67 09.7	30 62	79.6
7	65 15.2	43 63	87.0	65 39.8	39 63	84.9	66 13.0	34 62	81.4	66 32.6	31 62	79.1
8	64 37.5	43 63	86.3	65 02.2	40 63	84.2	65 35.7	35 62	80.9	65 55.5	31 62	78.6
9	63 59.8	43 63	85.7	64 24.7	40 62	83.6	64 58.5	35 62	80.3	65 18.5	32 62	78.1
40	63 22.2	43 63	85.0	63 47.2	40 62	82.9	64 21.3	36 62	79.8	64 41.6	32 61	77.6
1	62 44.6	43 63	84.3	63 09.7	40 62	82.3	63 44.1	36 62	79.2	64 04.8	33 61	77.1
2	62 07.0	44 62	83.7	62 32.3	41 62	81.7	63 07.1	36 62	78.7	63 28.0	33 61	76.6
3	61 29.5	44 62	83.0	61 55.0	41 62	81.1	62 30.1	37 62	78.2	62 51.3	34 61	76.1
4	60 52.1	44 62	82.4	61 17.7	41 62	80.5	61 53.2	37 61	77.6	62 14.7	34 61	75.6
45	60 14.7	44 62	81.8	60 40.5	42 62	79.9	61 16.3	38 61	77.1	61 38.2	35 61	75.2
6	59 37.3	45 62	81.2	60 03.4	42 62	79.4	60 39.6	38 61	76.6	61 01.7	36 61	74.7
7	59 00.1	45 62	80.6	59 26.3	43 62	78.8	60 02.9	39 61	76.1	60 25.3	36 60	74.2
8	58 22.8	45 62	80.0	58 49.3	43 62	78.2	59 26.3	39 61	75.6	59 49.0	37 60	73.7
9	57 45.7	46 62	79.4	58 12.3	43 61	77.7	58 49.7	40 61	75.1	59 12.8	37 60	73.3
50	57 08.6	46 62	78.8	57 35.5	44 61	77.1	58 13.3	40 61	74.5	58 36.7	38 60	72.8
1	56 31.6	46 62	78.2	56 58.7	44 61	76.6	57 36.9	41 60	74.0	58 00.7	38 60	72.3
2	55 54.7	47 61	77.6	56 22.1	45 61	76.0	57 00.7	41 60	73.5	57 24.8	39 60	71.8
3	55 17.9	47 61	77.0	55 45.5	45 61	75.5	56 24.5	42 60	73.0	56 48.9	40 60	71.4
4	54 41.1	47 61	76.5	55 09.0	45 61	74.9	55 48.5	42 60	72.5	56 13.2	40 59	70.9
55	54 04.5	48 61	75.9	54 32.5	46 61	74.4	55 12.5	43 60	72.0	55 37.6	41 59	70.4
6	53 27.9	48 61	75.3	53 56.2	46 60	73.8	54 36.6	43 60	71.5	55 02.1	41 59	70.0
7	52 51.4	49 61	74.8	53 20.0	47 60	73.3	54 00.9	44 59	71.0	54 26.6	42 59	69.5
8	52 15.0	49 60	74.2	52 43.9	47 60	72.8	53 25.2	44 59	70.5	53 51.3	43 59	69.0
9	51 38.7	49 60	73.7	52 07.9	48 60	72.2	52 49.6	45 59	70.1	53 16.1	43 58	68.6
60	51 02.6	50 60	73.1	51 32.0	48 60	71.7	52 14.2	46 59	69.6	52 41.0	44 58	68.1
1	50 26.5	50 60	72.6	50 56.2	49 59	71.2	51 38.9	46 59	69.1	52 06.1	44 58	67.6
2	49 50.5	51 60	72.0	50 20.5	49 59	70.7	51 03.7	47 58	68.6	51 31.2	45 58	67.2
3	49 14.7	51 60	71.5	49 44.9	50 59	70.1	50 28.6	47 58	68.1	50 56.5	46 58	66.7
4	48 38.9	52 59	70.9	49 09.5	50 59	69.6	49 53.6	48 58	67.6	50 21.8	46 58	66.2
65	48 03.3	52 59	70.4	48 34.1	51 59	69.1	49 18.8	48 58	67.1	49 47.4	47 57	65.7
6	47 27.8	53 59	69.8	47 58.9	51 58	68.6	48 44.0	49 58	66.6	49 13.0	47 57	65.3
7	46 52.4	53 59	69.3	47 23.9	52 58	68.0	48 09.5	50 57	66.1	48 38.8	48 57	64.8
8	46 17.1	54 59	68.8	46 48.9	52 58	67.5	47 35.0	50 57	65.6	48 04.7	49 57	64.3
9	45 42.0	54 58	68.2	46 14.1	53 58	67.0	47 00.7	51 57	65.1	47 30.7	49 56	63.9
70	45 07.0	55 58	67.7	45 39.4	53 58	66.5	46 26.5	51 57	64.6	46 56.9	50 56	63.4
1	44 32.2	55 58	67.1	45 04.8	54 57	66.0	45 52.4	52 56	64.1	46 23.2	51 56	62.9
2	43 57.4	56 58	66.6	44 30.4	54 57	65.4	45 18.5	53 56	63.6	45 49.6	51 56	62.4
3	43 22.9	56 57	66.1	43 56.2	55 57	64.9	44 44.8	53 56	63.2	45 16.3	52 55	61.9
4	42 48.4	57 57	65.5	43 22.0	55 57	64.4	44 11.2	54 56	62.7	44 43.0	52 55	61.5
75	42 14.1	57 57	65.0	42 48.1	56 56	63.9	43 37.7	54 56	62.2	44 09.9	53 55	61.0
6	41 40.0	58 57	64.5	42 14.2	57 56	63.4	43 04.4	55 55	61.7	43 37.0	54 55	60.5
7	41 06.0	58 56	63.9	41 40.6	57 56	62.8	42 31.2	55 55	61.2	43 04.2	54 54	60.0
8	40 32.1	59 56	63.4	41 07.0	58 56	62.3	41 58.2	56 55	60.7	42 31.5	55 54	59.5
9	39 58.5	59 56	62.9	40 33.7	58 55	61.8	41 25.4	57 54	60.2	41 59.1	56 54	59.1
80	39 25.0	60 56	62.3	40 00.5	59 55	61.3	40 52.7	57 54	59.7	41 26.8	56 54	58.6
1	38 51.6	60 55	61.8	39 27.5	59 55	60.7	40 20.2	58 54	59.2	40 54.6	57 53	58.1
2	38 18.4	61 55	61.2	38 54.6	60 54	60.2	39 47.9	58 54	58.7	40 22.7	58 53	57.6
3	37 45.4	61 55	60.7	38 21.9	60 54	59.7	39 15.7	59 53	58.1	39 50.9	58 53	57.1
4	37 12.6	62 54	60.2	37 49.4	61 54	59.2	38 43.7	60 53	57.6	39 19.3	59 52	56.6
85	36 39.9	62 54	59.6	37 17.1	62 54	58.6	38 11.9	60 53	57.1	38 47.8	59 52	56.1
6	36 07.4	63 54	59.1	36 44.9	62 53	58.1	37 40.3	61 52	56.6	38 16.6	60 52	55.6
7	35 35.1	63 54	58.5	36 13.0	63 53	57.6	37 08.9	62 52	56.1	37 45.5	61 51	55.1
8	35 03.0	64 53	58.0	35 41.2	63 53	57.1	36 37.6	62 52	55.6	37 14.6	61 51	54.6
9	34 31.1	65 53	57.5	35 09.6	64 52	56.5	36 06.6	63 51	55.1	36 43.9	62 51	54.1
90	33 59.3	65 53	56.9	34 38.2	64 52	56.0	35 35.7	63 51	54.6	36 13.5	63 50	53.6

H.A.	50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	89 30.0	1.0 31	180.0	89 30.0	1.0 30	00.0	88 30.0	1.0 12	00.0	87 00.0	1.0 06	00.0	00
1	89 11.6	63 55	127.9	89 11.9	62 55	51.0	88 22.6	92 32	22.0	86 56.3	98 18	11.1	1
2	88 38.4	38 60	110.8	88 39.1	36 60	67.4	88 03.3	76 44	38.8	86 45.8	92 27	21.3	2
3	88 02.2	27 62	103.6	88 03.4	24 61	73.9	87 36.8	61 51	49.9	86 29.3	84 35	30.1	3
4	87 25.2	22 62	99.6	87 26.8	17 62	77.2	87 06.3	49 54	57.2	86 08.2	76 41	37.5	4
05	86 47.9	19 63	97.0	86 49.9	12 62	79.0	86 33.7	40 57	62.2	85 43.7	68 45	43.5	05
6	86 10.3	17 63	95.2	86 12.8	09 62	80.1	85 59.7	34 58	65.7	85 16.6	60 48	48.2	6
7	85 32.7	16 63	93.7	85 35.5	07 62	80.8	85 25.0	28 59	68.2	84 47.5	53 51	52.1	7
8	84 55.0	15 63	92.5	84 58.2	04 62	81.2	84 49.7	24 59	70.0	84 17.1	48 52	55.2	8
9	84 17.2	15 63	91.5	84 20.9	03 62	81.4	84 14.0	20 60	71.4	83 45.6	42 54	57.8	9
10	83 39.5	15 63	90.6	83 43.6	01 62	81.5	83 38.1	17 60	72.5	83 13.3	38 55	59.9	10
1	83 01.7	15 63	89.8	83 06.2	00 62	81.6	83 02.0	14 60	73.3	82 40.4	34 56	61.6	1
2	82 24.0	15 63	89.1	82 28.8	02 62	81.5	82 25.8	12 61	73.9	82 06.9	30 56	63.0	2
3	81 46.2	15 63	88.4	81 51.5	03 62	81.4	81 49.5	09 61	74.4	81 33.1	27 57	64.2	3
4	81 08.5	15 63	87.8	81 14.2	04 62	81.3	81 13.1	07 61	74.7	80 59.0	24 57	65.1	4
15	80 30.8	15 63	87.2	80 36.9	05 62	81.1	80 36.7	06 61	75.0	80 24.6	21 58	65.9	15
6	79 53.1	16 63	86.6	79 59.6	06 62	80.9	80 00.2	04 61	75.1	79 50.0	18 58	66.6	6
7	79 15.4	16 63	86.0	79 22.3	07 62	80.7	79 23.7	02 61	75.3	79 15.3	16 58	67.2	7
8	78 37.7	16 63	85.5	78 45.0	08 62	80.4	78 47.1	01 61	75.3	78 40.4	14 58	67.6	8
9	78 00.1	17 63	85.0	78 07.8	09 62	80.2	78 10.6	01 61	75.3	78 05.5	12 58	68.0	9
20	77 22.5	17 63	84.5	77 30.6	10 62	79.9	77 34.1	02 61	75.3	77 30.4	10 59	68.3	20
1	76 44.9	18 63	84.0	76 53.5	11 62	79.6	76 57.6	03 61	75.2	76 55.3	08 59	68.6	1
2	76 07.4	18 62	83.5	76 16.4	11 62	79.3	76 21.1	04 61	75.1	76 20.1	06 59	68.8	2
3	75 29.9	19 62	83.0	75 39.3	12 62	79.0	75 44.6	05 61	75.0	75 44.9	05 59	68.9	3
4	74 52.4	19 62	82.5	75 02.2	13 62	78.7	75 08.1	07 61	74.8	75 09.7	03 59	69.0	4
25	74 15.0	20 62	82.0	74 25.2	14 62	78.4	74 31.7	08 61	74.7	74 34.4	02 59	69.0	25
6	73 37.6	21 62	81.6	73 48.2	15 62	78.1	73 55.3	09 61	74.5	73 59.1	00 59	69.1	6
7	73 00.3	21 62	81.1	73 11.3	16 61	77.7	73 18.9	10 61	74.3	73 23.9	01 59	69.1	7
8	72 23.0	22 62	80.7	72 34.4	16 61	77.4	72 42.6	11 60	74.1	72 48.6	02 59	69.0	8
9	71 45.8	22 62	80.2	71 57.6	17 61	77.1	72 06.3	12 60	73.8	72 13.4	04 59	69.0	9
30	71 08.6	23 62	79.8	71 20.8	18 61	76.7	71 30.1	13 60	73.6	71 38.1	05 59	68.9	30
1	70 31.5	23 62	79.3	70 44.1	19 61	76.4	70 53.9	14 60	73.4	71 02.9	06 59	68.8	1
2	69 54.4	24 62	78.9	70 07.5	19 61	76.0	70 17.7	15 60	73.1	70 27.7	07 59	68.7	2
3	69 17.4	25 62	78.4	69 30.9	20 61	75.6	69 41.6	16 60	72.8	69 52.6	09 59	68.5	3
4	68 40.4	25 62	78.0	68 54.3	21 61	75.3	69 05.6	17 60	72.5	69 17.5	10 58	68.4	4
35	68 03.5	26 61	77.5	68 17.8	22 61	74.9	68 29.6	17 60	72.3	68 42.4	11 58	68.2	35
6	67 26.7	26 61	77.1	67 41.4	22 61	74.6	67 53.7	18 60	72.0	68 07.4	12 58	68.0	6
7	66 49.9	27 61	76.7	67 05.0	23 60	74.2	67 17.8	19 60	71.7	67 32.4	13 58	67.8	7
8	66 13.2	28 61	76.2	66 28.7	24 60	73.8	66 42.0	20 60	71.4	66 57.4	14 58	67.6	8
9	65 36.6	28 61	75.8	65 52.5	25 60	73.4	66 06.2	21 59	71.0	66 22.6	15 58	67.4	9
40	65 00.0	29 61	75.3	65 16.3	25 60	73.1	65 30.6	22 59	70.7	65 47.7	16 58	67.2	40
1	64 23.5	30 61	74.9	64 40.3	26 60	72.7	64 54.9	23 59	70.4	65 13.0	17 58	66.9	1
2	63 47.1	30 61	74.5	64 04.3	27 60	72.3	64 19.4	24 59	70.1	64 38.3	18 58	66.7	2
3	63 10.8	31 60	74.0	63 28.3	28 60	71.9	63 43.9	24 59	69.7	64 03.6	19 58	66.4	3
4	62 34.5	31 60	73.6	62 52.5	28 60	71.5	63 08.6	25 59	69.4	63 29.1	20 58	66.1	4
45	61 58.3	32 60	73.2	62 16.7	29 59	71.1	62 33.3	26 59	69.1	62 54.6	21 57	65.9	45
6	61 22.2	33 60	72.7	61 41.0	30 59	70.7	61 58.0	27 59	68.7	62 20.1	22 57	65.6	6
7	60 46.2	33 60	72.3	61 05.4	31 59	70.3	61 22.9	28 58	68.4	61 45.8	23 57	65.3	7
8	60 10.3	34 60	71.9	60 29.9	31 59	70.0	60 47.8	28 58	68.0	61 11.5	24 57	65.0	8
9	59 34.4	35 60	71.4	59 54.5	32 59	69.6	60 12.9	29 58	67.7	60 37.3	25 57	64.7	9
50	58 58.7	35 59	71.0	59 19.1	33 59	69.2	59 38.0	30 58	67.3	60 03.2	26 57	64.4	50
1	58 23.0	36 59	70.6	58 43.9	33 59	68.8	59 03.2	31 58	66.9	59 29.2	27 57	64.1	1
2	57 47.5	37 59	70.1	58 08.7	34 58	68.4	58 28.5	32 58	66.6	58 55.3	28 56	63.8	2
3	57 12.0	37 59	69.7	57 33.7	35 58	68.0	57 53.9	32 57	66.2	58 21.5	29 56	63.5	3
4	56 36.7	38 59	69.2	56 58.7	36 58	67.5	57 19.4	33 57	65.8	57 47.7	30 56	63.2	4
55	56 01.4	39 59	68.8	56 23.9	36 58	67.1	56 45.0	34 57	65.4	57 14.1	30 56	62.8	55
6	55 26.3	39 58	68.4	55 49.2	37 58	66.7	56 10.7	35 57	65.1	56 40.5	31 56	62.5	6
7	54 51.2	40 58	67.9	55 14.5	38 58	66.3	55 36.6	36 57	64.7	56 07.1	32 56	62.2	7
8	54 16.3	41 58	67.5	54 40.0	39 57	65.9	55 02.5	36 57	64.3	55 33.8	33 55	61.8	8
9	53 41.4	41 58	67.0	54 05.6	39 57	65.5	54 28.5	37 56	63.9	55 00.5	34 55	61.5	9
60	53 06.7	42 58	66.6	53 31.3	40 57	65.1	53 54.7	38 56	63.5	54 27.4	35 55	61.1	60
1	52 32.1	43 57	66.2	52 57.1	41 57	64.6	53 20.9	39 56	63.1	53 54.4	36 55	60.8	1
2	51 57.7	43 57	65.7	52 23.1	41 57	64.2	52 47.3	39 56	62.7	53 21.5	36 55	60.4	2
3	51 23.3	44 57	65.3	51 49.1	42 56	63.8	52 13.8	40 56	62.3	52 48.7	37 54	60.1	3
4	50 49.1	45 57	64.8	51 15.3	43 56	63.4	51 40.4	41 55	61.9	52 16.1	38 54	59.7	4
65	50 15.0	45 57	64.4	50 41.6	44 56	63.0	51 07.2	42 55	61.5	51 43.5	39 54	59.3	65
6	49 41.0	46 56	63.9	50 08.0	44 56	62.5	50 34.1	43 55	61.1	51 11.1	40 54	58.9	6
7	49 07.2	47 56	63.5	49 34.6	45 56	62.1	50 01.1	43 55	60.7	50 38.8	41 54	58.6	7
8	48 33.4	47 56	63.0	49 01.3	46 55	61.7	49 28.2	44 55	60.3	50 06.7	41 53	58.2	8
9	47 59.9	48 56	62.6	48 28.1	46 55	61.2	48 55.5	45 54	59.9	49 34.7	42 53	57.8	9
70	47 26.4	49 56	62.1	47 55.1	47 55	60.8	48 22.9	46 54	59.5	49 02.8	43 53	57.4	70
1	46 53.1	49 55	61.6	47 22.2	48 55	60.4	47 50.4	46 54	59.0	48 31.0	44 53	57.0	1
2	46 20.0	50 55	61.2	46 49.5	48 54	59.9	47 18.1	47 54	58.6	47 59.4	45 52	56.6	2
3	45 47.0	51 55	60.7	46 16.9	49 54	59.5	46 46.0	48 53	58.2	47 27.9	46 52	56.3	3
4	45 14.1	51 54	60.3	45 44.4	50 54	59.0	46 13.9	48 53	57.8	46 56.6	46 52	55.9	4
75	44 41.4	52 54	59.8	45 12.1	51 54	58.6	45 42.1	49 53	57.3	46 25.5	47 52	55.5	75
6	44 08.8	53 54	59.3	44 40.0	51 53	58.1	45 10.4	50 53	56.9	45 54.4	48 51	55.0	6
7	43 36.4	53 54	58.9	44 08.0	52 53	57.7	44 38.8	51 52	56.5	45 23.6	49 51	54.6	7
8	43 04.2	54 53	58.4	43 36.2	53 53	57.2	44 07.4	51 52	56.0	44 52.8	50 51	54.2	8
9	42 32.1	55 53	57.9	43 04.5	53 52	56.8	43 36.2	52 52	55.6	44 22.3	50 51	53.8	9
80	42 00.2	55 53	57.5	42 33.0	54 52	56.3	43 05.1	53 52	55.2	43 51.9	51 50	53.4	80
1	41 28.5	56 53	57.0	42 01.6	55 52	55.9	42 34.2	54 51	54.7	43 21.6	52 50	53.0	1
2	40 56.9	56 52	56.5	41 30.5	55 52	55.4	42 03.4	54 51	54.3	42 51.6	53 50	52.6	2
3	40 25.5	57 52	56.0	40 59.5	56 51	54.9	41 32.8	55 51	53.8	42 21.7	53 50	52.1	3
4	39 54.3	58 52	55.6	40 28.7	57 51	54.5	41 02.5	56 50	53.4	41 52.0	54 49	51.7	4
85	39 23.2	58 51	55.1	39 58.0	58 51	54.0	40 32.2	57 50	52.9	41 22.4	55 49	51.3	85
6	38 52.3	59 51	54.6	39 27.6	58 50	53.5	40 02.2	57 50	52.5	40 53.0	56 49	50.9	6
7	38 21.7	60 51	54.1	38 57.3	59 50	53.1	39 32.3	58 49	52.0	40 23.8	56 48	50.4	7
8	37 51.2	60 50	53.6	38 27.2	60 50	52.6	39 02.7	59 49	51.6	39 54.8	57 48	50.0	8
9	37 20.9	61 50	53.1	37 57.3	60 50	52.1	38 33.2	59 49	51.1	39 26.0	58 48	49.5	9
90	36 50.8	62 50	52.6	37 27.6	61 49	51.7	38 03.9	60 48	50.6	38 57.4	59 47	49.1	90

Digitized by Google

Lat. 51°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	33 27.8	66 52	56.4	34 07.0	65 52	55.5	35 05.0	64 51	54.1	35 43.2	63 50	53.1	36 20.8	62 50	52.1	36 58.1	62 49	51.2	37 34.8	61 48	50.2	38 28.9	59 47	48.7	91
2	32 56.5	66 52	55.8	33 36.0	66 51	54.9	34 34.5	65 50	53.5	35 13.1	64 50	52.6	35 51.1	63 49	51.7	36 28.7	62 48	50.7	37 05.9	61 48	49.7	38 00.7	60 47	48.2	2
3	32 25.3	67 52	55.3	33 05.2	66 51	54.4	34 04.3	65 50	53.0	34 43.2	64 49	52.1	35 21.6	64 49	51.2	35 59.6	63 48	50.2	36 37.2	62 48	49.2	37 32.6	61 46	47.8	3
4	31 54.4	67 51	54.7	32 34.6	67 51	53.8	33 34.2	66 50	52.5	34 13.5	65 49	51.6	34 52.3	64 48	50.7	35 30.7	64 48	49.7	36 08.7	63 47	48.8	37 04.8	62 46	47.3	4
95	31 23.7	68 51	54.2	32 04.2	67 50	53.3	33 04.4	66 49	52.0	33 44.0	66 49	51.1	34 23.2	65 48	50.2	35 02.0	64 48	49.2	35 40.4	64 47	48.3	36 37.1	62 46	46.8	95
6	30 53.2	68 50	53.6	31 34.1	68 50	52.8	32 34.7	67 49	51.4	33 14.7	66 48	50.6	33 54.3	66 48	49.7	34 33.5	65 47	48.7	35 12.3	64 46	47.8	36 09.7	63 45	46.4	6
7	30 22.9	69 50	53.1	31 04.1	68 50	52.2	32 05.3	68 49	50.9	32 45.7	67 48	50.0	33 25.6	66 47	49.2	34 05.2	66 47	48.3	34 44.4	65 46	47.3	35 42.4	64 45	45.9	7
8	29 52.8	70 50	52.5	30 34.4	69 49	51.7	31 36.1	68 48	50.4	32 16.8	68 48	49.5	32 57.2	67 47	48.6	33 37.2	66 46	47.8	34 16.8	66 46	46.8	35 15.4	65 45	45.5	8
9	29 23.0	70 49	51.9	30 04.9	70 49	51.1	31 07.1	69 48	49.9	31 48.2	68 47	49.0	32 29.0	68 47	48.1	33 09.3	67 46	47.3	33 49.3	66 45	46.4	34 48.6	65 44	45.0	9
100	28 53.4	71 49	51.4	29 35.6	70 48	50.6	30 38.4	69 48	49.3	31 19.8	69 47	48.5	32 01.0	68 46	47.6	32 41.7	68 46	46.8	33 22.1	67 45	45.9	34 22.0	66 44	44.5	100
1	28 24.0	71 49	50.8	29 06.5	71 48	50.0	30 09.9	70 47	48.8	30 51.7	69 47	48.0	31 33.2	69 46	47.1	32 14.3	68 45	46.3	32 55.1	68 45	45.4	33 55.6	67 44	44.1	1
2	27 54.8	72 48	50.3	28 37.7	71 48	49.5	29 41.6	71 47	48.3	30 23.7	70 46	47.4	31 05.6	70 46	46.6	31 47.2	69 45	45.8	32 28.4	68 44	44.9	33 29.5	67 43	43.6	2
3	27 25.9	72 48	49.7	28 09.2	72 47	48.9	29 13.5	71 46	47.7	29 56.1	71 46	46.9	30 38.3	70 45	46.1	31 20.2	70 44	45.2	32 01.8	69 44	44.4	33 03.6	68 43	43.1	3
4	26 57.2	73 47	49.1	27 40.8	72 47	48.4	28 45.7	72 46	47.2	29 28.6	71 45	46.4	30 11.2	71 45	45.6	30 53.5	70 44	44.7	31 35.5	70 43	43.9	32 37.9	69 42	42.6	4
105	26 28.8	73 47	48.6	27 12.7	73 46	47.8	28 18.1	72 46	46.6	29 01.4	72 45	45.8	29 44.4	71 44	45.0	30 27.1	71 44	44.2	31 09.5	70 43	43.4	32 12.4	70 42	42.1	105
6	26 00.6	74 47	48.0	26 44.9	74 46	47.2	27 50.8	73 45	46.1	28 34.4	72 45	45.3	29 17.8	72 44	44.5	30 00.9	72 43	43.7	30 43.6	71 43	42.9	31 47.2	70 42	41.7	6
7	25 32.7	75 46	47.4	26 17.3	74 46	46.7	27 23.7	74 45	45.5	28 07.7	73 44	44.8	28 51.4	73 44	44.0	29 34.9	72 43	43.2	30 18.1	72 42	42.4	31 22.2	71 41	41.2	7
8	25 05.0	75 46	46.8	25 49.9	75 45	46.1	26 56.9	74 44	45.0	27 41.2	74 44	44.2	28 25.3	73 43	43.5	29 09.2	73 42	42.7	29 52.7	72 42	41.9	30 57.5	72 41	40.7	8
9	24 37.6	76 45	46.3	25 22.9	75 45	45.5	26 30.3	75 44	44.4	27 15.0	74 43	43.7	27 59.5	74 43	42.9	28 43.7	73 42	42.2	29 27.6	73 41	41.4	30 33.0	72 40	40.2	9
110	24 10.5	76 45	45.7	24 56.0	76 44	45.0	26 04.0	75 43	43.9	26 49.1	75 43	43.1	27 33.9	74 42	42.4	28 18.5	74 42	41.6	29 02.8	74 41	40.9	30 08.8	73 40	39.7	110
1	23 43.6	77 44	45.1	24 29.5	76 44	44.4	25 38.0	76 43	43.3	26 23.4	75 42	42.6	27 08.6	75 42	41.9	27 53.5	75 41	41.1	28 38.2	74 41	40.4	29 44.8	74 40	39.2	1
2	23 17.0	77 44	44.5	24 03.2	77 43	43.8	25 12.2	76 42	42.8	25 58.0	76 42	42.0	26 43.5	76 41	41.3	27 28.8	75 41	40.6	28 13.9	75 40	39.8	29 21.0	74 39	38.7	2
3	22 50.6	78 43	43.9	23 37.2	77 43	43.3	24 46.7	77 42	42.2	25 32.8	77 41	41.5	26 18.7	76 41	40.8	27 04.4	76 40	40.1	27 49.8	76 40	39.3	28 57.6	75 39	38.2	3
4	22 24.6	78 43	43.3	23 11.5	78 42	42.7	24 21.5	78 42	41.6	25 07.9	77 41	40.9	25 54.2	77 40	40.2	26 40.2	77 40	39.5	27 26.0	76 39	38.8	28 34.3	76 38	37.7	4
115	21 58.8	79 42	42.8	22 46.0	79 42	42.1	23 56.5	78 41	41.1	24 43.3	78 41	40.4	25 29.9	78 40	39.7	26 16.3	77 39	39.0	27 02.5	77 39	38.3	28 11.4	76 38	37.2	115
6	21 33.3	79 42	42.2	22 20.8	79 41	41.5	23 31.9	79 41	40.5	24 19.0	78 40	39.8	25 06.0	78 40	39.1	25 52.7	78 39	38.5	26 39.3	77 38	37.7	27 48.7	77 37	36.7	6
7	21 08.1	80 42	41.6	21 56.0	80 41	40.9	23 07.5	79 40	39.9	23 55.0	79 40	39.3	24 42.3	79 39	38.6	25 29.4	78 38	37.9	26 16.3	78 38	37.2	27 26.3	78 37	36.2	7
8	20 43.2	80 41	41.0	21 31.4	80 40	40.3	22 43.4	80 40	39.4	23 31.2	80 39	38.7	24 18.8	79 39	38.0	25 06.3	79 38	37.4	25 53.6	79 37	36.7	27 04.1	78 36	35.6	8
9	20 18.6	81 40	40.4	21 07.1	81 40	39.8	22 19.6	80 39	38.8	23 07.7	80 39	38.1	23 55.7	80 38	37.5	24 43.5	80 38	36.8	25 31.2	79 37	36.2	26 42.3	79 36	35.1	9
120	19 54.3	81 40	39.8	20 43.1	81 39	39.2	21 56.1	81 39	38.2	22 44.6	81 38	37.6	23 32.9	80 38	36.9	24 21.0	80 37	36.3	25 09.0	80 36	35.6	26 20.7	79 36	34.6	120
1	19 30.3	82 40	39.2	20 19.4	82 39	38.6	21 32.9	81 38	37.6	22 21.7	81 38	37.0	23 10.3	81 37	36.4	23 58.8	81 37	35.7	24 47.2	80 36	35.1	25 59.4	80 35	34.1	1
2	19 06.6	83 39	38.6	19 56.0	82 38	38.0	21 10.0	82 38	37.1	21 59.1	82 37	36.4	22 48.1	82 37	35.8	23 36.9	81 36	35.2	24 25.6	81 35	34.5	25 38.4	81 35	33.6	2
3	18 43.2	83 38	38.0	19 32.9	83 38	37.4	20 47.4	83 37	36.5	21 36.8	82 37	35.9	22 26.1	82 36	35.2	23 15.3	82 36	34.6	24 04.4	82 35	34.0	25 17.6	81 34	33.0	3
4	18 20.1	84 38	37.4	19 10.2	83 37	36.8	20 25.1	83 37	35.9	21 14.9	83 36	35.3	22 04.5	83 36	34.7	22 54.0	82 35	34.1	23 43.4	82 34	33.5	24 57.2	82 34	32.5	4
125	17 57.4	84 37	36.7	18 47.7	84 37	36.2	20 03.1	84 36	35.3	20 53.2	83 36	34.7	21 43.2	83 35	34.1	22 33.0	83 34	33.5	23 22.7	83 34	32.9	24 37.0	82 33	32.0	125
6	17 34.9	85 37	36.1	18 25.6	84 36	35.6	19 41.4	84 36	34.7	20 31.9	84 35	34.1	21 22.2	84 34	33.5	22 12.3	84 34	33.0	23 02.4	83 33	32.4	24 17.2	83 33	31.4	6
7	17 12.8	85 36	35.5	18 03.8	85 36	35.0	19 20.1	85 35	34.1	20 10.8	84 35	33.5	21 01.4	84 34	33.0	21 51.9	84 33	32.4	22 42.3	84 33	31.8	23 57.6	84 32	30.9	7
8	16 51.1	86 36	34.9	17 42.3	85 35	34.3	18 59.1	85 34	33.5	19 50.1	85 34	33.0	20 41.1	85 33	32.4	21 31.9	85 33	31.8	22 22.6	84 32	31.2	23 38.4	84 32	30.4	8
9	16 29.6	86 35	34.3	17 21.2	86 35	33.7	18 38.4	86 34	32.9	19 29.7	85 33	32.4	20 21.0	85 33	31.8	21 12.1	85 32	31.3	22 03.1	85 32	30.7	23 19.5	85 31	29.8	9
130	16 08.6	86 35	33.6	17 00.4	86 34	33.1	18 18.0	86 33	32.3	19 09.7	86 33	31.8	20 01.2	86 32	31.2	20 52.7	86 32	30.7	21 44.0	85 31	30.1	23 00.8	85 31	29.3	130
1	15 47.8	87 34	33.0	16 40.0	87 34	32.5	17 58.0	87 33	31.7	18 50.0	86 32	31.2	19 41.8	86 32	30.7	20 33.6	86 31	30.1	21 25.2	86 31	29.6	22 42.5	86 30	28.7	1
2	15 27.4	87 33	32.4	16 19.8	87 33	31.9	17 38.3	87 32	31.1	18 30.6	87 32	30.6	19 22.7	87 31	30.1	20 14.8	87 31	29.5	21 06.8	87 30	29.0	22 24.5	86 29	28.2	2
3	15 07.4	88 33	31.8	16 00.1	88 32	31.3	17 19.0	88 32	30.5	18 11.5	87 31	30.0	19 04.0	87 31	29.5	19 56.3	87 30	29.0	20 48.6	87 30	28.4	22 06.8	87 29	27.6	3
4	14 47.7	88 32	31.1	15 40.7	88 32	30.6	17 00.0	88 31	29.9	17 52.8	88 31	29.4	18 45.6	88 30	28.9	19 38.2	88 30	28.4	20 30.8	88 29	27.9	21 49.5	87 28	27.1	4
135	14 28.3	89 32	30.5	15 21.6	89 31	30.0	16 41.4	89 30	29.3	17 34.5	88 30	28.8	18 27.5	88 30	28.3	19 20.4	88 29	27.8	20 13.3	88 29	27.3	21 32.4	88 28	26.5	135
6	14 09.4	89 31	29.8	15 02.9	89 31	29.4	16 23.1	89 30	28.7	17 16.5	89 29	28.2	18 09.8	89 29	27.7	19 03.0	89 29	27.2	19 56.2	89 28	26.7	21 15.7	88 27	26.0	6
7	13 50.8	90 30	29.2	14 44.5	90 30	28.7	16 05.1	89 29	28.1	16 58.8	89 29	27.6	17 52.4	89 28	27.1	18 45.9	89 28	26.6	19 39.3	89 27	26.2	20 59.4	89 27	25.4	7
8	13 32.5	90 30	28.6	14 26.6	90 29	28.1	15 47.6	90 29	27.4	16 41.5	90 28	27.0	17 35.3	90 28	26.5	18 29.1	90 27	26.1	19 22.9	89 27	25.6	20 43.3	89 26	24.9	8
9	13 14.7	91 29	27.9	14 09.0	90 29	27.5	15 30.3	90 28	26.8	16 24.5	90 28	26.4	17 18.7	90 27	25.9	18 12.7	90 27	25.5	19 06.7	90 26	25.0	20 27.6	90 26	24.3	9
140	12 57.2	91 29	27.3	13 51.7	91 28	26.8	15 13.5	91 27	26.2	16 07.9	91 27	25.8	17 02.3	91 27	25.3	17 56.7	91 26	24.9	18 50.9	90 26	24.4	20 12.2	90 25	23.7	140
1	12 40.0	91 28	26.6	13 34.9	91 27	26.2	14 57.0	91 27	25.6	15 51.7	91 26	25.1	16 46.4	91 26	24.7	17 41.0	91 26	24.3	18 35.5	91 25	23.8	19 57.2	91 24	23.2	1
2	12 23.3	92 27	26.0	13 18.4	92 27	25.6	14 40.9	92 26	24.9	15 35.9	92 26	24.5	16 30.8	91 25	24.1	17 25.6	91 25	23.7	18 20.4	91 25	23.3	19 42.5	91 24	22.6	2
3	12 07.0	92 27	25.3	13 02.3	92 26	24.9	14 25.2	92 26	24.3	15 20.4	92 25	23.9	16 15.5	92 25	23.5	17 10.6	92 24	23.1	18 05.7	92 24	22.7	19 28.2	92 23	22.0	3
4	11 51.0	93 26	24.7	12 46.6	93 26	24.3	14 09.8	92 25	23.7	15 05.2	92 25	23.3	16 00.6	92 24	22.9	16 56.0	92 24	22.5	17 51.3	92 23	22.1	19 14.2	92 23	21.5	4
145	11 35.5	93 25	24.0	12 31.2	93 25	23.6	13 54.8	93 24	23.1	14 50.5	93 24	22.7	15 46.1	93 24	22.3	16 41.7	93 23	21.9	17 37.3	93 23	21.5	19 00.5	92 22	20.9	145
6	11 20.3	93 25	23.3	12 16.3	93 24	23.0	13 40.2	93 24	22.4	14 36.1	93 23	22.0	15 32.0	93 23	21.7	16 27.9	93 23	21.3	17 23.6	93 22	20.9	18 47.2	93 22	20.3	6
7	11 05.6	94 24	22.7	12 01.8	94 24	22.3	13 26.0	94 23	21.8	14 22.2	94 23	21.4	15 18.3	93 22	21.0	16 14.3	93 22	20.7	17 10.4	93 22	20.3	18 34.3	93 21	19.7	7
8	10 51.2	94 23	22.0	11 47.6	94 23	21.7	13 12.2	94 22	21.1	14 08.6	94 22	20.8	15 04.9	94 22	20.4	16 01.2	94 21	20.1	16 57.4	94 21	19.7	18 21.7	94 20	19.2	8
9	10 37.3	94 23	21.3	11 33.9	94 22	21.0	12 58.8	94 22	20.5	13 55.4	94 21	20.2	14 51.9	94 21	19.8	15 48.4	94 21	19.5	16 44.9	94 20	19.1	18 09.5	94 20	18.6	9
150	10 23.7	95 22	20.7	11 20.6	95 22	20.4	12 45.8	95 21	19.9	13 42.5	95 21	19.5	14 39.3	95 20	19.2	15 36.0	95 20	18.9	16 32.7	94 20	18.5	17 57.7	94 19	18.0	150
1	10 10.6	95 21	20.0	11 07.6	95 21	19.7	12 33.1	95 20	19.2	13 30.1	95 20	18.9	14 27.1	95 20	18.6	15 24.0	95 19	18.2	16 20.9	95 19	17.9	17 46.2	95 19	17.4	1
2	9 57.9	95 20	19.3	10 55.1	95 20	19.0	12 20.9	95 20	18.6	13 18.1	95 19	18.3	14 15.3	95 19	17.9	15 12.4	95 19	17.6	16 09.5	95 18	17.3	17 35.1	95 18	16.8	2
3	9 45.6	96 20	18.7	10 43.0	96 19	18.4	12 09.1	96 19	17.9	13 06.5	96 19	17.6	14 03.8	96 18	17.3	15 01.1	96 18	17.0	15 58.4	95 18	16.7	17 24.3	95 17	16.2	3
4	9 33.7	96 19	18.0	10 31.3	96 19	17.7	11 57.7	96 18	17.3	12 55.2	96 18	17.0	13 52.8	96 18	16.7	14 50.3	96 17	16.4	15 47.8	96 17	16.1	17 14.0	96 17	15.7	4
155	9 22.3	96 18	17.3	10 20.0	96 18	17.0	11 46.7	96 18	16.6	12 44.4	96 17	16.3	13 42.1	96 17	16.1	14 39.8	96 17	15.8	15 37.5	96 16	15.5	17 04.0	96 16	15.1	155
6	9 11.2	97 18	16.6	10 09.2	97 17	16.4	11 36.1	97 17	16.0	12 34.0	97 17	15.7	13 31.9	96 16	15.4	14 29.7	96 16	15.2	15 27.6	96 16	14.9	16 54.3	96 15	14.5	6
7	9 00.7	97 17	16.0	9 58.8	97 17	15.7	11 25.9	97 16	15.3	12 24.0	97 16	15.1	13 22.0	97 16	14.8	14 20.1	97 15	14.5	15 18.1	97 15	14.3	16 45.1	97 15	13.9	7
8	8 50.5	97 16	15.3	9 48.8	97 16	15.0	11 16.1	97 16	14.7	12 14.4	97 15	14.4	13 12.6	97 15	14.2	14 10.8	97 15	13.9	15 09.0	97 15	13.7	16 36.2	97 14	13.3	8
9	8 40.8	97 16	14.6	9 39.2	97 15	14.4	11 06.8	97 15	14.0	12 05.2	97 15	13.8	13 03.5	97 14	13.5	14 01.9	97 14	13.3	15 00.3	97 14	13.1	16 27.8	97 14	12.7	9
160	8 31.5	98 15	13.9	9 30.0	98 15	13.7	10 57.9	98 14	13.3	11 56.4	98 14	13.1	12 54.9	98 14	12.9	13 53.4	98 13	12.7	14 51.9	97 13	12.4	16 19.6	97 13	12.1	160
1	8 22.6	98 14	13.2	9 21.3	98 14	13.0	10 49.3	98 13	12.7	11 48.0	98 13	12.5	12 46.7	98 13	12.3	13 45.3	98 13	12.0	14 44.0	98 13	11.8	16 11.9	98 12	11.5	1
2	8 14.2	98 13	12.5	9 13.0	98 13	12.3	10 41.3	98 13	12.0	11 40.1	98 13	11.8	12 38.9	98 12	11.6	13 37.7	98 12	11.4	14 36.5	98 12	11.2	16 04.6	98 12	10.9	2
3	8 06.2	98 13	11.8	9 05.2	98 12	11.6	10 33.6	98 12	11.4	11 32.5	98 12	11.2	12 31.5	98 12	11.0	13 30.4	98 11	10.8	14 29.3	98 11	10.6	15 57.7	98 11	10.3	3
4	7 58.7	98 12	11.1	8 57.8	98 12	11.0	10 26.4	98 11	10.7	11 25.4	98 11	10.5	12 24.5	98 11	10.3	13 23.5	98 11	10.2	14 22.6	98 11	10.0	15 51.1	98 10	09.7	4
165	7 51.6	99 11	10.5	8 50.8	99 11	10.3	10 19.6	99 11	10.0	11 18.8	99 10	09.9	12 17.9	99 10	09.7	13 17.1	99 10	09.5	14 16.2	99 10	09.4	15 44.9	99 10	09.1	165
6	7 45.0	99 10	09.8	8 44.3	99 10	09.6	10 13.2	99 10	09.4	11 12.5	99 10	09.2	12 11.8	99 10	09.1	13 11.0	99 09	08.9	14 10.3	99 09	08.7	15 39.2	99 09	08.5	6
7	7 38.8	99 10	09.1	8 38.2	99 09	08.9	10 07.3	99 09	08.7	11 06.7	99 09	08.6	12 06.0	99 09	08.4	13 05.4	99 09	08.3	14 04.8	99 09	08.1	15 33.8	99 08	07.9	7
8	7 33.1	99 09	08.4	8 32.6	99 09	08.2	10 01.8	99 08	08.0	11 01.3	99 08	07.9	12 00.7	99 08	07.8	13 00.2	99 08	07.6	13 59.6	99 08	07.5	15 28.8	99 08	07.3	8
9	7 27.8	99 08	07.7	8 27.4	99 08	07.6	9 56.7	99 08	07.4	10 56.3	99 08	07.3	11 55.8	99 07	07.1	12 55.4	99 07	07.0	13 54.9	99 07	06.9	15 24.2	99 07	06.7	9
170	7 23.0	99 07	07.0	8 22.6	99 07	06.9	9 52.1	99 07	06.7	10 51.7	99 07	06.6	11 51.3	99 07	06.5	12 51.0	99 07	06.4	13 50.6	99 07	06.3	15 20.0	99 06	06.1	170
1	7 18.6	1.0 07	06.3	8 18.4	1.0 06	06.2	9 47.9	99 06	06.0	10 47.6	99 06	05.9	11 47.3	99 06	05.8	12 47.0	99 06	05.7	13 46.7	99 06	05.6	15 16.2	99 06	05.5	1
2	7 14.7	1.0 06	05.6	8 14.5	1.0 06	05.5	9 44.1	1.0 06	05.4	10 43.9	1.0 05	05.3	11 43.7	1.0 05	05.2	12 43.4	1.0 05	05.1	13 43.2	1.0 05	05.0	15 12.8	1.0 05	04.9	2
3	7 11.3	1.0 05	04.9	8 11.1	1.0 05	04.8	9 40.8	1.0 05	04.7	10 40.7	1.0 05	04.6	11 40.5	1.0 05	04.5	12 40.3	1.0 05	04.5	13 40.1	1.0 04	04.4	15 09.8	1.0 04	04.3	3
4	7 08.3	1.0 04	04.2	8 08.2	1.0 04	04.1	9 38.0	1.0 04	04.0	10 37.8	1.0 04	04.0	11 37.7	1.0 04	03.9	12 37.6	1.0 04	03.8	13 37.4	1.0 04	03.8	15 07.2	1.0 04	03.6	4
175	7 05.8	1.0 03	03.5	8 05.7	1.0 03	03.4	9 35.5	1.0 03	03.4	10 35.4	1.0 03	03.3	11 35.3	1.0 03	03.2	12 35.3	1.0 03	03.2	13 35.2	1.0 03	03.1	15 05.0	1.0 03	03.0	175
6	7 03.7	1.0 03	02.8	8 03.6	1.0 03	02.8	9 33.5	1.0 03	02.7	10 33.5	1.0 03	02.6	11 33.4	1.0 02	02.6	12 33.4	1.0 02	02.6	13 33.3	1.0 02	02.5	15 03.2	1.0 02	02.4	6
7	7 02.1	1.0 02	02.1	8 02.0	1.0 02	02.1	9 32.0	1.0 02	02.0	10 32.0	1.0 02	02.0	11 31.9	1.0 02	01.9	12 31.9	1.0 02	01.9	13 31.9	1.0 02	01.9	15 01.8	1.0 02	01.8	7
8	7 00.9	1.0 01	01.4	8 00.9	1.0 01	01.4	9 30.9	1.0 01	01.3	10 30.9	1.0 01	01.3	11 30.9	1.0 01	01.3	12 30.8	1.0 01	01.3	13 30.8	1.0 01	01.3	15 00.6	1.0 01	01.2	8
9	7 00.2	1.0 00	00.7	8 00.2	1.0 00	00.7	9 30.2	1.0 00	00.7	10 30.2	1.0 00	00.7	11 30.2	1.0 00	00.6	12 30.2	1.0 00	00.6	13 30.2	1.0 00	00.6	15 00.2	1.0 00	00.6	9
180	7 00.0	1.0 00	00.0	8 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0	10 30.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 30.0	1.0 00	00.0	13 30.0	1.0 00	00.0	15 00.0	1.0 00	00.0	180

Lat. 51°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	86 30.0	1.0 05	00.0	86 00.0	1.0 04	00.0	85 00.0	1.0 04	00.0	84 30.0	1.0 03	00.0	84 00.0	1.0 03	00.0	83 30.0	1.0 03	00.0	82 00.0	1.0 02	00.0	81 30.0	1.0 02	00.0	00
1	86 26.9	98 15	09.4	85 57.3	99 13	08.2	84 57.9	99 10	06.4	84 28.1	99 09	05.7	83 58.3	99 08	05.2	83 28.4	1.0 08	04.7	81 58.8	1.0 06	03.7	81 28.9	1.0 06	03.4	1
2	86 17.8	94 24	18.3	85 49.4	95 21	16.0	84 51.7	97 17	12.6	84 22.5	97 15	11.3	83 53.2	98 14	10.3	83 23.8	98 13	09.4	81 55.1	99 10	07.3	81 25.5	99 09	06.8	2
3	86 03.5	88 31	26.2	85 36.8	90 28	23.1	84 41.5	93 23	18.4	84 13.4	94 21	16.7	83 44.9	95 19	15.2	83 16.2	96 17	13.9	81 49.2	97 14	10.9	81 19.9	98 13	10.2	3
4	85 44.7	81 37	33.1	85 20.0	84 34	29.5	84 27.9	89 28	23.9	84 00.9	91 26	21.7	83 33.5	92 24	19.8	83 05.7	93 22	18.2	81 40.9	95 17	14.4	81 12.2	96 16	13.4	4
05	85 22.5	73 42	38.9	84 59.8	78 38	35.0	84 11.2	84 32	28.8	83 45.6	86 30	26.3	83 19.4	88 28	24.1	82 52.7	90 26	22.2	81 30.4	93 21	17.7	81 02.5	94 19	16.5	05
6	84 57.6	66 45	43.7	84 36.9	71 42	39.7	83 51.7	79 36	33.1	83 27.6	82 34	30.4	83 02.8	84 31	28.0	82 37.3	86 29	25.9	81 18.0	90 24	20.8	80 50.8	91 22	19.5	6
7	84 30.5	60 48	47.7	84 11.8	65 45	43.7	83 30.0	74 39	37.0	83 07.4	77 37	34.2	82 44.0	80 35	31.6	82 19.8	82 32	29.4	81 03.6	87 27	23.8	80 37.3	88 25	22.3	7
8	84 01.9	54 50	51.0	83 44.8	59 47	47.1	83 06.4	68 42	40.4	82 45.3	72 40	37.5	82 23.2	75 37	34.9	82 00.3	78 35	32.5	80 47.5	84 29	26.6	80 22.2	85 28	25.0	8
9	83 31.9	49 52	53.8	83 16.5	54 49	50.0	82 41.1	63 44	43.4	82 21.5	67 42	40.5	82 00.8	71 40	37.8	81 39.2	73 38	35.4	80 29.8	80 32	29.2	80 05.5	82 30	27.5	9
10	83 01.0	44 53	56.0	82 47.1	49 51	52.5	82 14.6	59 46	46.0	81 56.3	63 44	43.1	81 37.0	66 42	40.4	81 16.7	69 40	38.0	80 10.7	77 34	31.6	79 47.4	79 32	29.8	10
1	82 29.4	40 54	58.0	82 16.7	45 52	54.5	81 46.9	54 48	48.3	81 30.0	58 46	45.4	81 11.9	62 44	42.8	80 52.8	65 42	40.3	79 50.3	73 36	33.8	79 28.0	75 34	32.0	1
2	81 57.1	36 55	59.6	81 45.6	41 53	56.3	81 18.2	50 49	50.3	81 02.6	54 47	47.5	80 45.8	58 45	44.9	80 27.9	61 43	42.4	79 28.7	70 38	35.9	79 07.4	72 36	34.0	2
3	81 24.3	32 55	60.9	81 13.9	37 54	57.8	80 48.8	46 50	52.0	80 34.4	50 48	49.3	80 18.7	54 46	46.7	80 01.9	58 45	44.3	79 06.0	66 39	37.8	78 45.8	69 38	35.9	3
4	80 51.1	29 56	62.1	80 41.7	34 54	59.1	80 18.8	43 51	53.5	80 05.4	47 49	50.9	79 50.8	50 48	48.4	79 35.2	54 46	46.0	78 42.4	63 41	39.5	78 23.2	65 39	37.6	4
15	80 17.6	26 56	63.0	80 09.1	31 55	60.2	79 48.2	39 52	54.8	79 35.8	43 50	52.3	79 22.3	47 49	49.8	79 07.7	50 47	47.5	78 18.0	60 42	41.1	77 59.7	62 40	39.2	15
6	79 43.8	23 57	63.9	79 36.2	28 56	61.2	79 17.1	36 52	56.0	79 05.7	40 51	53.5	78 53.1	44 49	51.1	78 39.5	47 48	48.9	77 52.8	56 43	42.5	77 35.5	59 42	40.6	6
7	79 09.8	21 57	64.6	79 03.0	25 56	62.0	78 45.6	33 53	57.0	78 35.1	37 52	54.6	78 23.5	40 50	52.3	78 10.8	44 49	50.1	77 27.0	53 44	43.9	77 10.6	56 43	42.0	7
8	78 35.6	18 57	65.1	78 29.5	22 56	62.7	78 13.7	30 54	57.9	78 04.1	34 52	55.6	77 53.4	38 51	53.3	77 41.6	41 49	51.2	77 00.5	50 45	45.1	76 45.1	53 44	43.2	8
9	78 01.3	16 57	65.6	77 55.9	20 56	63.3	77 41.6	28 54	58.7	77 32.8	31 53	56.4	77 22.9	35 51	54.3	77 12.0	38 50	52.1	76 33.5	47 46	46.2	76 18.9	50 44	44.3	9
20	77 26.8	14 58	66.0	77 22.1	18 57	63.8	77 09.2	25 54	59.3	77 01.2	29 53	57.2	76 52.1	32 52	55.1	76 42.0	35 51	53.0	76 06.1	44 46	47.2	75 52.3	47 45	45.3	20
1	76 52.3	12 58	66.4	76 48.2	16 57	64.2	76 36.7	23 55	59.9	76 29.4	26 53	57.8	76 21.0	29 52	55.8	76 11.7	33 51	53.8	75 38.2	42 47	48.1	75 25.3	44 46	46.3	1
2	76 17.6	10 58	66.7	76 14.1	14 57	64.6	76 03.9	20 55	60.4	75 57.3	24 54	58.4	75 49.7	27 53	56.4	75 41.1	30 51	54.5	75 09.9	39 48	48.9	74 57.8	42 46	47.1	2
3	75 42.9	08 58	66.9	75 40.0	12 57	64.9	75 31.0	18 55	60.9	75 25.0	21 54	58.9	75 18.1	25 53	57.0	75 10.2	28 52	55.1	74 41.3	36 48	49.6	74 29.9	39 47	47.9	3
4	75 08.2	07 58	67.0	75 05.7	10 57	65.1	74 57.9	16 55	61.3	74 52.6	19 54	59.4	74 46.3	22 53	57.5	74 39.2	25 52	55.7	74 12.4	34 49	50.3	74 01.8	37 47	48.6	4
25	74 33.4	05 58	67.2	74 31.5	08 57	65.3	74 24.8	14 55	61.6	74 20.0	17 54	59.7	74 14.4	20 53	57.9	74 07.9	23 52	56.1	73 43.2	32 49	50.9	73 33.3	34 48	49.3	25
6	73 58.6	03 58	67.3	73 57.1	06 57	65.4	73 51.5	12 56	61.9	73 47.4	15 55	60.1	73 42.3	18 54	58.3	73 36.4	21 53	56.6	73 13.7	29 49	51.5	73 04.5	32 48	49.8	6
7	73 23.8	02 58	67.3	73 22.8	05 57	65.6	73 18.2	11 56	62.1	73 14.6	13 55	60.4	73 10.2	16 54	58.6	73 04.9	19 53	56.9	72 44.1	27 50	52.0	72 35.6	30 49	50.4	7
8	72 48.9	00 58	67.3	72 48.4	03 57	65.6	72 44.8	09 56	62.3	72 41.7	12 55	60.6	72 37.9	14 54	58.9	72 33.2	17 53	57.3	72 14.2	25 50	52.4	72 06.4	27 49	50.9	8
9	72 14.1	01 58	67.3	72 14.0	02 57	65.7	72 11.4	07 56	62.4	72 08.8	10 55	60.8	72 05.5	12 54	59.2	72 01.3	15 53	57.6	71 44.2	23 50	52.8	71 37.0	25 49	51.3	9
30	71 39.2	02 58	67.3	71 39.6	00 57	65.7	71 37.9	05 56	62.5	71 35.8	08 55	60.9	71 33.0	11 54	59.4	71 29.4	13 53	57.8	71 14.1	21 50	53.2	71 07.5	23 49	51.7	30
1	71 04.4	04 58	67.2	71 05.2	01 57	65.7	71 04.4	04 56	62.6	71 02.8	06 55	61.1	71 00.5	09 54	59.5	70 57.4	11 53	58.0	70 43.8	19 51	53.5	70 37.8	21 50	52.0	1
2	70 29.6	05 58	67.2	70 30.8	03 57	65.7	70 30.8	02 56	62.7	70 29.7	05 55	61.2	70 27.9	07 54	59.7	70 25.4	10 54	58.2	70 13.4	17 51	53.8	70 08.0	19 50	52.3	2
3	69 54.8	06 58	67.1	69 56.4	04 57	65.6	69 57.3	01 56	62.7	69 56.7	03 55	61.2	69 55.3	06 54	59.8	69 53.3	08 54	58.3	69 42.9	15 51	54.0	69 38.0	17 50	52.6	3
4	69 20.1	08 58	66.9	69 22.0	05 57	65.5	69 23.7	01 56	62.7	69 23.5	02 55	61.3	69 22.7	04 54	59.9	69 21.1	06 54	58.4	69 12.3	13 51	54.2	69 08.0	15 50	52.8	4
35	68 45.3	09 58	66.8	68 47.6	06 57	65.4	68 50.2	02 56	62.7	68 50.4	00 55	61.3	68 50.0	03 54	59.9	68 48.9	05 54	58.5	68 41.6	11 51	54.4	68 37.9	14 50	53.0	35
6	68 10.7	10 58	66.7	68 13.3	08 57	65.3	68 16.6	03 56	62.6	68 17.3	01 55	61.3	68 17.3	01 54	59.9	68 16.7	03 54	58.6	68 10.9	10 51	54.5	68 07.6	12 50	53.2	6
7	67 36.0	11 58	66.5	67 39.0	09 57	65.2	67 43.1	05 56	62.6	67 44.2	03 55	61.3	67 44.7	00 54	59.9	67 44.5	02 54	58.6	67 40.1	08 51	54.7	67 37.4	10 51	53.4	7
8	67 01.4	12 58	66.3	67 04.8	10 57	65.1	67 09.6	06 56	62.5	67 11.1	04 55	61.2	67 12.0	02 54	59.9	67 12.2	00 54	58.6	67 09.3	06 51	54.8	67 07.1	08 51	53.5	8
9	66 26.8	13 58	66.1	66 30.5	11 57	64.9	66 36.1	07 56	62.4	66 38.0	05 55	61.1	66 39.3	03 54	59.9	66 40.0	01 54	58.6	66 38.4	05 51	54.8	66 36.7	07 51	53.6	9
40	65 52.3	14 57	65.9	65 56.4	12 57	64.7	66 02.7	09 56	62.3	66 05.0	07 55	61.1	66 06.7	05 54	59.8	66 07.8	03 54	58.6	66 07.6	03 51	54.9	66 06.3	05 51	53.6	40
1	65 17.9	15 57	65.7	65 22.2	14 57	64.5	65 29.3	10 56	62.2	65 31.9	08 55	61.0	65 34.0	06 54	59.8	65 35.6	04 54	58.5	65 36.7	02 52	54.9	65 35.9	04 51	53.7	1
2	64 43.5	17 57	65.5	64 48.2	15 57	64.4	64 55.9	11 56	62.0	64 59.0	09 55	60.8	65 01.4	07 54	59.7	65 03.4	05 54	58.5	65 05.8	00 52	54.9	65 05.4	02 51	53.7	2
3	64 09.2	18 57	65.3	64 14.2	16 57	64.2	64 22.6	12 55	61.9	64 26.0	10 55	60.7	64 28.9	09 54	59.6	64 31.2	07 54	58.4	64 34.9	01 52	54.9	64 35.0	00 51	53.8	3
4	63 34.9	19 57	65.0	63 40.2	17 56	63.9	63 49.3	13 55	61.7	63 53.1	12 55	60.6	63 56.3	10 54	59.4	63 59.0	08 54	58.3	64 04.0	03 51	54.9	64 04.5	01 51	53.7	4
45	63 00.7	20 57	64.8	63 06.3	18 56	63.7	63 16.1	15 55	61.5	63 20.2	13 55	60.4	63 23.8	11 54	59.3	63 26.9	09 53	58.2	63 33.1	04 51	54.9	63 34.1	02 51	53.7	45
6	62 26.6	21 57	64.5	62 32.5	19 56	63.5	62 42.9	16 55	61.3	62 47.4	14 55	60.3	62 51.4	12 54	59.2	62 54.9	11 53	58.1	63 02.2	06 51	54.8	63 03.7	04 51	53.7	6
7	61 52.5	22 57	64.3	61 58.8	20 56	63.2	62 09.8	17 55	61.1	62 14.6	15 54	60.1	62 19.0	14 54	59.0	62 22.8	12 53	58.0	62 31.4	07 51	54.7	62 33.2	05 51	53.6	7
8	61 18.5	23 56	64.0	61 25.1	21 56	63.0	61 36.8	18 55	60.9	61 41.9	16 54	59.9	61 46.6	15 54	58.9	61 50.8	13 53	57.8	62 00.6	08 51	54.6	62 02.8	07 51	53.6	8
9	60 44.6	24 56	63.7	60 51.5	22 56	62.7	61 03.8	19 55	60.7	61 09.3	18 54	59.7	61 14.3	16 54	58.7	61 18.9	14 53	57.7	61 29.8	10 51	54.5	61 32.5	08 51	53.5	9
50	60 10.8	25 56	63.5	60 17.9	23 56	62.5	60 39.9	20 55	60.5	60 36.7	19 54	59.5	60 42.1	17 54	58.5	60 47.0	16 53	57.5	60 59.1	11 51	54.4	61 02.1	09 50	53.4	50
1	59 37.1	25 56	63.2	59 44.5	24 56	62.2	59 58.1	21 55	60.3	60 04.2	20 54	59.3	60 10.0	18 54	58.3	60 15.2	17 53	57.3	60 28.4	12 51	54.3	60 31.8	11 50	53.3	1
2	59 03.4	26 56	62.9	59 11.1	25 55	61.9	59 25.3	22 54	60.0	59 31.8	21 54	59.1	59 37.9	19 53	58.1	59 43.5	18 53	57.1	59 57.7	14 51	54.2	60 01.6	12 50	53.2	2
3	58 29.9	27 56	62.6	58 37.9	26 55	61.6	58 52.7	23 54	59.8	58 59.5	22 54	58.8	59 05.9	21 53	57.9	59 11.8	19 53	56.9	59 27.1	15 51	54.0	59 31.4	13 50	53.1	3
4	57 56.4	28 56	62.3	58 04.7	27 55	61.4	58 20.1	24 54	59.5	58 27.2	23 54	58.6	58 33.9	22 53	57.7	58 40.2	20 53	56.7	58 56.6	16 51	53.9	59 01.2	15 50	52.9	4
55	57 23.0	29 55	61.9	57 31.6	28 55	61.1	57 47.6	25 54	59.3	57 55.0	24 53	58.3	58 02.1	23 53	57.4	58 08.7	21 52	56.5	58 26.1	17 51	53.7	58 31.1	16 50	52.8	55
6	56 49.7	30 55	61.6	56 58.6	29 55	60.8	57 15.2	26 54	59.0	57 22.9	25 53	58.1	57 30.3	24 53	57.2	57 37.2	23 52	56.3	57 55.7	19 51	53.5	58 01.1	17 50	52.6	6
7	56 16.6	31 55	61.3	56 25.7	30 55	60.4	56 42.9	27 54	58.7	56 50.9	26 53	57.8	56 58.6	25 53	56.9	57 05.9	24 52	56.1	57 25.4	20 50	53.3	57 31.2	18 50	52.4	7
8	55 43.5	32 55	61.0	55 52.9	31 54	60.1	56 10.7	28 54	58.4	56 19.0	27 53	57.6	56 27.0	26 53	56.7	56 34.6	25 52	55.8	56 55.2	21 50	53.2	57 01.3	20 50	52.3	8
9	55 10.5	33 55	60.6	55 20.2	32 54	59.8	55 38.5	29 53	58.1	55 47.2	28 53	57.3	55 55.5	27 52	56.4	56 03.4	26 52	55.6	56 25.0	22 50	53.0	56 31.4	21 50	52.1	9
60	54 37.7	34 55	60.3	54 47.6	33 54	59.5	55 06.5	30 53	57.8	55 15.5	29 53	57.0	55 24.1	28 52	56.2	55 32.3	27 52	55.3	55 54.9	23 50	52.7	56 01.7	22 49	51.9	60
1	54 04.9	35 54	60.0	54 15.1	34 54	59.2	54 34.6	31 53	57.5	54 43.8	30 53	56.7	54 52.7	29 52	55.9	55 01.3	28 52	55.1	55 24.9	24 50	52.5	55 32.0	23 49	51.7	1
2	53 32.3	35 54	59.6	53 42.8	34 54	58.8	54 02.8	32 53	57.2	54 12.3	31 52	56.4	54 21.5	30 52	55.6	54 30.4	29 51	54.8	54 55.0	26 50	52.3	55 02.5	24 49	51.5	2
3	52 59.8	36 54	59.3	53 10.5	35 54	58.5	53 31.1	33 53	56.9	53 40.9	32 52	56.1	53 50.4	31 52	55.3	53 59.6	30 51	54.5	54 25.1	27 50	52.1	54 33.0	26 49	51.2	3
4	52 27.4	37 54	58.9	52 38.4	36 53	58.2	52 59.5	34 52	56.6	53 09.6	33 52	55.8	53 19.4	32 51	55.0	53 28.9	31 51	54.2	53 55.4	28 49	51.8	54 03.6	27 49	51.0	4
65	51 55.1	38 54	58.6	52 06.4	37 53	57.8	52 28.0	35 52	56.3	52 38.4	34 52	55.5	52 48.5	33 51	54.7	52 58.3	32 51	54.0	53 25.8	29 49	51.6	53 34.3	28 49	50.8	65
6	51 22.9	39 53	58.2	51 34.5	38 53	57.5	51 56.7	36 52	56.0	52 07.4	35 52	55.2	52 17.8	34 51	54.4	52 27.8	33 51	53.7	52 56.2	30 49	51.3	53 05.1	29 48	50.5	6
7	50 50.9	40 53	57.8	51 02.7	39 53	57.1	51 25.5	37 52	55.6	51 36.4	36 51	54.9	51 47.1	35 51	54.1	51 57.5	34 50	53.4	52 26.8	31 49	51.1	52 36.0	30 48	50.3	7
8	50 19.0	41 53	57.5	50 31.1	40 53	56.8	50 54.4	38 52	55.3	51 05.6	37 51	54.6	51 16.6	36 51	53.8	51 27.2	35 50	53.1	51 57.5	32 49	50.8	52 07.0	31 48	50.0	8
9	49 47.2	41 53	57.1	49 59.5	41 52	56.4	50 23.4	39 51	55.0	50 34.9	38 51	54.2	50 46.1	37 50	53.5	50 57.1	36 50	52.8	51 28.3	33 48	50.5	51 38.1	32 48	49.8	9
70	49 15.6	42 52	56.7	49 28.2	41 52	56.0	49 52.5	40 51	54.6	50 04.3	39 51	53.9	50 15.8	38 50	53.2	50 27.1	37 50	52.5	50 59.2	34 48	50.2	51 09.3	33 48	49.5	70
1	48 44.1	43 52	56.4	48 56.9	42 52	55.7	49 21.8	41 51	54.3	49 33.9	40 51	53.6	49 45.7	39 50	52.9	49 57.2	38 50	52.1	50 30.2	35 48	50.0	50 40.7	34 48	49.2	1
2	48 12.7	44 52	56.0	48 25.8	43 52	55.3	48 51.2	42 51	53.9	49 03.6	41 50	53.2	49 15.6	40 50	52.5	49 27.5	39 49	51.8	50 01.4	36 48	49.7	50 12.2	35 47	48.9	2
3	47 41.5	45 52	55.6	47 54.8	44 51	54.9	48 20.8	42 51	53.6	48 33.4	42 50	52.9	48 45.7	41 50	52.2	48 57.8	40 49	51.5	49 32.7	37 48	49.4	49 43.7	36 47	48.7	3
4	47 10.4	46 52	55.2	47 24.0	45 51	54.5	47 50.5	43 50	53.2	48 03.3	43 50	52.5	48 16.0	42 49	51.9	48 28.4	41 49	51.2	49 04.1	38 47	49.1	49 15.5	38 47	48.4	4
75	46 39.5	46 51	54.8	46 53.3	46 51	54.2	47 20.3	44 50	52.8	47 33.4	43 50	52.2	47 46.3	43 49	51.5	47 59.0	42 49	50.8	48 35.6	39 47	48.8	48 47.3	39 47	48.1	75
6	46 08.7	47 51	54.4	46 22.8	47 51	53.8	46 50.3	45 50	52.5	47 03.7	44 49	51.8	47 16.9	44 49	51.2	47 29.8	43 48	50.5	48 07.3	40 47	48.5	48 19.3	40 46	47.8	6
7	45 38.1	48 51	54.0	45 52.4	47 50	53.4	46 20.4	46 50	52.1	46 34.1	45 49	51.5	46 47.5	44 49	50.8	47 00.7	44 48	50.2	47 39.1	41 47	48.2	47 51.4	41 46	47.5	7
8	45 07.6	49 51	53.6	45 22.2	48 50	53.0	45 50.7	47 49	51.7	46 04.6	46 49	51.1	46 18.3	45 48	50.5	46 31.8	45 48	49.8	47 11.0	42 47	47.8	47 23.6	42 46	47.2	8
9	44 37.3	50 50	53.2	44 52.1	49 50	52.6	45 21.1	48 49	51.4	45 35.3	47 49	50.7	45 49.3	46 48	50.1	46 03.1	46 48	49.5	46 43.1	43 46	47.5	46 56.0	43 46	46.9	9
80	44 07.1	50 50	52.8	44 22.2	50 50	52.2	44 51.7	49 49	51.0	45 06.1	48 48	50.4	45 20.4	47 48	49.7	45 34.4	46 47	49.1	46 15.3	44 46	47.2	46 28.5	44 46	46.5	80
1	43 37.1	51 50	52.4	43 52.4	51 49	51.8	44 22.4	49 48	50.6	44 37.1	49 48	50.0	44 51.7	48 48	49.4	45 06.0	47 47	48.7	45 47.7	45 46	46.9	46 01.2	45 45	46.2	1
2	43 07.3	52 49	52.0	43 22.8	51 49	51.4	43 53.3	50 48	50.2	44 08.3	50 48	49.6	44 23.1	49 47	49.0	44 37.7	48 47	48.4	45 20.2	46 46	46.5	45 34.0	46 45	45.9	2
3	42 37.6	53 49	51.6	42 53.4	52 49	51.0	43 24.4	51 48	49.8	43 39.6	50 48	49.2	43 54.7	50 47	48.6	44 09.5	49 47	48.0	44 52.9	47 45	46.2	45 07.0	47 45	45.5	3
4	42 08.1	54 49	51.2	42 24.1	53 48	50.6	42 55.6	52 48	49.4	43 11.1	51 47	48.8	43 26.4	51 47	48.2	43 41.5	50 46	47.6	44 25.7	48 45	45.8	44 40.1	47 45	45.2	4
85	41 38.8	54 49	50.7	41 55.1	54 48	50.2	42 27.0	53 47	49.0	42 42.8	52 47	48.4	42 58.3	52 47	47.9	43 13.7	51 46	47.3	43 58.7	49 45	45.5	44 13.4	48 44	44.9	85
6	41 09.7	55 48	50.3	41 26.1	55 48	49.7	41 58.6	54 47	48.6	42 14.6	53 47	48.1	42 30.4	52 46	47.5	42 46.1	52 46	46.9	43 31.9	50 44	45.1	43 46.8	49 44	44.5	6
7	40 40.7	56 48	49.9	40 57.4	55 48	49.3	41 30.4	54 47	48.2	41 46.6	54 46	47.7	42 02.7	53 46	47.1	42 18.6	53 46	46.5	43 05.2	51 44	44.8	43 20.4	50 44	44.2	7
8	40 11.9	57 48	49.4	40 28.9	56 47	48.9	41 02.3	55 46	47.8	41 18.8	55 46	47.3	41 35.1	54 46	46.7	41 51.3	54 45	46.1	42 38.7	52 44	44.4	42 54.2	51 43	43.8	8
9	39 43.3	58 47	49.0	40 00.5	57 47	48.5	40 34.4	56 46	47.4	40 51.1	55 46	46.9	41 07.7	55 45	46.3	41 24.1	54 45	45.7	42 12.4	53 44	44.0	42 28.1	52 43	43.5	9
90	39 14.9	58 47	48.6	39 32.3	58 47	48.1	40 06.7	57 46	47.0	40 23.7	56 45	46.4	40 40.5	56 45	45.9	40 57.2	55 45	45.4	41 46.2	54 43	43.7	42 02.2	53 43	43.1	90

Lat. 51°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	d Δd Δt	°	° ′	d Δd Δt	°	° ′	d Δd Δt	°	° ′	d Δd Δt	°	° ′	d Δd Δt	°	° ′	d Δd Δt	°	° ′	d Δd Δt	°	° ′	d Δd Δt	°	°
91	38 46.7	59 47	48.1	39 04.3	59 46	47.6	39 39.2	58 46	46.6	39 56.4	57 45	46.0	40 13.5	57 45	45.5	40 30.4	56 44	45.0	41 20.2	55 43	43.3	41 36.5	54 43	42.7	91
2	38 18.7	60 46	47.7	38 36.5	59 46	47.2	39 11.9	58 45	46.1	39 29.3	58 45	45.6	39 46.6	57 44	45.1	40 03.8	57 44	44.6	40 54.4	55 43	42.9	41 11.0	55 42	42.4	2
3	37 50.8	61 46	47.3	38 08.9	60 46	46.7	38 44.7	59 45	45.7	39 02.4	59 44	45.2	39 20.0	58 44	44.7	39 37.4	58 44	44.2	40 28.8	56 42	42.5	40 45.6	56 42	42.0	3
4	37 23.2	61 46	46.8	37 41.5	61 45	46.3	38 17.8	60 45	45.3	38 35.7	60 44	44.8	38 53.5	59 44	44.3	39 11.2	59 43	43.8	40 03.4	57 42	42.2	40 20.4	57 42	41.6	4
95	36 55.8	62 45	46.4	37 14.3	62 45	45.9	37 51.1	61 44	44.9	38 09.2	60 44	44.4	38 27.3	60 43	43.9	38 45.2	59 43	43.3	39 38.1	58 42	41.8	39 55.5	58 41	41.2	95
6	36 28.6	63 45	45.9	36 47.3	62 45	45.4	37 24.5	62 44	44.4	37 42.9	61 44	43.9	38 01.2	61 43	43.4	38 19.4	60 43	42.9	39 13.0	59 41	41.4	39 30.7	58 41	40.9	6
7	36 01.5	64 45	45.5	36 20.5	63 44	45.0	36 58.2	62 44	44.0	37 16.8	62 43	43.5	37 35.4	62 43	43.0	37 53.8	61 42	42.5	38 48.2	60 41	41.0	39 06.9	59 41	40.5	7
8	35 34.7	64 44	45.0	35 54.0	64 44	44.5	36 32.1	63 43	43.6	36 50.9	63 43	43.1	37 09.7	62 42	42.6	37 28.3	62 42	42.1	38 23.5	61 41	40.6	38 41.6	60 40	40.1	8
9	35 08.2	65 44	44.5	35 27.6	65 44	44.1	36 06.2	64 43	43.1	36 25.3	64 42	42.6	36 44.3	63 42	42.2	37 03.1	63 42	41.7	37 59.0	61 40	40.2	38 17.4	61 40	39.7	9
100	34 41.8	66 44	44.1	35 01.4	65 43	43.6	35 40.4	65 42	42.7	35 59.8	64 42	42.2	36 19.0	64 42	41.7	36 38.1	64 41	41.3	37 34.8	62 40	39.8	37 53.4	62 40	39.3	100
1	34 15.6	66 43	43.6	34 35.5	66 43	43.2	35 15.0	65 42	42.2	35 34.5	65 42	41.8	35 54.0	65 41	41.3	36 13.3	64 41	40.8	37 10.7	63 40	39.4	37 29.6	63 39	38.9	1
2	33 49.7	67 43	43.1	34 09.8	67 42	42.7	34 49.7	66 42	41.8	35 09.5	66 41	41.3	35 29.2	65 41	40.9	35 48.8	65 41	40.4	36 46.8	64 39	39.0	37 06.0	64 39	38.5	2
3	33 24.0	68 42	42.7	33 44.3	68 42	42.2	34 24.6	67 41	41.3	34 44.7	67 41	40.9	35 04.6	66 41	40.4	35 24.4	66 40	40.0	36 23.2	65 39	38.6	36 42.6	64 39	38.1	3
4	32 58.5	69 42	42.2	33 19.0	68 42	41.8	33 59.8	68 41	40.9	34 20.1	67 41	40.4	34 40.2	67 40	40.0	35 00.3	67 40	39.5	35 59.8	66 39	38.1	36 19.4	65 38	37.7	4
105	32 33.3	69 42	41.7	32 54.0	69 41	41.3	33 35.2	68 41	40.4	33 55.7	68 40	40.0	34 16.1	68 40	39.5	34 36.3	67 40	39.1	35 36.6	66 38	37.7	35 56.4	66 38	37.3	105
6	32 08.3	70 41	41.2	32 29.2	70 41	40.8	33 10.8	69 40	40.0	33 31.5	69 40	39.5	33 52.1	68 40	39.1	34 12.6	68 39	38.6	35 13.6	67 38	37.3	35 33.7	67 38	36.8	6
7	31 43.5	71 41	40.8	32 04.6	70 41	40.3	32 46.7	70 40	39.5	33 07.6	70 39	39.1	33 28.4	69 39	38.6	33 49.2	69 39	38.2	34 50.8	68 38	36.9	35 11.1	68 37	36.4	7
8	31 19.0	71 40	40.3	31 40.3	71 40	39.9	32 22.8	71 39	39.0	32 43.9	70 39	38.6	33 05.0	70 39	38.2	33 25.9	70 38	37.8	34 28.2	69 37	36.5	34 48.8	68 37	36.0	8
9	30 54.7	72 40	39.8	31 16.2	72 40	39.4	31 59.2	71 39	38.6	32 20.5	71 39	38.1	32 41.8	71 38	37.7	33 02.9	70 38	37.3	34 05.9	70 37	36.0	34 26.7	69 36	35.6	9
110	30 30.6	73 40	39.3	30 52.4	72 39	38.9	31 35.7	72 39	38.1	31 57.3	72 38	37.7	32 18.8	71 38	37.3	32 40.2	71 38	36.9	33 43.8	70 36	35.6	34 04.9	70 36	35.2	110
1	30 06.8	73 39	38.8	30 28.8	73 39	38.4	31 12.6	73 38	37.6	31 34.3	72 38	37.2	31 56.0	72 38	36.8	32 17.6	72 37	36.4	33 22.0	71 36	35.2	33 43.3	71 36	34.7	1
2	29 43.3	74 39	38.3	30 05.5	74 38	37.9	30 49.6	73 38	37.1	31 11.6	73 37	36.7	31 33.5	73 37	36.3	31 55.3	73 37	35.9	33 00.4	72 36	34.7	33 21.9	72 35	34.3	2
3	29 20.0	75 38	37.8	29 42.4	75 38	37.4	30 27.0	74 37	36.7	30 49.2	74 37	36.3	31 11.3	74 37	35.9	31 33.3	73 36	35.5	32 39.0	73 35	34.3	33 00.7	72 35	33.9	3
4	28 57.0	75 38	37.3	29 19.6	75 38	36.9	30 04.6	75 37	36.2	30 26.9	75 37	35.8	30 49.3	74 36	35.4	31 11.5	74 36	35.0	32 17.8	73 35	33.8	32 39.8	73 34	33.4	4
115	28 34.2	76 37	36.8	28 57.0	76 37	36.4	29 42.4	75 36	35.7	30 05.0	75 36	35.3	30 27.5	75 36	34.9	30 50.0	75 36	34.5	31 56.9	74 34	33.4	32 19.1	74 34	33.0	115
6	28 11.7	77 37	36.3	28 34.7	76 37	35.9	29 20.5	76 36	35.2	29 43.3	76 36	34.8	30 06.0	76 35	34.5	30 28.7	75 35	34.1	31 36.3	75 34	32.9	31 58.7	75 34	32.5	6
7	27 49.5	77 37	35.8	28 12.7	77 36	35.4	28 58.9	77 36	34.7	29 21.9	77 35	34.4	29 44.8	76 35	34.0	30 07.7	76 35	33.6	31 15.9	75 34	32.5	31 38.5	75 33	32.1	7
8	27 27.6	78 36	35.3	27 50.9	78 36	34.9	28 37.5	77 35	34.2	29 00.7	77 35	33.9	29 23.8	77 35	33.5	29 46.9	77 34	33.1	30 55.7	76 33	32.0	31 18.6	76 33	31.6	8
9	27 05.9	79 36	34.8	27 29.4	78 35	34.4	28 16.4	78 35	33.7	28 39.8	78 34	33.4	29 03.1	78 34	33.0	29 26.4	77 34	32.7	30 35.9	77 33	31.6	30 58.9	77 32	31.2	9
120	26 44.5	79 35	34.3	27 08.2	79 35	33.9	27 55.5	79 34	33.2	28 19.1	79 34	32.9	28 42.7	78 34	32.5	29 06.1	78 33	32.2	30 16.2	78 32	31.1	30 39.5	77 32	30.7	120
1	26 23.4	80 35	33.8	26 47.3	80 34	33.4	27 35.0	79 34	32.7	27 58.8	79 33	32.4	28 22.5	79 33	32.0	28 46.2	79 33	31.7	29 56.9	78 32	30.6	30 20.3	78 32	30.3	1
2	26 02.5	80 34	33.2	26 26.6	80 34	32.9	27 14.7	80 33	32.2	27 38.7	80 33	31.9	28 02.6	80 33	31.6	28 26.5	79 32	31.2	29 37.8	79 31	30.2	30 01.4	79 31	29.8	2
3	25 42.0	81 34	32.7	26 06.3	81 33	32.4	26 54.7	81 33	31.7	27 18.9	80 33	31.4	27 43.0	80 32	31.1	28 07.0	80 32	30.7	29 18.9	80 31	29.7	29 42.8	79 31	29.3	3
4	25 21.7	82 33	32.2	25 46.2	82 33	31.9	26 35.0	81 32	31.2	26 59.3	81 32	30.9	27 23.6	81 32	30.6	27 47.9	81 31	30.2	29 00.3	80 30	29.2	29 24.4	80 30	28.9	4
125	25 01.7	82 33	31.7	25 26.4	82 32	31.4	26 15.6	82 32	30.7	26 40.1	82 32	30.4	27 04.6	82 31	30.1	27 29.0	81 31	29.7	28 42.0	81 30	28.8	29 06.3	81 30	28.4	125
6	24 42.1	83 32	31.1	25 06.9	83 32	30.8	25 56.4	82 31	30.2	26 21.1	82 31	29.9	26 45.8	82 31	29.6	27 10.4	82 30	29.2	28 24.0	82 30	28.3	28 48.5	81 29	27.9	6
7	24 22.7	83 32	30.6	24 47.7	83 32	30.3	25 37.6	83 31	29.7	26 02.5	83 31	29.4	26 27.3	83 30	29.1	26 52.1	83 30	28.8	28 06.3	82 29	27.8	28 30.9	82 29	27.5	7
8	24 03.6	84 31	30.1	24 28.8	84 31	29.8	25 19.0	84 30	29.2	25 44.1	83 30	28.9	26 09.1	83 30	28.6	26 34.1	83 30	28.3	27 48.8	83 29	27.3	28 13.6	83 28	27.0	8
9	23 44.8	85 31	29.5	24 10.2	84 30	29.2	25 00.8	84 30	28.7	25 26.0	84 30	28.4	25 51.2	84 29	28.1	26 16.4	84 29	27.8	27 31.6	83 28	26.8	27 56.6	83 28	26.5	9
130	23 26.4	85 30	29.0	23 51.9	85 30	28.7	24 42.8	85 29	28.1	25 08.2	85 29	27.8	25 33.6	85 29	27.5	25 58.9	84 29	27.2	27 14.7	84 28	26.3	27 39.9	84 27	26.0	130
1	23 08.2	86 30	28.5	23 33.9	86 29	28.2	24 25.1	85 29	27.6	24 50.7	85 29	27.3	25 16.3	85 28	27.0	25 41.8	85 28	26.7	26 58.1	85 27	25.9	27 23.5	84 27	25.6	1
2	22 50.4	86 29	27.9	23 16.2	86 29	27.6	24 07.8	86 28	27.1	24 33.5	86 28	26.8	24 59.3	86 28	26.5	25 24.9	86 28	26.2	26 41.8	85 27	25.4	27 07.3	85 26	25.1	2
3	22 32.9	87 29	27.4	22 58.9	87 28	27.1	23 50.8	86 28	26.6	24 16.7	86 28	26.3	24 42.6	86 27	26.0	25 08.4	86 27	25.7	26 25.8	86 26	24.9	26 51.5	86 26	24.6	3
4	22 15.7	87 28	26.8	22 41.8	87 28	26.6	23 34.0	87 27	26.0	24 00.1	87 27	25.8	24 26.1	87 27	25.5	24 52.2	87 27	25.2	26 10.0	86 26	24.4	26 35.9	86 25	24.1	4
135	21 58.8	88 28	26.3	22 25.1	88 27	26.0	23 17.6	87 27	25.5	23 43.9	87 27	25.2	24 10.1	87 26	25.0	24 36.2	87 26	24.7	25 54.6	87 25	23.9	26 20.6	87 25	23.6	135
6	21 42.2	88 27	25.7	22 08.7	88 27	25.5	23 01.5	88 26	25.0	23 27.9	88 26	24.7	23 54.3	88 26	24.4	24 20.6	88 26	24.2	25 39.4	87 25	23.4	26 05.7	87 24	23.1	6
7	21 26.0	89 26	25.2	21 52.6	89 26	24.9	22 45.7	89 26	24.4	23 12.3	88 26	24.2	23 38.8	88 25	23.9	24 05.3	88 25	23.7	25 24.6	88 24	22.9	25 51.0	88 24	22.6	7
8	21 10.1	89 26	24.6	21 36.8	89 26	24.4	22 30.3	89 25	23.9	22 57.0	89 25	23.6	23 23.7	89 25	23.4	23 50.3	89 24	23.1	25 10.1	89 24	22.4	25 36.6	88 23	22.1	8
9	20 54.5	90 25	24.1	21 21.4	90 25	23.8	22 15.2	89 25	23.4	22 42.0	89 24	23.1	23 08.8	89 24	22.9	23 35.6	89 24	22.6	24 55.9	89 23	21.9	25 22.6	89 23	21.6	9
140	20 39.3	90 25	23.5	21 06.3	90 25	23.3	22 00.4	90 24	22.8	22 27.3	90 24	22.6	22 54.3	90 24	22.3	23 21.2	90 23	22.1	24 41.9	90 23	21.4	25 08.8	89 22	21.1	140
1	20 24.4	91 24	22.9	20 51.6	91 24	22.7	21 45.9	90 24	22.3	22 13.0	90 23	22.0	22 40.1	90 23	21.8	23 07.2	90 23	21.6	24 28.3	90 22	20.9	24 55.3	90 22	20.6	1
2	20 09.8	91 24	22.4	20 37.2	91 23	22.2	21 31.7	91 23	21.7	21 59.0	91 23	21.5	22 26.3	91 23	21.3	22 53.5	91 22	21.0	24 15.0	91 22	20.4	24 42.2	90 21	20.1	2
3	19 55.6	92 23	21.8	20 23.1	91 23	21.6	21 17.9	91 22	21.2	21 45.3	91 22	21.0	22 12.7	91 22	20.7	22 40.1	91 22	20.5	24 02.1	91 21	19.8	24 29.4	91 21	19.6	3
4	19 41.8	92 23	21.3	20 09.4	92 22	21.0	21 04.5	92 22	20.6	21 32.0	92 22	20.4	21 59.5	92 21	20.2	22 27.0	92 21	20.0	23 49.4	91 21	19.3	24 16.8	91 20	19.1	4
145	19 28.3	92 22	20.7	19 56.0	92 22	20.5	20 51.3	92 21	20.1	21 19.0	92 21	19.9	21 46.7	92 21	19.7	22 14.3	92 21	19.4	23 37.1	92 20	18.8	24 04.6	92 20	18.6	145
6	19 15.1	93 21	20.1	19 42.9	93 21	19.9	20 38.5	93 21	19.5	21 06.3	93 21	19.3	21 34.1	93 20	19.1	22 01.9	93 20	18.9	23 25.1	92 19	18.3	23 52.8	92 19	18.1	6
7	19 02.3	93 21	19.5	19 30.2	93 21	19.4	20 26.1	93 20	19.0	20 54.0	93 20	18.8	21 21.9	93 20	18.6	21 49.8	93 20	18.4	23 13.4	93 19	17.8	23 41.2	93 19	17.6	7
8	18 49.8	94 20	19.0	19 17.9	94 20	18.8	20 14.0	93 20	18.4	20 42.0	93 19	18.2	21 10.1	93 19	18.0	21 38.1	93 19	17.8	23 02.0	93 18	17.3	23 30.0	93 18	17.1	8
9	18 37.7	94 20	18.4	19 05.9	94 19	18.2	20 02.3	94 19	17.9	20 30.4	94 19	17.7	20 58.5	94 19	17.5	21 26.7	94 18	17.3	22 51.0	94 18	16.7	23 19.1	94 18	16.5	9
150	18 26.0	94 19	17.8	18 54.3	94 19	17.6	19 50.9	94 18	17.3	20 19.1	94 18	17.1	20 47.4	94 18	16.9	21 15.6	94 18	16.8	22 40.3	94 17	16.2	23 08.5	94 17	16.0	150
1	18 14.6	95 18	17.2	18 43.0	95 18	17.1	19 39.8	95 18	16.7	20 08.2	95 18	16.6	20 36.6	95 17	16.4	21 04.9	95 17	16.2	22 29.9	94 17	15.7	22 58.2	94 17	15.5	1
2	18 03.6	95 18	16.7	18 32.1	95 18	16.5	19 29.1	95 17	16.2	19 57.6	95 17	16.0	20 26.1	95 17	15.8	20 54.5	95 17	15.7	22 19.9	95 16	15.2	22 48.3	95 16	15.0	2
3	17 53.0	95 17	16.1	18 21.6	95 17	15.9	19 18.8	95 17	15.6	19 47.4	95 16	15.4	20 15.9	95 16	15.3	20 44.5	95 16	15.1	22 10.2	95 16	14.6	22 38.7	95 15	14.5	3
4	17 42.7	96 16	15.5	18 11.4	96 16	15.3	19 08.8	96 16	15.0	19 37.5	96 16	14.9	20 06.2	96 16	14.7	20 34.8	96 16	14.6	22 00.8	95 15	14.1	22 29.4	95 15	13.9	4
155	17 32.8	96 16	14.9	18 01.6	96 16	14.8	18 59.2	96 15	14.5	19 28.0	96 15	14.3	19 56.7	96 15	14.2	20 25.5	96 15	14.0	21 51.8	96 14	13.6	22 20.5	96 14	13.4	155
6	17 23.3	96 15	14.3	17 52.1	96 15	14.2	18 49.9	96 15	13.9	19 18.8	96 15	13.8	19 47.7	96 15	13.6	20 16.5	96 14	13.5	21 43.1	96 14	13.0	22 11.9	96 14	12.9	6
7	17 14.1	97 15	13.7	17 43.1	97 14	13.6	18 41.0	97 14	13.3	19 10.0	97 14	13.2	19 39.0	97 14	13.1	20 07.9	97 14	12.9	21 34.7	96 13	12.5	22 03.7	96 13	12.4	7
8	17 05.3	97 14	13.2	17 34.4	97 14	13.0	18 32.5	97 14	12.8	19 01.6	97 13	12.6	19 30.6	97 13	12.5	19 59.7	97 13	12.4	21 26.8	97 13	12.0	21 55.8	97 13	11.8	8
9	16 56.9	97 13	12.6	17 26.1	97 13	12.4	18 24.4	97 13	12.2	18 53.5	97 13	12.1	19 22.6	97 13	11.9	19 51.7	97 13	11.8	21 19.1	97 12	11.4	21 48.2	97 12	11.3	9
160	16 48.9	97 13	12.0	17 18.1	97 13	11.9	18 16.6	97 12	11.6	18 45.8	97 12	11.5	19 15.0	97 12	11.4	19 44.2	97 12	11.3	21 11.8	97 12	10.9	21 41.0	97 11	10.8	160
1	16 41.2	98 12	11.4	17 10.5	98 12	11.3	18 09.1	98 12	11.0	18 38.4	98 12	10.9	19 07.7	98 12	10.8	19 37.0	98 11	10.7	21 04.8	98 11	10.4	21 34.1	98 11	10.2	1
2	16 34.0	98 11	10.8	17 03.4	98 11	10.7	18 02.1	98 11	10.5	18 31.5	98 11	10.4	19 00.8	98 11	10.3	19 30.2	98 11	10.1	20 58.2	98 10	09.8	21 27.6	98 10	09.7	2
3	16 27.1	98 11	10.2	16 56.5	98 11	10.1	17 55.4	98 10	09.9	18 24.8	98 10	09.8	18 54.3	98 10	09.7	19 23.7	98 10	09.6	20 52.0	98 10	09.3	21 21.4	98 10	09.2	3
4	16 20.6	98 10	09.6	16 50.1	98 10	09.5	17 49.1	98 10	09.3	18 18.6	98 10	09.2	18 48.1	98 10	09.1	19 17.6	98 10	09.0	20 46.0	98 09	08.7	21 15.5	98 09	08.6	4
165	16 14.5	99 10	09.0	16 44.1	99 09	08.9	17 43.2	99 09	08.7	18 12.7	99 09	08.6	18 42.3	99 09	08.6	19 11.9	99 09	08.5	20 40.5	98 09	08.2	21 10.0	98 09	08.1	165
6	16 08.8	99 09	08.4	16 38.4	99 09	08.3	17 37.6	99 09	08.2	18 07.3	99 09	08.1	18 36.9	99 08	08.0	19 06.5	99 08	07.9	20 35.3	99 08	07.6	21 04.9	99 08	07.6	6
7	16 03.5	99 08	07.8	16 33.1	99 08	07.7	17 32.5	99 08	07.6	18 02.1	99 08	07.5	18 31.8	99 08	07.4	19 01.5	99 08	07.3	20 30.4	99 07	07.1	21 00.1	99 07	07.0	7
8	15 58.5	99 08	07.2	16 28.2	99 08	07.1	17 27.7	99 07	07.0	17 57.4	99 07	06.9	18 27.1	99 07	06.9	18 56.8	99 07	06.8	20 25.9	99 07	06.6	20 55.7	99 07	06.5	8
9	15 54.0	99 07	06.6	16 23.7	99 07	06.6	17 23.3	99 07	06.4	17 53.0	99 07	06.4	18 22.8	99 07	06.3	18 52.5	99 07	06.2	20 21.8	99 06	06.0	20 51.6	99 06	05.9	9
170	15 49.8	99 06	06.0	16 19.6	99 06	06.0	17 19.2	99 06	05.8	17 49.0	99 06	05.8	18 18.8	99 06	05.7	18 48.6	99 06	05.7	20 18.0	99 06	05.5	20 47.8	99 06	05.4	170
1	15 46.1	99 06	05.4	16 15.9	99 06	05.4	17 15.6	99 05	05.3	17 45.4	99 05	05.2	18 15.3	99 05	05.1	18 45.1	99 05	05.1	20 14.6	99 05	04.9	20 44.4	99 05	04.9	1
2	15 42.7	1.0 05	04.8	16 12.6	1.0 05	04.8	17 12.3	1.0 05	04.7	17 42.2	1.0 05	04.6	18 12.1	1.0 05	04.6	18 41.9	1.0 05	04.5	20 11.5	1.0 04	04.4	20 41.4	1.0 04	04.3	2
3	15 39.7	1.0 04	04.2	16 09.6	1.0 04	04.2	17 09.4	1.0 04	04.1	17 39.3	1.0 04	04.0	18 09.2	1.0 04	04.0	18 39.1	1.0 04	04.0	20 08.8	1.0 04	03.8	20 38.7	1.0 04	03.8	3
4	15 37.1	1.0 04	03.6	16 07.1	1.0 04	03.6	17 06.9	1.0 04	03.5	17 36.9	1.0 04	03.5	18 06.8	1.0 03	03.4	18 36.7	1.0 03	03.4	20 06.5	1.0 03	03.3	20 36.4	1.0 03	03.2	4
175	15 35.0	1.0 03	03.0	16 04.9	1.0 03	03.0	17 04.8	1.0 03	02.9	17 34.8	1.0 03	02.9	18 04.7	1.0 03	02.9	18 34.7	1.0 03	02.8	20 04.5	1.0 03	02.7	20 34.5	1.0 03	02.7	175
6	15 33.2	1.0 02	02.4	16 03.1	1.0 02	02.4	17 03.1	1.0 02	02.3	17 33.1	1.0 02	02.3	18 03.0	1.0 02	02.3	18 33.0	1.0 02	02.3	20 02.9	1.0 02	02.2	20 32.9	1.0 02	02.2	6
7	15 31.8	1.0 02	01.8	16 01.8	1.0 02	01.8	17 01.7	1.0 02	01.8	17 31.7	1.0 02	01.7	18 01.7	1.0 02	01.7	18 31.7	1.0 02	01.7	20 01.6	1.0 02	01.6	20 31.6	1.0 01	01.6	7
8	15 30.8	1.0 01	01.2	16 00.8	1.0 01	01.2	17 00.8	1.0 01	01.2	17 30.8	1.0 01	01.2	18 00.8	1.0 01	01.1	18 30.7	1.0 01	01.1	20 00.7	1.0 01	01.1	20 30.7	1.0 01	01.1	8
9	15 30.2	1.0 00	00.6	16 00.2	1.0 00	00.6	17 00.2	1.0 00	00.6	17 30.2	1.0 00	00.6	18 00.2	1.0 00	00.6	18 30.2	1.0 00	00.6	20 00.2	1.0 00	00.5	20 30.2	1.0 00	00.5	9
180	15 30.0	1.0 00	00.0	16 00.0	1.0 00	00.0	17 00.0	1.0 00	00.0	17 30.0	1.0 00	00.0	18 00.0	1.0 00	00.0	18 30.0	1.0 00	00.0	20 00.0	1.0 00	00.0	20 30.0	1.0 00	00.0	180

Lat. 51°

H.A.	60° 00′				60° 30′				62° 00′				62° 30′			
	Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.
°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°
00	81 00.0	1.0	02	00.0	80 30.0	1.0	02	00.0	79 00.0	1.0	01	00.0	78 30.0	1.0	01	00.0
1	80 59.0	1.0	05	03.2	80 29.0	1.0	05	03.0	78 59.2	1.0	04	02.5	78 29.2	1.0	04	02.3
2	80 55.8	99	09	06.4	80 26.1	99	08	05.9	78 56.8	99	07	04.9	78 27.0	99	06	04.6
3	80 50.6	98	12	09.5	80 21.2	98	11	08.8	78 52.7	99	09	07.3	78 23.2	99	09	06.9
4	80 43.4	96	15	12.5	80 14.5	97	14	11.7	78 47.2	97	12	09.7	78 17.9	98	11	09.1
05	80 34.3	94	18	15.4	80 05.9	95	17	14.5	78 40.0	96	14	12.0	78 11.2	96	14	11.3
6	80 23.4	92	21	18.2	79 55.7	93	20	17.1	78 31.4	94	17	14.3	78 03.1	95	16	13.5
7	80 10.7	89	24	20.9	79 43.7	90	22	19.7	78 21.4	92	19	16.5	77 53.6	93	18	15.6
8	79 56.4	87	26	23.5	79 30.3	88	25	22.1	78 10.1	90	21	18.6	77 42.8	91	20	17.6
9	79 40.6	84	29	25.9	79 15.4	85	27	24.4	77 57.4	88	23	20.6	77 30.8	89	22	19.5
10	79 23.5	80	31	28.1	78 59.1	82	29	26.6	77 43.5	86	25	22.5	77 17.6	87	24	21.4
1	79 05.1	77	33	30.3	78 41.6	79	31	28.6	77 28.5	83	27	24.4	77 03.3	84	26	23.2
2	78 45.5	74	34	32.2	78 23.0	76	33	30.6	77 12.3	81	29	26.2	76 47.9	82	27	24.9
3	78 24.8	71	36	34.1	78 03.2	73	34	32.4	76 55.2	78	30	27.8	76 31.6	79	29	26.5
4	78 03.2	68	37	35.8	77 42.6	70	36	34.0	76 37.1	75	32	29.4	76 14.3	77	30	28.0
15	77 40.7	65	39	37.3	77 21.0	67	37	35.6	76 18.2	73	33	30.9	75 56.1	74	32	29.5
6	77 17.4	62	40	38.8	76 58.6	64	39	37.0	75 58.4	70	34	32.3	75 37.2	72	33	30.8
7	76 53.4	58	41	40.1	76 35.5	61	40	38.4	75 37.9	67	35	33.6	75 17.4	69	34	32.1
8	76 28.8	56	42	41.4	76 11.8	58	41	39.6	75 16.6	64	36	34.8	74 57.0	66	35	33.3
9	76 03.6	53	43	42.5	75 47.4	55	42	40.8	74 54.8	62	37	36.0	74 36.0	64	36	34.5
20	75 37.8	50	44	43.6	75 22.5	52	42	41.8	74 32.3	59	38	37.0	74 14.3	61	37	35.5
1	75 11.5	47	44	44.5	74 57.0	50	43	42.8	74 09.3	56	39	38.0	73 52.1	58	38	36.6
2	74 44.9	44	45	45.4	74 31.2	47	44	43.7	73 45.8	54	40	39.0	73 29.3	56	39	37.5
3	74 17.8	42	46	46.2	74 04.9	44	44	44.5	73 21.8	51	41	39.8	73 06.1	53	39	38.4
4	73 50.4	39	46	46.9	73 38.2	42	45	45.3	72 57.4	49	41	40.7	72 42.5	51	40	39.2
25	73 22.6	37	47	47.6	73 11.2	39	46	46.0	72 32.6	46	42	41.4	72 18.4	48	41	39.9
6	72 54.6	34	47	48.2	72 43.9	37	46	46.6	72 07.5	44	42	42.1	71 54.0	46	41	40.7
7	72 26.3	32	48	48.8	72 16.3	35	46	47.2	71 42.0	41	43	42.7	71 29.2	44	42	41.3
8	71 57.8	30	48	49.3	71 48.4	32	47	47.8	71 16.2	39	43	43.3	71 04.1	41	42	41.9
9	71 29.1	28	48	49.8	71 20.4	30	47	48.3	70 50.2	37	44	43.9	70 38.8	39	43	42.5
30	71 00.1	26	48	50.2	70 52.1	28	47	48.7	70 23.9	35	44	44.4	70 13.1	37	43	43.0
1	70 31.1	24	49	50.5	70 23.6	26	48	49.1	69 57.3	33	45	44.9	69 47.3	35	44	43.5
2	70 01.8	22	49	50.9	69 55.0	24	48	49.5	69 30.6	30	45	45.3	69 21.2	32	44	43.9
3	69 32.5	20	49	51.2	69 26.3	22	48	49.8	69 03.7	28	45	45.7	68 54.9	30	44	44.3
4	69 03.0	18	49	51.4	68 57.4	20	48	50.1	68 36.6	26	45	46.0	68 28.4	28	44	44.7
35	68 33.4	16	49	51.7	68 28.4	18	48	50.3	68 09.3	24	46	46.4	68 01.7	26	45	45.1
6	68 03.8	14	50	51.9	67 59.2	16	49	50.6	67 41.9	22	46	46.7	67 34.9	24	45	45.4
7	67 34.0	12	50	52.0	67 30.0	14	49	50.8	67 14.4	20	46	46.9	67 08.0	22	45	45.7
8	67 04.2	10	50	52.2	67 00.8	13	49	50.9	66 46.8	19	46	47.1	66 40.9	20	45	45.9
9	66 34.4	09	50	52.3	66 31.4	11	49	51.1	66 19.0	17	46	47.4	66 13.8	19	45	46.1
40	66 04.5	07	50	52.4	66 02.0	09	49	51.2	65 51.2	15	46	47.5	65 46.5	17	46	46.3
1	65 34.5	06	50	52.5	65 32.6	07	49	51.3	65 23.3	13	47	47.7	65 19.1	15	46	46.5
2	65 04.5	04	50	52.6	65 03.1	06	49	51.4	64 55.4	11	47	47.8	64 51.7	13	46	46.7
3	64 34.6	02	50	52.6	64 33.6	04	49	51.4	64 27.4	10	47	47.9	64 24.2	11	46	46.8
4	64 04.6	01	50	52.6	64 04.1	03	49	51.5	63 59.3	08	47	48.0	63 56.7	10	46	46.9
45	63 34.6	01	50	52.6	63 34.5	01	49	51.5	63 31.2	06	47	48.1	63 29.1	08	46	47.0
6	63 04.6	02	50	52.6	63 05.0	00	49	51.5	63 03.1	05	47	48.2	63 01.4	06	46	47.1
7	62 34.6	04	50	52.6	62 35.4	02	49	51.5	62 34.9	03	47	48.2	62 33.8	05	46	47.1
8	62 04.6	05	50	52.5	62 05.9	03	49	51.4	62 06.8	01	47	48.2	62 06.1	03	46	47.2
9	61 34.7	07	50	52.5	61 36.4	05	49	51.4	61 38.6	00	47	48.2	61 38.4	02	46	47.2
50	61 04.7	08	50	52.4	61 06.9	06	49	51.3	61 10.5	02	47	48.2	61 10.7	00	46	47.2
1	60 34.9	09	50	52.3	60 37.4	08	49	51.3	60 42.3	03	47	48.2	60 43.0	02	46	47.2
2	60 05.0	11	50	52.2	60 08.0	09	49	51.2	60 14.1	05	47	48.2	60 15.3	03	46	47.2
3	59 35.2	12	50	52.1	59 38.6	10	49	51.1	59 46.0	06	47	48.1	59 47.6	05	46	47.1
4	59 05.4	13	50	51.9	59 09.2	12	49	51.0	59 17.9	07	47	48.1	59 19.9	06	46	47.1
55	58 35.7	15	49	51.8	58 39.9	13	49	50.9	58 49.8	09	47	48.0	58 52.3	07	46	47.0
6	58 06.1	16	49	51.7	58 10.6	14	49	50.7	58 21.8	10	47	47.9	58 24.7	09	46	47.0
7	57 36.5	17	49	51.5	57 41.4	16	49	50.6	57 53.8	12	47	47.8	57 57.1	10	46	46.9
8	57 07.0	18	49	51.4	57 12.3	17	48	50.4	57 25.9	13	46	47.7	57 29.6	12	46	46.8
9	56 37.5	20	49	51.2	56 43.2	18	48	50.3	56 58.0	14	46	47.6	57 02.1	13	46	46.7
60	56 08.1	21	49	51.0	56 14.2	20	48	50.1	56 30.1	16	46	47.4	56 34.6	14	46	46.6
1	55 38.8	22	49	50.8	55 45.3	21	48	49.9	56 02.3	17	46	47.3	56 07.3	16	46	46.4
2	55 09.6	23	49	50.6	55 16.4	22	48	49.8	55 34.6	18	46	47.2	55 39.9	17	45	46.3
3	54 40.5	24	48	50.4	54 47.6	23	48	49.6	55 06.9	20	46	47.0	55 12.7	18	45	46.1
4	54 11.4	26	48	50.2	54 18.9	24	48	49.4	54 39.4	21	46	46.8	54 45.5	20	45	46.0
65	53 42.5	27	48	50.0	53 50.3	26	48	49.1	54 11.9	22	46	46.7	54 18.4	21	45	45.8
6	53 13.6	28	48	49.7	53 21.8	27	47	48.9	53 44.4	23	46	46.5	53 51.3	22	45	45.7
7	52 44.9	29	48	49.5	52 53.4	28	47	48.7	53 17.1	25	45	46.3	53 24.4	24	45	45.5
8	52 16.2	30	48	49.3	52 25.1	29	47	48.5	52 49.9	26	45	46.1	52 57.5	25	45	45.3
9	51 47.6	31	47	49.0	51 56.9	30	47	48.2	52 22.7	27	45	45.9	52 30.7	28	44	45.1
70	51 19.2	32	47	48.7	51 28.8	31	47	48.0	51 55.6	28	45	45.7	52 04.0	27	44	44.9
1	50 50.9	33	47	48.5	51 00.8	32	46	47.7	51 28.7	30	45	45.5	51 37.4	29	44	44.7
2	50 22.7	35	47	48.2	50 32.9	34	46	47.5	51 01.8	31	45	45.2	51 10.9	30	44	44.5
3	49 54.6	36	47	47.9	50 05.1	35	46	47.2	50 35.1	32	44	45.0	50 44.5	31	44	44.2
4	49 26.6	37	46	47.7	49 37.4	36	46	46.9	50 08.4	33	44	44.8	50 18.2	32	44	44.0
75	48 58.7	38	46	47.4	49 09.9	37	46	46.7	49 41.9	34	44	44.5	49 52.0	33	43	43.8
6	48 31.0	39	46	47.1	48 42.5	38	45	46.4	49 15.5	35	44	44.3	49 25.9	34	43	43.5
7	48 03.4	40	46	46.8	48 15.2	39	45	46.1	48 49.2	36	44	44.0	49 00.0	36	43	43.3
8	47 36.0	41	46	46.5	47 48.1	40	45	45.8	48 23.0	38	43	43.7	48 34.1	37	43	43.0
9	47 08.7	42	45	46.2	47 21.1	41	45	45.5	47 57.0	39	43	43.5	48 08.4	38	43	42.8
80	46 41.5	43	45	45.9	46 54.2	42	45	45.2	47 31.0	40	43	43.2	47 42.8	39	42	42.5
1	46 14.4	44	45	45.6	46 27.5	43	44	44.9	47 05.3	41	43	42.9	47 17.4	40	42	42.3
2	45 47.6	45	45	45.2	46 00.9	44	44	44.6	46 39.6	42	42	42.6	46 52.1	41	42	42.0
3	45 20.8	46	44	44.9	45 34.5	45	44	44.3	46 14.1	43	42	42.4	46 26.9	42	42	41.7
4	44 54.2	47	44	44.6	45 08.2	46	44	44.0	45 48.7	44	42	42.1	46 01.8	43	42	41.4
85	44 27.8	48	44	44.3	44 42.0	47	43	43.6	45 23.5	45	42	41.8	45 36.9	44	41	41.1
6	44 01.5	49	44	43.9	44 16.1	48	43	43.3	44 58.5	46	42	41.5	45 12.2	45	41	40.8
7	43 35.4	50	43	43.6	43 50.2	49	43	43.0	44 33.5	47	41	41.1	44 47.6	46	41	40.5
8	43 09.5	51	43	43.2	43 24.6	50	42	42.6	44 08.8	48	41	40.8	44 23.1	47	41	40.2
9	42 43.7	52	43	42.9	42 59.1	51	42	42.3	43 44.2	49	41	40.5	43 58.8	49	40	39.9
90	42 18.1	53	42	42.5	42 33.7	52	42	42.0	43 19.7	50	40	40.2	43 34.7	50	40	39.6

H.A.	63° 00′				69° 00′				69° 30′				74° 30′			
	Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.
°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°
00	78 00.0	1.0	01	00.0	72 00.0	1.0	01	00.0	71 30.0	1.0	01	00.0	66 30.0	1.0	00	00.0
1	77 59.3	1.0	04	02.2	71 59.6	1.0	02	01.2	71 29.6	1.0	02	01.1	66 29.8	1.0	01	00.7
2	77 57.1	99	06	04.4	71 58.5	1.0	03	02.3	71 28.5	1.0	03	02.2	66 29.1	1.0	02	01.3
3	77 53.6	99	08	06.5	71 56.6	99	04	03.5	71 26.7	99	04	03.3	66 28.0	1.0	03	02.0
4	77 48.6	98	11	08.6	71 53.9	99	06	04.6	71 24.2	99	05	04.4	66 26.5	99	03	02.7
05	77 42.2	97	13	10.7	71 50.5	98	07	05.8	71 21.0	99	07	05.5	66 24.5	99	04	03.3
6	77 34.6	95	15	12.7	71 46.3	98	08	06.9	71 17.0	98	08	06.6	66 22.1	99	05	04.0
7	77 25.6	94	17	14.7	71 41.5	97	09	08.0	71 12.3	97	09	07.6	66 19.2	98	05	04.7
8	77 15.4	92	19	16.6	71 35.8	96	10	09.1	71 07.0	96	10	08.7	66 16.0	98	06	05.3
9	77 04.0	90	21	18.5	71 29.5	95	12	10.2	71 01.0	95	11	09.7	66 12.3	97	07	05.9
10	76 51.4	88	23	20.3	71 22.5	94	13	11.2	70 54.3	94	12	10.7	66 08.1	96	08	06.6
1	76 37.8	85	24	22.0	71 14.8	93	14	12.3	70 46.9	93	13	11.7	66 03.6	96	08	07.2
2	76 23.2	83	26	23.6	71 06.5	91	15	13.3	70 39.0	92	14	12.7	65 58.6	95	09	07.8
3	76 07.6	81	28	25.2	70 57.4	90	16	14.3	70 30.3	91	15	13.7	65 53.3	94	10	08.5
4	75 51.0	78	29	26.7	70 47.8	89	17	15.3	70 21.1	89	16	14.6	65 47.5	93	10	09.1
15	75 33.6	76	30	28.1	70 37.5	87	18	16.2	70 11.3	88	17	15.5	65 41.4	92	11	09.7
6	75 15.5	73	32	29.5	70 26.7	86	19	17.2	70 00.9	86	18	16.4	65 34.8	91	12	10.3
7	74 56.5	71	33	30.7	70 15.3	84	20	18.1	69 50.0	85	19	17.3	65 27.9	90	12	10.8
8	74 36.9	68	34	31.9	70 03.3	82	21	18.9	69 38.5	83	20	18.1	65 20.6	88	13	11.4
9	74 16.6	65	35	33.1	69 50.8	80	22	19.8	69 26.5	81	21	18.9	65 13.0	87	13	12.0
20	73 55.7	63	36	34.1	69 37.7	79	23	20.6	69 14.0	79	22	19.7	65 05.0	86	14	12.5
1	73 34.3	60	37	35.1	69 24.2	77	23	21.4	69 01.0	78	22	20.5	64 56.6	85	14	13.1
2	73 12.3	58	37	36.1	69 10.2	75	24	22.2	68 47.5	76	23	21.3	64 47.9	83	15	13.6
3	72 49.8	55	38	36.9	68 55.7	73	25	22.9	68 33.6	74	24	22.0	64 38.8	82	16	14.1
4	72 26.9	53	39	37.8	68 40.7	71	26	23.6	68 19.3	72	25	22.7	64 29.5	80	16	14.6
25	72 03.6	50	40	38.5	68 25.4	69	26	24.3	68 04.5	70	25	23.4	64 19.8	79	17	15.1
6	71 39.9	48	40	39.2	68 09.6	67	27	25.0	67 49.3	68	26	24.0	64 09.8	77	17	15.6
7	71 15.8	46	41	39.9	67 53.5	65	28	25.6	67 33.8	66	26	24.6	63 59.5	76	18	16.1
8	70 51.4	43	41	40.5	67 37.0	63	28	26.2	67 17.9	64	27	25.2	63 48.9	74	18	16.5
9	70 26.8	41	42	41.1	67 20.2	61	29	26.8	67 01.6	62	28	25.8	63 38.0	73	19	17.0
30	70 01.8	39	42	41.7	67 03.0	59	29	27.4	66 45.0	60	28	26.3	63 26.9	71	19	17.4
1	69 36.6	37	42	42.2	66 45.5	57	30	27.9	66 28.1	58	29	26.9	63 15.5	69	19	17.8
2	69 11.1	35	43	42.6	66 27.6	55	30	28.4	66 10.9	56	29	27.4	63 03.8	68	20	18.2
3	68 45.4	32	43	43.0	66 09.6	53	31	28.9	65 53.4	54	30	27.8	62 51.9	66	20	18.6
4	68 19.6	30	43	43.4	65 51.2	51	31	29.3	65 35.7	52	30	28.3	62 39.7	64	21	19.0
35	67 53.5	28	44	43.8	65 32.6	49	31	29.8	65 17.7	50	30	28.7	62 27.3	63	21	19.4
6	67 27.3	26	44	44.1	65 13.7	47	32	30.2	64 59.4	48	31	29.1	62 14.7	61	21	19.7
7	67 01.0	24	44	44.4	64 54.6	45	32	30.6	64 40.9	46	31	29.5	62 01.8	59	22	20.1
8	66 34.5	22	44	44.7	64 35.3	43	33	30.9	64 22.2	44	32	29.9	61 48.8	57	22	20.4
9	66 07.9	20	45	44.9	64 15.8	41	33	31.3	64 03.3	42	32	30.2	61 35.5	55	22	20.7
40	65 41.2	19	45	45.1	63 56.1	39	33	31.6	63 44.1	41	32	30.6	61 22.1	54	23	21.0
1	65 14.4	17	45	45.3	63 36.2	37	33	31.9	63 24.8	39	32	30.9	61 08.4	52	23	21.3
2	64 47.5	15	45	45.5	63 16.1	35	34	32.2	63 05.4	37	33	31.2	60 54.6	50	23	21.6
3	64 20.5	13	45	45.6	62 55.9	33	34	32.5	62 45.7	35	33	31.5	60 40.7	48	24	21.8
4	63 53.5	11	45	45.8	62 35.6	31	34	32.7	62 26.0	33	33	31.7	60 26.5	46	24	22.1
45	63 26.4	10	45	45.9	62 15.1	29	34	33.0	62 06.0	31	33	32.0	60 12.3	45	24	22.4
6	62 59.3	08	45	46.0	61 54.5	28	35	33.2	61 46.0	29	34	32.2	59 57.8	43	24	22.6
7	62 32.1	06	45	46.0	61 33.8	26	35	33.4	61 25.8	27	34	32.4	59 43.3	41	24	22.8
8	62 04.9	05	45	46.1	61 12.9	24	35	33.6	61 05.6	25	34	32.6	59 28.6	39	25	23.0
9	61 37.7	03	45	46.1	60 52.0	22	35	33.7	60 45.2	23	34	32.7	59 13.7	37	25	23.2
50	61 10.5	02	45	46.2	60 31.0	20	35	33.9	60 24.7	22	34	32.9	58 58.8	35	25	23.4
1	60 43.2	00	45	46.2	60 09.9	18	35	34.0	60 04.2	20	34	33.1	58 43.7	34	25	23.6
2	60 16.0	02	45	46.2	59 48.7	17	35	34.2	59 43.5	18	34	33.2	58 28.6	32	25	23.8
3	59 48.7	03	45	46.1	59 27.5	15	36	34.3	59 22.8	16	35	33.3	58 13.3	30	26	23.9
4	59 21.5	05	45	46.1	59 06.2	13	36	34.4	59 02.1	14	35	33.4	57 58.0	28	26	24.1
55	58 54.3	06	45	46.1	58 44.8	11	36	34.5	58 41.2	13	35	33.5	57 42.5	26	26	24.2
6	58 27.2	08	45	46.0	58 23.4	10	36	34.5	58 20.4	11	35	33.6	57 27.0	24	26	24.3
7	58 00.0	09	45	45.9	58 02.0	08	36	34.6	57 59.5	09	35	33.6	57 11.4	23	26	24.4
8	57 32.9	10	45	45.8	57 40.6	06	36	34.6	57 38.5	08	35	33.7	56 55.8	21	26	24.5
9	57 05.8	12	45	45.8	57 19.1	04	36	34.7	57 17.6	06	35	33.7	56 40.1	19	26	24.6
60	56 38.8	13	45	45.7	56 57.6	03	36	34.7	56 56.6	04	35	33.8	56 24.3	17	26	24.7
1	56 11.8	15	45	45.5	56 36.1	01	36	34.7	56 35.6	02	35	33.8	56 08.5	15	26	24.8
2	55 44.9	16	45	45.4	56 14.6	00	36	34.7	56 14.6	01	35	33.8	55 52.6	14	26	24.9
3	55 18.0	17	45	45.3	55 53.1	02	36	34.7	55 53.6	01	35	33.8	55 36.7	12	27	24.9
4	54 51.2	19	45	45.1	55 31.6	04	36	34.7	55 32.5	02	35	33.8	55 20.8	10	27	25.0
65	54 24.5	20	44	45.0	55 10.1	05	36	34.7	55 11.5	04	35	33.8	55 04.8	08	27	25.0
6	53 57.8	21	44	44.8	54 48.7	07	36	34.6	54 50.6	06	35	33.8	54 48.8	07	27	25.1
7	53 31.3	22	44	44.7	54 27.2	08	36	34.6	54 29.6	07	35	33.7	54 32.8	05	27	25.1
8	53 04.8	24	44	44.5	54 05.8	10	36	34.5	54 08.6	09	35	33.7	54 16.8	03	27	25.1
9	52 38.4	25	44	44.3	53 44.5	11	36	34.4	53 47.7	10	35	33.6	54 00.8	02	27	25.1
70	52 12.0	26	44	44.1	53 23.1	13	36	34.4	53 26.8	12	35	33.5	53 44.8	00	27	25.1
1	51 45.8	28	44	43.9	53 01.8	15	35	34.3	53 06.0	13	35	33.5	53 28.7	02	27	25.1
2	51 19.6	29	43	43.7	52 40.6	16	35	34.2	52 45.2	15	35	33.4	53 12.7	03	27	25.1
3	50 53.6	30	43	43.5	52 19.4	17	35	34.1	52 24.4	16	34	33.3	52 56.7	05	27	25.1
4	50 27.7	31	43	43.3	51 58.2	19	35	34.0	52 03.7	18	34	33.2	52 40.7	07	27	25.1
75	50 01.8	32	43	43.1	51 37.1	20	35	33.9	51 43.1	19	34	33.1	52 24.7	08	27	25.0
6	49 36.1	34	43	42.8	51 16.1	22	35	33.8	51 22.5	21	34	33.0	52 08.7	10	27	25.0
7	49 10.5	35	42	42.6	50 55.2	23	35	33.6	51 02.0	22	34	32.9	51 52.8	12	27	24.9
8	48 45.0	36	42	42.3	50 34.3	25	35	33.5	50 41.5	24	34	32.7	51 36.9	13	26	24.9
9	48 19.7	37	42	42.1	50 13.5	26	35	33.4	50 21.1	25	34	32.6	51 21.0	15	26	24.8
80	47 54.4	38	42	41.8	49 52.8	27	34	33.2	50 00.8	26	34	32.5	51 05.1	16	26	24.8
1	47 29.3	39	42	41.6	49 32.1	29	34	33.1	49 40.6	28	34	32.3	50 49.3	18	26	24.7
2	47 04.3	40	41	41.3	49 11.6	30	34	32.9	49 20.5	29	33	32.2	50 33.6	19	26	24.6
3	46 39.4	41	41	41.0	48 51.1	31	34	32.7	49 00.4	31	33	32.0	50 17.9	21	26	24.5
4	46 14.7	43	41	40.8	48 30.8	33	34	32.5	48 40.5	32	33	31.8	50 02.2	22	26	24.4
85	45 50.1	44	41	40.5	48 10.5	34	34	32.4	48 20.6	33	33	31.7	49 46.6	24	26	24.3
6	45 25.7	45	40	40.2	47 50.3	35	33	32.2	48 00.8	35	33	31.5	49 31.1	25	26	24.2
7	45 01.4	46	40	39.9	47 30.3	37	33	32.0	47 41.2	36	33	31.3	49 15.6	27	26	24.1
8	44 37.3	47	40	39.6	47 10.3	38	33	31.8	47 21.6	37	32	31.1	49 00.2	28	26	24.0
9	44 13.3	48	40	39.3	46 50.5	39	33	31.6	47 02.1	38	32	30.9	48 44.9	30	25	23.9
90	43 49.4	49	39	39.0	46 30.8	40	33	31.4	46 42.8	40	32	30.7	48 29.6	31	25	23.8

Digitized by Google

Lat. 51°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	41 52.6	53 42	42.2	42 08.6	53 42	41.6	42 55.4	51 40	39.9	43 10.7	51 40	39.3	43 25.7	50 39	38.7	46 11.2	42 32	31.2	46 23.6	41 32	30.5	48 14.4	33 25	23.7	91
2	41 27.4	54 42	41.8	41 43.6	54 41	41.3	42 31.3	52 40	39.5	42 46.8	52 39	39.0	43 02.2	51 39	38.4	45 51.7	43 32	31.0	46 04.5	42 32	30.3	47 59.3	34 25	23.5	2
3	41 02.3	55 42	41.5	41 18.8	55 41	40.9	42 07.3	53 40	39.2	42 23.2	53 39	38.6	42 38.9	52 39	38.1	45 32.3	44 32	30.7	45 45.5	43 31	30.1	47 44.3	36 25	23.4	3
4	40 37.4	56 41	41.1	40 54.2	56 41	40.5	41 43.6	54 39	38.9	41 59.7	54 39	38.3	42 15.7	53 38	37.7	45 13.1	45 32	30.5	45 26.6	45 31	29.9	47 29.4	37 25	23.2	4
95	40 12.7	57 41	40.7	40 29.7	57 40	40.2	41 20.0	55 39	38.5	41 36.4	54 39	38.0	41 52.7	54 38	37.4	44 54.0	47 32	30.3	45 07.9	46 31	29.6	47 14.5	38 25	23.1	95
6	39 48.1	58 41	40.3	40 05.4	58 40	39.8	40 56.5	56 39	38.2	41 13.2	55 38	37.6	41 29.8	55 38	37.1	44 35.0	48 31	30.0	44 49.3	47 31	29.4	46 59.7	40 24	22.9	6
7	39 23.8	59 40	40.0	39 41.4	58 40	39.4	40 33.3	57 38	37.8	40 50.3	56 38	37.3	41 07.1	56 38	36.7	44 16.2	49 31	29.8	44 30.8	48 31	29.2	46 45.1	41 24	22.8	7
8	38 59.6	60 40	39.6	39 17.5	59 40	39.1	40 10.2	58 38	37.5	40 27.5	57 38	36.9	40 44.6	57 37	36.4	43 57.5	50 31	29.5	44 12.4	49 30	28.9	46 30.5	42 24	22.6	8
9	38 35.7	61 40	39.2	38 53.8	60 39	38.7	39 47.3	59 38	37.1	40 04.9	58 37	36.6	40 22.3	58 37	36.1	43 39.0	51 31	29.3	43 54.2	51 30	28.7	46 16.0	44 24	22.4	9
100	38 11.9	61 39	38.8	38 30.3	61 39	38.3	39 24.6	60 38	36.8	39 42.5	59 37	36.2	40 00.2	59 37	35.7	43 20.6	52 30	29.0	43 36.2	52 30	28.4	46 01.7	45 24	22.3	100
1	37 48.4	62 39	38.4	38 07.0	62 38	37.9	39 02.1	61 37	36.4	39 20.3	60 37	35.9	39 38.2	60 36	35.4	43 02.3	53 30	28.8	43 18.3	53 30	28.2	45 47.4	46 24	22.1	1
2	37 25.0	63 39	38.0	37 43.9	63 38	37.5	38 39.8	62 37	36.0	38 58.2	61 36	35.5	39 16.5	61 36	35.0	42 44.2	55 30	28.5	43 00.5	54 29	27.9	45 33.3	48 23	21.9	2
3	37 01.9	64 38	37.6	37 21.0	64 38	37.1	38 17.7	62 37	35.7	38 36.4	62 36	35.2	38 54.9	62 36	34.6	42 26.3	56 30	28.2	42 42.9	55 29	27.7	45 19.2	49 23	21.7	3
4	36 38.9	65 38	37.2	36 58.3	64 37	36.7	37 55.8	63 36	35.3	38 14.8	63 36	34.8	38 33.6	62 35	34.3	42 08.5	57 29	28.0	42 25.4	56 29	27.4	45 05.3	50 23	21.5	4
105	36 16.2	66 38	36.8	36 35.8	65 37	36.3	37 34.1	64 36	34.9	37 53.3	64 35	34.4	38 12.4	63 35	33.9	41 50.9	58 29	27.7	42 08.1	57 29	27.1	44 51.5	51 23	21.4	105
6	35 53.7	67 37	36.4	36 13.6	66 37	35.9	37 12.6	65 35	34.5	37 32.1	65 35	34.0	37 51.4	64 35	33.6	41 33.4	59 29	27.4	41 51.0	58 28	26.9	44 37.8	53 23	21.2	6
7	35 31.4	67 37	36.0	35 51.5	67 36	35.5	36 51.3	66 35	34.1	37 11.0	66 35	33.7	37 30.6	65 34	33.2	41 16.1	60 29	27.1	41 34.0	59 28	26.6	44 24.2	54 22	21.0	7
8	35 09.3	68 36	35.6	35 29.7	68 36	35.1	36 30.2	67 35	33.7	36 50.2	66 34	33.3	37 10.1	66 34	32.8	40 59.0	61 28	26.8	41 17.2	60 28	26.3	44 10.8	55 22	20.8	8
9	34 47.5	69 36	35.1	35 08.1	69 36	34.7	36 09.4	68 34	33.4	36 29.6	67 34	32.9	36 49.7	67 34	32.4	40 42.0	62 28	26.5	41 00.5	61 27	26.0	43 57.5	56 22	20.5	9
110	34 25.8	70 36	34.7	34 46.7	69 35	34.3	35 48.7	68 34	33.0	36 09.2	68 34	32.5	36 29.6	68 33	32.0	40 25.2	63 28	26.3	40 44.1	63 27	25.7	43 44.3	57 22	20.3	110
1	34 04.4	70 35	34.3	34 25.5	70 35	33.9	35 28.3	69 34	32.6	35 49.0	69 33	32.1	36 09.7	69 33	31.7	40 08.6	64 27	26.0	40 27.7	64 27	25.4	43 31.2	59 22	20.1	1
2	33 43.3	71 35	33.9	34 04.6	71 34	33.5	35 08.1	70 33	32.2	35 29.1	70 33	31.7	35 49.9	69 32	31.3	39 52.2	65 27	25.7	40 11.6	65 27	25.2	43 18.3	60 21	19.9	2
3	33 22.4	72 34	33.4	33 43.9	72 34	33.0	34 48.1	71 33	31.8	35 09.3	71 33	31.3	35 30.4	70 32	30.9	39 35.9	66 27	25.3	39 55.6	66 26	24.9	43 05.5	61 21	19.7	3
4	33 01.7	73 34	33.0	33 23.5	73 34	32.6	34 28.3	72 33	31.3	34 49.8	71 32	30.9	35 11.2	71 32	30.5	39 19.9	67 26	25.0	39 39.9	66 26	24.6	42 52.9	62 21	19.5	4
115	32 41.2	74 34	32.6	33 03.2	73 33	32.2	34 08.8	72 32	30.9	34 30.5	72 32	30.5	34 52.1	72 31	30.1	39 04.0	68 26	24.7	39 24.3	67 26	24.3	42 40.3	63 21	19.2	115
6	32 21.0	74 33	32.1	32 43.2	74 33	31.7	33 49.5	73 32	30.5	34 11.5	73 31	30.1	34 33.3	73 31	29.7	38 48.3	69 26	24.4	39 08.8	68 25	23.9	42 28.0	64 20	19.0	6
7	32 01.0	75 33	31.7	32 23.5	75 32	31.3	33 30.5	74 31	30.1	33 52.6	74 31	29.7	34 14.7	73 31	29.3	38 32.8	70 26	24.1	38 53.6	69 25	23.6	42 15.8	65 20	18.8	7
8	31 41.3	76 32	31.3	32 04.0	76 32	30.9	33 11.6	75 31	29.7	33 34.0	75 31	29.3	33 56.3	74 30	28.9	38 17.4	71 25	23.8	38 38.6	70 25	23.3	42 03.7	66 20	18.5	8
9	31 21.9	76 32	30.8	31 44.8	76 32	30.4	32 53.1	76 31	29.3	33 15.7	75 30	28.9	33 38.2	75 30	28.5	38 02.3	72 25	23.5	38 23.7	71 24	23.0	41 51.8	67 20	18.3	9
120	31 02.6	77 32	30.4	31 25.8	77 31	30.0	32 34.7	76 30	28.8	32 57.6	76 30	28.5	33 20.3	76 29	28.1	37 47.4	72 25	23.1	38 09.1	72 24	22.7	41 40.0	68 19	18.0	120
1	30 43.7	78 31	29.9	31 07.0	78 31	29.5	32 16.6	77 30	28.4	32 39.7	77 29	28.0	33 02.7	77 29	27.7	37 32.6	73 24	22.8	37 54.6	73 24	22.4	41 28.4	69 19	17.8	1
2	30 25.0	79 31	29.5	30 48.5	78 30	29.1	31 58.8	78 29	28.0	32 22.1	78 29	27.6	32 45.3	77 29	27.2	37 18.1	74 24	22.5	37 40.3	74 23	22.0	41 16.9	70 19	17.6	2
3	30 06.6	79 30	29.0	30 30.3	79 30	28.6	31 41.2	78 29	27.6	32 04.7	78 29	27.2	32 28.1	78 28	26.8	37 03.8	75 24	22.1	37 26.3	75 23	21.7	41 05.6	71 19	17.3	3
4	29 48.4	80 30	28.5	30 12.3	80 30	28.2	31 23.8	79 28	27.1	31 47.5	79 28	26.8	32 11.2	79 28	26.4	36 49.7	76 23	21.8	37 12.4	76 23	21.4	40 54.4	72 18	17.0	4
125	29 30.5	81 29	28.1	29 54.6	80 29	27.7	31 06.7	80 28	26.7	31 30.7	80 28	26.3	31 54.5	79 27	26.0	36 35.8	77 23	21.4	36 58.7	76 22	21.0	40 43.4	73 18	16.8	125
6	29 12.8	81 29	27.6	29 37.2	81 29	27.3	30 49.9	81 28	26.3	31 14.0	80 27	25.9	31 38.1	80 27	25.6	36 22.1	77 22	21.1	36 45.3	77 22	20.7	40 32.6	74 18	16.5	6
7	28 55.5	82 28	27.1	29 20.0	82 28	26.8	30 33.3	81 27	25.8	30 57.7	81 27	25.5	31 21.9	81 26	25.1	36 08.6	78 22	20.8	36 32.0	78 22	20.4	40 22.0	75 18	16.3	7
8	28 38.4	83 28	26.7	29 03.1	82 28	26.4	30 17.0	82 27	25.4	30 41.6	82 26	25.0	31 06.0	82 26	24.7	35 55.3	79 22	20.4	36 19.0	79 21	20.0	40 11.5	76 17	16.0	8
9	28 21.6	83 28	26.2	28 46.5	83 27	25.9	30 01.0	83 26	24.9	30 25.7	82 26	24.6	30 50.4	82 26	24.3	35 42.2	80 21	20.1	36 06.2	80 21	19.7	40 01.1	77 17	15.7	9
130	28 05.1	84 27	25.7	28 30.2	84 27	25.4	29 45.2	83 26	24.5	30 10.1	83 26	24.2	30 35.0	83 25	23.8	35 29.4	81 21	19.7	35 53.5	80 21	19.3	39 51.0	78 17	15.5	130
1	27 48.8	84 27	25.3	28 14.1	84 26	25.0	29 29.7	84 25	24.0	29 54.8	84 25	23.7	30 19.9	83 25	23.4	35 16.8	81 21	19.3	35 41.2	81 20	19.0	39 41.0	79 16	15.2	1
2	27 32.8	85 26	24.8	27 58.3	85 26	24.5	29 14.5	84 25	23.6	29 39.8	84 25	23.3	30 05.0	84 24	22.9	35 04.4	82 20	19.0	35 29.0	82 20	18.6	39 31.2	80 16	14.9	2
3	27 17.2	86 26	24.3	27 42.8	85 25	24.0	28 59.5	85 24	23.1	29 25.0	85 24	22.8	29 50.4	85 24	22.5	34 52.2	83 20	18.6	35 17.0	83 20	18.3	39 21.6	80 16	14.6	3
4	27 01.8	86 25	23.8	27 27.6	86 25	23.5	28 44.8	86 24	22.7	29 10.5	86 24	22.4	29 36.1	85 23	22.1	34 40.3	83 20	18.3	35 05.3	83 19	17.9	39 12.1	81 15	14.4	4
135	26 46.7	87 25	23.3	27 12.7	87 24	23.0	28 30.4	86 24	22.2	28 56.3	86 23	21.9	29 22.1	86 23	21.6	34 28.5	84 19	17.9	34 53.8	84 19	17.6	39 02.8	82 15	14.1	135
6	26 31.9	87 24	22.8	26 58.0	87 24	22.6	28 16.3	87 23	21.7	28 42.3	87 23	21.5	29 08.3	87 22	21.2	34 17.0	85 19	17.5	34 42.5	85 18	17.2	38 53.7	83 15	13.8	6
7	26 17.3	88 24	22.4	26 43.7	88 23	22.1	28 02.5	87 23	21.3	28 28.7	87 22	21.0	28 54.8	87 22	20.7	34 05.8	86 18	17.2	34 31.4	85 18	16.9	38 44.8	83 15	13.5	7
8	26 03.1	88 23	21.9	26 29.6	88 23	21.6	27 48.9	88 22	20.8	28 15.3	88 22	20.5	28 41.6	88 22	20.3	33 54.8	86 18	16.8	34 20.6	86 18	16.5	38 36.1	84 14	13.2	8
9	25 49.2	89 23	21.4	26 15.9	89 22	21.1	27 35.6	88 22	20.3	28 02.2	88 21	20.1	28 28.7	88 21	19.8	33 44.0	87 18	16.4	34 10.0	87 17	16.1	38 27.5	85 14	12.9	9
140	25 35.6	89 22	20.9	26 02.4	89 22	20.6	27 22.7	89 21	19.9	27 49.3	89 21	19.6	28 16.0	89 21	19.3	33 33.4	87 17	16.0	33 59.6	87 17	15.8	38 19.2	86 14	12.6	140
1	25 22.3	90 22	20.4	25 49.3	90 21	20.1	27 10.0	90 21	19.4	27 36.8	89 20	19.1	28 03.6	89 20	18.9	33 23.1	88 17	15.7	33 49.5	88 16	15.4	38 11.0	86 13	12.4	1
2	25 09.3	90 21	19.9	25 36.4	90 21	19.6	26 57.6	90 20	18.9	27 24.6	90 20	18.7	27 51.6	90 20	18.4	33 13.0	89 16	15.3	33 39.6	89 16	15.0	38 03.0	87 13	12.1	2
3	24 56.6	91 21	19.4	25 23.9	91 20	19.2	26 45.5	91 20	18.4	27 12.6	90 19	18.2	27 39.8	90 19	18.0	33 03.2	89 16	14.9	33 29.9	89 16	14.6	37 55.2	88 13	11.8	3
4	24 44.3	91 20	18.9	25 11.6	91 20	18.7	26 33.7	91 19	18.0	27 01.0	91 19	17.7	27 28.3	91 19	17.5	32 53.6	90 16	14.5	33 20.5	90 15	14.3	37 47.6	88 12	11.5	4
145	24 32.2	92 20	18.4	24 59.7	92 19	18.2	26 22.2	92 19	17.5	26 49.6	91 18	17.3	27 17.1	91 18	17.0	32 44.2	90 15	14.1	33 11.3	90 15	13.9	37 40.2	89 12	11.2	145
6	24 20.4	92 19	17.9	24 48.1	92 19	17.7	26 11.0	92 18	17.0	26 38.6	92 18	16.8	27 06.1	92 18	16.6	32 35.1	91 15	13.8	33 02.4	91 14	13.5	37 33.0	90 12	10.9	6
7	24 09.0	93 18	17.4	24 36.8	93 18	17.2	26 00.1	92 18	16.5	26 27.8	92 17	16.3	26 55.5	92 17	16.1	32 26.3	91 14	13.4	32 53.7	91 14	13.1	37 26.0	90 11	10.6	7
8	23 57.9	93 18	16.9	24 25.8	93 18	16.7	25 49.5	93 17	16.0	26 17.4	93 17	15.8	26 45.2	93 17	15.6	32 17.7	92 14	13.0	32 45.2	92 14	12.7	37 19.2	91 11	10.3	8
9	23 47.1	94 17	16.3	24 15.2	93 17	16.2	25 39.2	93 17	15.6	26 07.2	93 16	15.4	26 35.2	93 16	15.2	32 09.3	92 14	12.6	32 37.0	92 13	12.4	37 12.5	91 11	10.0	9
150	23 36.7	94 17	15.8	24 04.8	94 17	15.6	25 29.2	94 16	15.1	25 57.4	94 16	14.9	26 25.5	94 16	14.7	32 01.2	93 13	12.2	32 29.0	93 13	12.0	37 06.1	92 10	09.6	150
1	23 26.5	94 16	15.3	23 54.8	94 16	15.1	25 19.6	94 16	14.6	25 47.8	94 15	14.4	26 16.0	94 15	14.2	31 53.3	93 13	11.8	32 21.3	93 12	11.6	36 59.9	92 10	09.3	1
2	23 16.7	95 16	14.8	23 45.1	95 16	14.6	25 10.2	95 15	14.1	25 38.6	94 15	13.9	26 06.9	94 15	13.7	31 45.7	94 12	11.4	32 13.9	94 12	11.2	36 53.9	93 10	09.0	2
3	23 07.2	95 15	14.3	23 35.7	95 15	14.1	25 01.2	95 15	13.6	25 29.7	95 14	13.4	25 58.1	95 14	13.3	31 38.4	94 12	11.0	32 06.7	94 12	10.8	36 48.0	93 09	08.7	3
4	22 58.1	95 15	13.8	23 26.7	95 15	13.6	24 52.5	95 14	13.1	25 21.0	95 14	12.9	25 49.6	95 14	12.8	31 31.3	95 11	10.6	31 59.7	95 11	10.4	36 42.4	94 09	08.4	4
155	22 49.2	96 14	13.3	23 18.0	96 14	13.1	24 44.1	96 14	12.6	25 12.7	96 13	12.5	25 41.4	96 13	12.3	31 24.5	95 11	10.2	31 53.0	95 11	10.0	36 37.0	94 09	08.1	155
6	22 40.8	96 14	12.7	23 09.6	96 13	12.6	24 36.0	96 13	12.1	25 04.8	96 13	12.0	25 33.5	96 13	11.8	31 17.9	95 11	09.8	31 46.5	95 10	09.6	36 31.8	95 08	07.8	6
7	22 32.6	96 13	12.2	23 01.5	96 13	12.1	24 28.2	96 12	11.6	24 57.1	96 12	11.5	25 26.0	96 12	11.3	31 11.6	96 10	09.4	31 40.3	96 10	09.3	36 26.8	95 08	07.5	7
8	22 24.8	97 12	11.7	22 53.8	97 12	11.6	24 20.8	97 12	11.1	24 49.7	97 12	11.0	25 18.7	97 12	10.8	31 05.6	96 10	09.0	31 34.4	96 09	08.9	36 22.0	96 08	07.1	8
9	22 17.3	97 12	11.2	22 46.4	97 12	11.0	24 13.6	97 11	10.6	24 42.7	97 11	10.5	25 11.7	97 11	10.4	30 59.8	96 09	08.6	31 28.7	96 09	08.5	36 17.4	96 07	06.8	9
160	22 10.2	97 11	10.6	22 39.3	97 11	10.5	24 06.8	97 11	10.1	24 36.0	97 11	10.0	25 05.1	97 11	09.9	30 54.2	97 09	08.2	31 23.3	97 09	08.1	36 13.0	96 07	06.5	160
1	22 03.4	98 11	10.1	22 32.6	98 11	10.0	24 00.3	97 10	09.6	24 29.6	97 10	09.5	24 58.8	97 10	09.4	30 49.0	97 08	07.8	31 18.1	97 08	07.7	36 08.8	97 07	06.2	1
2	21 56.9	98 10	09.6	22 26.2	98 10	09.5	23 54.2	98 10	09.1	24 23.5	98 10	09.0	24 52.8	98 09	08.9	30 44.0	97 08	07.4	31 13.2	97 08	07.3	36 04.9	97 06	05.9	2
3	21 50.8	98 10	09.1	22 20.2	98 10	09.0	23 48.4	98 09	08.6	24 17.7	98 09	08.5	24 47.1	98 09	08.4	30 39.2	98 07	07.0	31 08.6	98 07	06.9	36 01.1	97 06	05.5	3
4	21 45.0	98 09	08.5	22 14.5	98 09	08.4	23 42.9	98 09	08.1	24 12.3	98 09	08.0	24 41.8	98 08	07.9	30 34.8	98 07	06.6	31 04.2	98 07	06.5	35 57.6	98 06	05.2	4
165	21 39.6	98 08	08.0	22 09.1	98 08	07.9	23 37.7	98 08	07.6	24 07.2	98 08	07.5	24 36.7	98 08	07.4	30 30.6	98 07	06.2	31 00.0	98 06	06.1	35 54.3	98 05	04.9	165
6	21 34.5	99 08	07.5	22 04.1	99 08	07.4	23 32.8	99 08	07.1	24 02.4	99 07	07.0	24 32.0	99 07	06.9	30 26.7	98 06	05.8	30 56.2	98 06	05.7	35 51.1	98 05	04.6	6
7	21 29.7	99 07	06.9	21 59.4	99 07	06.9	23 28.3	99 07	06.6	23 58.0	99 07	06.5	24 27.6	99 07	06.4	30 23.0	99 06	05.4	30 52.6	99 06	05.3	35 48.2	98 04	04.3	7
8	21 25.4	99 07	06.4	21 55.1	99 07	06.3	23 24.1	99 06	06.1	23 53.8	99 06	06.0	24 23.5	99 06	05.9	30 19.6	99 05	05.0	30 49.2	99 05	04.9	35 45.5	99 04	03.9	8
9	21 21.3	99 06	05.9	21 51.1	99 06	05.8	23 20.3	99 06	05.6	23 50.0	99 06	05.5	24 19.8	99 06	05.5	30 16.5	99 05	04.5	30 46.2	99 05	04.5	35 43.1	99 04	03.6	9
170	21 17.6	99 06	05.3	21 47.4	99 06	05.3	23 16.8	99 05	05.1	23 46.6	99 05	05.0	24 16.4	99 05	05.0	30 13.6	99 04	04.1	30 43.4	99 04	04.1	35 40.8	99 03	03.3	170
1	21 14.3	99 05	04.8	21 44.1	99 05	04.8	23 13.6	99 05	04.6	23 43.4	99 05	04.5	24 13.2	99 05	04.5	30 11.0	99 04	03.7	30 40.8	99 04	03.7	35 38.8	99 03	02.9	1
2	21 11.3	1.0 04	04.3	21 41.1	1.0 04	04.2	23 10.7	1.0 04	04.1	23 40.6	1.0 04	04.0	24 10.5	1.0 04	04.0	30 08.7	99 03	03.3	30 38.6	99 03	03.2	35 36.9	99 03	02.6	2
3	21 08.6	1.0 04	03.7	21 38.5	1.0 04	03.7	23 08.2	1.0 04	03.6	23 38.1	1.0 04	03.5	24 08.0	1.0 04	03.5	30 06.7	1.0 03	02.9	30 36.6	1.0 03	02.8	35 35.3	1.0 02	02.3	3
4	21 06.3	1.0 03	03.2	21 36.3	1.0 03	03.2	23 06.0	1.0 03	03.1	23 36.0	1.0 03	03.0	24 05.9	1.0 03	03.0	30 04.9	1.0 02	02.5	30 34.8	1.0 02	02.4	35 33.9	1.0 02	02.0	4
175	21 04.4	1.0 03	02.7	21 34.4	1.0 03	02.6	23 04.2	1.0 03	02.5	23 34.1	1.0 02	02.5	24 04.1	1.0 02	02.5	30 03.4	1.0 02	02.1	30 33.3	1.0 02	02.0	35 32.7	1.0 02	01.6	175
6	21 02.8	1.0 02	02.1	21 32.8	1.0 02	02.1	23 02.7	1.0 02	02.0	23 32.7	1.0 02	02.0	24 02.6	1.0 02	02.0	30 02.2	1.0 02	01.7	30 32.1	1.0 02	01.6	35 31.7	1.0 01	01.3	6
7	21 01.6	1.0 01	01.6	21 31.6	1.0 01	01.6	23 01.5	1.0 01	01.5	23 31.5	1.0 01	01.5	24 01.5	1.0 01	01.5	30 01.2	1.0 01	01.2	30 31.2	1.0 01	01.2	35 31.0	1.0 01	01.0	7
8	21 00.7	1.0 01	01.1	21 30.7	1.0 01	01.1	23 00.7	1.0 01	01.0	23 30.7	1.0 01	01.0	24 00.7	1.0 01	01.0	30 00.5	1.0 01	00.8	30 30.5	1.0 01	00.8	35 30.4	1.0 01	00.7	8
9	21 00.2	1.0 00	00.5	21 30.2	1.0 00	00.5	23 00.2	1.0 00	00.5	23 30.2	1.0 00	00.5	24 00.2	1.0 00	00.5	30 00.1	1.0 00	00.4	30 30.1	1.0 00	00.4	35 30.1	1.0 00	00.3	9
180	21 00.0	1.0 00	00.0	21 30.0	1.0 00	00.0	23 00.0	1.0 00	00.0	23 30.0	1.0 00	00.0	24 00.0	1.0 00	00.0	30 00.0	1.0 00	00.0	30 30.0	1.0 00	00.0	35 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 51°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	43	180	47	180	51	180	55	180	59	180	63	180	67	180	71	180	75	180	79	180	83	180	00
4	43	175	47	174	51	174	55	173	59	173	63	172	67	171	71	170	75	168	79	164	82	157	4
8	43	169	46	168	50	168	54	167	58	166	62	164	66	162	70	160	74	156	78	150	81	139	8
12	42	164	46	163	50	162	54	160	58	159	61	157	65	154	69	150	73	146	76	138	79	126	12
16	41	159	45	157	49	156	53	154	57	152	60	149	64	146	68	142	71	136	74	128	77	117	16
20	40	154	44	152	48	150	52	148	55	146	59	143	62	139	66	135	69	129	72	121	75	110	20
24	39	149	43	147	46	145	50	142	54	140	57	137	61	133	64	128	67	122	70	114	72	104	24
28	37	144	41	142	45	140	48	137	52	134	55	131	59	127	62	122	65	116	68	109	70	99	28
32	36	139	40	137	43	135	47	132	50	129	53	126	57	121	60	117	63	111	65	104	67	96	32
36	34	135	38	133	41	130	45	127	48	124	51	121	55	117	58	112	60	106	63	100	65	92	36
40	32	131	36	128	39	126	43	123	46	120	49	116	52	112	55	107	58	102	60	96	62	89	40
44	30	127	34	124	37	121	40	119	44	115	47	112	50	108	53	103	55	98	58	93	60	86	44
48	28	123	32	120	35	117	38	115	41	111	44	108	47	104	50	100	53	95	55	89	57	83	48
52	26	119	29	116	33	114	36	111	39	108	42	104	45	100	48	96	50	92	53	86	55	81	52
56	24	115	27	113	30	110	34	107	37	104	40	101	42	97	45	93	48	88	50	84	52	78	56
60	22	112	25	109	28	106	31	104	34	100	37	97	40	94	43	90	45	85	48	81	50	76	60
64	19	108	22	106	26	103	29	100	32	97	35	94	37	90	40	87	43	83	45	78	48	73	64
68	17	105	20	102	23	100	26	97	29	94	32	91	35	87	38	84	40	80	43	76	45	71	68
72	14	102	18	99	21	96	24	94	27	91	30	88	32	84	35	81	38	77	40	73	43	69	72
76	12	98	15	96	18	93	21	90	24	88	27	85	30	81	33	78	35	74	38	71	40	67	76
80	09	95	12	93	16	90	19	87	22	85	25	82	27	79	30	75	33	72	36	68	38	64	80
84	07	92	10	90	13	87	16	84	19	82	22	79	25	76	28	73	31	69	33	66	36	62	84
88	04	89	07	86	11	84	14	81	17	79	20	76	23	73	25	70	28	67	31	63	34	60	88
92	02	86	05	83	08	81	11	78	14	76	17	73	20	70	23	67	26	64	29	61	32	58	92
96	*01*	83	02	80	06	78	09	75	12	73	15	70	18	67	21	64	24	62	27	59	30	55	96
100	*03*	80	*00*	77	03	75	06	72	09	70	12	67	16	65	19	62	22	59	25	56	27	53	100
104	*06*	77	*02*	74	01	72	04	69	07	67	10	64	13	62	16	59	19	56	23	54	25	51	104
108	*08*	73	*05*	71	*02*	69	02	66	05	64	08	61	11	59	14	56	17	54	21	51	24	48	108
112	*10*	70	*07*	68	*04*	65	*01*	63	03	61	06	58	09	56	12	54	15	51	19	49	22	46	112
116	*13*	67	*09*	64	*06*	62	*03*	60	00	58	04	55	07	53	10	51	14	48	17	46	20	43	116
120	*15*	63	*12*	61	*08*	59	*05*	57	*02*	54	02	52	05	50	08	48	12	46	15	43	18	41	120
124	*17*	60	*14*	58	*11*	56	*07*	53	*04*	51	*00*	49	03	47	07	45	10	43	13	41	17	38	124
128	*19*	56	*16*	54	*13*	52	*09*	50	*06*	48	*02*	46	01	44	05	41	08	40	12	38	15	36	128
132	*21*	53	*18*	51	*14*	49	*11*	47	*07*	45	*04*	43	*00*	41	03	39	07	37	10	35	14	33	132
136	*23*	49	*20*	47	*16*	45	*13*	43	*09*	41	*06*	40	*02*	38	02	36	05	34	09	33	12	31	136
140	*25*	45	*22*	43	*18*	41	*14*	40	*11*	38	*07*	36	*03*	35	00	32	04	31	07	30	11	28	140
144	*27*	41	*23*	39	*20*	38	*16*	36	*12*	34	*09*	33	*05*	31	*01*	29	03	28	06	27	10	25	144
148	*29*	37	*25*	35	*21*	34	*17*	32	*14*	31	*10*	29	*06*	28	*02*	26	01	25	05	24	09	23	148
152	*30*	33	*26*	31	*22*	30	*19*	28	*15*	27	*11*	26	*07*	25	*03*	23	00	22	04	21	08	20	152
156	*31*	28	*27*	27	*24*	26	*20*	25	*16*	23	*12*	22	*08*	21	*04*	20	*00*	19	03	18	07	17	156
160	*32*	24	*29*	23	*25*	22	*21*	21	*17*	20	*13*	19	*09*	18	*05*	17	*01*	16	03	15	07	14	160
164	*33*	19	*29*	18	*25*	17	*22*	17	*18*	16	*14*	15	*10*	14	*06*	14	*02*	13	02	12	06	12	164
168	*34*	14	*30*	14	*26*	13	*22*	12	*18*	12	*14*	11	*10*	11	*06*	10	*02*	10	02	09	06	09	168
172	*35*	10	*31*	09	*27*	09	*23*	08	*19*	08	*15*	08	*11*	07	*07*	07	*03*	06	01	06	05	06	172
176	*35*	05	*31*	05	*27*	04	*23*	04	*19*	04	*15*	04	*11*	04	*07*	03	*03*	03	01	03	05	03	176
180	*35*	00	*31*	00	*27*	00	*23*	00	*19*	00	*15*	00	*11*	00	*07*	00	*03*	00	01	00	05	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18036

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

Lat. 51°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	87	180	89	00	85	00	81	00	77	00	73	00	69	00	65	00	61	00	57	00	53	00	00
4	86	138	87	67	84	24	81	12	77	08	73	05	69	03	65	02	61	01	57	01	53	00	4
8	84	117	85	76	83	40	80	23	76	15	73	10	69	07	65	05	61	03	57	02	53	00	8
12	82	106	82	78	81	50	79	32	76	21	72	15	68	10	65	07	61	04	57	02	53	01	12
16	79	100	80	78	79	56	77	39	75	27	71	19	68	13	64	09	61	06	57	03	53	01	16
20	77	95	78	78	77	59	76	44	73	31	70	22	67	16	64	11	60	07	57	04	53	01	20
24	74	92	75	77	75	61	74	47	72	35	69	26	66	18	63	13	60	08	56	04	53	01	24
28	72	88	73	76	73	62	72	49	70	38	68	28	66	21	63	14	60	09	56	05	53	02	28
32	69	86	70	75	71	63	70	51	69	40	67	31	65	23	62	16	59	10	56	06	53	02	32
36	67	83	68	73	68	63	68	52	67	42	66	32	64	24	61	17	59	11	56	06	53	02	36
40	64	81	65	72	66	62	66	52	65	43	64	34	63	26	61	18	58	12	55	07	53	02	40
44	62	79	63	70	64	62	64	53	64	44	63	35	62	27	60	19	58	13	55	07	52	02	44
48	59	76	61	69	62	61	62	53	62	44	61	36	60	28	59	20	57	14	55	08	52	02	48
52	57	74	58	67	59	60	60	52	60	44	60	36	59	28	58	21	56	14	54	08	52	03	52
56	54	72	56	66	57	59	58	52	59	44	58	36	58	29	57	22	56	15	54	08	52	03	56
60	52	70	54	64	55	58	56	51	57	44	57	37	57	29	56	22	55	15	54	09	52	03	60
64	50	68	51	63	53	57	54	50	55	43	55	36	56	29	55	22	54	16	53	09	52	03	64
68	47	66	49	61	51	55	52	49	53	43	54	36	54	29	54	23	54	16	53	09	52	03	68
72	45	64	47	59	49	54	50	48	52	42	53	36	53	29	53	23	53	16	52	09	52	03	72
76	43	62	45	58	47	52	49	47	50	41	51	35	52	29	52	23	52	16	52	09	51	03	76
80	41	60	43	56	45	51	47	46	48	40	50	35	51	29	51	22	52	16	52	10	51	03	80
84	38	58	41	54	43	49	45	45	47	39	48	34	49	28	50	22	51	16	51	10	51	03	84
88	36	56	39	52	41	48	43	43	45	38	47	33	48	28	49	22	50	16	51	10	51	03	88
92	34	54	37	50	39	46	41	42	44	37	45	32	47	27	48	21	50	16	50	09	51	03	92
96	32	52	35	48	37	44	40	40	42	36	44	31	46	26	48	21	49	15	50	09	51	03	96
100	30	50	33	46	36	43	38	39	41	35	43	30	45	25	47	20	48	15	50	09	51	03	100
104	28	48	31	44	34	41	37	37	39	33	42	29	44	25	46	20	48	14	49	09	50	03	104
108	27	45	30	42	32	39	35	36	38	32	40	28	43	24	45	19	47	14	49	09	50	03	108
112	25	43	28	40	31	37	34	34	37	30	39	27	42	23	44	18	46	14	48	08	50	03	112
116	23	41	26	38	29	35	32	32	35	29	38	25	41	22	43	17	46	13	48	08	50	03	116
120	22	39	25	36	28	33	31	30	34	27	37	24	40	20	43	17	45	12	48	08	50	03	120
124	20	36	23	34	27	31	30	29	33	26	36	23	39	19	42	16	45	12	47	07	50	03	124
128	19	34	22	32	25	29	29	27	32	24	35	21	38	18	41	15	44	11	47	07	50	02	128
132	17	31	21	29	24	27	28	25	31	22	34	20	38	17	41	14	44	10	47	07	50	02	132
136	16	29	19	27	23	25	27	23	30	21	33	18	37	16	40	13	43	10	47	06	50	02	136
140	15	26	18	25	22	23	26	21	29	19	33	17	36	14	40	12	43	09	46	06	49	02	140
144	14	24	17	22	21	21	25	19	28	17	32	15	36	13	39	11	43	08	46	05	49	02	144
148	13	21	16	20	20	18	24	17	28	15	31	13	35	12	39	09	42	07	46	05	49	02	148
152	12	19	16	17	19	16	23	15	27	13	31	12	35	10	38	08	42	06	46	04	49	01	152
156	11	16	15	15	19	14	23	13	27	11	30	10	34	09	38	07	42	05	45	03	49	01	156
160	10	13	14	13	18	12	22	11	26	10	30	09	34	07	38	06	42	05	45	03	49	01	160
164	10	11	14	10	18	09	22	09	26	08	30	07	34	06	37	05	41	04	45	02	49	01	164
168	10	08	13	08	17	07	21	06	25	06	29	05	33	04	37	04	41	03	45	02	49	01	168
172	09	05	13	05	17	05	21	04	25	04	29	03	33	03	37	02	41	02	45	01	49	00	172
176	09	03	13	03	17	02	21	02	25	02	29	02	33	01	37	01	41	01	45	01	49	00	176
180	09	00	13	00	17	00	21	00	25	00	29	00	33	00	37	00	41	00	45	00	49	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

Lat. 52°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	38 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	39 00.0	1.0 01	180.0	39 30.0	1.0 01	180.0	40 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	41 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	00
1	37 59.6	1.0 02	178.7	38 29.6	1.0 02	178.7	38 59.6	1.0 02	178.7	39 29.6	1.0 02	178.7	39 59.6	1.0 02	178.7	40 29.6	1.0 02	178.7	40 59.6	1.0 02	178.7	41 29.6	1.0 02	178.7	1
2	37 58.4	1.0 03	177.5	38 28.4	1.0 03	177.4	38 58.3	1.0 03	177.4	39 28.3	1.0 03	177.4	39 58.3	1.0 04	177.4	40 28.3	1.0 04	177.4	40 58.3	1.0 04	177.4	41 28.3	1.0 04	177.3	2
3	37 56.3	1.0 05	176.2	38 26.3	1.0 05	176.2	38 56.3	1.0 05	176.1	39 26.2	1.0 05	176.1	39 56.2	1.0 05	176.1	40 26.2	1.0 05	176.1	40 56.2	1.0 05	176.0	41 26.1	1.0 05	176.0	3
4	37 53.5	1.0 06	174.9	38 23.4	1.0 06	174.9	38 53.4	1.0 06	174.9	39 23.3	1.0 06	174.8	39 53.3	1.0 06	174.8	40 23.2	1.0 06	174.8	40 53.2	1.0 06	174.7	41 23.1	1.0 06	174.7	4
05	37 49.8	1.0 07	173.7	38 19.7	1.0 08	173.6	38 49.7	1.0 08	173.6	39 19.6	1.0 08	173.5	39 49.5	1.0 08	173.5	40 19.4	1.0 08	173.4	40 49.4	1.0 08	173.4	41 19.3	1.0 08	173.3	05
6	37 45.3	1.0 09	172.4	38 15.2	1.0 09	172.4	38 45.1	1.0 09	172.3	39 15.0	1.0 09	172.2	39 44.9	1.0 09	172.2	40 14.8	1.0 09	172.1	40 44.7	1.0 09	172.1	41 14.6	1.0 09	172.0	6
7	37 40.0	1.0 10	171.1	38 09.9	1.0 10	171.1	38 39.8	1.0 10	171.0	39 09.6	1.0 10	171.0	39 39.5	1.0 10	170.9	40 09.3	1.0 10	170.8	40 39.2	1.0 11	170.8	41 09.0	1.0 11	170.7	7
8	37 33.9	99 11	169.9	38 03.8	99 12	169.8	38 33.6	99 12	169.7	39 03.4	99 12	169.7	39 33.2	99 12	169.6	40 03.0	99 12	169.5	40 32.8	99 12	169.5	41 02.6	99 12	169.4	8
9	37 27.1	99 13	168.6	37 56.8	99 13	168.6	38 26.6	99 13	168.5	38 56.4	99 13	168.4	39 26.1	99 13	168.3	39 55.9	99 13	168.2	40 25.7	99 13	168.2	40 55.4	99 13	168.1	9
10	37 19.4	99 14	167.4	37 49.1	99 14	167.3	38 18.8	99 14	167.2	38 48.6	99 14	167.1	39 18.3	99 14	167.0	39 48.0	99 15	166.9	40 17.7	99 15	166.9	40 47.4	99 15	166.8	10
1	37 10.9	99 15	166.1	37 40.6	99 16	166.1	38 10.3	99 16	166.0	38 39.9	99 16	165.9	39 09.6	99 16	165.8	39 39.2	99 16	165.7	40 08.9	99 16	165.6	40 38.5	99 16	165.5	1
2	37 01.7	99 17	164.9	37 31.3	99 17	164.8	38 00.9	99 17	164.7	38 30.5	99 17	164.6	39 00.1	99 17	164.5	39 29.7	99 17	164.4	39 59.3	99 17	164.3	40 28.8	99 17	164.2	2
3	36 51.7	98 18	163.7	37 21.2	98 18	163.6	37 50.8	98 18	163.5	38 20.3	98 18	163.3	38 49.8	98 18	163.2	39 19.3	98 19	163.1	39 48.9	98 19	163.0	40 18.4	98 19	162.9	3
4	36 40.9	98 19	162.4	37 10.4	98 19	162.3	37 39.9	98 19	162.2	38 09.3	98 20	162.1	38 38.8	98 20	162.0	39 08.2	98 20	161.8	39 37.7	98 20	161.7	40 07.1	98 20	161.6	4
15	36 29.4	98 20	161.2	36 58.8	98 21	161.1	37 28.2	98 21	161.0	37 57.6	98 21	160.8	38 27.0	98 21	160.7	38 56.3	98 21	160.6	39 25.7	98 21	160.5	39 55.0	98 21	160.3	15
6	36 17.1	98 22	160.0	36 46.5	98 22	159.9	37 15.8	98 22	159.7	37 45.1	98 22	159.6	38 14.4	98 22	159.5	38 43.7	98 22	159.3	39 12.9	98 22	159.2	39 42.2	98 23	159.0	6
7	36 04.1	97 23	158.8	36 33.4	97 23	158.7	37 02.6	97 23	158.5	37 31.8	97 23	158.4	38 01.1	97 23	158.2	38 30.3	97 24	158.1	38 59.4	97 24	157.9	39 28.6	97 24	157.8	7
8	35 50.4	97 24	157.6	36 19.6	97 24	157.4	36 48.7	97 24	157.3	37 17.9	97 25	157.2	37 47.0	97 25	157.0	38 16.1	97 25	156.8	38 45.2	97 25	156.7	39 14.3	97 25	156.5	8
9	35 36.0	97 25	156.4	36 05.1	97 25	156.2	36 34.1	97 26	156.1	37 03.2	97 26	155.9	37 32.2	97 26	155.8	38 01.2	97 26	155.6	38 30.2	97 26	155.5	38 59.2	97 26	155.3	9
20	35 20.8	97 26	155.2	35 49.8	97 27	155.0	36 18.8	97 27	154.9	36 47.7	96 27	154.7	37 16.7	96 27	154.6	37 45.6	96 27	154.4	38 14.5	96 27	154.2	38 43.4	96 28	154.1	20
1	35 05.0	96 28	154.0	35 33.9	96 28	153.9	36 02.8	96 28	153.7	36 31.6	96 28	153.5	37 00.5	96 28	153.4	37 29.3	96 28	153.2	37 58.1	96 29	153.0	38 26.9	96 29	152.8	1
2	34 48.5	96 29	152.9	35 17.3	96 29	152.7	35 46.0	96 29	152.5	36 14.8	96 29	152.3	36 43.5	96 29	152.2	37 12.3	96 30	152.0	37 41.0	96 30	151.8	38 09.7	96 30	151.6	2
3	34 31.3	96 30	151.7	35 00.0	96 30	151.5	35 28.7	96 30	151.3	35 57.3	95 30	151.1	36 26.0	95 30	151.0	36 54.6	95 31	150.8	37 23.2	95 31	150.6	37 51.8	95 31	150.4	3
4	34 13.5	95 31	150.5	34 42.0	95 31	150.3	35 10.6	95 31	150.2	35 39.2	95 31	150.0	36 07.7	95 32	149.8	36 36.2	95 32	149.6	37 04.7	95 32	149.4	37 33.2	95 32	149.2	4
25	33 55.0	95 32	149.4	34 23.4	95 32	149.2	34 51.9	95 32	149.0	35 20.3	95 32	148.8	35 48.8	95 33	148.6	36 17.2	95 33	148.4	36 45.6	95 33	148.2	37 13.9	95 33	148.0	25
6	33 35.8	95 33	148.2	34 04.2	95 33	148.0	34 32.6	94 33	147.9	35 00.9	94 33	147.7	35 29.2	94 34	147.4	35 57.5	94 34	147.2	36 25.8	94 34	147.0	36 54.0	94 34	146.8	6
7	33 16.1	94 34	147.1	33 44.4	94 34	146.9	34 12.6	94 34	146.7	34 40.8	94 34	146.5	35 09.0	94 35	146.3	35 37.2	94 35	146.1	36 05.4	94 35	145.9	36 33.5	94 35	145.7	7
8	32 55.7	94 35	146.0	33 23.9	94 35	145.8	33 52.0	94 35	145.6	34 20.1	94 36	145.4	34 48.2	94 36	145.2	35 16.3	94 36	144.9	35 44.3	93 36	144.7	36 12.4	93 36	144.5	8
9	32 34.8	94 36	144.9	33 02.8	93 36	144.7	33 30.8	93 36	144.5	33 58.8	93 36	144.2	34 26.8	93 37	144.0	34 54.8	93 37	143.8	35 22.7	93 37	143.6	35 50.6	93 37	143.3	9
30	32 13.2	93 37	143.8	32 41.2	93 37	143.6	33 09.1	93 37	143.3	33 37.0	93 37	143.1	34 04.8	93 38	142.9	34 32.7	93 38	142.7	35 00.5	93 38	142.4	35 28.3	93 38	142.2	30
1	31 51.1	93 38	142.7	32 18.9	93 38	142.5	32 46.7	93 38	142.2	33 14.5	93 38	142.0	33 42.2	92 39	141.8	34 10.0	92 39	141.5	34 37.7	92 39	141.3	35 05.3	92 39	141.1	1
2	31 28.4	92 39	141.6	31 56.1	92 39	141.4	32 23.8	92 39	141.1	32 51.5	92 39	140.9	33 19.1	92 39	140.7	33 46.7	92 40	140.4	34 14.3	92 40	140.2	34 41.8	92 40	140.0	2
3	31 05.2	92 40	140.5	31 32.8	92 40	140.3	32 00.4	92 40	140.0	32 27.9	92 40	139.8	32 55.4	92 40	139.6	33 22.9	92 41	139.3	33 50.4	91 41	139.1	34 17.8	91 41	138.8	3
4	30 41.5	92 40	139.4	31 08.9	92 41	139.2	31 36.4	91 41	139.0	32 03.8	91 41	138.7	32 31.2	91 41	138.5	32 58.6	91 41	138.2	33 25.9	91 42	138.0	33 53.2	91 42	137.8	4
35	30 17.2	91 41	138.4	30 44.5	91 42	138.1	31 11.9	91 42	137.9	31 39.2	91 42	137.7	32 06.5	91 42	137.4	32 33.7	91 42	137.2	33 00.9	91 42	136.9	33 28.1	91 43	136.7	35
6	29 52.4	91 42	137.3	30 19.6	91 42	137.1	30 46.9	91 42	136.8	31 14.1	91 43	136.6	31 41.2	91 43	136.3	32 08.4	90 43	136.1	32 35.5	90 43	135.8	33 02.5	90 44	135.6	6
7	29 27.1	90 43	136.3	29 54.2	90 43	136.0	30 21.3	90 43	135.8	30 48.4	90 44	135.5	31 15.5	90 44	135.3	31 42.5	90 44	135.0	32 09.5	90 44	134.8	32 36.4	90 44	134.5	7
8	29 01.3	90 44	135.2	29 28.3	90 44	135.0	29 55.3	90 44	134.7	30 22.3	90 44	134.5	30 49.2	90 44	134.2	31 16.1	90 45	134.0	31 43.0	90 45	133.7	32 09.9	89 45	133.5	8
9	28 35.1	90 44	134.2	29 02.0	90 45	134.0	29 28.9	90 45	133.7	29 55.7	89 45	133.5	30 22.5	89 45	133.2	30 49.3	89 45	132.9	31 16.1	89 46	132.7	31 42.8	89 46	132.4	9
40	28 08.4	89 45	133.2	28 35.2	89 45	132.9	29 01.9	89 46	132.7	29 28.7	89 46	132.4	29 55.4	89 46	132.2	30 22.1	89 46	131.9	30 48.7	89 46	131.6	31 15.3	89 47	131.4	40
1	27 41.2	89 46	132.2	28 07.9	89 46	131.9	28 34.6	89 46	131.7	29 01.2	89 47	131.4	29 27.8	89 47	131.1	29 54.4	88 47	130.9	30 20.9	88 47	130.6	30 47.4	88 47	130.3	1
2	27 13.7	89 47	131.2	27 40.2	89 47	130.9	28 06.8	88 47	130.7	28 33.3	88 47	130.4	28 59.8	88 47	130.1	29 26.2	88 48	129.9	29 52.6	88 48	129.6	30 19.0	88 48	129.3	2
3	26 45.6	88 47	130.2	27 12.1	88 48	129.9	27 38.5	88 48	129.7	28 04.9	88 48	129 4	28 31.3	88 48	129.1	28 57.6	88 48	128.9	29 23.9	88 48	128.6	29 50.2	88 49	128.3	3
4	26 17.2	88 48	129.2	26 43.6	88 48	128.9	27 09.9	88 48	128.7	27 36.2	88 49	128.4	28 02.5	87 49	128.1	28 28.7	87 49	127.9	28 54.9	87 49	127.6	29 21.0	87 49	127.3	4
45	25 48.4	88 49	128.2	26 14.7	87 49	128.0	26 40.9	87 49	127.7	27 07.1	87 49	127.4	27 33.2	87 49	127.1	27 59.3	87 50	126.9	28 25.4	87 50	126.6	28 51.5	87 50	126.3	45
6	25 19.2	87 49	127.3	25 45.3	87 49	127.0	26 11.4	87 50	126.7	26 37.5	87 50	126.4	27 03.6	87 50	126.2	27 29.6	87 50	125.9	27 55.6	87 50	125.6	28 21.5	86 51	125.3	6
7	24 49.6	87 50	126.3	25 15.7	87 50	126.0	25 41.7	87 50	125.8	26 07.6	87 50	125.5	26 33.6	86 51	125.2	26 59.5	86 51	124.9	27 25.3	86 51	124.6	27 51.2	86 51	124.3	7
8	24 19.7	86 50	125.4	24 45.6	86 51	125.1	25 11.5	86 51	124.8	25 37.4	86 51	124.5	26 03.2	86 51	124.2	26 29.0	86 51	124.0	26 54.8	86 52	123.7	27 20.5	86 52	123.4	8
9	23 49.4	86 51	124.4	24 15.2	86 51	124.1	24 41.0	86 51	123.9	25 06.8	86 52	123.6	25 32.5	86 52	123.3	25 58.2	86 52	123.0	26 23.9	85 52	122.7	26 49.5	85 52	122.4	9
50	23 18.7	86 52	123.5	23 44.5	86 52	123.2	24 10.1	86 52	122.9	24 35.8	85 52	122.6	25 01.4	85 52	122.3	25 27.0	85 52	122.1	25 52.6	85 53	121.8	26 18.1	85 53	121.5	50
1	22 47.7	85 52	122.5	23 13.4	85 52	122.3	23 39.0	85 52	122.0	24 04.5	85 53	121.7	24 30.1	85 53	121.4	24 55.6	85 53	121.1	25 21.0	85 53	120.8	25 46.5	85 53	120.5	1
2	22 16.5	85 53	121.6	22 42.0	85 53	121.3	23 07.5	85 53	121.0	23 33.0	85 53	120.8	23 58.4	85 53	120.5	24 23.8	85 53	120.2	24 49.2	85 54	119.9	25 14.5	84 54	119.6	2
3	21 44.8	85 53	120.7	22 10.3	85 53	120.4	22 35.7	85 54	120.1	23 01.1	85 54	119.8	23 26.4	84 54	119.5	23 51.7	84 54	119.3	24 17.0	84 54	119.0	24 42.2	84 54	118.7	3
4	21 12.9	85 54	119.8	21 38.3	84 54	119.5	22 03.6	84 54	119.2	22 28.9	84 54	118.9	22 54.1	84 54	118.6	23 19.3	84 54	118.3	23 44.5	84 55	118.0	24 09.7	84 55	117.7	4
55	20 40.7	84 54	118.9	21 06.0	84 54	118.6	21 31.2	84 54	118.3	21 56.4	84 55	118.0	22 21.6	84 55	117.7	22 46.7	84 55	117.4	23 11.8	84 55	117.1	23 36.9	83 55	116.8	55
6	20 08.2	84 55	118.0	20 33.4	84 55	117.7	20 58.5	84 55	117.4	21 23.7	84 55	117.1	21 48.7	84 55	116 8	22 13.8	83 55	116.5	22 38.8	83 55	116.2	23 03.8	83 56	115.9	6
7	19 35.5	84 55	117.1	20 00.6	84 55	116.8	20 25.6	83 55	116.5	20 50.6	83 55	116.2	21 15.6	83 56	115.9	21 40.6	83 56	115.6	22 05.5	83 56	115.3	22 30.4	83 56	115.0	7
8	19 02.5	83 55	116.2	19 27.5	83 56	115.9	19 52.4	83 56	115.6	20 17.4	83 56	115.3	20 42.3	83 56	115.0	21 07.2	83 56	114.7	21 32.0	83 56	114.4	21 56.8	83 56	114.1	8
9	18 29.2	83 56	115.3	18 54.1	83 56	115.0	19 19.0	83 56	114.7	19 43.9	83 56	114.5	20 08.7	83 56	114.2	20 33.5	83 56	113.9	20 58.3	82 57	113.5	21 23.0	82 57	113.2	9
60	17 55.7	83 56	114.5	18 20.5	83 56	114.2	18 45.4	83 56	113.9	19 10.1	83 57	113.6	19 34.9	82 57	113.3	19 59.6	82 57	113.0	20 24.3	82 57	112.7	20 48.9	82 57	112.4	60
1	17 22.0	83 57	113.6	17 46.7	82 57	113.3	18 11.5	82 57	113.0	18 36.2	82 57	112.7	19 00.8	82 57	112.4	19 25.5	82 57	112.1	19 50.1	82 57	111.8	20 14.7	82 57	111.5	1
2	16 48.0	82 57	112.7	17 12.7	82 57	112.4	17 37.4	82 57	112.1	18 02.0	82 57	111.8	18 26.6	82 57	111.5	18 51.2	82 58	111.2	19 15.7	82 58	110.9	19 40.2	82 58	110.6	2
3	16 13.8	82 57	111.9	16 38.4	82 57	111.6	17 03.0	82 58	111.3	17 27.6	82 58	111.0	17 52.1	82 58	110.7	18 16.6	82 58	110.4	18 41.1	82 58	110.1	19 05.5	81 58	109.8	3
4	15 39.5	82 58	111.0	16 04.0	82 58	110.7	16 28.5	82 58	110.4	16 53.0	82 58	110.1	17 17.5	81 58	109.8	17 41.9	81 58	109.5	18 06.3	81 58	109.2	18 30.7	81 58	108.9	4
65	15 04.9	82 58	110.2	15 29.4	82 58	109.9	15 53.8	81 58	109.6	16 18.2	81 58	109.3	16 42.6	81 58	109.0	17 07.0	81 58	108.7	17 31.3	81 59	108.4	17 55.6	81 59	108.1	65
6	14 30.1	81 58	109.3	14 54.5	81 58	109.0	15 18.9	81 58	108.7	15 43.3	81 59	108.4	16 07.6	81 59	108.1	16 31.9	81 59	107.8	16 56.2	81 59	107.5	17 20.4	81 59	107.2	6
7	13 55.2	81 59	108 5	14 19.5	81 59	108.2	14 43.8	81 59	107.9	15 08.1	81 59	107.6	15 32.4	81 59	107.3	15 56.7	81 59	107.0	16 20.9	81 59	106.7	16 45.1	81 59	106.4	7
8	13 20.1	81 59	107.7	13 44.3	81 59	107.4	14 08.6	81 59	107.1	14 32.8	81 59	106.8	14 57.1	81 59	106.4	15 21.2	81 59	106.1	15 45.4	81 59	105.8	16 09.6	80 59	105.5	8
9	12 44.8	81 59	106.8	13 09.0	81 59	106.5	13 33.2	81 59	106.2	13 57.4	81 59	105.9	14 21.6	80 59	105.6	14 45.7	80 60	105.3	15 09.8	80 60	105.0	15 33.9	80 60	104.7	9
70	12 09.3	81 59	106.0	12 33.5	81 59	105.7	12 57.7	80 59	105.4	13 21.8	80 60	105.1	13 45.9	80 60	104.8	14 10.0	80 60	104.5	14 34.1	80 60	104.2	14 58.1	80 60	103.9	70
1	11 33.8	80 60	105.2	11 57.9	80 60	104.9	12 22.0	80 60	104.6	12 46.1	80 60	104.3	13 10.1	80 60	104.0	13 34.2	80 60	103.7	13 58.2	80 60	103.3	14 22.2	80 60	103.0	1
2	10 58.0	80 60	104.4	11 22.1	80 60	104.1	11 46.2	80 60	103.8	12 10.2	80 60	103.4	12 34.2	80 60	103.1	12 58.2	80 60	102.8	13 22.2	80 60	102.5	13 46.1	80 60	102.2	2
3	10 22.2	80 60	103.5	10 46.2	80 60	103.2	11 10.2	80 60	102.9	11 34.2	80 60	102.6	11 58.2	80 60	102 3	12 22.1	80 60	102.0	12 46.1	80 60	101.7	13 10.0	80 60	101.4	3
4	9 46.2	80 60	102.7	10 10.2	80 60	102.4	10 34.2	80 60	102.1	10 58.1	80 60	101.8	11 22.0	80 60	101.5	11 45.9	80 60	101.2	12 09.8	80 61	100.9	12 33.7	80 61	100.6	4
75	9 10.1	80 60	101.9	9 34.1	80 60	101.6	9 58.0	80 60	101.3	10 21.9	80 61	101.0	10 45.8	80 61	100.7	11 09.7	80 61	100.4	11 33.5	79 61	100.1	11 57.3	79 61	99.8	75
6	8 33.9	80 60	101.1	8 57.8	80 61	100.8	9 21.7	80 61	100.5	9 45.6	80 61	100.2	10 09.4	79 61	99.9	10 33.3	79 61	99.6	10 57.1	79 61	99.3	11 20.9	79 61	99.0	6
7	7 57.6	80 61	100.3	8 21.5	80 61	100.0	8 45.4	79 61	99.7	9 09.2	79 61	99.4	9 33.0	79 61	99.1	9 56.8	79 61	98.8	10 20.6	79 61	98.5	10 44.4	79 61	98.2	7
8	7 21.3	79 61	99.5	7 45.1	79 61	99.2	8 08.9	79 61	98.9	8 32.7	79 61	98.6	8 56.5	79 61	98.3	9 20.3	79 61	98.0	9 44.0	79 61	97.7	10 07.8	79 61	97.3	8
9	6 44.8	79 61	98.7	7 08.6	79 61	98.4	7 32.4	79 61	98.1	7 56.1	79 61	97.8	8 19.9	79 61	97.5	8 43.6	79 61	97.2	9 07.4	79 61	96.9	9 31.1	79 61	96.5	9
80	6 08.2	79 61	97.9	6 32.0	79 61	97.6	6 55.8	79 61	97.3	7 19.5	79 61	97.0	7 43.2	79 61	96.7	8 07.0	79 61	96.4	8 30.7	79 61	96.1	8 54.4	79 61	95.8	80
1	5 31.6	79 61	97.1	5 55.4	79 61	96.8	6 19.1	79 61	96.5	6 42.8	79 61	96.2	7 06.5	79 61	95.9	7 30.2	79 61	95.6	7 53.9	79 61	95.3	8 17.6	79 61	95.0	1
2				5 18.6	79 61	96.0	5 42.4	79 61	95.7	6 06.1	79 61	95.4	6 29.8	79 61	95.1	6 53.4	79 61	94.8	7 17.1	79 61	94.5	7 40.8	79 61	94.2	2
3							5 05.6	79 61	94.9	5 29.3	79 61	94.6	5 52.9	79 61	94.3	6 16.6	79 61	94.0	6 40.3	79 61	93.7	7 03.9	79 61	93.4	3
4													5 16.1	79 61	93.5	5 39.7	79 61	93.2	6 03.4	79 62	92.9	6 27.0	79 62	92.6	4
85																5 02.8	79 62	92.4	5 26.5	79 62	92.1	5 50.1	79 62	91.8	85
6																						5 13.2	79 62	91.0	6

Digitized by Google

Lat. 52°

H.A.	0° 00′ Alt.	Δd	Δt	Az.	0° 30′ Alt.	Δd	Δt	Az.	1° 00′ Alt.	Δd	Δt	Az.	1° 30′ Alt.	Δd	Δt	Az.	2° 00′ Alt.	Δd	Δt	Az.	2° 30′ Alt.	Δd	Δt	Az.	3° 00′ Alt.	Δd	Δt	Az.	3° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	38 00.0	1.0	01	180.0	37 30.0	1.0	01	180.0	37 00.0	1.0	01	180.0	36 30.0	1.0	01	180.0	36 00.0	1.0	01	180.0	35 30.0	1.0	01	180.0	35 00.0	1.0	01	180.0	34 30.0	1.0	01	180.0	00
1	37 59.6	1.0	02	178.7	37 29.6	1.0	02	178.7	36 59.6	1.0	02	178.7	36 29.6	1.0	02	178.8	35 59.6	1.0	02	178.8	35 29.6	1.0	02	178.8	34 59.6	1.0	02	178.8	34 29.6	1.0	02	178.8	1
2	37 58.4	1.0	03	177.5	37 28.4	1.0	03	177.5	36 58.4	1.0	03	177.5	36 28.4	1.0	03	177.5	35 58.4	1.0	03	177.5	35 28.4	1.0	03	177.5	34 58.4	1.0	03	177.6	34 28.4	1.0	03	177.6	2
3	37 56.3	1.0	05	176.2	37 26.3	1.0	05	176.2	36 56.4	1.0	05	176.2	36 26.4	1.0	05	176.3	35 56.4	1.0	05	176.3	35 26.4	1.0	05	176.3	34 56.5	1.0	05	176.3	34 26.5	1.0	05	176.4	3
4	37 53.5	1.0	06	174.9	37 23.5	1.0	06	175.0	36 53.5	1.0	06	175.0	36 23.6	1.0	06	175.0	35 53.6	1.0	06	175.1	35 23.7	1.0	06	175.1	34 53.7	1.0	06	175.1	34 23.8	1.0	06	175.2	4
05	37 49.8	1.0	07	173.7	37 19.9	1.0	07	173.7	36 49.9	1.0	07	173.7	36 20.0	1.0	07	173.8	35 50.1	1.0	07	173.8	35 20.1	1.0	07	173.9	34 50.2	1.0	07	173.9	34 20.3	1.0	07	174.0	05
6	37 45.3	1.0	09	172.4	37 15.4	1.0	09	172.5	36 45.5	1.0	09	172.5	36 15.6	1.0	09	172.6	35 45.7	1.0	09	172.6	35 15.8	1.0	09	172.7	34 45.9	1.0	08	172.7	34 16.0	1.0	08	172.7	6
7	37 40.0	1.0	10	171.1	37 10.2	1.0	10	171.2	36 40.3	1.0	10	171.3	36 10.4	1.0	10	171.3	35 40.6	1.0	10	171.4	35 10.7	1.0	10	171.4	34 40.8	1.0	10	171.5	34 10.9	1.0	10	171.5	7
8	37 33.9	99	11	169.9	37 04.1	99	11	170.0	36 34.3	99	11	170.0	36 04.5	99	11	170.1	35 34.6	99	11	170.2	35 04.8	99	11	170.2	34 35.0	99	11	170.3	34 05.1	99	11	170.3	8
9	37 27.1	99	13	168.6	36 57.3	99	13	168.7	36 27.5	99	13	168.8	35 57.7	99	13	168.9	35 27.9	99	12	168.9	34 58.1	99	12	169.0	34 28.3	99	12	169.1	33 58.5	99	12	169.1	9
10	37 19.4	99	14	167.4	36 49.7	99	14	167.5	36 19.9	99	14	167.6	35 50.2	99	14	167.6	35 20.4	99	14	167.7	34 50.7	99	14	167.8	34 21.0	99	14	167.9	33 51.2	99	14	168.0	10
1	37 10.9	99	15	166.1	36 41.3	99	15	166.2	36 11.6	99	15	166.3	35 41.9	99	15	166.4	35 12.2	99	15	166.5	34 42.5	99	15	166.6	34 12.8	99	15	166.7	33 43.1	99	15	166.8	1
2	37 01.7	99	17	164.9	36 32.1	99	17	165.0	36 02.5	99	16	165.1	35 32.8	99	16	165.2	35 03.2	99	16	165.3	34 33.6	99	16	165.4	34 03.9	99	16	165.5	33 34.3	99	16	165.6	2
3	36 51.7	98	18	163.7	36 22.1	99	18	163.8	35 52.6	99	18	163.9	35 23.0	99	18	164.0	34 53.5	99	18	164.1	34 23.9	99	17	164.2	33 54.3	99	17	164.3	33 24.7	99	17	164.4	3
4	36 40.9	98	19	162.4	36 11.4	98	19	162.6	35 42.0	98	19	162.7	35 12.5	98	19	162.8	34 43.0	98	19	162.9	34 13.5	98	19	163.0	33 43.9	98	18	163.1	33 14.4	98	18	163.2	4
15	36 29.4	98	20	161.2	36 00.0	98	20	161.3	35 30.6	98	20	161.5	35 01.2	98	20	161.6	34 31.7	98	20	161.7	34 02.3	98	20	161.8	33 32.8	98	20	161.9	33 03.4	98	20	162.0	15
6	36 17.1	98	22	160.0	35 47.8	98	22	160.1	35 18.5	98	21	160.3	34 49.1	98	21	160.4	34 19.8	98	21	160.5	33 50.4	98	21	160.6	33 21.0	98	21	160.8	32 51.7	98	21	160.9	6
7	36 04.1	97	23	158.8	35 34.9	98	23	158.9	35 05.6	98	23	159.1	34 36.4	98	22	159.2	34 07.1	98	22	159.3	33 37.8	98	22	159.5	33 08.5	98	22	159.6	32 39.2	98	22	159.7	7
8	35 50.4	97	24	157.6	35 21.3	97	24	157.7	34 52.1	97	24	157.9	34 22.9	97	24	158.0	33 53.7	97	24	158.2	33 24.5	97	23	158.3	32 55.3	97	23	158.4	32 26.0	97	23	158.6	8
9	35 36.0	97	25	156.4	35 06.9	97	25	156.5	34 37.8	97	25	156.7	34 08.7	97	25	156.8	33 39.6	97	25	157.0	33 10.5	97	24	157.1	32 41.3	97	24	157.3	32 12.2	97	24	157.4	9
20	35 20.8	97	26	155.2	34 51.9	97	26	155.4	34 22.9	97	26	155.5	33 53.8	97	26	155.7	33 24.8	97	26	155.8	32 55.8	97	26	156.0	32 26.7	97	25	156.1	31 57.7	97	25	156.3	20
1	35 05.0	96	28	154.0	34 36.1	96	27	154.2	34 07.2	96	27	154.4	33 38.3	96	27	154.5	33 09.4	96	27	154.7	32 40.4	97	27	154.8	32 11.4	97	27	155.0	31 42.5	97	26	155.1	1
2	34 48.5	96	29	152.9	34 19.7	96	28	153.0	33 50.9	96	28	153.2	33 22.1	96	28	153.4	32 53.2	96	28	153.5	32 24.4	96	28	153.7	31 55.5	96	28	153.8	31 26.6	96	28	154.0	2
3	34 31.3	96	30	151.7	34 02.6	96	30	151.9	33 33.9	96	29	152.0	33 05.2	96	29	152.2	32 36.4	96	29	152.4	32 07.7	96	29	152.6	31 38.9	96	29	152.7	31 10.1	96	29	152.9	3
4	34 13.5	95	31	150.5	33 44.9	95	31	150.7	33 16.2	95	30	150.9	32 47.6	95	30	151.1	32 19.0	96	30	151.3	31 50.3	96	30	151.4	31 21.6	96	30	151.6	30 52.9	96	30	151.8	4
25	33 55.0	95	32	149.4	33 26.5	95	32	149.6	32 58.0	95	32	149.8	32 29.4	95	31	149.9	32 00.9	95	31	150.1	31 32.3	95	31	150.3	31 03.8	95	31	150.5	30 35.2	95	31	150.7	25
6	33 35.8	95	33	148.2	33 07.5	95	33	148.4	32 39.0	95	33	148.6	32 10.6	95	32	148.8	31 42.2	95	32	149.0	31 13.7	95	32	149.2	30 45.2	95	32	149.4	30 16.8	95	32	149.6	6
7	33 16.1	94	34	147.1	32 47.8	94	34	147.3	32 19.5	94	34	147.5	31 51.2	94	33	147.7	31 22.8	94	33	147.9	30 54.5	95	33	148.1	30 26.1	95	33	148.3	29 57.7	95	33	148.5	7
8	32 55.7	94	35	146.0	32 27.6	94	35	146.2	31 59.4	94	35	146.4	31 31.1	94	34	146.6	31 02.9	94	34	146.8	30 34.7	94	34	147.0	30 06.4	94	34	147.2	29 38.1	94	34	147.4	8
9	32 34.8	94	36	144.9	32 06.7	94	36	145.1	31 38.6	94	36	145.3	31 10.5	94	35	145.5	30 42.4	94	35	145.7	30 14.2	94	35	145.9	29 46.1	94	35	146.1	29 17.9	94	35	146.3	9
30	32 13.2	93	37	143.8	31 45.3	93	37	144.0	31 17.3	93	36	144.2	30 49.3	93	36	144.4	30 21.3	93	36	144.6	29 53.2	93	36	144.8	29 25.2	94	36	145.0	28 57.1	94	36	145.2	30
1	31 51.1	93	38	142.7	31 23.3	93	38	142.9	30 55.4	93	37	143.1	30 27.5	93	37	143.3	29 59.6	93	37	143.5	29 31.7	93	37	143.7	29 03.7	93	37	144.0	28 35.8	93	36	144.2	1
2	31 28.4	92	39	141.6	31 00.7	92	38	141.8	30 33.0	93	38	142.0	30 05.2	93	38	142.2	29 37.4	93	38	142.5	29 09.6	93	38	142.7	28 41.7	93	38	142.9	28 13.9	93	37	143.1	2
3	31 05.2	92	40	140.5	30 37.6	92	39	140.7	30 10.0	92	39	141.0	29 42.3	92	39	141.2	29 14.6	92	39	141.4	28 46.9	92	39	141.6	28 19.2	92	38	141.8	27 51.4	93	38	142.1	3
4	30 41.5	92	40	139.4	30 14.0	92	40	139.7	29 46.4	92	40	139.9	29 18.9	92	40	140.1	28 51.3	92	40	140.4	28 23.7	92	40	140.6	27 56.1	92	39	140.8	27 28.4	92	39	141.0	4
35	30 17.2	91	41	138.4	29 49.8	91	41	138.6	29 22.4	91	41	138.8	28 54.9	92	41	139.1	28 27.5	92	41	139.3	28 00.0	92	40	139.5	27 32.5	92	40	139.8	27 05.0	92	40	140.0	35
6	29 52.4	91	42	137.3	29 25.1	91	42	137.6	28 57.8	91	42	137.8	28 30.5	91	42	138.0	28 03.1	91	41	138.3	27 35.8	91	41	138.5	27 08.4	91	41	138.7	26 40.9	91	41	139.0	6
7	29 27.1	90	43	136.3	28 59.9	91	43	136.5	28 32.7	91	43	136.8	28 05.5	91	42	137.0	27 38.3	91	42	137.2	27 11.0	91	42	137.5	26 43.8	91	42	137.7	26 16.4	91	42	137.9	7
8	29 01.3	90	44	135.2	28 34.3	90	44	135.5	28 07.2	90	43	135.7	27 40.1	90	43	136.0	27 13.0	90	43	136.2	26 45.8	91	43	136.5	26 18.7	91	43	136.7	25 51.5	91	42	136.9	8
9	28 35.1	90	44	134.2	28 08.2	90	44	134.5	27 41.2	90	44	134.7	27 14.2	90	44	135.0	26 47.2	90	44	135.2	26 20.1	90	44	135.5	25 53.1	90	43	135.7	25 26.0	90	43	135.9	9
40	28 08.4	89	45	133.2	27 41.6	89	45	133.5	27 14.7	90	45	133.7	26 47.8	90	45	134.0	26 20.9	90	44	134.2	25 54.0	90	44	134.4	25 27.0	90	44	134.7	25 00.1	90	44	134.9	40
1	27 41.2	89	46	132.2	27 14.5	89	46	132.4	26 47.8	89	46	132.7	26 21.0	89	45	133.0	25 54.2	89	45	133.2	25 27.4	89	45	133.5	25 00.6	90	45	133.7	24 33.7	90	45	133.9	1
2	27 13.7	89	47	131.2	26 47.1	89	46	131.5	26 20.4	89	46	131.7	25 53.8	89	46	132.0	25 27.1	89	46	132.2	25 00.4	89	46	132.5	24 33.6	89	46	132.7	24 06.9	89	45	133.0	2
3	26 45.6	88	47	130.2	26 19.2	88	47	130.5	25 52.6	88	47	130.7	25 26.1	89	47	131.0	24 59.5	89	47	131.2	24 32.9	89	46	131.5	24 06.3	89	46	131.7	23 39.6	89	46	132.0	3
4	26 17.2	88	48	129.2	25 50.8	88	48	129.5	25 24.4	88	48	129.7	24 58.0	88	48	130.0	24 31.5	88	47	130.3	24 05.0	88	47	130.5	23 38.5	88	47	130.8	23 12.0	89	47	131.0	4
45	25 48.4	88	49	128.2	25 22.1	88	48	128.5	24 55.8	88	48	128.8	24 29.5	88	48	129.0	24 03.1	88	48	129.3	23 36.8	88	48	129.6	23 10.3	88	48	129.8	22 43.9	88	47	130.1	45
6	25 19.2	87	49	127.3	24 53.0	87	49	127.5	24 26.8	87	49	127.8	24 00.6	87	49	128.1	23 34.4	88	49	128.3	23 08.1	88	48	128.6	22 41.8	88	48	128.9	22 15.4	88	48	129.1	6
7	24 49.6	87	50	126.3	24 23.6	87	50	126.6	23 57.5	87	50	126.9	23 31.3	87	49	127.1	23 05.2	87	49	127.4	22 39.0	87	49	127.7	22 12.8	87	49	127.9	21 46.6	87	49	128.2	7
8	24 19.7	86	50	125.4	23 53.7	87	50	125.6	23 27.7	87	50	125.9	23 01.7	87	50	126.2	22 35.7	87	50	126.4	22 09.6	87	50	126.7	21 43.5	87	49	127.0	21 17.4	87	49	127.2	8
9	23 49.4	86	51	124.4	23 23.5	86	51	124.7	22 57.6	86	51	125.0	22 31.7	86	51	125.2	22 05.8	87	50	125.5	21 39.8	87	50	125.8	21 13.8	87	50	126.0	20 47.8	87	50	126.3	9
50	23 18.7	86	52	123.5	22 53.0	86	51	123.8	22 27.2	86	51	124.0	22 01.4	86	51	124.3	21 35.5	86	51	124.6	21 09.7	86	51	124.9	20 43.8	86	51	125.1	20 17.8	86	50	125.4	50
1	22 47.7	85	52	122.5	22 22.1	86	52	122.8	21 56.4	86	52	123.1	21 30.7	86	52	123.4	21 04.9	86	52	123.7	20 39.2	86	51	123.9	20 13.4	86	51	124.2	19 47.6	86	51	124.5	1
2	22 16.5	85	53	121.6	21 50.9	85	53	121.9	21 25.3	85	52	122.2	20 59.7	85	52	122.5	20 34.0	86	52	122.7	20 08.4	86	52	123.0	19 42.7	86	52	123.3	19 16.9	86	52	123.6	2
3	21 44.8	85	53	120.7	21 19.4	85	53	121.0	20 53.9	85	53	121.3	20 28.4	85	53	121.5	20 02.8	85	53	121.8	19 37.2	85	52	122.1	19 11.6	85	52	122.4	18 46.0	85	52	122.7	3
4	21 12.9	85	54	119.8	20 47.6	85	54	120.1	20 22.2	85	53	120.4	19 56.7	85	53	120.6	19 31.3	85	53	120.9	19 05.8	85	53	121.2	18 40.3	85	53	121.5	18 14.8	85	53	121.8	4
55	20 40.7	84	54	118.9	20 15.4	84	54	119.2	19 50.1	84	54	119.5	19 24.8	85	54	119.7	18 59.4	85	54	120.0	18 34.0	85	53	120.3	18 08.6	85	53	120.6	17 43.2	85	53	120.9	55
6	20 08.2	84	55	118.0	19 43.1	84	54	118.3	19 17.8	84	54	118.6	18 52.6	84	54	118.9	18 27.3	84	54	119.1	18 02.0	84	54	119.4	17 36.7	84	54	119.7	17 11.3	85	54	120.0	6
7	19 35.5	84	55	117.1	19 10.4	84	55	117.4	18 45.3	84	55	117.7	18 20.1	84	55	118.0	17 54.9	84	54	118.3	17 29.7	84	54	118.5	17 04.5	84	54	118.8	16 39.2	84	54	119.1	7
8	19 02.5	83	55	116.2	18 37.5	83	55	116.5	18 12.4	84	55	116.8	17 47.3	84	55	117.1	17 22.2	84	55	117.4	16 57.1	84	55	117.7	16 32.0	84	55	117.9	16 06.8	84	54	118.2	8
9	18 29.2	83	56	115.3	18 04.3	83	56	115.6	17 39.3	83	56	115.9	17 14.3	83	55	116.2	16 49.3	83	55	116.5	16 24.3	84	55	116.8	15 59.2	84	55	117.1	15 34.1	84	55	117.4	9
60	17 55.7	83	56	114.5	17 30.9	83	56	114.8	17 06.0	83	56	115.0	16 41.1	83	56	115.3	16 16.1	83	56	115.6	15 51.2	83	56	115.9	15 26.2	83	55	116.2	15 01.2	83	55	116.5	60
1	17 22.0	83	57	113.6	16 57.2	83	56	113.9	16 32.4	83	56	114.2	16 07.6	83	56	114.5	15 42.7	83	56	114.8	15 17.8	83	56	115.1	14 52.9	83	56	115.3	14 28.0	83	56	115.6	1
2	16 48.0	82	57	112.7	16 23.3	82	57	113.0	15 58.6	82	57	113.3	15 33.8	83	57	113.6	15 09.0	83	56	113.9	14 44.2	83	56	114.2	14 19.4	83	56	114.5	13 54.6	83	56	114.8	2
3	16 13.8	82	57	111.9	15 49.2	82	57	112.2	15 24.5	82	57	112.5	14 59.9	82	57	112.8	14 35.2	82	57	113.1	14 10.4	82	57	113.3	13 45.7	83	57	113.6	13 20.9	83	56	113.9	3
4	15 39.5	82	58	111.0	15 14.9	82	58	111.3	14 50.3	82	57	111.6	14 25.7	82	57	111.9	14 01.1	82	57	112.2	13 36.4	82	57	112.5	13 11.7	82	57	112.8	12 47.0	82	57	113.1	4
65	15 04.9	82	58	110.2	14 40.4	82	58	110.5	14 15.9	82	58	110.8	13 51.3	82	58	111.1	13 26.8	82	58	111.4	13 02.2	82	57	111.7	12 37.6	82	57	112.0	12 13.0	82	57	112.2	65
6	14 30.1	81	58	109.3	14 05.7	81	58	109.6	13 41.2	82	58	109.9	13 16.8	82	58	110.2	12 52.3	82	58	110.5	12 27.8	82	58	110.8	12 03.2	82	58	111.1	11 38.7	82	57	111.4	6
7	13 55.2	81	59	108.5	13 30.8	81	58	108.8	13 06.4	81	58	109.1	12 42.0	81	58	109.4	12 17.6	81	58	109.7	11 53.1	82	58	110.0	11 28.7	82	58	110.3	11 04.2	82	58	110.6	7
8	13 20.1	81	59	107.7	12 55.7	81	59	108.0	12 31.4	81	59	108.3	12 07.1	81	58	108.6	11 42.7	81	58	108.9	11 18.3	81	58	109.2	10 53.9	81	58	109.5	10 29.5	81	58	109.7	8
9	12 44.8	81	59	106.8	12 20.5	81	59	107.1	11 56.3	81	59	107.4	11 32.0	81	59	107.7	11 07.7	81	59	108.0	10 43.3	81	59	108.3	10 19.0	81	58	108.6	9 54.6	81	58	108.9	9
70	12 09.3	81	59	106.0	11 45.1	81	59	106.3	11 20.9	81	59	106.6	10 56.7	81	59	106.9	10 32.5	81	59	107.2	10 08.2	81	59	107.5	9 43.9	81	59	107.8	9 19.6	81	59	108.1	70
1	11 33.8	80	60	105.2	11 09.6	80	59	105.5	10 45.5	81	59	105.8	10 21.3	81	59	106.1	9 57.1	81	59	106.4	9 32.9	81	59	106.7	9 08.7	81	59	107.0	8 44.4	81	59	107.3	1
2	10 58.0	80	60	104.4	10 34.0	80	60	104.7	10 09.8	80	60	105.0	9 45.7	80	60	105.3	9 21.6	80	59	105.6	8 57.4	81	59	105.9	8 33.3	81	59	106.2	8 09.1	81	59	106.5	2
3	10 22.2	80	60	103.5	9 58.2	80	60	103.8	9 34.1	80	60	104.2	9 10.0	80	60	104.5	8 45.9	80	60	104.8	8 21.8	80	60	105.1	7 57.7	80	60	105.4	7 33.6	80	59	105.7	3
4	9 46.2	80	60	102.7	9 22.2	80	60	103.0	8 58.2	80	60	103.3	8 34.2	80	60	103.6	8 10.1	80	60	103.9	7 46.1	80	60	104.2	7 22.0	80	60	104.5	6 57.9	80	60	104.9	4
75	9 10.1	80	60	101.9	8 46.2	80	60	102.2	8 22.2	80	60	102.5	7 58.2	80	60	102.8	7 34.2	80	60	103.1	7 10.2	80	60	103.4	6 46.2	80	60	103.7	6 22.2	80	60	104.0	75
6	8 33.9	80	60	101.1	8 10.0	80	60	101.4	7 46.1	80	60	101.7	7 22.2	80	60	102.0	6 58.2	80	60	102.3	6 34.2	80	60	102.6	6 10.3	80	60	102.9	5 46.3	80	60	103.2	6
7	7 57.6	80	61	100.3	7 33.8	80	61	100.6	7 09.9	80	61	100.9	6 46.0	80	60	101.2	6 22.1	80	60	101.5	5 58.1	80	60	101.8	5 34.2	80	60	102.1	5 10.3	80	60	102.4	7
8	7 21.3	79	61	99.5	6 57.4	79	61	99.8	6 33.6	80	61	100.1	6 09.7	80	61	100.4	5 45.8	80	61	100.7	5 21.9	80	60	101.0									8
9	6 44.8	79	61	98.7	6 21.0	79	61	99.0	5 57.1	79	61	99.3	5 33.3	79	61	99.6	5 09.5	79	61	99.9													9
80	6 08.2	79	61	97.9	5 44.4	79	61	98.2	5 20.7	79	61	98.5																					80
1	5 31.6	79	61	97.1	5 07.9	79	61	97.4																									1

Digitized by Google

Lat. 52°

H.A.	4° 00′ Alt.	Δd Δt	Az.	4° 30′ Alt.	Δd Δt	Az.	5° 00′ Alt.	Δd Δt	Az.	5° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	42 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0
1	41 59.6	1.0 02	178.7	42 29.6	1.0 02	178.6	42 59.6	1.0 02	178.6	43 29.6	1.0 02	178.6
2	41 58.3	1.0 04	177.3	42 28.3	1.0 04	177.3	42 58.2	1.0 04	177.3	43 28.2	1.0 04	177.3
3	41 56.1	1.0 05	176.0	42 26.1	1.0 05	175.9	42 56.1	1.0 05	175.9	43 26.0	1.0 05	175.9
4	41 53.1	1.0 06	174.6	42 23.0	1.0 06	174.6	42 53.0	1.0 07	174.6	43 22.9	1.0 07	174.5
05	41 49.2	1.0 08	173.3	42 19.1	1.0 08	173.3	42 49.0	1.0 08	173.2	43 19.0	1.0 08	173.2
6	41 44.5	1.0 09	172.0	42 14.4	1.0 09	171.9	42 44.2	1.0 09	171.8	43 14.1	1.0 10	171.8
7	41 38.9	99 11	170.6	42 08.7	99 11	170.6	42 38.6	99 11	170.5	43 08.4	99 11	170.4
8	41 32.4	99 12	169.3	42 02.3	99 12	169.2	42 32.0	99 12	169.2	43 01.8	99 12	169.1
9	41 25.2	99 14	168.0	41 54.9	99 14	167.9	42 24.7	99 14	167.8	42 54.4	99 14	167.7
10	41 17.1	99 15	166.7	41 46.8	99 15	166.6	42 16.5	99 15	166.5	42 46.1	99 15	166.4
1	41 08.2	99 16	165.4	41 37.8	99 16	165.3	42 07.4	99 16	165.2	42 37.0	99 17	165.0
2	40 58.4	99 18	164.1	41 28.0	99 18	163.9	41 57.5	99 18	163.8	42 27.1	98 18	163.7
3	40 47.9	98 19	162.8	41 17.3	98 19	162.6	41 46.8	98 19	162.5	42 16.3	98 19	162.4
4	40 36.5	98 20	161.5	41 05.9	98 20	161.3	41 35.3	98 20	161.2	42 04.7	98 21	161.1
15	40 24.4	98 22	160.2	40 53.7	98 22	160.0	41 23.0	98 22	159.9	41 52.3	98 22	159.8
6	40 11.5	98 23	158.9	40 40.7	97 23	158.8	41 09.9	97 23	158.6	41 39.2	97 23	158.5
7	39 57.8	97 24	157.6	40 26.9	97 24	157.5	40 56.1	97 24	157.3	41 25.2	97 25	157.2
8	39 43.4	97 25	156.4	40 12.4	97 25	156.2	40 41.5	97 26	156.0	41 10.5	97 26	155.9
9	39 28.2	97 26	155.1	39 57.1	97 27	155.0	40 26.1	96 27	154.8	40 55.0	96 27	154.6
20	39 12.3	96 28	153.9	39 41.1	96 28	153.7	40 10.0	96 28	153.5	40 38.8	96 28	153.3
1	38 55.7	96 29	152.6	39 24.4	96 29	152.5	39 53.2	96 29	152.3	40 21.9	96 29	152.1
2	38 38.3	96 30	151.4	39 07.0	95 30	151.2	39 35.6	95 30	151.0	40 04.2	95 31	150.8
3	38 20.3	95 31	150.2	38 48.9	95 31	150.0	39 17.4	95 32	149.8	39 45.9	95 32	149.6
4	38 01.6	95 32	149.0	38 30.1	95 32	148.8	38 58.5	95 33	148.6	39 26.9	95 33	148.4
25	37 42.3	94 33	147.8	38 10.6	94 34	147.6	38 38.9	94 34	147.4	39 07.2	94 34	147.2
6	37 22.3	94 34	146.6	37 50.5	94 35	146.4	38 18.6	94 35	146.2	38 46.8	94 35	146.0
7	37 01.6	94 35	145.4	37 29.7	94 36	145.2	37 57.8	94 36	145.0	38 25.8	93 36	144.8
8	36 40.4	93 36	144.3	37 08.3	93 37	144.0	37 36.3	93 37	143.8	38 04.2	93 37	143.6
9	36 18.5	93 37	143.1	36 46.3	93 38	142.9	37 14.2	93 38	142.7	37 42.0	93 38	142.4
30	35 56.0	92 38	142.0	36 23.8	92 39	141.7	36 51.5	92 39	141.5	37 19.1	92 39	141.3
1	35 33.0	92 39	140.8	36 00.6	92 40	140.6	36 28.2	92 40	140.4	36 55.7	92 40	140.1
2	35 09.4	92 40	139.7	35 36.9	92 40	139.5	36 04.3	91 41	139.2	36 31.8	91 41	139.0
3	34 45.2	91 41	138.6	35 12.6	91 41	138.4	35 39.9	91 42	138.1	36 07.2	91 42	137.8
4	34 20.5	91 42	137.5	34 47.8	91 42	137.2	35 15.0	91 42	137.0	35 42.2	91 43	136.7
35	33 55.3	90 43	136.4	34 22.4	90 43	136.1	34 49.5	90 43	135.9	35 16.6	90 43	135.6
6	33 29.6	90 44	135.3	33 56.6	90 44	135.1	34 23.6	90 44	134.8	34 50.5	90 44	134.5
7	33 03.4	90 44	134.3	33 30.3	90 45	134.0	33 57.1	89 45	133.7	34 23.9	89 45	133.4
8	32 36.7	89 45	133.2	33 03.4	89 45	132.9	33 30.2	89 46	132.6	33 56.9	89 46	132.4
9	32 09.5	89 46	132.1	32 36.2	89 46	131.9	33 02.8	89 46	131.6	33 29.4	89 47	131.3
40	31 41.9	89 47	131.1	32 08.4	88 47	130.8	32 34.9	88 47	130.5	33 01.4	88 47	130.3
1	31 13.8	88 47	130.1	31 40.3	88 48	129.8	32 06.6	88 48	129.5	32 33.0	88 48	129.2
2	30 45.3	88 48	129.0	31 11.7	88 48	128.8	31 37.9	88 49	128.5	32 04.2	87 49	128.2
3	30 16.4	87 49	128.0	30 42.6	87 49	127.7	31 08.8	87 49	127.5	31 34.9	87 49	127.2
4	29 47.2	87 49	127.0	30 13.2	87 50	126.7	30 39.3	87 50	126.4	31 05.3	87 50	126.2
45	29 17.5	87 50	126.0	29 43.4	87 50	125.7	30 09.4	86 50	125.4	30 35.3	86 51	125.2
6	28 47.4	86 51	125.0	29 13.3	86 51	124.7	29 39.1	86 51	124.5	30 04.9	86 51	124.2
7	28 17.0	86 51	124.1	28 42.7	86 51	123.8	29 08.5	86 52	123.5	29 34.2	86 52	123.2
8	27 46.2	86 52	123.1	28 11.9	85 52	122.8	28 37.5	85 52	122.5	29 03.1	85 52	122.2
9	27 15.1	85 52	122.1	27 40.6	85 53	121.8	28 06.2	85 53	121.5	28 31.6	85 53	121.2
50	26 43.6	85 53	121.2	27 09.1	85 53	120.9	27 34.5	85 53	120.6	27 59.9	85 53	120.3
1	26 11.9	85 53	120.2	26 37.2	84 54	119.9	27 02.6	84 54	119.6	27 27.8	84 54	119.3
2	25 39.8	84 54	119.3	26 05.1	84 54	119.0	26 30.3	84 54	118.7	26 55.5	84 54	118.4
3	25 07.4	84 54	118.4	25 32.6	84 55	118.1	25 57.8	84 55	117.8	26 22.9	84 55	117.5
4	24 34.8	84 55	117.4	24 59.9	84 55	117.1	25 24.9	83 55	116.8	25 49.9	83 55	116.5
55	24 01.9	83 55	116.5	24 26.9	83 55	116.2	24 51.8	83 56	115.9	25 16.8	83 56	115.6
6	23 28.7	83 56	115.6	23 53.6	83 56	115.3	24 18.5	83 56	115.0	24 43.3	83 56	114.7
7	22 55.3	83 56	114.7	23 20.1	83 56	114.4	23 44.9	83 56	114.1	24 09.6	82 57	113.8
8	22 21.6	83 56	113.8	22 46.3	82 57	113.5	23 11.1	82 57	113.2	23 35.7	82 57	112.9
9	21 47.7	82 57	112.9	22 12.4	82 57	112.6	22 37.0	82 57	112.3	23 01.6	82 57	112.0
60	21 13.6	82 57	112.1	21 38.2	82 57	111.8	22 02.7	82 57	111.4	22 27.2	82 58	111.1
1	20 39.2	82 58	111.2	21 03.7	82 58	110.9	21 28.2	82 58	110.6	21 52.7	81 58	110.3
2	20 04.7	82 58	110.3	20 29.1	81 58	110.0	20 53.5	81 58	109.7	21 17.9	81 58	109.4
3	19 29.9	81 58	109.5	19 54.3	81 58	109.1	20 18.7	81 58	108.8	20 43.0	81 59	108.5
4	18 55.0	81 58	108.6	19 19.3	81 59	108.3	19 43.6	81 59	108.0	20 07.9	81 59	107.7
65	18 19.9	81 59	107.7	18 44.2	81 59	107.4	19 08.4	81 59	107.1	19 32.6	81 59	106.8
6	17 44.7	81 59	106.9	18 08.9	81 59	106.6	18 33.0	81 59	106.3	18 57.2	80 59	106.0
7	17 09.2	81 59	106.1	17 33.4	80 59	105.7	17 57.5	80 59	105.4	18 21.6	80 60	105.1
8	16 33.7	80 60	105.2	16 57.8	80 60	104.9	17 21.8	80 60	104.6	17 45.8	80 60	104.3
9	15 58.0	80 60	104.4	16 22.0	80 60	104.1	16 46.0	80 60	103.8	17 10.0	80 60	103.4
70	15 22.1	80 60	103.5	15 46.1	80 60	103.2	16 10.1	80 60	102.9	16 34.0	80 60	102.6
1	14 46.1	80 60	102.7	15 10.1	80 60	102.4	15 34.0	80 60	102.1	15 57.9	80 60	101.8
2	14 10.0	80 60	101.9	14 33.9	80 60	101.6	14 57.8	80 60	101.3	15 21.7	79 61	101.0
3	13 33.8	80 60	101.1	13 57.7	79 61	100.8	14 21.5	79 61	100.5	14 45.4	79 61	100.1
4	12 57.5	79 61	100.3	13 21.4	79 61	100.0	13 45.2	79 61	99.6	14 08.9	79 61	99.3
75	12 21.2	79 61	99.5	12 44.9	79 61	99.1	13 08.7	79 61	98.8	13 32.5	79 61	98.5
6	11 44.7	79 61	98.6	12 08.4	79 61	98.3	12 32.2	79 61	98.0	12 55.9	79 61	97.7
7	11 08.1	79 61	97.8	11 31.8	79 61	97.5	11 55.6	79 61	97.2	12 19.2	79 61	96.9
8	10 31.5	79 61	97.0	10 55.2	79 61	96.7	11 18.9	79 61	96.4	11 42.5	79 61	96.1
9	9 54.8	79 61	96.2	10 18.5	79 61	95.9	10 42.1	79 61	95.6	11 05.8	79 61	95.3
80	9 18.0	79 61	95.4	9 41.7	79 61	95.1	10 05.4	79 61	94.8	10 29.0	79 61	94.5
1	8 41.2	79 61	94.6	9 04.9	79 61	94.3	9 28.5	79 61	94.0	9 52.1	79 61	93.7
2	8 04.4	79 61	93.8	8 28.0	79 61	93.5	8 51.7	79 61	93.2	9 15.3	79 62	92.9
3	7 27.5	79 62	93.1	7 51.2	79 62	92.7	8 14.8	79 62	92.4	8 38.4	79 62	92.1
4	6 50.6	79 62	92.3	7 14.2	79 62	92.0	7 37.8	79 62	91.6	8 01.4	79 62	91.3
85	6 13.7	79 62	91.5	6 37.3	79 62	91.2	7 00.9	79 62	90.9	7 24.5	79 62	90.5
6	5 36.8	79 62	90.7	6 00.4	79 62	90.4	6 24.0	79 62	90.1	6 47.6	79 62	89.8
7				5 23.4	79 62	89.6	5 47.0	79 62	89.3	6 10.6	79 62	89.0
8							5 10.1	79 62	88.5	5 33.7	79 62	88.2
9												
90												

H.A.	6° 00′ Alt.	Δd Δt	Az.	6° 30′ Alt.	Δd Δt	Az.	7° 00′ Alt.	Δd Δt	Az.	7° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	44 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0
1	43 59.6	1.0 02	178.6	44 29.6	1.0 02	178.6	44 59.5	1.0 02	178.6	45 29.5	1.0 02	178.6
2	43 58.2	1.0 04	177.2	44 28.2	1.0 04	177.2	44 58.2	1.0 04	177.2	45 28.2	1.0 04	177.2
3	43 56.0	1.0 05	175.9	44 26.0	1.0 05	175.8	44 55.9	1.0 05	175.8	45 25.9	1.0 05	175.8
4	43 52.9	1.0 07	174.5	44 22.8	1.0 07	174.4	44 52.8	1.0 07	174.4	45 22.7	1.0 07	174.3
05	43 48.9	1.0 08	173.1	44 18.8	1.0 08	173.0	44 48.7	1.0 08	173.0	45 18.6	1.0 08	172.9
6	43 44.0	1.0 10	171.7	44 13.9	1.0 10	171.7	44 43.8	1.0 10	171.6	45 13.6	1.0 10	171.5
7	43 38.3	99 11	170.4	44 08.1	99 11	170.3	44 37.9	99 11	170.2	45 07.8	99 11	170.1
8	43 31.6	99 12	169.0	44 01.4	99 13	168.9	44 31.2	99 13	168.8	45 01.0	99 13	168.7
9	43 24.2	99 14	167.6	43 53.9	99 14	167.5	44 23.6	99 14	167.4	44 53.3	99 14	167.4
10	43 15.8	99 15	166.3	43 45.5	99 15	166.2	44 15.2	99 16	166.1	44 44.8	99 16	166.0
1	43 06.6	99 17	164.9	43 36.2	99 17	164.8	44 05.8	99 17	164.7	44 35.4	99 17	164.6
2	42 56.6	98 18	163.6	43 26.2	98 18	163.5	43 55.7	98 18	163.3	44 25.2	98 18	163.2
3	42 45.8	98 19	162.3	43 15.2	98 20	162.1	43 44.7	98 20	162.0	44 14.1	98 20	161.9
4	42 34.1	98 21	160.9	43 03.5	98 21	160.8	43 32.8	98 21	160.7	44 02.2	98 21	160.5
15	42 21.6	98 22	159.6	42 50.9	98 22	159.5	43 20.2	98 22	159.3	43 49.5	98 23	159.2
6	42 08.4	97 23	158.3	42 37.6	97 24	158.1	43 06.8	97 24	158.0	43 35.9	97 24	157.8
7	41 54.3	97 25	157.0	42 23.4	97 25	156.8	42 52.5	97 25	156.7	43 21.6	97 25	156.5
8	41 39.5	97 26	155.7	42 08.5	97 26	155.5	42 37.5	97 26	155.4	43 06.5	97 26	155.2
9	41 23.9	96 27	154.4	41 52.8	96 27	154.2	42 21.7	96 28	154.1	42 50.6	96 28	153.9
20	41 07.6	96 28	153.2	41 36.4	96 29	153.0	42 05.2	96 29	152.8	42 34.0	96 29	152.6
1	40 50.6	96 30	151.9	41 19.3	96 30	151.7	41 47.9	96 30	151.5	42 16.6	95 30	151.3
2	40 32.8	95 31	150.6	41 01.4	95 31	150.4	41 30.0	95 31	150.2	41 58.5	95 31	150.0
3	40 14.4	95 32	149.4	40 42.8	95 32	149.2	41 11.3	95 32	149.0	41 39.7	95 32	148.8
4	39 55.2	95 33	148.2	40 23.6	94 33	148.0	40 51.9	94 33	147.7	41 20.2	94 34	147.5
25	39 35.4	94 34	146.9	40 03.6	94 34	146.7	40 31.8	94 35	146.5	41 00.0	94 35	146.3
6	39 14.9	94 35	145.7	39 43.0	94 35	145.5	40 11.1	94 36	145.3	40 39.2	93 36	145.0
7	38 53.8	93 36	144.5	39 21.8	93 36	144.3	39 49.8	93 37	144.1	40 17.7	93 37	143.8
8	38 32.1	93 37	143.4	38 59.9	93 37	143.1	39 27.8	93 38	142.9	39 55.6	93 38	142.6
9	38 09.7	93 38	142.2	38 37.5	92 38	141.9	39 05.2	92 39	141.7	39 32.9	92 39	141.4
30	37 46.8	92 39	141.0	38 14.4	92 39	140.8	38 42.0	92 40	140.5	39 09.5	92 40	140.3
1	37 23.3	92 40	139.9	37 50.7	92 40	139.6	38 18.2	91 41	139.4	38 45.6	91 41	139.1
2	36 59.2	91 41	138.7	37 26.5	91 41	138.5	37 53.9	91 42	138.2	38 21.2	91 42	137.9
3	36 34.5	91 42	137.6	37 01.8	91 42	137.3	37 29.0	91 42	137.1	37 56.1	91 43	136.8
4	36 09.3	90 43	136.5	36 36.5	90 43	136.2	37 03.5	90 43	135.9	37 30.6	90 43	135.7
35	35 43.6	90 44	135.4	36 10.6	90 44	135.1	36 37.6	90 44	134.8	37 04.5	90 44	134.5
6	35 17.4	90 44	134.3	35 44.3	90 45	134.0	36 11.1	89 45	133.7	36 37.9	89 45	133.4
7	34 50.7	89 45	133.2	35 17.5	89 46	132.9	35 44.2	89 46	132.6	36 10.9	89 46	132.3
8	34 23.6	89 46	132.1	34 50.2	89 46	131.8	35 16.8	89 46	131.5	35 43.3	88 47	131.2
9	33 55.9	88 47	131.0	34 22.4	88 47	130.8	34 48.9	88 47	130.5	35 15.3	88 47	130.2
40	33 27.8	88 48	130.0	33 54.2	88 48	129.7	34 20.6	88 48	129.4	34 46.9	88 48	129.1
1	32 59.3	88 48	128.9	33 25.6	88 48	128.6	33 51.8	87 49	128.4	34 18.0	87 49	128.1
2	32 30.4	87 49	127.9	32 56.5	87 49	127.6	33 22.6	87 49	127.3	33 48.7	87 50	127.0
3	32 01.0	87 50	126.9	32 27.1	87 50	126.6	32 53.1	87 50	126.3	33 19.0	86 50	126.0
4	31 31.3	87 50	125.9	31 57.2	86 50	125.6	32 23.1	86 51	125.3	32 48.9	86 51	125.0
45	31 01.1	86 51	124.9	31 27.0	86 51	124.6	31 52.7	86 51	124.3	32 18.5	86 51	124.0
6	30 30.6	86 51	123.9	30 56.4	86 52	123.6	31 22.0	85 52	123.3	31 47.7	85 52	123.0
7	29 59.8	85 52	122.9	30 25.4	85 52	122.6	30 51.0	85 52	122.3	31 16.5	85 52	122.0
8	29 28.6	85 53	121.9	29 54.1	85 53	121.6	30 19.6	85 53	121.3	30 45.0	85 53	121.0
9	28 57.1	85 53	120.9	29 22.5	85 53	120.6	29 47.8	84 53	120.3	30 13.2	84 54	120.0
50	28 25.2	84 54	120.0	28 50.5	84 54	119.7	29 15.8	84 54	119.4	29 41.0	84 54	119.0
1	27 53.1	84 54	119.0	28 18.3	84 54	118.7	28 43.5	84 54	118.4	29 08.6	84 55	118.1
2	27 20.6	84 55	118.1	27 45.8	84 55	117.8	28 10.8	83 55	117.5	28 35.8	83 55	117.1
3	26 47.9	83 55	117.1	27 12.9	83 55	116.8	27 37.9	83 55	116.5	28 02.8	83 55	116.2
4	26 14.9	83 55	116.2	26 39.8	83 56	115.9	27 04.7	83 56	115.6	27 29.6	83 56	115.3
55	25 41.6	83 56	115.3	26 06.5	83 56	115.0	26 31.3	83 56	114.7	26 56.0	82 56	114.4
6	25 08.1	83 56	114.4	25 32.9	82 56	114.1	25 57.6	82 57	113.8	26 22.3	82 57	113.4
7	24 34.4	82 57	113.5	24 59.0	82 57	113.2	25 23.7	82 57	112.9	25 48.3	82 57	112.5
8	24 00.4	82 57	112.6	24 25.0	82 57	112.3	24 49.5	82 57	112.0	25 14.0	82 57	111.6
9	23 26.1	82 57	111.7	23 50.7	82 58	111.4	24 15.2	82 58	111.1	24 39.6	81 58	110.8
60	22 51.7	82 58	110.8	23 16.2	81 58	110.5	23 40.6	81 58	110.2	24 05.0	81 58	109.9
1	22 17.1	81 58	109.9	22 41.5	81 58	109.6	23 05.8	81 58	109.3	23 30.1	81 58	109.0
2	21 42.3	81 58	109.1	22 06.6	81 58	108.8	22 30.9	81 59	108.4	22 55.1	81 59	108.1
3	21 07.3	81 59	108.2	21 31.5	81 59	107.9	21 55.7	81 59	107.6	22 19.9	81 59	107.3
4	20 32.1	81 59	107.3	20 56.3	81 59	107.0	21 20.4	80 59	106.7	21 44.5	80 59	106.4
65	19 56.8	80 59	106.5	20 20.9	80 59	106.2	20 45.0	80 59	105.9	21 09.0	80 59	105.5
6	19 21.3	80 59	105.6	19 45.3	80 60	105.3	20 09.4	80 60	105.0	20 33.4	80 60	104.7
7	18 45.6	80 60	104.8	19 09.6	80 60	104.5	19 33.6	80 60	104.2	19 57.6	80 60	103.8
8	18 09.8	80 60	104.0	18 33.8	80 60	103.6	18 57.7	80 60	103.3	19 21.6	80 60	103.0
9	17 33.9	80 60	103.1	17 57.8	80 60	102.8	18 21.7	80 60	102.5	18 45.6	79 60	102.2
70	16 57.9	80 60	102.3	17 21.8	80 60	102.0	17 45.6	79 60	101.7	18 09.4	79 60	101.3
1	16 21.7	79 60	101.5	16 45.6	79 60	101.2	17 09.4	79 61	100.8	17 33.2	79 61	100.5
2	15 45.5	79 61	100.6	16 09.3	79 61	100.3	16 33.1	79 61	100.0	16 56.8	79 61	99.7
3	15 09.1	79 61	99.8	15 32.9	79 61	99.5	15 56.6	79 61	99.2	16 20.3	79 61	98.9
4	14 32.7	79 61	99.0	14 56.4	79 61	98.7	15 20.1	79 61	98.4	15 43.8	79 61	98.1
75	13 56.2	79 61	98.2	14 19.9	79 61	97.9	14 43.5	79 61	97.6	15 07.2	79 61	97.3
6	13 19.6	79 61	97.4	13 43.2	79 61	97.1	14 06.9	79 61	96.8	14 30.5	79 61	96.4
7	12 42.9	79 61	96.6	13 06.6	79 61	96.3	13 30.2	79 61	96.0	13 53.8	79 61	95.6
8	12 06.2	79 61	95.8	12 29.8	79 61	95.5	12 53.4	79 61	95.2	13 17.0	79 61	94.8
9	11 29.4	79 61	95.0	11 53.0	79 61	94.7	12 16.6	79 61	94.4	12 40.2	79 61	94.0
80	10 52.6	79 61	94.2	11 16.2	79 61	93.9	11 39.7	79 61	93.6	12 03.3	78 62	93.2
1	10 15.7	79 62	93.4	10 39.3	79 62	93.1	11 02.9	78 62	92.8	11 26.4	78 62	92.4
2	9 38.8	79 62	92.6	10 02.4	79 62	92.3	10 26.0	78 62	92.0	10 49.5	78 62	91.7
3	9 01.9	79 62	91.8	9 25.5	79 62	91.5	9 49.0	78 62	91.2	10 12.6	78 62	90.9
4	8 25.0	79 62	91.0	8 48.6	78 62	90.7	9 12.1	78 62	90.4	9 35.6	78 62	90.1
85	7 48.1	79 62	90.2	8 11.6	78 62	89.9	8 35.2	78 62	89.6	8 58.7	78 62	89.3
6	7 11.1	79 62	89.4	7 34.7	78 62	89.1	7 58.2	78 62	88.8	8 21.7	78 62	88.5
7	6 34.2	79 62	88.7	6 57.7	79 62	88.3	7 21.3	78 62	88.0	7 44.8	78 62	87.7
8	5 57.3	79 62	87.9	6 20.8	79 62	87.6	6 44.4	78 61	87.2	7 07.9	78 61	86.9
9	5 20.4	79 62	87.1	5 43.9	79 61	86.8	6 07.5	79 61	86.5	6 31.1	78 61	86.1
90				5 07.1	79 61	86.0	5 30.7	79 61	85.7	5 54.2	79 61	85.4

Digitized by Google

10—15936

Lat. 52°

H.A.	4° 00′ Alt.	Az.	4° 30′ Alt.	Az.	5° 00′ Alt.	Az.	5° 30′ Alt.	Az.	6° 00′ Alt.	Az.	6° 30′ Alt.	Az.	7° 00′ Alt.	Az.	7° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	34 00.0 1.0 01	180.0	33 30.0 1.0 01	180.0	33 00.0 1.0 01	180.0	32 30.0 1.0 01	180.0	32 00.0 1.0 01	180.0	31 30.0 1.0 01	180.0	31 00.0 1.0 01	180.0	30 30.0 1.0 01	180.0	00
1	33 59.6 1.0 02	178.8	33 29.6 1.0 02	178.8	32 59.6 1.0 02	178.8	32 29.6 1.0 02	178.8	31 59.6 1.0 02	178.8	31 29.6 1.0 02	178.8	30 59.6 1.0 02	178.8	30 29.6 1.0 02	178.8	1
2	33 58.4 1.0 03	177.6	33 28.5 1.0 03	177.6	32 58.5 1.0 03	177.6	32 28.5 1.0 03	177.6	31 58.5 1.0 03	177.7	31 28.5 1.0 03	177.7	30 58.5 1.0 03	177.7	30 28.5 1.0 03	177.7	2
3	33 56.5 1.0 05	176.4	33 26.5 1.0 04	176.4	32 56.6 1.0 04	176.4	32 26.6 1.0 04	176.5	31 56.6 1.0 04	176.5	31 26.6 1.0 04	176.5	30 56.6 1.0 04	176.5	30 26.7 1.0 04	176.5	3
4	33 53.8 1.0 06	175.2	33 23.8 1.0 06	175.2	32 53.9 1.0 06	175.3	32 23.9 1.0 06	175.3	31 54.0 1.0 06	175.3	31 24.0 1.0 06	175.3	30 54.0 1.0 06	175.4	30 24.1 1.0 06	175.4	4
05	33 50.3 1.0 07	174.0	33 20.4 1.0 07	174.0	32 50.4 1.0 07	174.1	32 20.5 1.0 07	174.1	31 50.6 1.0 07	174.1	31 20.6 1.0 07	174.2	30 50.7 1.0 07	174.2	30 20.7 1.0 07	174.3	05
6	33 46.1 1.0 08	172.8	33 16.2 1.0 08	172.8	32 46.2 1.0 08	172.9	32 16.3 1.0 08	172.9	31 46.4 1.0 08	173.0	31 16.5 1.0 08	173.0	30 46.6 1.0 08	173.1	30 16.7 1.0 08	173.1	6
7	33 41.1 1.0 10	171.6	33 11.2 1.0 10	171.7	32 41.3 1.0 10	171.7	32 11.4 1.0 09	171.8	31 41.5 1.0 09	171.8	31 11.6 1.0 09	171.9	30 41.8 1.0 09	171.9	30 11.9 1.0 09	172.0	7
8	33 35.3 99 11	170.4	33 05.4 99 11	170.5	32 35.6 99 11	170.5	32 05.7 99 11	170.6	31 35.9 99 11	170.6	31 06.0 99 11	170.7	30 36.2 1.0 10	170.8	30 06.3 1.0 10	170.8	8
9	33 28.7 99 12	169.2	32 58.9 99 12	169.3	32 29.1 99 12	169.4	31 59.3 99 12	169.4	31 29.5 99 12	169.5	30 59.7 99 12	169.6	30 29.9 99 12	169.6	30 00.1 99 12	169.7	9
10	33 21.5 99 13	168.0	32 51.7 99 13	168.1	32 21.9 99 13	168.2	31 52.2 99 13	168.3	31 22.4 99 13	168.3	30 52.7 99 13	168.4	30 22.9 99 13	168.5	29 53.1 99 13	168.5	10
1	33 13.4 99 15	166.8	32 43.7 99 15	166.9	32 14.0 99 14	167.0	31 44.3 99 14	167.1	31 14.6 99 14	167.2	30 44.9 99 14	167.3	30 15.1 99 14	167.3	29 45.4 99 14	167.4	1
2	33 04.6 99 16	165.7	32 35.0 99 16	165.8	32 05.3 99 16	165.8	31 35.7 99 16	165.9	31 06.0 99 15	166.0	30 36.4 99 15	166.1	30 06.7 99 15	166.2	29 37.0 99 15	166.3	2
3	32 55.1 99 17	164.5	32 25.5 99 17	164.6	31 55.9 99 17	164.7	31 26.3 99 17	164.8	30 56.7 99 17	164.9	30 27.1 99 17	165.0	29 57.5 99 16	165.1	29 27.9 99 16	165.2	3
4	32 44.9 98 18	163.3	32 15.4 98 18	163.4	31 45.8 98 18	163.5	31 16.3 98 18	163.6	30 46.8 98 18	163.7	30 17.2 99 18	163.8	29 47.7 99 18	163.9	29 18.1 99 18	164.0	4
15	32 33.9 98 19	162.2	32 04.5 98 19	162.3	31 35.0 98 19	162.4	31 05.5 98 19	162.5	30 36.1 98 19	162.6	30 06.6 98 19	162.7	29 37.1 98 19	162.8	29 07.6 98 19	162.9	15
6	32 22.3 98 21	161.0	31 52.9 98 21	161.1	31 23.5 98 20	161.2	30 54.1 98 20	161.4	30 24.7 98 20	161.5	29 55.2 98 20	161.6	29 25.8 98 20	161.7	28 56.4 98 20	161.8	6
7	32 09.9 98 22	159.8	31 40.6 98 22	160.0	31 11.2 98 22	160.1	30 41.9 98 21	160.2	30 12.6 98 21	160.3	29 43.2 98 21	160.5	29 13.9 98 21	160.6	28 44.5 98 21	160.7	7
8	31 56.8 97 23	158.7	31 27.6 97 23	158.8	30 58.3 98 23	159.0	30 29.1 98 23	159.1	29 59.8 98 22	159.2	29 30.5 98 22	159.3	29 01.3 98 22	159.5	28 32.0 98 22	159.6	8
9	31 43.1 97 24	157.6	31 13.9 97 24	157.7	30 44.7 97 24	157.8	30 15.5 97 24	158.0	29 46.4 97 24	158.1	29 17.2 97 23	158.2	28 48.0 97 23	158.4	28 18.8 97 23	158.5	9
20	31 28.6 97 25	156.4	30 59.5 97 25	156.6	30 30.5 97 25	156.7	30 01.4 97 25	156.8	29 32.3 97 25	157.0	29 03.1 97 24	157.1	28 34.0 97 24	157.3	28 04.9 97 24	157.4	20
1	31 13.5 97 26	155.3	30 44.5 97 26	155.4	30 15.5 97 26	155.6	29 46.5 97 26	155.7	29 17.5 97 26	155.9	28 48.5 97 26	156.0	28 19.4 97 25	156.2	27 50.4 97 25	156.3	1
2	30 57.7 96 27	154.2	30 28.8 96 27	154.3	29 59.9 96 27	154.5	29 31.0 96 27	154.6	29 02.1 96 27	154.8	28 33.1 96 27	154.9	28 04.2 97 26	155.1	27 35.2 97 26	155.2	2
3	30 41.3 96 28	153.0	30 12.5 96 28	153.2	29 43.7 96 28	153.4	29 14.8 96 28	153.5	28 46.0 96 28	153.7	28 17.2 96 28	153.8	27 48.3 96 28	154.0	27 19.4 96 27	154.1	3
4	30 24.2 96 30	151.9	29 55.5 96 29	152.1	29 26.8 96 29	152.3	28 58.1 96 29	152.4	28 29.3 96 29	152.6	28 00.6 96 29	152.8	27 31.8 96 29	152.9	27 03.0 96 28	153.1	4
25	30 06.6 95 30	150.8	29 37.9 95 30	151.0	29 09.3 95 30	151.2	28 40.7 96 30	151.3	28 12.0 96 30	151.5	27 43.3 96 30	151.7	27 14.7 96 30	151.8	26 46.0 96 29	152.0	25
6	29 48.2 95 32	149.7	29 19.7 95 31	149.9	28 51.2 95 31	150.1	28 22.6 95 31	150.3	27 54.1 95 31	150.4	27 25.5 95 31	150.6	26 56.9 95 31	150.8	26 28.3 95 30	151.0	6
7	29 29.3 95 33	148.6	29 00.9 95 32	148.8	28 32.5 95 32	149.0	28 04.0 95 32	149.2	27 35.6 95 32	149.4	27 07.1 95 32	149.6	26 38.6 95 32	149.7	26 10.1 95 31	149.9	7
8	29 09.8 94 34	147.6	28 41.5 94 33	147.8	28 13.2 94 33	147.9	27 44.8 95 33	148.1	27 16.5 95 33	148.3	26 48.1 95 33	148.5	26 19.7 95 32	148.7	25 51.3 95 32	148.9	8
9	28 49.7 94 34	146.5	28 21.5 94 34	146.7	27 53.3 94 34	146.9	27 25.0 94 34	147.1	26 56.8 94 34	147.3	26 28.5 94 34	147.4	26 00.2 94 33	147.6	25 31.9 94 33	147.8	9
30	28 29.0 94 35	145.4	28 00.9 94 35	145.6	27 32.8 94 35	145.8	27 04.7 94 35	146.0	26 36.5 94 35	146.2	26 08.3 94 35	146.4	25 40.1 94 34	146.6	25 11.9 94 34	146.8	30
1	28 07.8 93 36	144.4	27 39.8 93 36	144.6	27 11.8 93 36	144.8	26 43.7 93 36	145.0	26 15.7 94 36	145.2	25 47.6 94 35	145.4	25 19.5 94 35	145.6	24 51.4 94 35	145.8	1
2	27 46.0 93 37	143.3	27 18.1 93 37	143.5	26 50.2 93 37	143.7	26 22.3 93 37	143.9	25 54.3 93 36	144.1	25 26.3 93 36	144.3	24 58.4 93 36	144.5	24 30.4 93 36	144.7	2
3	27 23.7 93 38	142.3	26 55.9 93 38	142.5	26 28.1 93 38	142.7	26 00.2 93 38	142.9	25 32.4 93 37	143.1	25 04.5 93 37	143.3	24 36.7 93 37	143.5	24 08.8 93 37	143.7	3
4	27 00.8 92 39	141.2	26 33.1 92 39	141.4	26 05.4 92 39	141.7	25 37.7 92 38	141.9	25 10.0 92 38	142.1	24 42.2 93 38	142.3	24 14.4 93 38	142.5	23 46.6 93 38	142.7	4
35	26 37.4 92 40	140.2	26 09.8 92 40	140.4	25 42.2 92 39	140.6	25 14.6 92 39	140.9	24 47.0 92 39	141.1	24 19.4 92 39	141.3	23 51.7 92 39	141.5	23 24.0 92 39	141.7	35
6	26 13.5 92 41	139.2	25 46.0 92 40	139.4	25 18.6 92 40	139.6	24 51.1 92 40	139.8	24 23.5 92 40	140.1	23 56.0 92 40	140.3	23 28.4 92 40	140.5	23 00.9 92 39	140.7	6
7	25 49.1 91 41	138.2	25 21.8 91 41	138.4	24 54.4 91 41	138.6	24 27.0 91 41	138.8	23 59.6 91 41	139.1	23 32.2 91 41	139.3	23 04.7 92 40	139.5	22 37.2 92 40	139.7	7
8	25 24.2 91 42	137.2	24 57.0 91 42	137.4	24 29.7 91 42	137.6	24 02.4 91 42	137.9	23 35.1 91 42	138.1	23 07.8 91 41	138.3	22 40.5 91 41	138.5	22 13.1 91 41	138.7	8
9	24 58.9 90 43	136.2	24 31.8 90 43	136.4	24 04.6 91 43	136.6	23 37.4 91 42	136.9	23 10.2 91 42	137.1	22 43.0 91 42	137.3	22 15.8 91 42	137.6	21 48.5 91 42	137.8	9
40	24 33.1 90 44	135.2	24 06.0 90 44	135.4	23 39.0 90 43	135.6	23 11.9 90 43	135.9	22 44.9 90 43	136.1	22 17.7 90 43	136.3	21 50.6 90 43	136.6	21 23.5 91 42	136.8	40
1	24 06.8 90 44	134.2	23 39.9 90 44	134.4	23 13.0 90 44	134.7	22 46.0 90 44	134.9	22 19.0 90 44	135.1	21 52.0 90 44	135.4	21 25.0 90 43	135.6	20 58.0 90 43	135.8	1
2	23 40.1 89 45	133.2	23 13.3 89 45	133.5	22 46.5 89 45	133.7	22 19.6 90 45	133.9	21 52.7 90 44	134.2	21 25.9 90 44	134.4	20 58.9 90 44	134.7	20 32.0 90 44	134.9	2
3	23 13.0 89 46	132.2	22 46.3 89 46	132.5	22 19.5 89 46	132.7	21 52.8 89 45	133.0	21 26.0 89 45	133.2	20 59.3 89 45	133.5	20 32.5 89 45	133.7	20 05.6 89 45	133.9	3
4	22 45.4 89 47	131.3	22 18.8 89 46	131.5	21 52.2 89 46	131.8	21 25.6 89 46	132.0	20 58.9 89 46	132.3	20 32.2 89 46	132.5	20 05.5 89 46	132.8	19 38.8 89 45	133.0	4
45	22 17.5 88 47	130.3	21 51.0 88 47	130.6	21 24.5 88 47	130.8	20 57.9 88 47	131.1	20 31.4 89 47	131.3	20 04.8 89 46	131.6	19 38.2 89 46	131.8	19 11.6 89 46	132.1	45
6	21 49.1 88 48	129.4	21 22.7 88 48	129.6	20 56.3 88 48	129.9	20 29.9 88 47	130.1	20 03.4 88 47	130.4	19 37.0 88 47	130.6	19 10.5 88 47	130.9	18 44.0 88 47	131.1	6
7	21 20.4 88 49	128.4	20 54.1 88 48	128.7	20 27.8 88 48	129.0	20 01.5 88 48	129.2	19 35.1 88 48	129.5	19 08.8 88 48	129.7	18 42.4 88 47	130.0	18 16.0 88 47	130.2	7
8	20 51.2 87 49	127.5	20 25.1 87 49	127.8	19 58.9 87 49	128.0	19 32.7 87 49	128.3	19 06.4 87 48	128.5	18 40.2 88 48	128.8	18 13.9 88 48	129.1	17 47.6 88 48	129.3	8
9	20 21.7 87 50	126.6	19 55.7 87 50	126.8	19 29.6 87 49	127.1	19 03.5 87 49	127.4	18 37.3 87 49	127.6	18 11.2 87 49	127.9	17 45.0 87 49	128.1	17 18.8 87 49	128.4	9
50	19 51.9 87 50	125.7	19 25.9 87 50	125.9	18 59.9 87 50	126.2	18 33.9 87 50	126.4	18 07.9 87 50	126.7	17 41.8 87 49	127.0	17 15.8 87 49	127.2	16 49.7 87 49	127.5	50
1	19 21.7 86 51	124.7	18 55.9 86 51	125.0	18 30.0 86 51	125.3	18 04.1 86 50	125.5	17 38.1 86 50	125.8	17 12.2 87 50	126.1	16 46.2 87 50	126.3	16 20.2 87 50	126.6	1
2	18 51.2 86 51	123.8	18 25.4 86 51	124.1	17 59.6 86 51	124.4	17 33.8 86 51	124.6	17 08.0 86 51	124.9	16 42.1 86 51	125.2	16 16.3 86 50	125.4	15 50.4 86 50	125.7	2
3	18 20.4 86 52	122.9	17 54.7 86 52	123.2	17 29.0 86 52	123.5	17 03.3 86 51	123.7	16 37.5 86 51	124.0	16 11.8 86 51	124.3	15 46.0 86 51	124.5	15 20.2 86 51	124.8	3
4	17 49.2 85 52	122.0	17 23.6 85 52	122.3	16 58.0 85 52	122.6	16 32.4 85 52	122.9	16 06.8 86 52	123.1	15 41.1 86 52	123.4	15 15.4 86 52	123.7	14 49.7 86 51	123.9	4
55	17 17.7 85 53	121.1	16 52.2 85 53	121.4	16 26.7 85 53	121.7	16 01.2 85 52	122.0	15 35.7 85 52	122.2	15 10.1 85 52	122.5	14 44.5 85 52	122.8	14 18.9 85 52	123.1	55
6	16 46.0 85 53	120.3	16 20.6 85 53	120.5	15 55.2 85 53	120.8	15 29.7 85 53	121.1	15 04.3 85 53	121.4	14 38.8 85 53	121.6	14 13.3 85 52	121.9	13 47.8 85 52	122.2	6
7	16 13.9 84 54	119.4	15 48.6 84 54	119.7	15 23.3 84 54	119.9	14 57.9 85 53	120.2	14 32.6 85 53	120.5	14 07.2 85 53	120.8	13 41.8 85 53	121.0	13 16.4 85 53	121.3	7
8	15 41.6 84 54	118.5	15 16.4 84 54	118.8	14 51.1 84 54	119.1	14 25.9 84 54	119.3	14 00.6 84 54	119.6	13 35.3 84 54	119.9	13 10.0 84 53	120.2	12 44.7 84 53	120.5	8
9	15 09.0 84 55	117.6	14 43.9 84 55	117.9	14 18.7 84 54	118.2	13 53.6 84 54	118.5	13 28.4 84 54	118.8	13 03.2 84 54	119.0	12 37.9 84 54	119.3	12 12.7 84 54	119.6	9
60	14 36.2 83 55	116.8	14 11.1 84 55	117.1	13 46.0 84 55	117.3	13 21.0 84 55	117.6	12 55.9 84 55	117.9	12 30.7 84 54	118.2	12 05.6 84 54	118.5	11 40.4 84 54	118.7	60
1	14 03.1 83 56	115.9	13 38.1 83 55	116.2	13 13.1 83 55	116.5	12 48.1 83 55	116.8	12 23.1 83 55	117.1	11 58.0 83 55	117.3	11 33.0 84 55	117.6	11 07.9 84 55	117.9	1
2	13 29.7 83 56	115.1	13 04.8 83 56	115.4	12 39.9 83 56	115.6	12 15.0 83 56	115.9	11 50.1 83 55	116.2	11 25.1 83 55	116.5	11 00.1 83 55	116.8	10 35.1 83 55	117.1	2
3	12 56.1 83 56	114.2	12 31.3 83 56	114.5	12 06.5 83 56	114.8	11 41.7 83 56	115.1	11 16.8 83 56	115.4	10 51.9 83 56	115.7	10 27.0 83 56	115.9	10 02.1 83 55	116.2	3
4	12 22.3 82 57	113.4	11 57.6 82 57	113.7	11 32.9 83 56	114.0	11 08.1 83 56	114.2	10 43.3 83 56	114.5	10 18.5 83 56	114.8	9 53.7 83 56	115.1	9 28.9 83 56	115.4	4
65	11 48.3 82 57	112.5	11 23.7 82 57	112.8	10 59.0 82 57	113.1	10 34.3 82 57	113.4	10 09.6 82 57	113.7	9 44.9 82 56	114.0	9 20.1 82 56	114.3	8 55.4 83 56	114.6	65
6	11 14.1 82 57	111.7	10 49.5 82 57	112.0	10 24.9 82 57	112.3	10 00.3 82 57	112.6	9 35.7 82 57	112.9	9 11.0 82 57	113.2	8 46.3 82 57	113.4	8 21.7 82 57	113.7	6
7	10 39.7 82 58	110.9	10 15.2 82 58	111.2	9 50.6 82 57	111.5	9 26.1 82 57	111.7	9 01.5 82 57	112.0	8 36.9 82 57	112.3	8 12.4 82 57	112.6	7 47.8 82 57	112.9	7
8	10 05.1 81 58	110.0	9 40.6 82 58	110.3	9 16.2 82 58	110.6	8 51.7 82 58	110.9	8 27.2 82 58	111.2	8 02.7 82 57	111.5	7 38.2 82 57	111.8	7 13.6 82 57	112.1	8
9	9 30.3 81 58	109.2	9 05.9 81 58	109.5	8 41.5 81 58	109.8	8 17.1 81 58	110.1	7 52.6 81 58	110.4	7 28.2 81 58	110.7	7 03.8 82 58	111.0	6 39.3 82 58	111.3	9
70	8 55.3 81 59	108.4	8 31.0 81 58	108.7	8 06.6 81 58	109.0	7 42.3 81 58	109.3	7 17.9 81 58	109.6	6 53.6 81 58	109.9	6 29.2 81 58	110.2	6 04.8 81 58	110.5	70
1	8 20.2 81 59	107.6	7 55.9 81 59	107.9	7 31.6 81 59	108.2	7 07.3 81 59	108.5	6 43.0 81 58	108.8	6 18.7 81 58	109.1	5 54.4 81 58	109.4	5 30.1 81 58	109.6	1
2	7 44.9 81 59	106.8	7 20.7 81 59	107.1	6 56.5 81 59	107.4	6 32.2 81 59	107.7	6 08.0 81 59	108.0	5 43.7 81 59	108.3	5 19.5 81 59	108.5			2
3	7 09.4 80 59	106.0	6 45.3 81 59	106.3	6 21.1 81 59	106.6	5 56.9 81 59	106.9	5 32.8 81 59	107.1	5 08.6 81 59	107.4					3
4	6 33.9 80 60	105.2	6 09.8 80 59	105.4	5 45.6 80 59	105.7	5 21.5 80 59	106.0									4
75	5 58.1 80 60	104.3	5 34.1 80 60	104.6	5 10.0 80 60	104.9											75
6	5 22.3 80 60	103.5															6

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′ Alt.	Az.	4° 30′ Alt.	Az.	5° 00′ Alt.	Az.	5° 30′ Alt.	Az.	6° 00′ Alt.	Az.	6° 30′ Alt.	Az.	7° 00′ Alt.	Az.	7° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
															5 17.4 79 61	84.6	91

Digitized by Google

Lat. 52°

H.A.	8° 00′ Alt.	Az.	8° 30′ Alt.	Az.	9° 00′ Alt.	Az.	9° 30′ Alt.	Az.	10° 00′ Alt.	Az.	10° 30′ Alt.	Az.	11° 00′ Alt.	Az.	11° 30′ Alt.	Az.	H.A.
°	′	d Δt °	′	d Δt °	′	d Δt °	′	d Δt °	′	d Δt °	′	d Δt °	′	d Δt °	′	d Δt °	°
00	46 00.0	1.0 01 180.0	46 30.0	1.0 01 180.0	47 00.0	1.0 01 180.0	47 30.0	1.0 01 180.0	48 00.0	1.0 01 180.0	48 30.0	1.0 01 180.0	49 00.0	1.0 01 180.0	49 30.0	1.0 01 180.0	00
1	45 59.5	1.0 02 178.6	46 29.5	1.0 02 178.6	46 59.5	1.0 02 178.6	47 29.5	1.0 02 178.5	47 59.5	1.0 02 178.5	48 29.5	1.0 02 178.5	48 59.5	1.0 02 178.5	49 29.5	1.0 02 178.5	1
2	45 58.2	1.0 04 177.2	46 28.1	1.0 04 177.1	46 58.1	1.0 04 177.1	47 28.1	1.0 04 177.1	47 58.1	1.0 04 177.1	48 28.1	1.0 04 177.0	48 58.1	1.0 04 177.0	49 28.1	1.0 04 177.0	2
3	45 55.9	1.0 05 175.7	46 25.8	1.0 05 175.7	46 55.8	1.0 05 175.7	47 25.8	1.0 05 175.6	47 55.7	1.0 06 175.6	48 25.7	1.0 06 175.6	48 55.7	1.0 06 175.5	49 25.6	1.0 06 175.5	3
4	45 52.7	1.0 07 174.3	46 22.6	1.0 07 174.3	46 52.5	1.0 07 174.2	47 22.5	1.0 07 174.2	47 52.4	1.0 07 174.1	48 22.4	1.0 07 174.1	48 52.3	1.0 07 174.0	49 22.2	1.0 07 174.0	4
05	45 48.5	1.0 08 172.9	46 18.4	1.0 08 172.8	46 48.4	1.0 08 172.8	47 18.3	1.0 09 172.7	47 48.2	1.0 09 172.7	48 18.1	1.0 09 172.6	48 48.0	1.0 09 172.5	49 17.9	1.0 09 172.5	05
6	45 43.5	1.0 10 171.5	46 13.4	1.0 10 171.4	46 43.3	1.0 10 171.3	47 13.1	1.0 10 171.3	47 43.0	1.0 10 171.2	48 12.8	1.0 10 171.1	48 42.7	1.0 10 171.1	49 12.6	1.0 10 171.0	6
7	45 37.6	99 11 170.1	46 07.4	99 11 170.0	46 37.2	99 12 169.9	47 07.1	99 12 169.8	47 36.9	99 12 169.7	48 06.7	99 12 169.7	48 36.5	99 12 169.6	49 06.3	99 12 169.5	7
8	45 30.8	99 13 168.7	46 00.5	99 13 168.6	46 30.3	99 13 168.5	47 00.1	99 13 168.4	47 29.8	99 13 168.3	47 59.6	99 13 168.2	48 29.3	99 13 168.1	48 59.1	99 14 168.0	8
9	45 23.1	99 14 167.3	45 52.8	99 14 167.2	46 22.5	99 15 167.1	46 52.2	99 15 167.0	47 21.9	99 15 166.9	47 51.6	99 15 166.7	48 21.3	99 15 166.6	48 50.9	99 15 166.5	9
10	45 14.5	99 16 165.9	45 44.1	99 16 165.8	46 13.8	99 16 165.6	46 43.4	99 16 165.5	47 13.0	99 16 165.4	47 42.7	99 16 165.3	48 12.3	99 16 165.2	48 41.9	99 17 165.1	10
1	45 05.0	99 17 164.5	45 34.6	99 17 164.4	46 04.2	99 17 164.2	46 33.7	99 18 164.1	47 03.3	99 18 164.0	47 32.8	99 18 163.9	48 02.4	99 18 163.7	48 31.9	99 18 163.6	1
2	44 54.7	98 19 163.1	45 24.2	98 19 163.0	45 53.7	98 19 162.8	46 23.2	98 19 162.7	46 52.7	98 19 162.6	47 22.1	98 19 162.4	47 51.6	98 19 162.3	48 21.0	98 20 162.1	2
3	44 43.5	98 20 161.7	45 13.0	98 20 161.6	45 42.4	98 20 161.4	46 11.8	98 20 161.3	46 41.2	98 21 161.2	47 10.5	98 21 161.0	47 39.9	98 21 160.9	48 09.3	98 21 160.7	3
4	44 31.5	98 21 160.4	45 00.9	98 22 160.2	45 30.2	98 22 160.1	45 59.5	98 22 159.9	46 28.8	98 22 159.8	46 58.1	98 22 159.6	47 27.4	98 22 159.4	47 56.6	97 22 159.3	4
15	44 18.7	97 23 159.0	44 48.0	97 23 158.9	45 17.2	97 23 158.7	45 46.4	97 23 158.5	46 15.6	97 23 158.4	46 44.8	97 24 158.2	47 14.0	97 24 158.0	47 43.1	97 24 157.9	15
6	44 05.1	97 24 157.7	44 34.2	97 24 157.5	45 03.4	97 24 157.3	45 32.5	97 25 157.2	46 01.6	97 25 157.0	46 30.7	97 25 156.8	46 59.7	97 25 156.6	47 28.8	97 25 156.4	6
7	43 50.7	97 25 156.3	44 19.7	97 26 156.2	44 48.7	97 26 156.0	45 17.7	97 26 155.8	45 46.7	97 26 155.6	46 15.7	97 26 155.4	46 44.7	96 26 155.2	47 13.6	96 27 155.0	7
8	43 35.4	96 27 155.0	44 04.4	96 27 154.8	44 33.3	96 27 154.6	45 02.2	96 27 154.4	45 31.1	96 27 154.3	45 59.9	96 28 154.1	46 28.8	96 28 153.9	46 57.6	96 28 153.7	8
9	43 19.4	96 28 153.7	43 48.3	96 28 153.5	44 17.1	96 28 153.3	44 45.9	96 28 153.1	45 14.6	96 29 152.9	45 43.4	96 29 152.7	46 12.1	96 29 152.5	46 40.8	96 29 152.3	9
20	43 02.7	96 29 152.4	43 31.4	96 29 152.2	44 00.1	96 30 152.0	44 28.8	96 30 151.8	44 57.4	95 30 151.6	45 26.1	95 30 151.4	45 54.7	95 30 151.1	46 23.3	95 31 150.9	20
1	42 45.2	95 30 151.1	43 13.8	95 31 150.9	43 42.4	95 31 150.7	44 11.0	95 31 150.5	44 39.5	95 31 150.3	45 08.0	95 31 150.0	45 36.5	95 32 149.8	46 04.9	95 32 149.6	1
2	42 27.0	95 32 149.8	42 55.5	95 32 149.6	43 23.9	95 32 149.4	43 52.4	95 32 149.2	44 20.8	95 32 148.9	44 49.2	95 33 148.7	45 17.5	94 33 148.5	45 45.9	94 33 148.3	2
3	42 08.1	95 33 148.5	42 36.4	95 33 148.3	43 04.8	94 33 148.1	43 33.1	94 33 147.9	44 01.4	94 34 147.6	44 29.6	94 34 147.4	44 57.9	94 34 147.2	45 26.1	94 34 146.9	3
4	41 48.5	94 34 147.3	42 16.7	94 34 147.1	42 44.9	94 34 146.8	43 13.1	94 34 146.6	43 41.3	94 35 146.4	44 09.4	94 35 146.1	44 37.5	94 35 145.9	45 05.6	93 35 145.6	4
25	41 28.2	94 35 146.0	41 56.3	94 35 145.8	42 24.4	94 35 145.6	42 52.4	93 36 145.3	43 20.5	93 36 145.1	43 48.5	93 36 144.8	44 16.4	93 36 144.6	44 44.4	93 36 144.3	25
6	41 07.2	93 36 144.8	41 35.2	93 36 144.6	42 03.2	93 36 144.3	42 31.1	93 37 144.1	42 59.0	93 37 143.8	43 26.9	93 37 143.6	43 54.7	93 37 143.3	44 22.5	93 38 143.1	6
7	40 45.6	93 37 143.6	41 13.5	93 37 143.3	41 41.3	93 38 143.1	42 09.1	93 38 142.8	42 36.9	93 38 142.6	43 04.6	92 38 142.3	43 32.3	92 38 142.1	44 00.0	92 39 141.8	7
8	40 23.4	93 38 142.4	40 51.1	92 38 142.1	41 18.8	92 39 141.9	41 46.5	92 39 141.6	42 14.1	92 39 141.4	42 41.7	92 39 141.1	43 09.3	92 39 140.8	43 36.8	92 40 140.5	8
9	40 00.5	92 39 141.2	40 28.1	92 39 140.9	40 55.7	92 40 140.7	41 23.2	92 40 140.4	41 50.7	92 40 140.1	42 18.2	91 40 139.9	42 45.6	91 40 139.6	43 13.0	91 41 139.3	9
30	39 37.1	92 40 140.0	40 04.5	92 40 139.7	40 32.0	91 40 139.5	40 59.4	91 41 139.2	41 26.8	91 41 138.9	41 54.1	91 41 138.7	42 21.4	91 41 138.4	42 48.6	91 42 138.1	30
1	39 13.0	91 41 138.8	39 40.4	91 41 138.6	40 07.7	91 41 138.3	40 35.0	91 42 138.0	41 02.2	91 42 137.7	41 29.4	91 42 137.5	41 56.6	90 42 137.2	42 23.7	90 43 136.9	1
2	38 48.4	91 42 137.7	39 15.6	91 42 137.4	39 42.8	91 42 137.1	40 10.0	90 43 136.8	40 37.1	90 43 136.6	41 04.2	90 43 136.3	41 31.2	90 43 136.0	41 58.2	90 43 135.7	2
3	38 23.3	90 43 136.5	38 50.4	90 43 136.2	39 17.4	90 43 136.0	39 44.4	90 43 135.7	40 11.4	90 44 135.4	40 38.4	90 44 135.1	41 05.2	90 44 134.8	41 32.1	89 44 134.5	3
4	37 57.6	90 44 135.4	38 24.6	90 44 135.1	38 51.5	90 44 134.8	39 18.4	90 44 134.5	39 45.2	89 45 134.2	40 12.0	89 45 134.0	40 38.8	89 45 133.7	41 05.5	89 45 133.4	4
35	37 31.4	90 44 134.3	37 58.2	89 45 134.0	38 25.0	89 45 133.7	38 51.8	89 45 133.4	39 18.5	89 45 133.1	39 45.2	89 46 132.8	40 11.8	89 46 132.5	40 38.4	89 46 132.2	35
6	37 04.7	89 45 133.1	37 31.4	89 46 132.9	37 58.1	89 46 132.6	38 24.7	89 46 132.3	38 51.3	89 46 132.0	39 17.8	88 46 131.7	39 44.3	88 47 131.4	40 10.8	88 47 131.1	6
7	36 37.5	89 46 132.0	37 04.1	89 46 131.8	37 30.6	88 47 131.5	37 57.1	88 47 131.2	38 23.6	88 47 130.9	38 50.0	88 47 130.6	39 16.4	88 47 130.3	39 42.7	88 48 129.9	7
8	36 09.8	88 47 131.0	36 36.3	88 47 130.7	37 02.7	88 47 130.4	37 29.1	88 47 130.1	37 55.4	88 48 129.8	38 21.7	88 48 129.5	38 48.0	87 48 129.2	39 14.1	87 48 128.8	8
9	35 41.7	88 48 129.9	36 08.1	88 48 129.6	36 34.4	88 48 129.3	37 00.6	87 48 129.0	37 26.8	87 48 128.7	37 53.0	87 49 128.4	38 19.1	87 49 128.1	38 45.2	87 49 127.7	9
40	35 13.1	87 48 128.8	35 39.4	87 49 128.5	36 05.5	87 49 128.2	36 31.7	87 49 127.9	36 57.8	87 49 127.6	37 23.8	87 49 127.3	37 49.8	87 50 127.0	38 15.7	86 50 126.7	40
1	34 44.2	87 49 127.8	35 10.3	87 49 127.5	35 36.3	87 49 127.2	36 02.3	87 50 126.8	36 28.3	86 50 126.5	36 54.2	86 50 126.2	37 20.1	86 50 125.9	37 45.9	86 50 125.6	1
2	34 14.7	87 50 126.7	34 40.7	87 50 126.4	35 06.7	86 50 126.1	35 32.6	86 50 125.8	35 58.4	86 50 125.5	36 24.2	86 51 125.2	36 50.0	86 51 124.9	37 15.7	86 51 124.5	2
3	33 44.9	86 50 125.7	34 10.8	86 50 125.4	34 36.6	86 51 125.1	35 02.4	86 51 124.8	35 28.1	86 51 124.4	35 53.8	86 51 124.1	36 19.5	85 51 123.8	36 45.0	85 52 123.5	3
4	33 14.7	86 51 124.7	33 40.5	86 51 124.4	34 06.2	86 51 124.0	34 31.9	85 52 123.7	34 57.5	85 52 123.4	35 23.1	85 52 123.1	35 48.6	85 52 122.8	36 14.0	85 52 122.4	4
45	32 44.2	86 52 123.7	33 09.8	85 52 123.3	33 35.4	85 52 123.0	34 01.0	85 52 122.7	34 26.5	85 52 122.4	34 51.9	85 52 122.1	35 17.3	85 53 121.7	35 42.7	84 53 121.4	45
6	32 13.2	85 52 122.6	32 38.8	85 52 122.3	33 04.3	85 52 122.0	33 29.7	85 53 121.7	33 55.1	85 53 121.4	34 20.5	84 53 121.1	34 45.8	84 53 120.7	35 11.0	84 53 120.4	6
7	31 42.0	85 53 121.7	32 07.4	85 53 121.3	32 32.8	85 53 121.0	32 58.1	84 53 120.7	33 23.4	84 53 120.4	33 48.6	84 54 120.1	34 13.8	84 54 119.7	34 39.0	84 54 119.4	7
8	31 10.4	85 53 120.7	31 35.7	84 53 120.4	32 01.0	84 54 120.0	32 26.2	84 54 119.7	32 51.4	84 54 119.4	33 16.5	84 54 119.1	33 41.6	84 54 118.7	34 06.6	83 54 118.4	8
9	30 38.4	84 54 119.7	31 03.7	84 54 119.4	31 28.8	84 54 119.1	31 54.0	84 54 118.7	32 19.1	84 54 118.4	32 44.1	83 55 118.1	33 09.1	83 55 117.8	33 34.0	83 55 117.4	9
50	30 06.2	84 54 118.7	30 31.3	84 54 118.4	30 56.4	84 55 118.1	31 21.4	83 55 117.8	31 46.4	83 55 117.5	32 11.4	83 55 117.1	32 36.2	83 55 116.8	33 01.1	83 55 116.5	50
1	29 33.7	84 55 117.8	29 58.7	83 55 117.5	30 23.7	83 55 117.1	30 48.6	83 55 116.8	31 13.5	83 55 116.5	31 38.3	83 55 116.2	32 03.1	83 56 115.8	32 27.9	82 56 115.5	1
2	29 00.8	83 55 116.8	29 25.8	83 55 116.5	29 50.7	83 55 116.2	30 15.5	83 56 115.9	30 40.3	83 56 115.5	31 05.0	82 56 115.2	31 29.7	82 56 114.9	31 54.4	82 56 114.5	2
3	28 27.7	83 56 115.9	28 52.6	83 56 115.6	29 17.4	83 56 115.3	29 42.1	82 56 114.9	30 06.8	82 56 114.6	30 31.5	82 56 114.3	30 56.1	82 56 113.9	31 20.7	82 57 113.6	3
4	27 54.4	83 56 115.0	28 19.1	82 56 114.6	28 43.8	82 56 114.3	29 08.5	82 56 114.0	29 33.1	82 57 113.7	29 57.7	82 57 113.3	30 22.2	82 57 113.0	30 46.7	81 57 112.7	4
55	27 20.8	82 56 114.0	27 45.4	82 57 113.7	28 10.1	82 57 113.4	28 34.6	82 57 113.1	28 59.2	82 57 112.7	29 23.7	82 57 112.4	29 48.1	81 57 112.1	30 12.5	81 57 111.7	55
6	26 46.9	82 57 113.1	27 11.5	82 57 112.8	27 36.0	82 57 112.5	28 00.5	82 57 112.2	28 25.0	81 57 111.8	28 49.4	81 57 111.5	29 13.8	81 58 111.2	29 38.1	81 58 110.8	6
7	26 12.8	82 57 112.2	26 37.3	82 57 111.9	27 01.8	81 57 111.6	27 26.2	81 58 111.3	27 50.6	81 58 110.9	28 14.9	81 58 110.6	28 39.2	81 58 110.3	29 03.4	81 58 109.9	7
8	25 38.5	82 58 111.3	26 03.0	81 58 111.0	26 27.3	81 58 110.7	26 51.7	81 58 110.4	27 16.0	81 58 110.0	27 40.2	81 58 109.7	28 04.5	81 58 109.4	28 28.6	80 58 109.0	8
9	25 04.0	81 58 110.4	25 28.4	81 58 110.1	25 52.7	81 58 109.8	26 17.0	81 58 109.5	26 41.2	81 58 109.1	27 05.4	81 58 108.8	27 29.5	80 59 108.5	27 53.6	80 59 108.1	9
60	24 29.3	81 58 109.5	24 53.6	81 58 109.2	25 17.8	81 58 108.9	25 42.0	81 58 108.6	26 06.2	80 59 108.2	26 30.3	80 59 107.9	26 54.4	80 59 107.6	27 18.4	80 59 107.2	60
1	23 54.4	81 58 108.7	24 18.6	81 59 108.3	24 42.8	81 59 108.0	25 06.9	80 59 107.7	25 31.0	80 59 107.4	25 55.1	80 59 107.0	26 19.1	80 59 106.7	26 43.0	80 59 106.4	1
2	23 19.3	81 59 107.8	23 43.5	80 59 107.5	24 07.6	80 59 107.1	24 31.7	80 59 106.8	24 55.7	80 59 106.5	25 19.7	80 59 106.2	25 43.6	80 59 105.8	26 07.5	80 59 105.5	2
3	22 44.0	80 59 106.9	23 08.1	80 59 106.6	23 32.2	80 59 106.3	23 56.2	80 59 106.0	24 20.2	80 59 105.6	24 44.1	80 60 105.3	25 08.0	80 60 105.0	25 31.9	79 60 104.6	3
4	22 08.6	80 59 106.1	22 32.7	80 59 105.7	22 56.7	80 59 105.4	23 20.6	80 60 105.1	23 44.5	80 60 104.8	24 08.4	80 60 104.4	24 32.3	79 60 104.1	24 56.0	79 60 103.8	4
65	21 33.1	80 60 105.2	21 57.0	80 60 104.9	22 21.0	80 60 104.6	22 44.9	80 60 104.2	23 08.8	79 60 103.9	23 32.6	79 60 103.6	23 56.4	79 60 103.2	24 20.1	79 60 102.9	65
6	20 57.3	80 60 104.4	21 21.3	80 60 104.0	21 45.2	80 60 103.7	22 09.0	79 60 103.4	22 32.8	79 60 103.1	22 56.6	79 60 102.7	23 20.3	79 60 102.4	23 44.0	79 60 102.1	6
7	20 21.5	80 60 103.5	20 45.4	80 60 103.2	21 09.2	79 60 102.9	21 33.0	79 60 102.5	21 56.8	79 60 102.2	22 20.5	79 60 101.9	22 44.2	79 60 101.6	23 07.9	79 60 101.2	7
8	19 45.5	80 60 102.7	20 09.3	79 60 102.4	20 33.1	79 60 102.0	20 56.9	79 60 101.7	21 20.6	79 60 101.4	21 44.3	79 60 101.1	22 08.0	79 61 100.7	22 31.6	79 61 100.4	8
9	19 09.4	79 60 101.8	19 33.2	79 60 101.5	19 57.0	79 60 101.2	20 20.7	79 61 100.9	20 44.4	79 61 100.5	21 08.0	79 61 100.2	21 31.6	79 61 99.9	21 55.2	78 61 99.6	9
70	18 33.2	79 60 101.0	18 57.0	79 61 100.7	19 20.7	79 61 100.4	19 44.4	79 61 100.0	20 08.0	79 61 99.7	20 31.6	79 61 99.4	20 55.2	79 61 99.1	21 18.7	78 61 98.7	70
1	17 56.9	79 61 100.2	18 20.6	79 61 99.9	18 44.3	79 61 99.5	19 07.9	79 61 99.2	19 31.5	79 61 98.9	19 55.1	79 61 98.6	20 18.7	78 61 98.2	20 42.2	78 61 97.9	1
2	17 20.5	79 61 99.4	17 44.2	79 61 99.1	18 07.8	79 61 98.7	18 31.4	79 61 98.4	18 55.0	79 61 98.1	19 18.6	78 61 97.7	19 42.1	78 61 97.4	20 05.5	78 61 97.1	2
3	16 44.0	79 61 98.6	17 07.7	79 61 98.2	17 31.3	79 61 97.9	17 54.9	79 61 97.6	18 18.4	78 61 97.3	18 41.9	78 61 96.9	19 05.4	78 61 96.6	19 28.9	78 61 96.3	3
4	16 07.4	79 61 97.7	16 31.1	79 61 97.4	16 54.6	79 61 97.1	17 18.2	78 61 96.8	17 41.7	78 61 96.4	18 05.2	78 61 96.1	18 28.7	78 61 95.8	18 52.1	78 61 95.5	4
75	15 30.8	79 61 96.9	15 54.4	79 61 96.6	16 18.0	78 61 96.3	16 41.5	78 61 96.0	17 05.0	78 61 95.6	17 28.5	78 61 95.3	17 51.9	78 61 95.0	18 15.3	78 61 94.7	75
6	14 54.1	79 61 96.1	15 17.7	79 61 95.8	15 41.2	78 61 95.5	16 04.7	78 61 95.2	16 28.2	78 61 94.8	16 51.7	78 61 94.5	17 15.1	78 61 94.2	17 38.5	78 61 93.9	6
7	14 17.4	79 61 95.3	14 40.9	78 61 95.0	15 04.4	78 61 94.7	15 27.9	78 61 94.4	15 51.4	78 61 94.0	16 14.8	78 61 93.7	16 38.2	78 62 93.4	17 01.6	78 62 93.1	7
8	13 40.5	78 61 94.5	14 04.1	78 61 94.2	14 27.6	78 61 93.9	14 51.1	78 61 93.6	15 14.5	78 62 93.2	15 37.9	78 62 92.9	16 01.3	78 62 92.6	16 24.7	78 62 92.3	8
9	13 03.7	78 61 93.7	13 27.2	78 61 93.4	13 50.7	78 62 93.1	14 14.2	78 62 92.8	14 37.6	78 62 92.4	15 01.0	78 62 92.1	15 24.4	78 62 91.8	15 47.8	78 62 91.5	9
80	12 26.8	78 62 92.9	12 50.3	78 62 92.6	13 13.8	78 62 92.3	13 37.3	78 62 92.0	14 00.7	78 62 91.6	14 24.1	78 62 91.3	14 47.5	78 62 91.0	15 10.9	78 62 90.7	80
1	11 49.9	78 62 92.1	12 13.4	78 62 91.8	12 36.9	78 62 91.5	13 00.3	78 62 91.2	13 23.8	78 62 90.9	13 47.2	78 62 90.5	14 10.6	78 62 90.2	14 33.9	78 62 89.9	1
2	11 13.0	78 62 91.3	11 36.5	78 62 91.0	12 00.0	78 62 90.7	12 23.4	78 62 90.4	12 46.8	78 62 90.1	13 10.2	78 62 89.7	13 33.6	78 62 89.4	13 57.0	78 62 89.1	2
3	10 36.1	78 62 90.5	10 59.6	78 62 90.2	11 23.0	78 62 89.9	11 46.5	78 62 89.6	12 09.9	78 62 89.3	12 33.3	78 62 89.0	12 56.7	78 62 88.6	13 20.0	78 62 88.3	3
4	9 59.1	78 62 89.8	10 22.6	78 62 89.4	10 46.1	78 62 89.1	11 09.5	78 62 88.8	11 33.0	78 62 88.5	11 56.4	78 62 88.2	12 19.8	78 62 87.9	12 43.1	78 62 87.5	4
85	9 22.2	78 62 89.0	9 45.7	78 62 88.7	10 09.2	78 62 88.3	10 32.6	78 62 88.0	10 56.0	78 62 87.7	11 19.5	78 62 87.4	11 42.9	78 61 87.1	12 06.2	78 61 86.7	85
6	8 45.3	78 62 88.2	9 08.8	78 62 87.9	9 32.2	78 61 87.6	9 55.7	78 61 87.2	10 19.1	78 61 86.9	10 42.6	78 61 86.6	11 06.0	78 61 86.3	11 29.4	78 61 86.0	6
7	8 08.3	78 61 87.4	8 31.9	78 61 87.1	8 55.3	78 61 86.8	9 18.8	78 61 86.5	9 42.3	78 61 86.1	10 05.7	78 61 85.8	10 29.1	78 61 85.5	10 52.5	78 61 85.2	7
8	7 31.5	78 61 86.6	7 55.0	78 61 86.3	8 18.5	78 61 86.0	8 42.0	78 61 85.7	9 05.4	78 61 85.4	9 28.9	78 61 85.0	9 52.3	78 61 84.7	10 15.8	78 61 84.4	8
9	6 54.6	78 61 85.8	7 18.1	78 61 85.5	7 41.6	78 61 85.2	8 05.2	78 61 84.9	8 28.6	78 61 84.6	8 52.1	78 61 84.3	9 15.6	78 61 84.0	9 39.0	78 61 83.6	9
90	6 17.8	78 61 85.1	6 41.3	78 61 84.7	7 04.9	78 61 84.4	7 28.4	78 61 84.1	7 51.9	78 61 83.8	8 15.4	78 61 83.5	8 38.9	78 61 83.2	9 02.3	78 61 82.9	90

16—15836

Lat. 52°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	
°	° ′		Az.	° ′		Az.	° ′		Az.	° ′		Az.	° ′		Az.	° ′		Az.	° ′		Az.	° ′		Az.	°
00	30 00.0	1.0 01	180.0	29 30.0	1.0 01	180.0	29 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	28 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	27 00.0	1.0 01	180.0	26 30.0	1.0 01	180.0	00
1	29 59.6	1.0 02	178.9	29 29.6	1.0 02	178.9	28 59.6	1.0 02	178.9	28 29.6	1.0 02	178.9	27 59.6	1.0 02	178.9	27 29.6	1.0 02	178.9	26 59.6	1.0 02	178.9	26 29.6	1.0 02	178.9	1
2	29 58.5	1.0 03	177.7	29 28.5	1.0 03	177.7	28 58.5	1.0 03	177.7	28 28.6	1.0 03	177.8	27 58.6	1.0 03	177.8	27 28.6	1.0 03	177.8	26 58.6	1.0 03	177.8	26 28.6	1.0 03	177.8	2
3	29 56.7	1.0 04	176.6	29 26.7	1.0 04	176.6	28 56.7	1.0 04	176.6	28 26.7	1.0 04	176.6	27 56.8	1.0 04	176.7	27 26.8	1.0 04	176.7	26 56.8	1.0 04	176.7	26 26.8	1.0 04	176.7	3
4	29 54.1	1.0 06	175.4	29 24.1	1.0 06	175.5	28 54.2	1.0 05	175.5	28 24.2	1.0 05	175.5	27 54.3	1.0 05	175.5	27 24.3	1.0 05	175.6	26 54.3	1.0 05	175.6	26 24.4	1.0 05	175.6	4
05	29 50.8	1.0 07	174.3	29 20.9	1.0 07	174.3	28 50.9	1.0 07	174.4	28 21.0	1.0 07	174.4	27 51.0	1.0 07	174.4	27 21.1	1.0 07	174.5	26 51.1	1.0 06	174.5	26 21.2	1.0 06	174.5	05
6	29 46.8	1.0 08	173.2	29 16.8	1.0 08	173.2	28 46.9	1.0 08	173.2	28 17.0	1.0 08	173.3	27 47.1	1.0 08	173.3	27 17.2	1.0 08	173.4	26 47.2	1.0 08	173.4	26 17.3	1.0 08	173.4	6
7	29 42.0	1.0 09	172.0	29 12.1	1.0 09	172.1	28 42.2	1.0 09	172.1	28 12.3	1.0 09	172.2	27 42.4	1.0 09	172.2	27 12.5	1.0 09	172.3	26 42.6	1.0 09	172.3	26 12.7	1.0 09	172.4	7
8	29 36.5	1.0 10	170.9	29 06.6	1.0 10	170.9	28 36.8	1.0 10	171.0	28 06.9	1.0 10	171.0	27 37.1	1.0 10	171.1	27 07.2	1.0 10	171.2	26 37.3	1.0 10	171.2	26 07.5	1.0 10	171.3	8
9	29 30.3	99 12	169.7	29 00.5	99 12	169.8	28 30.6	99 11	169.9	28 00.8	99 11	169.9	27 31.0	99 11	170.0	27 01.2	99 11	170.1	26 31.4	99 11	170.1	26 01.5	99 11	170.2	9
10	29 23.3	99 13	168.6	28 53.6	99 13	168.7	28 23.8	99 13	168.8	27 54.0	99 13	168.8	27 24.2	99 12	168.9	26 54.5	99 12	169.0	26 24.7	99 12	169.0	25 54.9	99 12	169.1	10
1	29 15.7	99 14	167.5	28 46.0	99 14	167.6	28 16.2	99 14	167.6	27 46.5	99 14	167.7	27 16.8	99 14	167.8	26 47.0	99 14	167.9	26 17.3	99 13	167.9	25 47.6	99 13	168.0	1
2	29 07.3	99 15	166.4	28 37.7	99 15	166.5	28 08.0	99 15	166.5	27 38.3	99 15	166.6	27 08.6	99 15	166.7	26 38.9	99 15	166.8	26 09.2	99 15	166.9	25 39.5	99 14	166.9	2
3	28 58.3	99 16	165.2	28 28.7	99 16	165.3	27 59.0	99 16	165.4	27 29.4	99 16	165.5	26 59.8	99 16	165.6	26 30.1	99 16	165.7	26 00.5	99 16	165.8	25 30.9	99 16	165.9	3
4	28 48.5	99 17	164.1	28 19.0	99 17	164.2	27 49.4	99 17	164.3	27 19.8	99 17	164.4	26 50.3	99 17	164.5	26 20.7	99 17	164.6	25 51.1	99 17	164.7	25 21.5	99 17	164.8	4
15	28 38.1	98 19	163.0	28 08.6	98 18	163.1	27 39.1	98 18	163.2	27 09.6	98 18	163.3	26 40.0	98 18	163.4	26 10.5	98 18	163.5	25 41.0	98 18	163.6	25 11.5	98 18	163.7	15
6	28 27.0	98 20	161.9	27 57.5	98 20	162.0	27 28.1	98 19	162.1	26 58.6	98 19	162.2	26 29.2	98 19	162.3	25 59.7	98 19	162.5	25 30.3	98 19	162.6	25 00.8	98 19	162.7	6
7	28 15.2	98 21	160.8	27 45.8	98 21	160.9	27 16.4	98 21	161.0	26 47.0	98 20	161.2	26 17.6	98 20	161.3	25 48.3	98 20	161.4	25 18.9	98 20	161.5	24 49.5	98 20	161.6	7
8	28 02.7	98 22	159.7	27 33.4	98 22	159.8	27 04.1	98 22	160.0	26 34.8	98 22	160.1	26 05.5	98 21	160.2	25 36.1	98 21	160.3	25 06.8	98 21	160.4	24 37.5	98 21	160.5	8
9	27 49.5	97 23	158.6	27 20.3	97 23	158.7	26 51.1	97 23	158.9	26 21.9	97 23	159.0	25 52.6	97 22	159.1	25 23.4	98 22	159.2	24 54.1	98 22	159.4	24 24.8	98 22	159.5	9
20	27 35.8	97 24	157.5	27 06.6	97 24	157.7	26 37.5	97 24	157.8	26 08.3	97 24	157.9	25 39.1	97 24	158.1	25 10.0	97 23	158.2	24 40.8	97 23	158.3	24 11.6	97 23	158.4	20
1	27 21.3	97 25	156.4	26 52.2	97 25	156.6	26 23.2	97 25	156.7	25 54.1	97 25	156.9	25 25.0	97 25	157.0	24 55.9	97 24	157.1	24 26.8	97 24	157.3	23 57.7	97 24	157.4	1
2	27 06.2	97 26	155.4	26 37.3	97 26	155.5	26 08.3	97 26	155.7	25 39.3	97 26	155.8	25 10.3	97 26	155.9	24 41.3	97 25	156.1	24 12.2	97 25	156.2	23 43.2	97 25	156.4	2
3	26 50.5	96 27	154.3	26 21.6	96 27	154.5	25 52.7	96 27	154.6	25 23.8	96 27	154.7	24 54.9	96 27	154.9	24 26.0	96 26	155.0	23 57.0	96 26	155.2	23 28.1	96 26	155.3	3
4	26 34.2	96 28	153.2	26 05.4	96 28	153.4	25 36.6	96 28	153.5	25 07.8	96 28	153.7	24 38.9	96 28	153.9	24 10.1	96 28	154.0	23 41.2	96 27	154.2	23 12.4	96 27	154.3	4
25	26 17.3	96 29	152.2	25 48.5	96 29	152.3	25 19.8	96 29	152.5	24 51.1	96 29	152.7	24 22.3	96 29	152.8	23 53.6	96 28	153.0	23 24.8	96 28	153.1	22 56.0	96 28	153.3	25
6	25 59.7	95 30	151.1	25 31.1	95 30	151.3	25 02.4	95 30	151.5	24 33.8	95 30	151.6	24 05.2	96 30	151.8	23 36.5	96 29	151.9	23 07.8	96 29	152.1	22 39.1	96 29	152.3	6
7	25 41.6	95 31	150.1	25 13.1	95 31	150.2	24 44.5	95 31	150.4	24 16.0	95 31	150.6	23 47.4	95 31	150.8	23 18.8	95 30	150.9	22 50.3	95 30	151.1	22 21.7	95 30	151.2	7
8	25 22.9	95 32	149.0	24 54.4	95 32	149.2	24 26.0	95 32	149.4	23 57.5	95 32	149.6	23 29.1	95 32	149.7	23 00.6	95 31	149.9	22 32.1	95 31	150.1	22 03.6	95 31	150.2	8
9	25 03.6	94 33	148.0	24 35.2	94 33	148.2	24 06.9	95 33	148.4	23 38.5	95 33	148.5	23 10.2	95 32	148.7	22 41.8	95 32	148.9	22 13.4	95 32	149.1	21 45.0	95 32	149.2	9
30	24 43.7	94 34	147.0	24 15.5	94 34	147.2	23 47.2	94 34	147.3	23 19.0	94 34	147.5	22 50.7	94 33	147.7	22 22.4	94 33	147.9	21 54.1	94 33	148.1	21 25.8	94 33	148.2	30
1	24 23.3	94 35	145.9	23 55.2	94 35	146.1	23 27.0	94 35	146.3	22 58.9	94 34	146.5	22 30.7	94 34	146.7	22 02.5	94 34	146.9	21 34.3	94 34	147.1	21 06.1	94 34	147.2	1
2	24 02.3	93 36	144.9	23 34.3	93 36	145.1	23 06.3	93 35	145.3	22 38.2	94 35	145.5	22 10.1	94 35	145.7	21 42.1	94 35	145.9	21 14.0	94 35	146.1	20 45.9	94 35	146.3	2
3	23 40.9	93 37	143.9	23 12.9	93 37	144.1	22 45.0	93 36	144.3	22 17.0	93 36	144.5	21 49.1	93 36	144.7	21 21.1	93 36	144.9	20 53.1	93 36	145.1	20 25.1	93 36	145.3	3
4	23 18.8	93 38	142.9	22 51.0	93 37	143.1	22 23.2	93 37	143.3	21 55.3	93 37	143.5	21 27.5	93 37	143.7	20 59.6	93 37	143.9	20 31.7	93 37	144.1	20 03.8	93 36	144.3	4
35	22 56.3	92 38	141.9	22 28.6	92 38	142.1	22 00.9	92 38	142.3	21 33.1	93 38	142.5	21 05.4	93 38	142.7	20 37.6	93 38	142.9	20 09.8	93 37	143.1	19 42.0	93 37	143.3	35
6	22 33.3	92 39	140.9	22 05.7	92 39	141.1	21 38.0	92 39	141.4	21 10.4	92 39	141.6	20 42.7	92 39	141.8	20 15.1	92 38	142.0	19 47.4	92 38	142.2	19 19.7	92 38	142.4	6
7	22 09.7	92 40	139.9	21 42.2	92 40	140.2	21 14.7	92 40	140.4	20 47.2	92 39	140.6	20 19.6	92 39	140.8	19 52.1	92 39	141.0	19 24.5	92 39	141.2	18 56.9	92 39	141.4	7
8	21 45.7	91 41	139.0	21 18.3	91 41	139.2	20 50.9	91 40	139.4	20 23.5	91 40	139.6	19 56.0	92 40	139.8	19 28.6	92 40	140.1	19 01.1	92 40	140.3	18 33.6	92 40	140.5	8
9	21 21.3	91 42	138.0	20 54.0	91 41	138.2	20 26.7	91 41	138.4	19 59.3	91 41	138.7	19 32.0	91 41	138.9	19 04.6	91 41	139.1	18 37.3	91 41	139.3	18 09.9	91 40	139.5	9
40	20 56.3	91 42	137.0	20 29.1	91 42	137.3	20 01.9	91 42	137.5	19 34.7	91 42	137.7	19 07.5	91 42	137.9	18 40.2	91 41	138.2	18 13.0	91 41	138.4	17 45.7	91 41	138.6	40
1	20 30.9	90 43	136.1	20 03.8	90 43	136.3	19 36.7	90 43	136.5	19 09.6	90 43	136.8	18 42.5	90 42	137.0	18 15.4	91 42	137.2	17 48.2	91 42	137.4	17 21.0	91 42	137.7	1
2	20 05.1	90 44	135.1	19 38.1	90 44	135.4	19 11.1	90 43	135.6	18 44.1	90 43	135.8	18 17.1	90 43	136.1	17 50.0	90 43	136.3	17 23.0	90 43	136.5	16 55.9	90 43	136.7	2
3	19 38.8	90 44	134.2	19 11.9	90 44	134.4	18 45.0	90 44	134.7	18 18.1	90 44	134.9	17 51.2	90 44	135.1	17 24.3	90 44	135.4	16 57.3	90 43	135.6	16 30.4	90 43	135.8	3
4	19 12.1	89 45	133.2	18 45.3	89 45	133.5	18 18.6	89 45	133.7	17 51.8	89 45	134.0	17 25.0	89 44	134.2	16 58.1	89 44	134.4	16 31.3	89 44	134.7	16 04.4	90 44	134.9	4
45	18 45.0	89 46	132.3	18 18.3	89 46	132.6	17 51.7	89 46	132.8	17 25.0	89 45	133.0	16 58.3	89 45	133.3	16 31.5	89 45	133.5	16 04.8	89 45	133.7	15 38.1	89 45	134.0	45
6	18 17.5	88 46	131.4	17 50.9	89 46	131.6	17 24.3	89 46	131.9	16 57.8	89 46	132.1	16 31.2	89 46	132.4	16 04.6	89 46	132.6	15 37.9	89 45	132.8	15 11.3	89 45	133.1	6
7	17 49.5	88 47	130.5	17 23.1	88 47	130.7	16 56.6	88 47	131.0	16 30.2	88 47	131.2	16 03.7	88 46	131.5	15 37.2	88 46	131.7	15 10.6	88 46	131.9	14 44.1	89 46	132.2	7
8	17 21.3	88 48	129.6	16 54.9	88 48	129.8	16 28.6	88 47	130.1	16 02.2	88 47	130.3	15 35.8	88 47	130.6	15 09.4	88 47	130.8	14 43.0	88 47	131.0	14 16.5	88 47	131.3	8
9	16 52.6	87 48	128.6	16 26.4	87 48	128.9	16 00.1	88 48	129.2	15 33.8	88 48	129.4	15 07.5	88 48	129.7	14 41.2	88 48	129.9	14 14.9	88 47	130.2	13 48.6	88 47	130.4	9
50	16 23.6	87 49	127.7	15 57.4	87 49	128.0	15 31.3	87 49	128.3	15 05.1	87 48	128.5	14 38.9	87 48	128.8	14 12.7	87 48	129.0	13 46.5	87 48	129.3	13 20.3	87 48	129.5	50
1	15 54.2	87 50	126.8	15 28.1	87 49	127.1	15 02.1	87 49	127.4	14 36.0	87 49	127.6	14 09.9	87 49	127.9	13 43.8	87 49	128.1	13 17.7	87 49	128.4	12 51.6	87 48	128.6	1
2	15 24.4	86 50	126.0	14 58.5	86 50	126.2	14 32.6	87 50	126.5	14 06.6	87 50	126.7	13 40.6	87 49	127.0	13 14.6	87 49	127.3	12 48.6	87 49	127.5	12 22.6	87 49	127.8	2
3	14 54.4	86 51	125.1	14 28.5	86 50	125.3	14 02.7	86 50	125.6	13 36.8	86 50	125.9	13 10.9	86 50	126.1	12 45.0	86 50	126.4	12 19.1	86 50	126.6	11 53.2	86 50	126.9	3
4	14 24.0	86 51	124.2	13 58.2	86 51	124.5	13 32.5	86 51	124.7	13 06.7	86 51	125.0	12 40.9	86 51	125.2	12 15.1	86 50	125.5	11 49.3	86 50	125.8	11 23.5	86 50	126.0	4
55	13 53.3	85 52	123.3	13 27.6	86 52	123.6	13 02.0	86 51	123.9	12 36.3	86 51	124.1	12 10.6	86 51	124.4	11 44.9	86 51	124.6	11 19.2	86 51	124.9	10 53.4	86 51	125.2	55
6	13 22.3	85 52	122.5	12 56.7	85 52	122.7	12 31.1	85 52	123.0	12 05.6	85 52	123.3	11 40.0	85 52	123.5	11 14.4	85 51	123.8	10 48.7	85 51	124.1	10 23.1	85 51	124.3	6
7	12 50.9	85 53	121.6	12 25.5	85 53	121.9	12 00.0	85 52	122.1	11 34.5	85 52	122.4	11 09.0	85 52	122.7	10 43.5	85 52	122.9	10 18.0	85 52	123.2	9 52.4	85 52	123.5	7
8	12 19.3	85 53	120.7	11 54.0	85 53	121.0	11 28.6	85 53	121.3	11 03.2	85 53	121.5	10 37.8	85 53	121.8	10 12.3	85 52	122.1	9 46.9	85 52	122.4	9 21.5	85 52	122.6	8
9	11 47.4	84 54	119.9	11 22.2	84 53	120.1	10 56.9	84 53	120.4	10 31.6	84 53	120.7	10 06.2	84 53	121.0	9 40.9	84 53	121.2	9 15.6	85 53	121.5	8 50.2	85 53	121.8	9
60	11 15.3	84 54	119.0	10 50.1	84 54	119.3	10 24.9	84 54	119.6	9 59.7	84 54	119.9	9 34.4	84 53	120.1	9 09.2	84 53	120.4	8 43.9	84 53	120.7	8 18.7	84 53	120.9	60
1	10 42.8	84 54	118.2	10 17.7	84 54	118.5	9 52.6	84 54	118.7	9 27.5	84 54	119.0	9 02.3	84 54	119.3	8 37.2	84 54	119.6	8 12.0	84 54	119.8	7 46.8	84 54	120.1	1
2	10 10.1	83 55	117.3	9 45.1	83 55	117.6	9 20.1	83 55	117.9	8 55.1	84 54	118.2	8 30.0	84 54	118.5	8 04.9	84 54	118.7	7 39.8	84 54	119.0	7 14.8	84 54	119.3	2
3	9 37.2	83 55	116.5	9 12.3	83 55	116.8	8 47.3	83 55	117.1	8 22.4	83 55	117.3	7 57.4	83 55	117.6	7 32.4	83 55	117.9	7 07.4	83 54	118.2	6 42.4	83 54	118.5	3
4	9 04.0	83 56	115.7	8 39.2	83 56	116.0	8 14.3	83 55	116.2	7 49.4	83 55	116.5	7 24.5	83 55	116.8	6 59.6	83 55	117.1	6 34.7	83 55	117.4	6 09.8	83 55	117.6	4
65	8 30.6	83 56	114.8	8 05.8	83 56	115.1	7 41.1	83 56	115.4	7 16.3	83 56	115.7	6 51.4	83 56	116.0	6 26.6	83 55	116.3	6 01.8	83 55	116.5	5 37.0	83 55	116.8	65
6	7 57.0	82 56	114.0	7 32.3	82 56	114.3	7 07.6	82 56	114.6	6 42.9	82 56	114.9	6 18.1	82 56	115.2	5 53.4	82 56	115.4	5 28.6	83 56	115.7	5 03.9	83 56	116.0	6
7	7 23.1	82 57	113.2	6 58.5	82 57	113.5	6 33.9	82 57	113.8	6 09.2	82 56	114.1	5 44.6	82 56	114.3	5 19.9	82 56	114.6							7
8	6 49.1	82 57	112.4	6 24.5	82 57	112.7	6 00.0	82 57	113.0	5 35.4	82 57	113.2	5 10.8	82 57	113.5										8
9	6 14.8	82 57	111.6	5 50.3	82 57	111.9	5 25.9	82 57	112.1	5 01.4	82 57	112.4													9
70	5 40.4	81 58	110.8	5 16.0	81 58	111.0																			70
1	5 05.7	81 58	109.9																						1

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	5 41.0	79 61	84.3	6 04.6	79 61	84.0	6 28.1	78 61	83.7	6 51.7	78 61	83.3	7 15.2	78 61	83.0	7 38.7	78 61	82.7	8 02.2	78 61	82.4	8 25.7	78 61	82.1	91
2	5 04.3	79 61	83.5	5 27.9	79 61	83.2	5 51.4	79 61	82.9	6 15.0	79 61	82.6	6 38.6	79 61	82.2	7 02.1	78 61	81.9	7 25.6	78 61	81.6	7 49.2	78 61	81.3	2
3							5 14.8	79 61	82.1	5 38.4	79 61	81.8	6 02.0	79 61	81.5	6 25.6	79 61	81.2	6 49.1	79 61	80.8	7 12.7	78 61	80.5	3
4										5 01.9	79 61	81.0	5 25.5	79 61	80.7	5 49.1	79 61	80.4	6 12.7	79 61	80.1	6 36.3	79 60	79.8	4
95																5 12.7	79 61	79.6	5 36.4	79 60	79.3	6 00.0	79 60	79.0	95
6																			5 00.1	79 60	78.5	5 23.8	79 60	78.2	6

Digitized by Google

Lat. 52°

H.A.	12° 00′ Alt.	Δd Δt	Az.	12° 30′ Alt.	Δd Δt	Az.	13° 00′ Alt.	Δd Δt	Az.	13° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	50 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0
1	49 59.5	1.0 02	178.5	50 29.5	1.0 02	178.5	50 59.5	1.0 02	178.5	51 29.5	1.0 03	178.4
2	49 58.0	1.0 04	177.0	50 28.0	1.0 04	176.9	50 58.0	1.0 04	176.9	51 28.0	1.0 04	176.9
3	49 55.6	1.0 06	175.4	50 25.6	1.0 06	175.4	50 55.5	1.0 06	175.4	51 25.5	1.0 06	175.3
4	49 52.2	1.0 07	173.9	50 22.1	1.0 07	173.9	50 52.0	1.0 07	173.8	51 22.0	1.0 08	173.8
05	49 47.8	1.0 09	172.4	50 17.7	1.0 09	172.3	50 47.6	1.0 09	172.3	51 17.4	1.0 09	172.2
6	49 42.4	1.0 11	170.9	50 12.3	99 11	170.8	50 42.1	99 11	170.7	51 11.9	99 11	170.7
7	49 36.1	99 12	169.4	50 05.9	99 12	169.3	50 35.7	99 12	169.2	51 05.5	99 12	169.1
8	49 28.8	99 14	167.9	49 58.6	99 14	167.8	50 28.3	99 14	167.7	50 58.0	99 14	167.6
9	49 20.6	99 15	166.4	49 50.3	99 15	166.3	50 19.9	99 16	166.2	50 49.6	99 16	166.1
10	49 11.5	99 17	164.9	49 41.1	99 17	164.8	50 10.7	99 17	164.7	50 40.2	99 17	164.5
1	49 01.4	98 18	163.5	49 30.9	98 18	163.3	50 00.4	98 19	163.2	50 29.9	98 19	163.0
2	48 50.5	98 20	162.0	49 19.9	98 20	161.9	49 49.3	98 20	161.7	50 18.7	98 20	161.5
3	48 38.6	98 21	160.5	49 07.9	98 21	160.4	49 37.2	98 22	160.2	50 06.5	98 22	160.1
4	48 25.9	97 23	159.1	48 55.1	97 23	158.9	49 24.3	97 23	158.8	49 53.5	97 23	158.6
15	48 12.3	97 24	157.7	48 41.4	97 24	157.5	49 10.5	97 24	157.3	49 39.6	97 25	157.1
6	47 57.8	97 25	156.3	48 26.8	97 26	156.1	48 55.8	97 26	155.9	49 24.8	97 26	155.7
7	47 42.5	96 27	154.8	48 11.4	96 27	154.6	48 40.3	96 27	154.4	49 09.1	96 27	154.2
8	47 26.4	96 28	153.5	47 55.2	96 28	153.2	48 23.9	96 29	153.0	48 52.7	96 29	152.8
9	47 09.5	96 29	152.1	47 38.2	95 30	151.9	48 06.8	95 30	151.6	48 35.4	95 30	151.4
20	46 51.8	95 31	150.7	47 20.3	95 31	150.5	47 48.8	95 31	150.2	48 17.3	95 31	150.0
1	46 33.4	95 32	149.4	47 01.8	95 32	149.1	47 30.1	95 32	148.9	47 58.5	94 33	148.6
2	46 14.2	94 33	148.0	46 42.4	94 33	147.8	47 10.7	94 34	147.5	47 38.9	94 34	147.3
3	45 54.2	94 34	146.7	46 22.4	94 35	146.4	46 50.5	94 35	146.2	47 18.5	93 35	145.9
4	45 33.6	93 36	145.4	46 01.6	93 36	145.1	46 29.5	93 36	144.9	46 57.5	93 36	144.6
25	45 12.3	93 37	144.1	45 40.1	93 37	143.8	46 07.9	93 37	143.5	46 35.7	93 37	143.3
6	44 50.2	92 38	142.8	45 18.0	92 38	142.5	45 45.7	92 38	142.2	46 13.3	92 38	142.0
7	44 27.6	92 39	141.5	44 55.2	92 39	141.2	45 22.7	92 39	141.0	45 50.2	92 40	140.7
8	44 04.3	92 40	140.3	44 31.7	91 40	140.0	44 59.1	91 40	139.7	45 26.5	91 41	139.4
9	43 40.4	91 41	139.0	44 07.7	91 41	138.7	44 34.9	91 41	138.5	45 02.2	91 42	138.2
30	43 15.9	91 42	137.8	43 43.0	90 42	137.5	44 10.1	90 42	137.2	44 37.2	90 43	136.9
1	42 50.8	90 43	136.6	43 17.8	90 43	136.3	43 44.8	90 43	136.0	44 11.7	90 43	135.7
2	42 25.1	90 44	135.4	42 52.0	90 44	135.1	43 18.8	89 44	134.8	43 45.6	89 44	134.5
3	41 58.9	89 45	134.2	42 25.6	89 45	133.9	42 52.3	89 45	133.6	43 19.0	89 45	133.3
4	41 32.2	89 45	133.1	41 58.8	89 46	132.7	42 25.3	88 46	132.4	42 51.8	88 46	132.1
35	41 04.9	88 46	131.9	41 31.4	88 46	131.6	41 57.8	88 47	131.3	42 24.2	88 47	130.9
6	40 37.2	88 47	130.8	41 03.5	88 47	130.4	41 29.8	88 47	130.1	41 56.0	87 48	129.8
7	40 09.0	87 48	129.6	40 35.2	87 48	129.3	41 01.3	87 48	129.0	41 27.4	87 48	128.7
8	39 40.3	87 49	128.5	40 06.4	87 49	128.2	40 32.4	87 49	127.9	40 58.4	86 49	127.5
9	39 11.2	87 49	127.4	39 37.1	86 49	127.1	40 03.0	86 50	126.8	40 28.9	86 50	126.4
40	38 41.6	86 50	126.3	39 07.4	86 50	126.0	39 33.2	86 50	125.7	39 58.9	86 51	125.3
1	38 11.7	86 51	125.3	38 37.4	86 51	124.9	39 03.0	85 51	124.6	39 28.6	85 51	124.3
2	37 41.3	85 51	124.2	38 06.9	85 51	123.9	38 32.4	85 52	123.5	38 57.9	85 52	123.2
3	37 10.6	85 52	123.2	37 36.0	85 52	122.8	38 01.4	85 52	122.5	38 26.8	84 52	122.1
4	36 39.4	85 52	122.1	37 04.8	84 53	121.8	37 30.1	84 53	121.4	37 55.3	84 53	121.1
45	36 08.0	84 53	121.1	36 33.2	84 53	120.8	36 58.4	84 53	120.4	37 23.5	84 54	120.1
6	35 36.2	84 54	120.1	36 01.3	84 54	119.7	36 26.4	83 54	119.4	36 51.4	83 54	119.1
7	35 04.1	84 54	119.1	35 29.1	83 54	118.7	35 54.0	83 54	118.4	36 19.0	83 55	118.0
8	34 31.6	83 55	118.1	34 56.5	83 55	117.7	35 21.4	83 55	117.4	35 46.2	83 55	117.1
9	33 58.9	83 55	117.1	34 23.7	83 55	116.8	34 48.5	82 55	116.4	35 13.2	82 56	116.1
50	33 25.8	83 56	116.1	33 50.6	82 56	115.8	34 15.2	82 56	115.4	34 39.8	82 56	115.1
1	32 52.5	82 56	115.2	33 17.2	82 56	114.8	33 41.7	82 56	114.5	34 06.3	82 56	114.1
2	32 19.0	82 56	114.2	32 43.5	82 56	113.9	33 08.0	82 57	113.5	33 32.4	81 57	113.2
3	31 45.2	82 57	113.3	32 09.6	81 57	112.9	32 34.0	81 57	112.6	32 58.3	81 57	112.2
4	31 11.1	81 57	112.3	31 35.5	81 57	112.0	31 59.8	81 57	111.6	32 24.0	81 58	111.3
55	30 36.8	81 58	111.4	31 01.1	81 58	111.1	31 25.3	81 58	110.7	31 49.5	80 58	110.4
6	30 02.3	81 58	110.5	30 26.5	81 58	110.1	30 50.7	80 58	109.8	31 14.8	80 58	109.5
7	29 27.6	81 58	109.6	29 51.8	80 58	109.2	30 15.8	80 58	108.9	30 39.9	80 59	108.5
8	28 52.7	80 58	108.7	29 16.8	80 59	108.3	29 40.8	80 59	108.0	30 04.7	80 59	107.6
9	28 17.6	80 59	107.8	28 41.6	80 59	107.4	29 05.6	80 59	107.1	29 29.5	80 59	106.8
60	27 42.4	80 59	106.9	28 06.3	80 59	106.6	28 30.2	79 59	106.2	28 54.0	79 59	105.9
1	27 07.0	80 59	106.0	27 30.8	79 59	105.7	27 54.6	79 60	105.3	28 18.4	79 60	105.0
2	26 31.4	79 60	105.2	26 55.2	79 60	104.8	27 18.9	79 60	104.5	27 42.6	79 60	104.1
3	25 55.6	79 60	104.3	26 19.4	79 60	103.9	26 43.1	79 60	103.6	27 06.8	79 60	103.3
4	25 19.8	79 60	103.4	25 43.5	79 60	103.1	26 07.1	79 60	102.7	26 30.7	79 60	102.4
65	24 43.8	79 60	102.6	25 07.4	79 60	102.2	25 31.0	79 60	101.9	25 54.6	78 60	101.5
6	24 07.7	79 60	101.7	24 31.3	79 60	101.4	24 54.8	78 60	101.0	25 18.4	78 61	100.7
7	23 31.5	79 61	100.9	23 55.0	78 61	100.5	24 18.5	78 61	100.2	24 42.0	78 61	99.9
8	22 55.1	78 61	100.1	23 18.7	78 61	99.7	23 42.1	78 61	99.4	24 05.6	78 61	99.0
9	22 18.7	78 61	99.2	22 42.2	78 61	98.9	23 05.6	78 61	98.5	23 29.0	78 61	98.2
70	21 42.2	78 61	98.4	22 05.7	78 61	98.1	22 29.1	78 61	97.7	22 52.4	78 61	97.4
1	21 05.6	78 61	97.6	21 29.1	78 61	97.2	21 52.4	78 61	96.9	22 15.8	78 61	96.6
2	20 29.0	78 61	96.8	20 52.4	78 61	96.4	21 15.7	78 61	96.1	21 39.1	78 61	95.7
3	19 52.3	78 61	95.9	20 15.6	78 61	95.6	20 39.0	78 61	95.3	21 02.3	78 61	94.9
4	19 15.5	78 61	95.1	19 38.9	78 61	94.8	20 02.2	78 61	94.5	20 25.5	78 61	94.1
75	18 38.7	78 61	94.3	19 02.0	78 61	94.0	19 25.3	78 61	93.7	19 48.6	77 61	93.3
6	18 01.8	78 61	93.5	18 25.2	78 61	93.2	18 48.4	78 62	92.9	19 11.7	77 62	92.5
7	17 24.9	78 62	92.7	17 48.3	78 62	92.4	18 11.5	78 62	92.1	18 34.8	77 62	91.7
8	16 48.0	78 62	91.9	17 11.3	78 62	91.6	17 34.6	78 62	91.3	17 57.9	77 62	90.9
9	16 11.1	78 62	91.1	16 34.4	78 62	90.8	16 57.7	78 62	90.5	17 20.9	77 62	90.1
80	15 34.2	78 62	90.3	15 57.5	78 62	90.0	16 20.7	78 62	89.7	16 44.0	77 62	89.4
1	14 57.2	78 62	89.6	15 20.5	78 62	89.2	15 43.8	78 62	88.9	16 07.0	77 62	88.6
2	14 20.3	78 62	88.8	14 43.6	78 62	88.4	15 06.9	78 62	88.1	15 30.1	77 62	87.8
3	13 43.4	78 62	88.0	14 06.7	78 62	87.7	14 30.0	78 61	87.3	14 53.2	77 61	87.0
4	13 06.5	78 61	87.2	13 29.8	78 61	86.9	13 53.1	78 61	86.6	14 16.3	78 61	86.2
85	12 29.6	78 61	86.4	12 52.9	78 61	86.1	13 16.2	78 61	85.8	13 39.5	78 61	85.5
6	11 52.7	78 61	85.6	12 16.1	78 61	85.3	12 39.4	78 61	85.0	13 02.7	78 61	84.7
7	11 15.9	78 61	84.9	11 39.3	78 61	84.6	12 02.6	78 61	84.2	12 25.9	78 61	83.9
8	10 39.2	78 61	84.1	11 02.5	78 61	83.8	11 25.9	78 61	83.5	11 49.2	78 61	83.1
9	10 02.4	78 61	83.3	10 25.8	78 61	83.0	10 49.2	78 61	82.7	11 12.6	78 61	82.4
90	9 25.8	78 61	82.5	9 49.2	78 61	82.2	10 12.6	78 61	81.9	10 36.0	78 61	81.6

H.A.	14° 00′ Alt.	Δd Δt	Az.	14° 30′ Alt.	Δd Δt	Az.	15° 00′ Alt.	Δd Δt	Az.	15° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	52 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0
1	51 59.5	1.0 03	178.4	52 29.5	1.0 03	178.4	52 59.5	1.0 03	178.4	53 29.5	1.0 03	178.4
2	51 58.0	1.0 04	176.8	52 28.0	1.0 04	176.8	52 57.9	1.0 04	176.8	53 27.9	1.0 04	176.8
3	51 55.4	1.0 06	175.3	52 25.4	1.0 06	175.2	52 55.3	1.0 06	175.2	53 25.3	1.0 06	175.1
4	51 51.9	1.0 08	173.7	52 21.8	1.0 08	173.7	52 51.7	1.0 08	173.6	53 21.7	1.0 08	173.5
05	51 47.3	1.0 09	172.1	52 17.2	1.0 09	172.1	52 47.1	1.0 09	172.0	53 17.0	1.0 10	171.9
6	51 41.8	99 11	170.6	52 11.6	99 11	170.5	52 41.5	99 11	170.4	53 11.3	99 11	170.3
7	51 35.3	99 13	169.0	52 05.0	99 13	168.9	52 34.8	99 13	168.8	53 04.6	99 13	168.7
8	51 27.7	99 14	167.5	51 57.4	99 14	167.4	52 27.1	99 14	167.3	52 56.8	99 15	167.1
9	51 19.2	99 16	165.9	51 48.9	99 16	165.8	52 18.5	99 16	165.7	52 48.1	99 16	165.6
10	51 09.8	99 17	164.4	51 39.4	99 17	164.3	52 08.9	98 18	164.1	52 38.4	98 18	164.0
1	50 59.4	98 19	162.9	51 28.9	98 19	162.7	51 58.3	98 19	162.6	52 27.8	98 19	162.4
2	50 48.1	98 20	161.4	51 17.4	98 21	161.2	51 46.8	98 21	161.1	52 16.1	98 21	160.9
3	50 35.8	98 22	159.9	51 05.1	98 22	159.7	51 34.3	97 22	159.5	52 03.6	97 22	159.4
4	50 22.7	97 23	158.4	50 51.8	97 24	158.2	51 21.0	97 24	158.0	51 50.1	97 24	157.8
15	50 08.6	97 25	156.9	50 37.7	97 25	156.7	51 06.7	97 25	156.5	51 35.7	97 25	156.3
6	49 53.7	96 26	155.5	50 22.7	96 26	155.3	50 51.6	96 27	155.1	51 20.4	96 27	154.8
7	49 38.0	96 28	154.0	50 06.8	96 28	153.8	50 35.6	96 28	153.6	51 04.3	96 28	153.4
8	49 21.4	96 29	152.6	49 50.0	96 29	152.4	50 18.7	95 29	152.1	50 47.3	95 30	151.9
9	49 04.0	95 30	151.2	49 32.5	95 31	150.9	50 01.0	95 31	150.7	50 29.5	95 31	150.5
20	48 45.8	95 32	149.8	49 14.2	95 32	149.5	49 42.6	95 32	149.3	50 10.9	94 32	149.0
1	48 26.8	94 33	148.4	48 55.0	94 33	148.1	49 23.3	94 33	147.9	49 51.5	94 34	147.6
2	48 07.0	94 34	147.0	48 35.2	94 34	146.8	49 03.3	94 35	146.5	49 31.3	93 35	146.2
3	47 46.6	93 35	145.7	48 14.6	93 36	145.4	48 42.5	93 36	145.1	49 10.4	93 36	144.8
4	47 25.4	93 36	144.3	47 53.2	93 37	144.0	48 21.0	93 37	143.8	48 48.8	92 37	143.5
25	47 03.5	92 38	143.0	47 31.2	92 38	142.7	47 58.8	92 38	142.4	48 26.5	92 38	142.1
6	46 40.9	92 39	141.7	47 08.5	92 39	141.4	47 36.0	92 39	141.1	48 03.4	91 39	140.8
7	46 17.7	91 40	140.4	46 45.1	91 40	140.1	47 12.5	91 40	139.8	47 39.8	91 40	139.5
8	45 53.8	91 41	139.1	46 21.1	91 41	138.8	46 48.3	91 41	138.5	47 15.5	90 42	138.2
9	45 29.3	90 42	137.9	45 56.4	90 42	137.5	46 23.5	90 42	137.2	46 50.5	90 43	136.9
30	45 04.2	90 43	136.6	45 31.2	90 43	136.3	45 58.1	90 43	136.0	46 25.0	89 44	135.7
1	44 38.6	90 44	135.4	45 05.4	89 44	135.1	45 32.2	89 44	134.7	45 58.9	89 44	134.4
2	44 12.4	89 45	134.2	44 39.0	89 45	133.8	45 05.7	89 45	133.5	45 32.2	88 45	133.2
3	43 45.6	89 45	133.0	44 12.1	88 46	132.6	44 38.6	88 46	132.3	45 05.1	88 46	132.0
4	43 18.3	88 46	131.8	43 44.7	88 47	131.5	44 11.1	88 47	131.1	44 37.3	88 47	130.8
35	42 50.5	88 47	130.6	43 16.8	87 47	130.3	43 43.0	87 48	130.0	44 09.1	87 48	129.6
6	42 22.2	87 48	129.5	42 48.4	87 48	129.1	43 14.4	87 48	128.8	43 40.4	87 49	128.5
7	41 53.5	87 49	128.3	42 19.5	87 49	128.0	42 45.4	86 49	127.7	43 11.3	86 49	127.3
8	41 24.3	86 49	127.2	41 50.1	86 50	126.9	42 15.9	86 50	126.5	42 41.7	86 50	126.2
9	40 54.6	86 50	126.1	41 20.4	86 50	125.8	41 46.0	85 51	125.4	42 11.6	85 51	125.1
40	40 24.6	85 51	125.0	40 50.2	85 51	124.7	41 15.7	85 51	124.3	41 41.2	85 51	124.0
1	39 54.1	85 51	123.9	40 19.6	85 52	123.6	40 45.0	85 52	123.2	41 10.4	84 52	122.9
2	39 23.3	85 52	122.9	39 48.6	84 52	122.5	40 13.9	84 52	122.2	40 39.2	84 53	121.8
3	38 52.1	84 53	121.8	39 17.3	84 53	121.4	39 42.5	84 53	121.1	40 07.6	84 53	120.7
4	38 20.5	84 53	120.8	38 45.6	84 53	120.4	39 10.7	83 54	120.1	39 35.7	83 54	119.7
45	37 48.6	83 54	119.7	38 13.6	83 54	119.4	38 38.5	83 54	119.0	39 03.4	83 54	118.7
6	37 16.4	83 54	118.7	37 41.2	83 54	118.4	38 06.1	83 55	118.0	38 30.8	82 55	117.6
7	36 43.8	83 55	117.7	37 08.6	83 55	117.3	37 33.3	82 55	117.0	37 58.0	82 55	116.6
8	36 10.9	82 55	116.7	36 35.6	82 55	116.3	37 00.3	82 56	116.0	37 24.8	82 56	115.6
9	35 37.8	82 56	115.7	36 02.4	82 56	115.4	36 26.9	82 56	115.0	36 51.4	81 56	114.6
50	35 04.4	82 56	114.7	35 28.9	82 56	114.4	35 53.3	81 56	114.0	36 17.7	81 57	113.7
1	34 30.7	81 57	113.8	34 55.1	81 57	113.4	35 19.4	81 57	113.1	35 43.7	81 57	112.7
2	33 56.8	81 57	112.8	34 21.1	81 57	112.5	34 45.3	81 57	112.1	35 09.5	80 57	111.8
3	33 22.6	81 57	111.9	33 46.8	81 57	111.5	34 11.0	80 58	111.2	34 35.1	80 58	110.8
4	32 48.2	81 58	110.9	33 12.4	80 58	110.6	33 36.4	80 58	110.2	34 00.5	80 58	109.9
55	32 13.6	80 58	110.0	32 37.7	80 58	109.7	33 01.7	80 58	109.3	33 25.6	80 58	108.9
6	31 38.8	80 58	109.1	32 02.8	80 58	108.8	32 26.7	80 59	108.4	32 50.6	79 59	108.0
7	31 03.8	80 59	108.2	31 27.7	80 59	107.8	31 51.6	79 59	107.5	32 15.4	79 59	107.1
8	30 28.6	80 59	107.3	30 52.5	79 59	106.9	31 16.3	79 59	106.6	31 40.0	79 59	106.2
9	29 53.3	79 59	106.4	30 17.1	79.59	106.1	30 40.8	79 59	105.7	31 04.4	79 60	105.3
60	29 17.8	79 59	105.5	29 41.5	79 60	105.2	30 05.1	79 60	104.8	30 28.7	79 60	104.5
1	28 42.1	79 60	104.6	29 05.8	79 60	104.3	29 29.4	79 60	103.9	29 52.9	78 60	103.6
2	28 06.3	79 60	103.8	28 29.9	79 60	103.4	28 53.4	78 60	103.1	29 16.9	78 60	102.7
3	27 30.4	79 60	102.9	27 53.9	78 60	102.6	28 17.4	78 60	102.2	28 40.8	78 60	101.9
4	26 54.3	78 60	102.1	27 17.8	78 60	101.7	27 41.2	78 60	101.4	28 04.6	78 61	101.0
65	26 18.1	78 60	101.2	26 41.6	78 61	100.9	27 05.0	78 61	100.5	27 28.3	78 61	100.2
6	25 41.8	78 61	100.4	26 05.2	78 61	100.0	26 28.6	78 61	99.7	26 51.9	78 61	99.3
7	25 05.4	78 61	99.5	25 28.8	78 61	99.2	25 52.1	78 61	98.8	26 15.4	78 61	98.5
8	24 29.0	78 61	98.7	24 52.3	78 61	98.3	25 15.6	78 61	98.0	25 38.8	77 61	97.6
9	23 52.4	78 61	97.9	24 15.7	78 61	97.5	24 39.0	77 61	97.2	25 02.2	77 61	96.8
70	23 15.8	78 61	97.0	23 39.1	78 61	96.7	24 02.3	77 61	96.3	24 25.5	77 61	96.0
1	22 39.1	78 61	96.2	23 02.3	77 61	95.9	23 25.6	77 61	95.5	23 48.7	77 61	95.2
2	22 02.3	78 61	95.4	22 25.6	77 61	95.1	22 48.8	77 61	94.7	23 11.9	77 61	94.4
3	21 25.5	77 61	94.6	21 48.8	77 61	94.3	22 11.9	77 61	93.9	22 35.1	77 61	93.6
4	20 48.7	77 61	93.8	21 11.9	77 62	93.5	21 35.1	77 62	93.1	21 58.2	77 62	92.8
75	20 11.8	77 62	93.0	20 35.0	77 62	92.7	20 58.2	77 62	92.3	21 21.3	77 62	92.0
6	19 34.9	77 62	92.2	19 58.1	77 62	91.9	20 21.2	77 62	91.5	20 44.3	77 62	91.2
7	18 58.0	77 62	91.4	19 21.2	77 62	91.1	19 44.3	77 62	90.7	20 07.4	77 62	90.4
8	18 21.1	77 62	90.6	18 44.2	77 62	90.3	19 07.4	77 62	89.9	19 30.5	77 62	89.6
9	17 44.1	77 62	89.8	18 07.3	77 62	89.5	18 30.4	77 62	89.1	18 53.5	77 62	88.8
80	17 07.2	77 62	89.0	17 30.4	77 62	88.7	17 53.5	77 62	88.4	18 16.6	77 62	88.0
1	16 30.3	77 62	88.2	16 53.4	77 62	87.9	17 16.6	77 62	87.6	17 39.7	77 61	87.2
2	15 53.3	77 62	87.5	16 16.5	77 61	87.1	16 39.7	77 61	86.8	17 02.8	77 61	86.5
3	15 16.5	77 61	86.7	15 39.7	77 61	86.4	16 02.8	77 61	86.0	16 26.0	77 61	85.7
4	14 39.6	77 61	85.9	15 02.8	77 61	85.6	15 26.0	77 61	85.3	15 49.1	77 61	84.9
85	14 02.8	77 61	85.1	14 26.0	77 61	84.8	14 49.2	77 61	84.5	15 12.4	77 61	84.2
6	13 26.0	78 61	84.4	13 49.2	77 61	84.0	14 12.5	77 61	83.7	14 35.7	77 61	83.4
7	12 49.2	78 61	83.6	13 12.5	78 61	83.3	13 35.8	77 61	82.9	13 59.0	77 61	82.6
8	12 12.6	78 61	82.8	12 35.9	78 61	82.5	12 59.1	78 61	82.2	13 22.4	77 61	81.8
9	11 35.9	78 61	82.0	11 59.3	78 61	81.7	12 22.6	78 61	81.4	12 45.9	78 61	81.1
90	10 59.4	78 61	81.3	11 22.8	78 61	81.0	11 46.1	78 61	80.6	12 09.4	78 61	80.3

Digitized by Google

Lat. 52°

H.A.	12° 00′ Alt.	Az.	12° 30′ Alt.	Az.	13° 00′ Alt.	Az.	13° 30′ Alt.	Az.	14° 00′ Alt.	Az.	14° 30′ Alt.	Az.	15° 00′ Alt.	Az.	15° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	26 00.0 1.0 01	180.0	25 30.0 1.0 01	180.0	25 00.0 1.0 01	180.0	24 30.0 1.0 01	180.0	24 00.0 1.0 01	180.0	23 30.0 1.0 01	180.0	23 00.0 1.0 00	180.0	22 30.0 1.0 01	180.0	00
1	25 59.6 1.0 02	178.9	25 29.7 1.0 02	178.9	24 59.7 1.0 02	178.9	24 29.7 1.0 02	178.9	23 59.7 1.0 02	178.9	23 29.7 1.0 02	178.9	22 59.7 1.0 02	179.0	22 29.7 1.0 02	179.0	1
2	25 58.6 1.0 03	177.8	25 28.6 1.0 03	177.8	24 58.6 1.0 03	177.8	24 28.6 1.0 03	177.9	23 58.6 1.0 03	177.9	23 28.6 1.0 03	177.9	22 58.6 1.0 03	177.9	22 28.7 1.0 03	177.9	2
3	25 56.8 1.0 04	176.7	25 26.9 1.0 04	176.8	24 56.9 1.0 04	176.8	24 26.9 1.0 04	176.8	23 56.9 1.0 04	176.8	23 26.9 1.0 04	176.8	22 57.0 1.0 04	176.9	22 27.0 1.0 04	176.9	3
4	25 54.4 1.0 05	175.6	25 24.4 1.0 05	175.7	24 54 5 1.0 05	175.7	24 24.5 1.0 05	175.7	23 54.5 1.0 05	175.8	23 24.6 1.0 05	175.8	22 54.6 1.0 05	175.8	22 24.6 1.0 05	175.8	4
05	25 51.2 1.0 06	174.6	25 21.3 1.0 06	174.6	24 51.3 1.0 06	174.6	24 21.4 1.0 06	174.7	23 51.5 1.0 06	174.7	23 21.5 1.0 06	174.7	22 51.6 1.0 06	174.8	22 21.6 1.0 06	174.8	05
6	25 47.4 1.0 08	173.5	25 17.5 1.0 08	173.5	24 47.5 1.0 07	173.6	24 17.6 1.0 07	173.6	23 47.7 1.0 07	173.6	23 17.8 1.0 07	173.7	22 47.8 1.0 07	173.7	22 17.9 1.0 07	173.7	6
7	25 42.9 1.0 09	172.4	25 13.0 1.0 09	172.4	24 43.1 1.0 09	172.5	24 13.2 1.0 09	172.5	23 43.3 1.0 09	172.6	23 13.4 1.0 08	172.6	22 43.5 1.0 08	172.7	22 13.6 1.0 08	172.7	7
8	25 37.6 1.0 10	171.3	25 07.8 1.0 10	171.4	24 37.9 1.0 10	171.4	24 08.0 1.0 10	171.5	23 38.2 1.0 10	171.5	23 08.3 1.0 10	171.6	22 38.4 1.0 10	171.6	22 08.5 1.0 09	171.7	8
9	25 31.7 99 11	170.2	25 01.9 99 11	170.3	24 32.0 99 11	170.4	24 02.2 99 11	170.4	23 32.4 99 11	170.5	23 02.5 99 11	170.5	22 32.7 99 11	170.6	22 02.9 99 11	170.6	9
10	25 25.1 99 12	169.2	24 55.3 99 12	169.2	24 25.5 99 12	169.3	23 55.7 99 12	169.4	23 25.9 99 12	169.4	22 56.1 99 12	169.5	22 26.3 99 12	169.5	21 56.5 99 12	169.6	10
1	25 17.8 99 13	168.1	24 48.1 99 13	168.2	24 18.3 99 13	168.2	23 48.6 99 13	168.3	23 18.8 99 13	168.4	22 49.1 99 13	168.4	22 19.3 99 13	168.5	21 49.5 99 13	168.6	1
2	25 09.8 99 14	167.0	24 40.1 99 14	167.1	24 10.4 99 14	167.2	23 40.7 99 14	167.2	23 11.0 99 14	167.3	22 41.3 99 14	167.4	22 11.6 99 14	167.5	21 41.9 99 14	167.5	2
3	25 01.2 99 16	165.9	24 31.6 99 15	166.0	24 01.9 99 15	166.1	23 32.3 99 15	166.2	23 02.6 99 15	166.3	22 32.9 99 15	166.4	22 03.3 99 15	166.4	21 33.6 99 15	166.5	3
4	24 51.9 99 17	164.9	24 22.3 99 17	165.0	23 52.7 99 16	165.1	23 23.1 99 16	165.2	22 53.5 99 16	165.2	22 23.9 99 16	165.3	21 54.3 99 16	165.4	21 24.7 99 16	165.5	4
15	24 41.9 98 18	163.8	24 12.4 98 18	163.9	23 42.9 98 18	164.0	23 13.3 98 17	164.1	22 43.8 98 17	164.2	22 14.2 99 17	164.3	21 44.7 99 17	164.4	21 15.1 99 17	164.5	15
6	24 31.3 98 19	162.8	24 01.8 98 19	162.9	23 32.4 98 19	163.0	23 02.9 98 18	163.1	22 33.4 98 18	163.2	22 03.9 98 18	163.3	21 34.4 98 18	163.4	21 04.9 98 18	163.5	6
7	24 20.0 98 20	161.7	23 50.6 98 20	161.8	23 21.2 98 20	161.9	22 51.8 98 20	162.0	22 22.4 98 19	162.1	21 53.0 98 19	162.2	21 23.5 98 19	162.3	20 54.1 98 19	162.4	7
8	24 08.1 98 21	160.7	23 38.8 98 21	160.8	23 09.4 98 21	160.9	22 40.1 98 21	161.0	22 10.7 98 20	161.1	21 41.4 98 20	161.2	21 12.0 98 20	161.3	20 42.6 98 20	161.4	8
9	23 55.6 98 22	159.6	23 26.3 98 22	159.7	22 57.0 98 22	159.8	22 27.7 98 22	160.0	21 58.5 98 22	160.1	21 29.2 98 21	160.2	20 59.9 98 21	160.3	20 30.6 98 21	160.4	9
20	23 42.4 97 23	158.6	23 13.2 97 23	158.7	22 44.0 97 23	158.8	22 14.8 97 23	158.9	21 45.6 97 22	159.1	21 16.3 97 22	159.2	20 47.1 97 22	159.3	20 17.9 97 22	159.4	20
1	23 28.6 97 24	157.5	22 59.5 97 24	157.7	22 30.3 97 24	157.8	22 01.2 97 24	157.9	21 32.1 97 24	158.0	21 02.9 97 23	158.2	20 33.8 97 23	158.3	20 04.6 97 23	158.4	1
2	23 14.2 97 25	156.5	22 45.1 97 25	156 6	22 16.1 97 25	156.8	21 47.0 97 25	156.9	21 18.0 97 24	157.0	20 48.9 97 24	157.2	20 19.8 97 24	157.3	19 50.7 97 24	157.4	2
3	22 59.1 97 26	155.5	22 30.2 97 26	155.6	22 01.2 97 26	155.8	21 32.2 97 26	155.9	21 03.2 97 26	156.0	20 34.3 97 25	156.2	20 05.3 97 25	156.3	19 36.3 97 25	156.4	3
4	22 43.5 96 27	154.4	22 14.6 96 27	154.6	21 45.7 96 27	154.7	21 16.8 96 27	154.9	20 47.9 96 26	155.0	20 19.0 96 26	155.2	19 50.1 96 26	155.3	19 21.2 96 26	155.5	4
25	22 27.3 96 28	153.4	21 58.5 96 28	153.6	21 29.7 96 28	153.7	21 00.9 96 28	153.9	20 32.1 96 27	154.0	20 03.2 96 27	154.2	19 34.4 96 27	154.3	19 05.6 96 27	154.5	25
6	22 10.5 96 29	152.4	21 41.8 96 29	152.6	21 13.0 96 29	152.7	20 44.3 96 29	152.9	20 15.6 96 28	153.0	19 46.9 96 28	153.2	19 18.1 96 28	153.3	18 49.4 96 28	153.5	6
7	21 53.1 95 30	151.4	21 24.4 95 30	151.6	20 55.8 95 30	151.7	20 27.2 95 29	151.9	19 58.6 95 29	152.0	19 29.9 96 29	152.2	19 01.3 96 29	152.4	18 32.6 96 29	152.5	7
8	21 35.1 95 31	150.4	21 06.6 95 31	150.6	20 38.1 95 31	150.7	20 09.5 95 30	150.9	19 41.0 95 30	151.1	19 12.4 95 30	151.2	18 43.8 95 30	151.4	18 15.3 95 30	151.6	8
9	21 16.6 95 32	149.4	20 48.2 95 32	149.6	20 19.7 95 31	149.8	19 51.3 95 31	149.9	19 22.8 95 31	150.1	18 54.4 95 31	150.3	18 25.9 95 31	150.4	17 57.4 95 31	150.6	9
30	20 57.5 94 33	148.4	20 29.2 94 33	148.6	20 00.8 94 32	148.8	19 32.5 95 32	148.9	19 04.1 95 32	149.1	18 35.8 95 32	149.3	18 07.4 95 32	149.5	17 39.0 95 32	149.6	30
1	20 37.9 94 34	147.4	20 09.7 94 33	147.6	19 41.4 94 33	147.8	19 13.2 94 33	148.0	18 44.9 94 33	148.1	18 16.6 94 33	148.3	17 48.3 94 33	148.5	17 20.1 94 32	148.7	1
2	20 17.7 94 34	146.5	19 49.6 94 34	146.6	19 21.5 94 34	146.8	18 53.3 94 34	147.0	18 25.1 94 34	147.2	17 57.0 94 34	147.4	17 28.8 94 33	147.5	17 00.6 94 33	147.7	2
3	19 57.1 93 35	145.5	19 29.0 93 35	145.7	19 01.0 93 35	145.9	18 32.9 94 35	146.0	18 04.9 94 35	146.2	17 36.8 94 34	146.4	17 08.7 94 34	146.6	16 40.6 94 34	146.8	3
4	19 35.9 93 36	144.5	19 07.9 93 36	144.7	18 40.0 93 36	144.9	18 12.0 93 36	145.1	17 44.1 93 36	145.3	17 16.1 93 35	145.5	16 48.1 93 35	145.7	16 20.1 93 35	145.8	4
35	19 14.2 93 37	143.5	18 46.3 93 37	143.7	18 18.5 93 37	143.9	17 50.6 93 36	144.1	17 22.8 93 36	144.3	16 54.9 93 36	144.5	16 27.0 93 36	144.7	15 59.1 93 36	144.9	35
6	18 52.0 92 38	142.6	18 24.2 92 38	142.8	17 56.5 92 37	143.0	17 28.8 93 37	143.2	17 01.0 93 37	143.4	16 33.2 93 37	143.6	16 05.4 93 37	143.8	15 37.6 93 37	144.0	6
7	18 29.3 92 39	141.6	18 01.7 92 38	141.8	17 34.0 92 38	142.0	17 06.4 92 38	142.2	16 38.7 92 38	142.4	16 11.0 92 38	142.6	15 43.4 92 38	142.8	15 15.7 92 37	143.0	7
8	18 06.1 92 39	140.7	17 38.6 92 39	140.9	17 11.1 92 39	141.1	16 43.5 92 39	141.3	16 16.0 92 39	141.5	15 48.4 92 39	141.7	15 20.8 92 38	141.9	14 53.2 92 38	142.1	8
9	17 42.5 91 40	139.7	17 15.1 91 40	140.0	16 47.6 91 40	140.2	16 20.2 91 40	140.4	15 52.8 92 39	140.6	15 25.3 92 39	140.8	14 57.8 92 39	141.0	14 30.3 92 39	141.2	9
40	17 18.4 91 41	138.8	16 51.1 91 41	139.0	16 23.8 91 41	139.2	15 56.4 91 40	139.5	15 29.1 91 40	139.7	15 01.7 91 40	139.9	14 34.3 91 40	140.1	14 07.0 91 40	140.3	40
1	16 53.8 91 42	137.9	16 26.6 91 42	138.1	15 59.4 91 41	138.3	15 32.2 91 41	138.5	15 04.9 91 41	138.8	14 37.7 91 41	139.0	14 10.4 91 41	139.2	13 43.1 91 40	139.4	1
2	16 28.8 90 42	137.0	16 01.7 90 42	137.2	15 34.6 90 42	137.4	15 07.5 90 42	137.6	14 40.4 90 42	137.8	14 13.2 91 42	138.1	13 46.1 91 41	138.3	13 18.9 91 41	138.5	2
3	16 03.4 90 43	136.0	15 36.4 90 43	136.3	15 09.4 90 43	136.5	14 42.4 90 43	136.7	14 15.4 90 42	136.9	13 48.3 90 42	137.2	13 21.3 90 42	137.4	12 54.2 90 42	137.6	3
4	15 37.6 90 44	135.1	15 10.7 90 44	135.4	14 43.8 90 43	135.6	14 16.9 90 43	135.8	13 49.9 90 43	136.0	13 23.0 90 43	136.3	12 56.0 90 43	136.5	12 29.1 90 43	136.7	4
45	15 11.3 89 44	134.2	14 44.5 89 44	134.5	14 17.7 89 44	134.7	13 50.9 89 44	134.9	13 24.1 89 44	135.1	12 57.2 89 44	135.4	12 30.4 90 43	135.6	12 03.5 90 43	135.8	45
6	14 44.6 89 45	133.3	14 17.9 89 45	133.6	13 51.2 89 45	133.8	13 24.5 89 45	134.0	12 57.8 89 44	134.3	12 31.1 89 44	134.5	12 04.4 89 44	134.7	11 37.6 89 44	135.0	6
7	14 17.5 89 46	132.4	13 51.0 89 46	132.7	13 24.4 89 45	132.9	12 57.8 89 45	133.1	12 31.2 89 45	133.4	12 04.5 89 45	133.6	11 37.9 89 45	133.8	11 11.3 89 45	134.1	7
8	13 50.1 88 46	131.5	13 23.6 88 46	131.8	12 57.1 88 46	132.0	12 30.6 88 46	132.3	12 04.1 88 46	132.5	11 37.6 88 46	132.7	11 11.1 88 45	133.0	10 44.5 88 45	133.2	8
9	13 22.2 88 47	130.6	12 55.9 88 47	130.9	12 29.5 88 47	131.1	12 03.1 88 46	131.4	11 36.7 88 46	131.6	11 10.3 88 46	131.9	10 43.8 88 46	132.1	10 17.4 88 46	132.3	9
50	12 54.0 88 48	129.8	12 27.8 88 47	130.0	12 01.5 88 47	130.3	11 35.2 88 47	130.5	11 08.9 88 47	130.7	10 42.6 88 47	131.0	10 16.3 88 47	131.2	9 49.9 88 46	131.5	50
1	12 25.4 87 48	128.9	11 59.3 87 48	129.1	11 33.1 87 48	129.4	11 06.9 87 48	129.6	10 40.7 87 48	129.9	10 14.5 87 47	130.1	9 48.3 87 47	130.4	9 22.1 87 47	130.6	1
2	11 56.5 87 49	128.0	11 30.5 87 49	128.3	11 04.4 87 48	128.5	10 38.3 87 48	128.8	10 12.2 87 48	129.0	9 46.1 87 48	129.3	9 20.0 87 48	129.5	8 53.8 87 48	129.8	2
3	11 27.2 87 49	127.1	11 01.3 87 49	127.4	10 35.3 87 49	127.7	10 09.3 87 49	127.9	9 43.3 87 49	128.2	9 17.3 87 49	128.4	8 51.3 87 48	128.7	8 25.3 87 48	128.9	3
4	10 57.6 86 50	126.3	10 31.8 86 50	126.5	10 05.9 86 50	126.8	9 40.0 86 49	127.1	9 14.1 86 49	127.3	8 48.2 86 49	127.6	8 22.3 86 49	127.8	7 56.4 86 49	128.1	4
55	10 27.7 86 50	125.4	10 01.9 86 50	125.7	9 36.2 86 50	126.0	9 10.4 86 50	126.2	8 44.6 86 50	126.5	8 18.8 86 50	126.7	7 53.0 86 49	127.0	7 27.1 86 49	127.2	55
6	9 57.4 86 51	124.6	9 31.8 86 51	124.8	9 06.1 86 51	125.1	8 40.4 86 50	125.4	8 14.7 86 50	125.6	7 49.0 86 50	125.9	7 23.3 86 50	126.1	6 57.6 86 50	126.4	6
7	9 26.9 85 51	123.7	9 01.3 85 51	124.0	8 35.7 85 51	124.3	8 10.1 85 51	124.5	7 44.5 85 51	124.8	7 18.9 85 51	125.1	6 53.3 85 50	125.3	6 27.7 85 50	125.6	7
8	8 56.0 85 52	122.9	8 30.5 85 52	123.2	8 05.0 85 52	123.4	7 39.5 85 51	123.7	7 14.0 85 51	124.0	6 48.5 85 51	124.2	6 23.0 85 51	124.5	5 57.5 85 51	124.8	8
9	8 24.8 85 52	122.1	7 59.5 85 52	122.3	7 34.1 85 52	122.6	7 08.7 85 52	122.9	6 43.3 85 52	123.1	6 17.8 85 52	123.4	5 52.4 85 52	123.7	5 27.0 85 51	123.9	9
60	7 53.4 84 53	121.2	7 28.1 84 53	121.5	7 02.8 84 53	121.8	6 37.5 84 52	122.0	6 12.2 84 52	122.3	5 46.9 84 52	122.6	5 21.5 84 52	122.8			60
1	7 21.7 84 53	120.4	6 56.5 84 53	120.7	6 31.3 84 53	120.9	6 06.0 84 53	121.2	5 40.8 84 53	121.5	5 15.6 84 53	121.8					1
2	6 49.7 84 54	119.6	6 24.5 84 54	119.8	5 59.4 84 53	120.1	5 34.3 84 53	120.4	5 09.2 84 53	120.7							2
3	6 17.4 83 54	118.7	5 52.4 83 54	119.0	5 27.3 83 54	119.3	5 02.3 83 54	119.6									3
4	5 44.9 83 55	117.9	5 19.9 83 54	118.2													4
65	5 12.1 83 55	117.1															65

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Az.	12° 30′ Alt.	Az.	13° 00′ Alt.	Az.	13° 30′ Alt.	Az.	14° 00′ Alt.	Az.	14° 30′ Alt.	Az.	15° 00′ Alt.	Az.	15° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	8 49.2 78 61	81.8	9 12.6 78 61	81.5	9 36.1 78 61	81.1	9 59.5 78 61	80.8	10 22.9 78 61	80.5	10 46.3 78 61	80.2	11 09.7 78 61	79.9	11 33.0 78 60	79.5	91
2	8 12.7 78 61	81.0	8 36.2 78 61	80.7	8 59.6 78 61	80.4	9 23.1 78 61	80.1	9 46.5 78 60	79.7	10 10.0 78 60	79.4	10 33.4 78 60	79.1	10 56.8 78 60	78.8	2
3	7 36.2 78 61	80.2	7 59.7 78 61	79.9	8 23.3 78 60	79.6	8 46.8 78 60	79.3	9 10.2 78 60	79.0	9 33.7 78 60	78.6	9 57.1 78 60	78.3	10 20.6 78 60	78.0	3
4	6 59.9 79 60	79.4	7 23.4 79 60	79.1	7 47.0 78 60	78.8	8 10.5 78 60	78.5	8 34.0 78 60	78.2	8 57.5 78 60	77.9	9 21.0 78 60	77.6	9 44.5 78 60	77.3	4
95	6 23.6 79 60	78.7	6 47.2 79 60	78.4	7 10.8 79 60	78.1	7 34.4 79 60	77.7	7 57.9 79 60	77.4	8 21.5 78 60	77.1	8 45.0 78 60	76.8	9 08.5 78 60	76.5	95
6	5 47.4 79 60	77.9	6 11.1 79 60	77.6	6 34 7 79 60	77.3	6 58.3 79 60	77.0	7 21.9 79 60	76.7	7 45.5 79 30	76.3	8 09.1 79 60	76.0	8 32.7 79 60	75.7	6
7	5 11.4 79 60	77.1	5 35.0 79 60	76.8	5 58.7 79 60	76.5	6 22.4 79 60	76.2	6 46.0 79 60	75.9	7 09.7 79 60	75.6	7 33.3 79 59	75.3	7 56.9 79 59	75.0	7
8					5 22.9 79 60	75.7	5 46.6 79 59	75.4	6 10.3 79 59	75.1	6 34.0 79 59	74.8	6 57.6 79 59	74.5	7 21.3 79 59	74.2	8
9							5 10.9 79 59	74.7	5 34.6 79 59	74.3	5 58.4 79 59	74.0	6 22.1 79 59	73.7	6 45.8 79 59	73.4	9
100											5 22.9 79 59	73.3	5 46.7 79 59	73.0	6 10.5 79 59	72.7	100
1													5 11.5 79 58	72.2	5 35.3 79 58	71.9	1
2															5 00.3 80 58	71.1	2

Digitized by Google

Lat. 52°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	54 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0
1	53 59.5	1.0 03	178.4	54 29.5	1.0 03	178.3	54 59.5	1.0 03	178.3	55 29.5	1.0 03	178.3
2	53 57.9	1.0 04	176.7	54 27.9	1.0 04	176.7	54 57.9	1.0 04	176.7	55 27.8	1.0 05	176.6
3	53 55.3	1.0 06	175.1	54 25.2	1.0 06	175.1	54 55.2	1.0 06	175.0	55 25.1	1.0 06	175.0
4	53 51.6	1.0 08	173.5	54 21.5	1.0 08	173.4	54 51.4	1.0 08	173.3	55 21.3	1.0 08	173.3
05	53 46.9	1.0 10	171.8	54 16.7	1.0 10	171.8	54 46.6	1.0 10	171.7	55 16.5	1.0 10	171.6
6	53 41.1	99 11	170.2	54 10.9	99 11	170.1	54 40.7	99 12	170.0	55 10.6	99 12	169.9
7	53 34.3	99 13	168.6	54 04.1	99 13	168.5	54 33.8	99 13	168.4	55 03.6	99 13	168.3
8	53 26.5	99 15	167.0	53 56.2	99 15	166.9	54 25.9	99 15	166.8	54 55.6	99 15	166.6
9	53 17.7	99 16	165.4	53 47.3	99 16	165.3	54 16.9	99 17	165.2	54 46.5	99 17	165.0
10	53 08.0	98 18	163.8	53 37.5	98 18	163.7	54 07.0	98 18	163.5	54 36.5	98 18	163.4
1	52 57.2	98 20	162.3	53 26.6	98 20	162.1	53 56.0	98 20	161.9	54 25.4	98 20	161.8
2	52 45.5	98 21	160.7	53 14.8	98 21	160.5	53 44.1	98 22	160.4	54 13.4	98 22	160.2
3	52 32.8	97 23	159.2	53 02.0	97 23	159.0	53 31.2	97 23	158.8	54 00.4	97 23	158.6
4	52 19.2	97 24	157.6	52 48.3	97 24	157.4	53 17.4	97 25	157.2	53 46.4	97 25	157.0
15	52 04.7	97 26	156.1	52 33.7	97 26	155.9	53 02.6	96 26	155.7	53 31.5	96 26	155.5
6	51 49.3	96 27	154.6	52 18.1	96 27	154.4	52 46.9	96 28	154.2	53 15.7	96 28	153.9
7	51 33.0	96 29	153.1	52 01.7	96 29	152.9	52 30.4	96 29	152.7	52 59.1	95 29	152.4
8	51 15.9	95 30	151.7	51 44.5	95 30	151.4	52 13.0	95 30	151.2	52 41.5	95 31	150.9
9	50 58.0	95 31	150.2	51 26.4	95 32	149.9	51 54.8	95 32	149.7	52 23.1	94 32	149.4
20	50 39.2	94 33	148.8	51 07.5	94 33	148.5	51 35.7	94 33	148.2	52 03.9	94 33	148.0
1	50 19.7	94 34	147.3	50 47.8	94 34	147.1	51 15.9	94 34	146.8	51 43.9	93 35	146.5
2	49 59.4	93 35	145.9	50 27.3	93 35	145.7	50 55.3	93 36	145.4	51 23.2	93 36	145.1
3	49 38.3	93 36	144.6	50 06.1	93 37	144.3	50 33.9	93 37	144.0	51 01.7	92 37	143.7
4	49 16.5	92 37	143.2	49 44.2	92 38	142.9	50 11.8	92 38	142.6	50 39.4	92 38	142.3
25	48 54.0	92 39	141.8	49 21.6	92 39	141.5	49 49.0	92 39	141.2	50 16.5	91 39	140.9
6	48 30.9	91 40	140.5	48 58.2	91 40	140.2	49 25.6	91 40	139.9	49 52.8	91 40	139.5
7	48 07.0	91 41	139.2	48 34.3	91 41	138.9	49 01.4	90 41	138.5	49 28.5	90 42	138.2
8	47 42.6	90 42	137.9	48 09.6	90 42	137.6	48 36.7	90 42	137.2	49 03.6	90 43	136.9
9	47 17.5	90 43	136.6	47 44.4	90 43	136.3	48 11.3	89 43	135.9	48 38.1	89 44	135.6
30	46 51.8	89 44	135.3	47 18.6	89 44	135.0	47 45.3	89 44	134.7	48 11.9	89 44	134.3
1	46 25.6	89 45	134.1	46 52.2	89 45	133.8	47 18.7	88 45	133.4	47 45.2	88 45	133.1
2	45 58.8	88 46	132.9	46 25.2	88 46	132.5	46 51.6	88 46	132.2	47 18.0	88 46	131.8
3	45 31.4	88 46	131.6	45 57.7	88 47	131.3	46 24.0	87 47	131.0	46 50.2	87 47	130.6
4	45 03.6	87 47	130.5	45 29.7	87 48	130.1	45 55.8	87 48	129.7	46 21.9	87 48	129.4
35	44 35.2	87 48	129.3	45 01.2	87 48	128.9	45 27.2	86 49	128.6	45 53.1	86 49	128.2
6	44 06.4	86 49	128.1	44 32.3	86 49	127.8	44 58.1	86 49	127.4	45 23.8	86 50	127.0
7	43 37.1	86 50	127.0	44 02.8	86 50	126.6	44 28.5	85 50	126.2	44 54.1	85 50	125.9
8	43 07.3	85 50	125.8	43 32.9	85 50	125.5	43 58.5	85 51	125.1	44 23.9	85 51	124.7
9	42 37.2	85 51	124.7	43 02.7	85 51	124.3	43 28.1	85 51	124.0	43 53.4	84 52	123.6
40	42 06.6	85 52	123.6	42 32.0	84 52	123.2	42 57.2	84 52	122.9	43 22.4	84 52	122.5
1	41 35.7	84 52	122.5	42 00.9	84 52	122.2	42 26.0	84 53	121.8	42 51.1	83 53	121.4
2	41 04.3	84 53	121.4	41 29.4	84 53	121.1	41 54.4	83 53	120.7	42 19.4	83 53	120.3
3	40 32.6	83 53	120.4	40 57.6	83 54	120.0	41 22.5	83 54	119.6	41 47.3	83 54	119.3
4	40 00.6	83 54	119.3	40 25.4	83 54	119.0	40 50.2	82 54	118.6	41 14.9	82 54	118.2
45	39 28.2	83 54	118.3	39 53.0	82 55	117.9	40 17.6	82 55	117.6	40 42.2	82 55	117.2
6	38 55.5	82 55	117.3	39 20.2	82 55	116.9	39 44.7	82 55	116.5	40 09.2	82 56	116.2
7	38 22.6	82 55	116.3	38 47.1	82 56	115.9	39 11.5	81 56	115.5	39 35.9	81 56	115.1
8	37 49.3	82 56	115.3	38 13.7	81 56	114.9	38 38.1	81 56	114.5	39 02.3	81 56	114.1
9	37 15.8	81 56	114.3	37 40.1	81 56	113.9	38 04.3	81 57	113.5	38 28.5	80 57	113.2
50	36 42.0	81 57	113.3	37 06.2	81 57	112.9	37 30.3	80 57	112.6	37 54.4	80 57	112.2
1	36 07.9	81 57	112.3	36 32.0	80 57	112.0	36 56.1	80 57	111.6	37 20.1	80 58	111.2
2	35 33.6	80 58	111.4	35 57.7	80 58	111.0	36 21.7	80 58	110.6	36 45.6	80 58	110.3
3	34 59.1	80 58	110.4	35 23.1	80 58	110.1	35 47.0	80 58	109.7	36 10.8	79 58	109.3
4	34 24.4	80 58	109.5	34 48.3	80 58	109.1	35 12.1	79 58	108.8	35 35.8	79 59	108.4
55	33 49.5	79 58	108.6	34 13.3	79 59	108.2	34 37.0	79 59	107.8	35 00.7	79 59	107.5
6	33 14.4	79 59	107.7	33 38.1	79 59	107.3	34 01.8	79 59	106.9	34 25.4	79 59	106.6
7	32 39.1	79 59	106.8	33 02.8	79 59	106.4	33 26.4	79 59	106.0	33 49.9	78 59	105.7
8	32 03.6	79 59	105.9	32 27.2	79 59	105.5	32 50.8	78 60	105.1	33 14.2	78 60	104.8
9	31 28.0	79 60	105.0	31 51.6	78 60	104.6	32 15.0	78 60	104.2	32 38.5	78 60	103.9
60	30 52.3	78 60	104.1	31 15.8	78 60	103.7	31 39.2	78 60	103.4	32 02.5	78 60	103.0
1	30 16.4	78 60	103.2	30 39.8	78 60	102.9	31 03.2	78 60	102.5	31 26.5	78 60	102.1
2	29 40.4	78 60	102.4	30 03.7	78 60	102.0	30 27.0	78 60	101.6	30 50.3	77 60	101.3
3	29 04.2	78 60	101.5	29 27.5	78 60	101.1	29 50.8	77 61	100.8	30 14.0	77 61	100.4
4	28 28.0	78 61	100.6	28 51.2	78 61	100.3	29 14.5	77 61	99.9	29 37.6	77 61	99.6
65	27 51.6	78 61	99.8	28 14.9	77 61	99.4	28 38.0	77 61	99.1	29 01.2	77 61	98.7
6	27 15.2	77 61	99.0	27 38.4	77 61	98.6	28 01.5	77 61	98.2	28 24.6	77 61	97.9
7	26 38.6	77 61	98.1	27 01.8	77 61	97.8	27 24.9	77 61	97.4	27 48.0	77 61	97.0
8	26 02.0	77 61	97.3	26 25.2	77 61	96.9	26 48.3	77 61	96.6	27 11.3	77 61	96.2
9	25 25.4	77 61	96.5	25 48.5	77 61	96.1	26 11.5	77 61	95.8	26 34.5	77 61	95.4
70	24 48.6	77 61	95.7	25 11.7	77 61	95.3	25 34.8	77 61	94.9	25 57.7	77 61	94.6
1	24 11.8	77 61	94.8	24 34.9	77 61	94.5	24 57.9	77 61	94.1	25 20.9	76 61	93.8
2	23 35.0	77 61	94.0	23 58.1	77 61	93.7	24 21.1	77 61	93.3	24 44.0	76 62	93.0
3	22 58.1	77 62	93.2	23 21.2	77 62	92.9	23 44.2	77 62	92.5	24 07.1	76 62	92.2
4	22 21.3	77 62	92.4	22 44.3	77 62	92.1	23 07.3	77 62	91.7	23 30.2	76 62	91.4
75	21 44.3	77 62	91.6	22 07.4	77 62	91.3	22 30.3	77 62	90.9	22 53.3	76 62	90.6
6	21 07.4	77 62	90.8	21 30.4	77 62	90.5	21 53.4	77 62	90.1	22 16.3	76 62	89.8
7	20 30.5	77 62	90.0	20 53.5	77 62	89.7	21 16.5	77 62	89.4	21 39.4	76 62	89.0
8	19 53.5	77 62	89.3	20 16.5	77 62	88.9	20 39.5	77 62	88.6	21 02.5	76 62	88.2
9	19 16.6	77 62	88.5	19 39.6	77 62	88.1	20 02.6	77 62	87.8	20 25.6	76 61	87.4
80	18 39.7	77 61	87.7	19 02.7	77 62	87.4	19 25.7	77 61	87.0	19 48.7	76 61	86.7
1	18 02.8	77 61	86.9	18 25.8	77 61	86.6	18 48.8	77 61	86.2	19 11.8	77 61	85.9
2	17 25.9	77 61	86.1	17 49.0	77 61	85.8	18 12.0	77 61	85.5	18 35.0	77 61	85.1
3	16 49.1	77 61	85.4	17 12.1	77 61	85.0	17 35.2	77 61	84.7	17 58.2	77 61	84.4
4	16 12.3	77 61	84.6	16 35.4	77 61	84.3	16 58.4	77 61	83.9	17 21.5	77 61	83.6
85	15 35.5	77 61	83.8	15 58.6	77 61	83.5	16 21.7	77 61	83.2	16 44.8	77 61	82.8
6	14 58.8	77 61	83.1	15 22.0	77 61	82.7	15 45.1	77 61	82.4	16 08.2	77 61	82.1
7	14 22.2	77 61	82.3	14 45.4	77 61	82.0	15 08.5	77 61	81.6	15 31.6	77 61	81.3
8	13 45.6	77 61	81.5	14 08.8	77 61	81.2	14 32.0	77 61	80.9	14 55.1	77 61	80.5
9	13 09.1	77 61	80.8	13 32.3	77 61	80.4	13 55.6	77 61	80.1	14 18.7	77 60	79.8
90	12 32.7	78 61	80.0	12 56.0	78 60	79.7	13 19.2	77 60	79.3	13 42.4	77 60	79.0

18° 00′			18° 30′			19° 00′			19° 30′			H.A.
Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	°
56 00.0	1.0 01	180.0	56 30.0	1.0 01	180.0	57 00.0	1.0 01	180.0	57 30.0	1.0 01	180.0	00
55 59.5	1.0 03	178.3	56 29.4	1.0 03	178.3	56 59.4	1.0 03	178.3	57 29.4	1.0 03	178.2	1
55 57.8	1.0 05	176.6	56 27.8	1.0 05	176.6	56 57.8	1.0 05	176.5	57 27.7	1.0 05	176.5	2
55 55.1	1.0 06	174.9	56 25.0	1.0 06	174.9	56 55.0	1.0 06	174.8	57 24.9	1.0 07	174.7	3
55 51.2	1.0 08	173.2	56 21.2	1.0 08	173.1	56 51.1	1.0 08	173.1	57 21.0	1.0 08	173.0	4
55 46.3	1.0 10	171.5	56 16.2	1.0 10	171.4	56 46.1	1.0 10	171.4	57 15.9	1.0 10	171.3	05
55 40.4	99 12	169.8	56 10.2	99 12	169.7	56 40.0	99 12	169.6	57 09.8	99 12	169.5	6
55 33.3	99 13	168.2	56 03.1	99 14	168.1	56 32.8	99 14	167.9	57 02.5	99 14	167.8	7
55 25.2	99 15	166.5	55 54.9	99 15	166.4	56 24.5	99 16	166.2	56 54.2	99 16	166.1	8
55 16.1	99 17	164.9	55 45.7	99 17	164.7	56 15.2	98 17	164.6	56 44.8	98 17	164.4	9
55 05.9	98 19	163.2	55 35.4	98 19	163.1	56 04.9	98 19	162.9	56 34.3	98 19	162.7	10
54 54.8	98 20	161.6	55 24.1	98 20	161.4	55 53.5	98 21	161.2	56 22.8	98 21	161.0	1
54 42.6	98 22	160.0	55 11.9	97 22	159.8	55 41.1	97 22	159.6	56 10.3	97 22	159.4	2
54 29.5	97 23	158.4	54 58.6	97 24	158.2	55 27.7	97 24	158.0	55 56.8	97 24	157.7	3
54 15.4	97 25	156.8	54 44.4	97 25	156.6	55 13.4	97 25	156.4	55 42.3	96 26	156.1	4
54 00.4	96 27	155.2	54 29.3	96 27	155.0	54 58.1	96 27	154.8	55 26.9	96 27	154.5	15
53 44.5	96 28	153.7	54 13.2	96 28	153.4	54 41.9	96 29	153.2	55 10.6	95 29	152.9	6
53 27.7	95 29	152.2	53 56.2	95 30	151.9	54 24.8	95 30	151.6	54 53.3	95 30	151.4	7
53 10.0	95 31	150.6	53 38.4	95 31	150.4	54 06.8	95 31	150.1	54 35.2	94 32	149.8	8
52 51.5	94 32	149.1	53 19.7	94 32	148.9	53 48.0	94 33	148.6	54 16.2	94 33	148.3	9
52 32.1	94 34	147.7	53 00.2	94 34	147.4	53 28.3	94 34	147.1	53 56.3	93 34	146.8	20
52 12.0	93 35	146.2	52 39.9	93 35	145.9	53 07.8	93 35	145.6	53 35.7	93 36	145.3	1
51 51.0	93 36	144.8	52 18.8	93 36	144.5	52 46.6	92 37	144.2	53 14.3	92 37	143.8	2
51 29.4	92 37	143.4	51 57.0	92 38	143.0	52 24.6	92 38	142.7	52 52.1	92 38	142.4	3
51 06.9	92 39	142.0	51 34.4	92 39	141.6	52 01.9	91 39	141.3	52 29.2	91 39	141.0	4
50 43.8	91 40	140.6	51 11.2	91 40	140.3	51 38.4	91 40	139.9	52 05.6	91 40	139.6	25
50 20.0	91 41	139.2	50 47.2	90 41	138.9	51 14.3	90 41	138.5	51 41.3	90 42	138.2	6
49 55.6	90 42	137.9	50 22.6	90 42	137.5	50 49.5	90 42	137.2	51 16.4	89 43	136.8	7
49 30.5	90 43	136.6	49 57.3	89 43	136.2	50 24.1	89 43	135.9	50 50.8	89 44	135.5	8
49 04.8	89 44	135.3	49 31.5	89 44	134.9	49 58.1	89 44	134.5	50 24.6	88 45	134.2	9
48 38.5	88 45	134.0	49 05.0	88 45	133.6	49 31.5	88 45	133.3	49 57.8	88 46	132.9	30
48 11.6	88 46	132.7	48 38.0	88 46	132.3	49 04.3	88 46	132.0	49 30.5	87 46	131.6	1
47 44.2	87 47	131.5	48 10.4	87 47	131.1	48 36.5	87 47	130.7	49 02.6	87 47	130.4	2
47 16.3	87 47	130.2	47 42.3	87 48	129.9	48 08.3	86 48	129.5	48 34.2	86 48	129.1	3
46 47.8	86 48	129.0	47 13.7	86 48	128.7	47 39.5	86 49	128.3	48 05.3	86 49	127.9	4
46 18.9	86 49	127.8	46 44.6	86 49	127.5	47 10.3	85 50	127.1	47 35.9	85 50	126.7	35
45 49.5	85 50	126.7	46 15.1	85 50	126.3	46 40.6	85 50	125.9	47 06.1	85 50	125.5	6
45 19.6	85 50	125.5	45 45.1	85 51	125.1	46 10.5	84 51	124.7	46 35.8	84 51	124.4	7
44 49.3	85 51	124.4	45 14.7	84 51	124.0	45 39.9	84 52	123.6	46 05.1	84 52	123.2	8
44 18.6	84 52	123.2	44 43.8	84 52	122.9	45 08.9	84 52	122.5	45 34.0	83 52	122.1	9
43 47.6	84 52	122.1	44 12.6	83 53	121.7	44 37.6	83 53	121.4	45 02.5	83 53	121.0	40
43 16.1	83 53	121.0	43 41.0	83 53	120.6	44 05.9	83 53	120.3	44 30.6	82 54	119.9	1
42 44.3	83 54	120.0	43 09.1	83 54	119.6	43 33.8	82 54	119.2	43 58.4	82 54	118.8	2
42 12.1	82 54	118.9	42 36.8	82 54	118.5	43 01.4	82 55	118.1	43 25.9	82 55	117.7	3
41 39.6	82 55	117.8	42 04.1	82 55	117.5	42 28.6	81 55	117.1	42 53.0	81 55	116.7	4
41 06.8	82 55	116.8	41 31.2	81 55	116.4	41 55.6	81 56	116.0	42 19.9	81 56	115.6	45
40 33.6	81 56	115.8	40 58.0	81 56	115.4	41 22.2	81 56	115.0	41 46.4	80 56	114.6	6
40 00.2	81 56	114.8	40 24.5	81 56	114.4	40 48.6	80 56	114.0	41 12.7	80 57	113.6	7
39 26.6	81 57	113.8	39 50.7	80 57	113.4	40 14.7	80 57	113.0	40 38.7	80 57	112.6	8
38 52.6	80 57	112.8	39 16.7	80 57	112.4	39 40.6	80 57	112.0	40 04.5	79 57	111.6	9
38 18.4	80 57	111.8	38 42.4	80 58	111.4	39 06.2	79 58	111.0	39 30.0	79 58	110.6	50
37 44.0	80 58	110.8	38 07.9	79 58	110.5	38 31.7	79 58	110.1	38 55.3	79 58	109.7	1
37 09.4	79 58	109.9	37 33.2	79 58	109.5	37 56.9	79 58	109.1	38 20.5	79 58	108.7	2
36 34.6	79 58	108.9	36 58.2	79 59	108.6	37 21.9	79 59	108.2	37 45.4	78 59	107.8	3
35 59.5	79 59	108.0	36 23.1	79 59	107.6	36 46.7	78 59	107.2	37 10.1	78 59	106.9	4
35 24.3	79 59	107.1	35 47.8	78 59	106.7	36 11.3	78 59	106.3	36 34.7	78 59	105.9	55
34 48.9	78 59	106.2	35 12.4	78 59	105.8	35 35.8	78 59	105.4	35 59.1	78 60	105.0	6
34 13.4	78 60	105.3	34 36.8	78 60	104.9	35 00.1	78 60	104.5	35 23.3	77 60	104.1	7
33 37.7	78 60	104.4	34 01.0	78 60	104.0	34 24.3	77 60	103.6	34 47.4	77 60	103.2	8
33 01.8	78 60	103.5	33 25.1	77 60	103.1	33 48.3	77 60	102.7	34 11.4	77 60	102.4	9
32 25.8	78 60	102.6	32 49.0	77 60	102.2	33 12.2	77 60	101.9	33 35.3	77 60	101.5	60
31 49.7	77 60	101.8	32 12.9	77 60	101.4	32 36.0	77 60	101.0	32 59.0	77 61	100.6	1
31 13.5	77 61	100.9	31 36.6	77 61	100.5	31 59.7	77 61	100.1	32 22.7	77 61	99.8	2
30 37.2	77 61	100.0	31 00.2	77 61	99.7	31 23.3	77 61	99.3	31 46.2	76 61	98.9	3
30 00.7	77 61	99.2	30 23.8	77 61	98.8	30 46.8	76 61	98.4	31 09.7	76 61	98.1	4
29 24.2	77 61	98.3	29 47.2	77 61	98.0	30 10.2	76 61	97.6	30 33.1	76 61	97.2	65
28 47.7	77 61	97.5	29 10.6	76 61	97.1	29 33.5	76 61	96.8	29 56.4	76 61	96.4	6
28 11.0	77 61	96.7	28 33.9	76 61	96.3	28 56.8	76 61	95.9	29 19.7	76 61	95.6	7
27 34.3	77 61	95.9	27 57.2	76 61	95.5	28 20.1	76 61	95.1	28 42.9	76 61	94.8	8
26 57.5	76 61	95.0	27 20.4	76 61	94.7	27 43.3	76 61	94.3	28 06.0	76 61	93.9	9
26 20.7	76 61	94.2	26 43.6	76 61	93.9	27 06.4	76 61	93.5	27 29.2	76 62	93.1	70
25 43.8	76 62	93.4	26 06.7	76 62	93.1	26 29.5	76 62	92.7	26 52.3	76 62	92.3	1
25 06.9	76 62	92.6	25 29.8	76 62	92.3	25 52.6	76 62	91.9	26 15.4	76 62	91.5	2
24 30.0	76 62	91.8	24 52.9	76 62	91.5	25 15.7	76 62	91.1	25 38.4	76 62	90.7	3
23 53.1	76 62	91.0	24 15.9	76 62	90.7	24 38.7	76 62	90.3	25 01.5	76 62	90.0	4
23 16.2	76 62	90.2	23 39.0	76 62	89.9	24 01.8	76 62	89.5	24 24.5	76 62	89.2	75
22 39.2	76 62	89.4	23 02.1	76 62	89.1	23 24.9	76 62	88.7	23 47.6	76 62	88.4	6
22 02.3	76 62	88.7	22 25.1	76 62	88.3	22 47.9	76 62	88.0	23 10.7	76 62	87.6	7
21 25.4	76 62	87.9	21 48.2	76 61	87.5	22 11.0	76 61	87.2	22 33.8	76 61	86.8	8
20 48.5	76 61	87.1	21 11.3	76 61	86.8	21 34.2	76 61	86.4	21 56.9	76 61	86.1	9
20 11.6	76 61	86.3	20 34.5	76 61	86.0	20 57.3	76 61	85.6	21 20.1	76 61	85.3	80
19 34.7	76 61	85.6	19 57.6	76 61	85.2	20 20.5	76 61	84.9	20 43.3	76 61	84.5	1
18 57.9	76 61	84.8	19 20.8	76 61	84.4	19 43.7	76 61	84.1	20 06.6	76 61	83.8	2
18 21.2	77 61	84.0	18 44.1	76 61	83.7	19 07.0	76 61	83.3	19 29.9	76 61	83.0	3
17 44.5	77 61	83.3	18 07.4	76 61	82.9	18 30.3	76 61	82.6	18 53.2	76 61	82.2	4
17 07.8	77 61	82.5	17 30.8	77 61	82.2	17 53.7	76 61	81.8	18 16.7	76 61	81.5	85
16 31.2	77 61	81.7	16 54.2	77 61	81.4	17 17.2	77 61	81.1	17 40.2	76 61	80.7	6
15 54.7	77 61	81.0	16 17.7	77 61	80.6	16 40.8	77 61	80.3	17 03.8	77 61	80.0	7
15 18.3	77 61	80.2	15 41.3	77 61	79.9	16 04.4	77 60	79.5	16 27.4	77 60	79.2	8
14 41.9	77 60	79.4	15 05.0	77 60	79.1	15 28.1	77 60	78.8	15 51.2	77 60	78.5	9
14 05.6	77 60	78.7	14 28.8	77 60	78.4	14 51.9	77 60	78.0	15 15.0	77 60	77.7	90

Digitized by Google

Lat. 52°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	22 00.0	1.0	01	180.0	21 30.0	1.0	01	180.0	21 00.0	1.0	01	180.0	20 30.0	1.0	01	180.0	20 00.0	1.0	01	180.0	19 30.0	1.0	01	180.0	19 00.0	1.0	01	180.0	18 30.0	1.0	01	180.0	00
1	21 59.7	1.0	02	179.0	21 29.7	1.0	02	179.0	20 59.7	1.0	02	179.0	20 29.7	1.0	02	179.0	19 59.7	1.0	02	179.0	19 29.7	1.0	02	179.0	18 59.7	1.0	02	179.0	18 29.7	1.0	02	179.0	1
2	21 58.7	1.0	03	177.9	21 28.7	1.0	03	177.9	20 58.7	1.0	03	178.0	20 28.7	1.0	03	178.0	19 58.7	1.0	03	178.0	19 28.7	1.0	03	178.0	18 58.7	1.0	03	178.0	18 28.7	1.0	03	178.0	2
3	21 57.0	1.0	04	176.9	21 27.0	1.0	04	176.9	20 57.0	1.0	04	176.9	20 27.0	1.0	04	176.9	19 57.1	1.0	04	177.0	19 27.1	1.0	04	177.0	18 57.1	1.0	04	177.0	18 27.1	1.0	04	177.0	3
4	21 54.7	1.0	05	175.9	21 24.7	1.0	05	175.9	20 54.7	1.0	05	175.9	20 24.8	1.0	05	175.9	19 54.8	1.0	05	176.0	19 24.8	1.0	05	176.0	18 54.8	1.0	05	176.0	18 24.9	1.0	05	176.0	4
05	21 51.7	1.0	06	174.8	21 21.7	1.0	06	174.9	20 51.8	1.0	06	174.9	20 21.8	1.0	06	174.9	19 51.9	1.0	06	174.9	19 21.9	1.0	06	175.0	18 52.0	1.0	06	175.0	18 22.0	1.0	06	175.0	05
6	21 48.9	1.0	07	173.8	21 18.1	1.0	07	173.8	20 48.1	1.0	07	173.9	20 18.2	1.0	07	173.9	19 48.3	1.0	07	173.9	19 18.3	1.0	07	174.0	18 48.4	1.0	07	174.0	18 18.5	1.0	07	174.0	6
7	21 43.7	1.0	08	172.8	21 13.8	1.0	08	172.8	20 43.9	1.0	08	172.8	20 14.0	1.0	08	172.9	19 44.0	1.0	08	172.9	19 14.1	1.0	08	173.0	18 44.2	1.0	08	173.0	18 14.3	1.0	08	173.1	7
8	21 38.7	1.0	09	171.7	21 08.8	1.0	09	171.8	20 38.9	1.0	09	171.8	20 09.1	1.0	09	171.9	19 39.2	1.0	09	171.9	19 09.3	1.0	09	172.0	18 39.4	1.0	09	172.0	18 09.5	1.0	09	172.1	8
9	21 33.0	99	10	170.7	21 03.2	99	10	170.8	20 33.3	99	10	170.8	20 03.5	99	10	170.9	19 33.7	99	10	170.9	19 03.8	99	10	171.0	18 34.0	99	10	171.0	18 04.1	99	10	171.1	9
10	21 26.7	99	12	169.7	20 56.9	99	12	169.7	20 27.1	99	11	169.8	19 57.3	99	11	169.9	19 27.5	99	11	169.9	18 57.7	99	11	170.0	18 27.9	99	11	170.0	17 58.1	99	11	170.1	10
1	21 19.8	99	13	168.6	20 50.0	99	13	168.7	20 20.3	99	12	168.8	19 50.5	99	12	168.8	19 20.7	99	12	168.9	18 51.0	99	12	169.0	18 21.2	99	12	169.0	17 51.4	99	12	169.1	1
2	21 12.2	99	14	167.6	20 42.5	99	14	167.7	20 12.7	99	14	167.8	19 43.0	99	14	167.8	19 13.3	99	13	167.9	18 43.6	99	13	168.0	18 13.9	99	13	168.1	17 44.1	99	13	168.1	2
3	21 03.9	99	15	166.6	20 34.3	99	15	166.7	20 04.6	99	15	166.8	19 34.9	99	15	166.8	19 05.3	99	14	166.9	18 35.6	99	14	167.0	18 05.9	99	14	167.1	17 36.2	99	14	167.1	3
4	20 55.1	99	16	165.6	20 25.4	99	16	165.7	19 55.8	99	16	165.8	19 26.2	99	16	165.8	18 56.6	99	16	165.9	18 27.0	99	15	166.0	17 57.3	99	15	166.1	17 27.7	99	15	166.2	4
15	20 45.6	99	17	164.6	20 16.0	99	17	164.7	19 46.4	99	17	164.8	19 16.9	99	17	164.8	18 47.3	99	17	164.9	18 17.7	99	16	165.0	17 48.1	99	16	165.1	17 18.6	99	16	165.2	15
6	20 35.4	98	18	163.6	20 05.9	98	18	163.7	19 36.4	98	18	163.8	19 06.9	98	18	163.8	18 37.4	98	18	163.9	18 07.9	98	17	164.0	17 38.3	98	17	164.1	17 08.8	98	17	164.2	6
7	20 24.6	98	19	162.5	19 55.2	98	19	162.7	19 25.8	98	19	162.8	18 56.3	98	19	162.9	18 26.8	98	19	163.0	17 57.4	98	18	163.1	17 27.9	98	18	163.2	16 58.5	98	18	163.3	7
8	20 13.3	98	20	161.5	19 43.9	98	20	161.7	19 14.5	98	20	161.8	18 45.1	98	20	161.9	18 15.7	98	20	162.0	17 46.3	98	19	162.1	17 16.9	98	19	162.2	16 47.5	98	19	162.3	8
9	20 01.3	98	21	160.5	19 31.9	98	21	160.7	19 02.6	98	21	160.8	18 33.3	98	21	160.9	18 04.0	98	21	161.0	17 34.7	98	20	161.1	17 05.3	98	20	161.2	16 36.0	98	20	161.3	9
20	19 48.7	97	22	159.5	19 19.4	97	22	159.7	18 50.2	97	22	159.8	18 20.9	98	22	159.9	17 51.7	98	22	160.0	17 22.4	98	21	160.1	16 53.1	98	21	160.2	16 23.9	98	21	160.4	20
1	19 35.4	97	23	158.6	19 06.3	97	23	158.7	18 37.1	97	23	158.8	18 07.9	97	23	158.9	17 38.7	97	22	159.0	17 09.6	97	22	159.2	16 40.4	97	22	159.3	16 11.2	97	22	159.4	1
2	19 21.6	97	24	157.6	18 52.5	97	24	157.7	18 23.4	97	24	157.8	17 54.3	97	24	157.9	17 25.2	97	23	158.1	16 56.1	97	23	158.2	16 27.0	97	23	158.3	15 57.9	97	23	158.5	2
3	19 07.2	97	25	156.6	18 38.2	97	25	156.7	18 09.2	97	25	156.8	17 40.2	97	25	157.0	17 11.2	97	24	157.1	16 42.1	97	24	157.2	16 13.1	97	24	157.4	15 44.0	97	24	157.5	3
4	18 52.3	96	26	155.6	18 23.3	96	26	155.7	17 54.4	96	26	155.9	17 25.5	96	26	156.0	16 56.5	97	25	156.1	16 27.5	97	25	156.3	15 58.6	97	25	156.4	15 29.6	97	25	156.6	4
25	18 36.7	96	27	154.6	18 07.9	96	27	154.8	17 39.0	96	27	154.9	17 10.2	96	26	155.0	16 41.3	96	26	155.2	16 12.4	96	26	155.3	15 43.5	96	26	155.5	15 14.6	96	26	155.6	25
6	18 20.6	96	28	153.6	17 51.8	96	28	153.8	17 23.1	96	28	153.9	16 54.3	96	27	154.1	16 25.5	96	27	154.2	15 56.7	96	27	154.4	15 27.9	96	27	154.5	14 59.1	96	27	154.7	6
7	18 03.9	96	29	152.7	17 35.2	96	29	152.8	17 06.6	96	28	153.0	16 37.9	96	28	153.1	16 09.2	96	28	153.3	15 40.5	96	28	153.4	15 11.8	96	28	153.6	14 43.0	96	28	153.7	7
8	17 46.7	95	30	151.7	17 18.1	95	29	151.9	16 49.5	95	29	152.0	16 20.9	95	29	152.2	15 52.3	95	29	152.3	15 23.7	95	29	152.5	14 55.1	95	29	152.7	14 26.4	95	29	152.8	8
9	17 28.9	95	31	150.8	17 00.4	95	30	150.9	16 31.9	95	30	151.1	16 03.4	95	30	151.2	15 34.9	95	30	151.4	15 06.4	95	30	151.6	14 37.8	95	30	151.7	14 09.3	95	29	151.9	9
30	17 10.6	95	31	149.8	16 42.2	95	31	150.0	16 13.8	95	31	150.1	15 45.4	95	31	150.3	15 16.9	95	31	150.5	14 48.5	95	31	150.6	14 20.1	95	30	150.8	13 51.6	95	30	151.0	30
1	16 51.8	94	32	148.8	16 23.4	94	32	149.0	15 55.1	94	32	149.2	15 26.8	94	32	149.4	14 58.5	94	32	149.5	14 30.1	94	31	149.7	14 01.8	95	31	149.9	13 33.4	95	31	150.0	1
2	16 32.4	94	33	147.9	16 04.2	94	33	148.1	15 35.9	94	33	148.3	15 07.7	94	33	148.4	14 39.5	94	32	148.6	14 11.2	94	32	148.8	13 43.0	94	32	149.0	13 14.7	94	32	149.1	2
3	16 12.5	94	34	147.0	15 44.4	94	34	147.1	15 16.3	94	34	147.3	14 48.1	94	33	147.5	14 20.0	94	33	147.7	13 51.8	94	33	147.9	13 23.7	94	33	148.0	12 55.5	94	33	148.2	3
4	15 52.1	93	35	146.0	15 24.1	93	35	146.2	14 56.1	93	34	146.4	14 28.0	93	34	146.6	14 00.0	93	34	146.8	13 31.9	94	34	146.9	13 03.9	94	34	147.1	12 35.8	94	34	147.3	4
35	15 31.2	93	36	145.1	15 03.3	93	35	145.3	14 35.4	93	35	145.5	14 07.4	93	35	145.7	13 39.5	93	35	145.8	13 11.5	93	35	146.0	12 43.6	93	35	146.2	12 15.6	93	34	146.4	35
6	15 09.8	93	36	144.2	14 42.0	93	36	144.4	14 14.2	93	36	144.6	13 46.4	93	36	144.7	13 18.5	93	36	144.9	12 50.7	93	36	145.1	12 22.8	93	35	145.3	11 54.9	93	35	145.5	6
7	14 48.0	92	37	143.2	14 20.3	92	37	143.4	13 52.5	92	37	143.6	13 24.8	92	37	143.8	12 57.1	92	37	144.0	12 29.3	93	36	144.2	12 01.5	93	36	144.4	11 33.8	93	36	144.6	7
8	14 25.6	92	38	142.3	13 58.0	92	38	142.5	13 30.4	92	38	142.7	13 02.8	92	38	142.9	12 35.1	92	37	143.1	12 07.5	92	37	143.3	11 39.8	92	37	143.5	11 12.1	92	37	143.7	8
9	14 02.8	92	39	141.4	13 35.3	92	39	141.6	13 07.8	92	38	141.8	12 40.3	92	38	142.0	12 12.7	92	38	142.2	11 45.2	92	38	142.4	11 17.6	92	38	142.6	10 50.1	92	38	142.8	9
40	13 39.6	91	40	140.5	13 12.2	91	39	140.7	12 44.7	91	39	140.9	12 17.3	91	39	141.1	11 49.9	91	39	141.3	11 22.4	91	39	141.6	10 55.0	92	38	141.8	10 27.5	92	38	142.0	40
1	13 15.8	91	40	139.6	12 48.5	91	40	139.8	12 21.2	91	40	140.0	11 53.9	91	40	140.3	11 26.6	91	40	140.5	10 59.3	91	39	140.7	10 31.9	91	39	140.9	10 04.5	91	39	141.1	1
2	12 51.7	91	41	138.7	12 24.5	91	41	138.9	11 57.3	91	41	139.2	11 30.1	91	40	139.4	11 02.9	91	40	139.6	10 35.6	91	40	139.8	10 08.4	91	40	140.0	9 41.1	91	40	140.2	2
3	12 27.1	90	42	137.8	12 00.0	90	42	138.0	11 32.9	90	41	138.3	11 05.8	90	41	138.5	10 38.7	90	41	138.7	10 11.6	90	41	138.9	9 44.4	90	41	139.1	9 17.3	90	40	139.4	3
4	12 02.1	90	42	136.9	11 35.1	90	42	137.2	11 08.1	90	42	137.4	10 41.1	90	42	137.6	10 14.1	90	42	137.8	9 47.1	90	42	138.0	9 20.0	90	41	138.3	8 53.0	90	41	138.5	4
45	11 36.7	90	43	136.1	11 09.8	90	43	136.3	10 42.9	90	43	136.5	10 16.0	90	43	136.7	9 49.1	90	42	137.0	9 22.2	90	42	137.2	8 55.2	90	42	137.4	8 28.3	90	42	137.6	45
6	11 10.8	89	44	135.2	10 44.1	89	44	135.4	10 17.3	89	43	135.6	9 50.5	89	43	135.9	9 23.7	89	43	136.1	8 56.9	89	43	136.3	8 30.0	89	43	136.6	8 03.2	89	42	136.8	6
7	10 44.6	89	44	134.3	10 17.9	89	44	134.5	9 51.3	89	44	134.8	9 24.6	89	44	135.0	8 57.9	89	44	135.2	8 31.2	89	44	135.5	8 04.4	89	43	135.7	7 37.7	89	43	135.9	7
8	10 18.0	89	45	133.4	9 51.4	89	45	133.7	9 24.8	89	45	133.9	8 58.3	89	44	134.1	8 31.7	89	44	134.4	8 05.1	89	44	134.6	7 38.5	89	44	134.9	7 11.8	89	44	135.1	8
9	9 51.0	88	46	132.6	9 24.5	88	45	132.8	8 58.0	88	45	133.1	8 31.6	88	45	133.3	8 05.1	88	45	133.5	7 38.6	88	45	133.8	7 12.1	88	45	134.0	6 45.6	88	44	134.2	9
50	9 23.6	88	46	131.7	8 57.2	88	46	132.0	8 30.9	88	46	132.2	8 04.5	88	46	132.4	7 38.1	88	46	132.7	7 11.7	88	45	132.9	6 45.3	88	45	133.2	6 18.9	88	45	133.4	50
1	8 55.8	87	47	130.9	8 29.6	88	47	131.1	8 03.3	88	47	131.4	7 37.0	88	46	131.6	7 10.8	88	46	131.8	6 44.5	88	46	132.1	6 18.2	88	46	132.3	5 51.9	88	46	132.6	1
2	8 27.7	87	47	130.0	8 01.6	87	47	130.3	7 35.4	87	47	130.5	7 09.2	87	47	130.8	6 43.1	87	47	131.0	6 16.9	87	47	131.3	5 50.7	87	46	131.5	5 24.5	87	46	131.7	2
3	7 59.2	87	48	129.2	7 33.2	87	48	129.4	7 07.1	87	48	129.7	6 41.1	87	48	129.9	6 15.0	87	47	130.2	5 48.9	87	47	130.4	5 22.9	87	47	130.7					3
4	7 30.4	86	49	128.3	7 04.5	86	48	128.6	6 38.5	87	48	128.8	6 12.6	87	48	129.1	5 46.6	87	48	129.3	5 20.6	87	48	129.6									4
55	7 01.3	86	49	127.5	6 35.5	86	49	127.8	6 09.6	86	49	128.0	5 43.7	86	49	128.3	5 17.9	86	48	128.5													55
6	6 31.8	86	50	126.7	6 06.1	86	49	126.9	5 40.3	86	49	127.2	5 14.6	86	49	127.4																	6
7	6 02.0	85	50	125.8	5 36.4	85	50	126.1	5 10.7	86	50	126.4																					7
8	5 31.9	85	51	125.0	5 06.4	85	50	125.3																									8
9	5 01.5	85	51	124.2																													9

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	11 56.4	78	60	79.2	12 19.7	78	60	78.9	12 43.0	78	60	78.6	13 06.2	77	60	78.3	13 29.5	77	60	77.9	13 52.7	77	60	77.6	14 15.8	77	60	77.3	14 39.0	77	60	76.9	91
2	11 20.1	78	60	78.5	11 43.5	78	60	78.1	12 06.8	78	60	77.8	12 30.1	78	60	77.5	12 53.4	78	60	77.2	13 16.6	77	60	76.8	13 39.9	77	60	76.5	14 03.1	77	60	76.2	2
3	10 44.0	78	60	77.7	11 07.4	78	60	77.4	11 30.7	78	60	77.1	11 54.1	78	60	76.7	12 17.4	78	60	76.4	12 40.7	78	60	76.1	13 04.0	78	60	75.8	13 27.3	77	60	75.4	3
4	10 07.9	78	60	76.9	10 31.4	78	60	76.6	10 54.8	78	60	76.3	11 18.2	78	60	76.0	11 41.6	78	60	75.7	12 04.9	78	59	75.3	12 28.3	78	59	75.0	12 51.6	78	59	74.7	4
95	9 32.0	78	60	76.2	9 55.5	78	60	75.9	10 19.0	78	60	75.5	10 42.4	78	59	75.2	11 05.8	78	59	74.9	11 29.2	78	59	74.6	11 52.6	78	59	74.3	12 16.0	78	59	73.9	95
6	8 56.2	78	59	75.4	9 19.7	78	59	75.1	9 43.3	78	59	74.8	10 06.8	78	59	74.5	10 30.2	78	59	74.1	10 53.7	78	59	73.8	11 17.1	78	59	73.5	11 40.6	78	59	73.2	6
7	8 20.5	79	59	74.6	8 44.1	79	59	74.3	9 07.7	79	59	74.0	9 31.2	78	59	73.7	9 54.8	78	59	73.4	10 18.3	78	59	73.1	10 41.8	78	59	72.8	11 05.3	78	59	72.4	7
8	7 45.0	79	59	73.9	8 08.6	79	59	73.6	8 32.2	79	59	73.3	8 55.8	79	59	72.9	9 19.4	79	59	72.6	9 43.0	79	59	72.3	10 06.6	79	58	72.0	10 30.1	78	58	71.7	8
9	7 09.5	79	59	73.1	7 33.2	79	59	72.8	7 56.9	79	59	72.5	8 20.6	79	58	72.2	8 44.3	79	58	71.9	9 07.9	79	58	71.6	9 31.5	79	58	71.3	9 55.1	79	58	70.9	9
100	6 34.3	79	59	72.3	6 58.0	79	58	72.0	7 21.8	79	58	71.7	7 45.5	79	58	71.4	8 09.2	79	58	71.1	8 32.9	79	58	70.8	8 56.6	79	58	70.5	9 20.3	79	58	70.2	100
1	5 59.1	79	58	71.6	6 23.0	79	58	71.3	6 46.8	79	58	71.0	7 10.6	79	58	70.7	7 34.4	79	58	70.4	7 58.1	79	58	70.0	8 21.9	79	58	69.7	8 45.6	79	57	69.4	1
2	5 24.2	80	58	70.8	5 48.1	80	58	70.5	6 11.9	80	58	70.2	6 35.8	80	58	69.9	6 59.7	79	58	69.6	7 23.5	79	57	69.3	7 47.3	79	57	69.0	8 11.1	79	57	68.7	2
3					5 13.3	80	58	69.7	5 37.3	80	58	69.4	6 01.2	80	57	69.1	6 25.1	80	57	68.8	6 49.0	80	57	68.5	7 12.9	80	57	68.2	7 36.8	80	57	67.9	3
4									5 02.8	80	57	68.7	5 26.8	80	57	68.4	5 50.8	80	57	68.1	6 14.7	80	57	67.8	6 38.7	80	57	67.5	7 02.7	80	57	67.2	4
105																	5 16.6	80	57	67.3	5 40.6	80	56	67.0	6 04.7	80	56	66.7	6 28.7	80	56	66.4	105
6																					5 06.7	80	56	66.2	5 30.9	80	56	65.9	5 55.0	80	56	65.6	6
7																													5 21.4	81	56	64.9	7

Digitized by Google

Lat. 52°

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	58 00.0	1.0	01	180.0	58 30.0	1.0	01	180.0	59 00.0	1.0	01	180.0	59 30.0	1.0	01	180.0
1	57 59.4	1.0	03	178.2	58 29.4	1.0	03	178.2	58 59.4	1.0	03	178.2	59 29.4	1.0	03	178.2
2	57 57.7	1.0	05	176.5	58 27.7	1.0	05	176.4	58 57.7	1.0	05	176.4	59 27.6	1.0	05	176.3
3	57 54.9	1.0	07	174.7	58 24.8	1.0	07	174.6	58 54.7	1.0	07	174.6	59 24.7	1.0	07	174.5
4	57 50.9	1.0	09	172.9	58 20.8	1.0	09	172.8	58 50.7	1.0	09	172.8	59 20.6	1.0	09	172.7
05	57 45.8	99	10	171.2	58 15.6	99	10	171.1	58 45.5	99	11	171.0	59 15.3	99	11	170.9
6	57 39.5	99	12	169.4	58 09.3	99	12	169.3	58 39.1	99	12	169.2	59 08.9	99	13	169.1
7	57 32.2	99	14	167.7	58 01.9	99	14	167.5	58 31.6	99	14	167.4	59 01.3	99	14	167.3
8	57 23.8	99	16	166.0	57 53.4	99	16	165.8	58 23.0	99	16	165.6	58 52.6	99	16	165.5
9	57 14.3	98	18	164.2	57 43.8	98	18	164.1	58 13.3	98	18	163.9	58 42.8	98	18	163.7
10	57 03.7	98	19	162.5	57 33.1	98	20	162.4	58 02.5	98	20	162.2	58 31.9	98	20	162.0
1	56 52.1	98	21	160.8	57 21.4	98	21	160.6	57 50.7	98	21	160.4	58 19.9	97	22	160.2
2	56 39.5	97	23	159.2	57 08.7	97	23	159.0	57 37.8	97	23	158.7	58 06.9	97	23	158.5
3	56 25.9	97	24	157.5	56 54.9	97	25	157.3	57 23.9	97	25	157.1	57 52.9	97	25	156.8
4	56 11.3	96	26	155.9	56 40.1	96	26	155.6	57 09.0	96	26	155.4	57 37.8	96	27	155.1
15	55 55.7	96	28	154.3	56 24.4	96	28	154.0	56 53.1	96	28	153.7	57 21.8	96	28	153.5
6	55 39.2	95	29	152.7	56 07.8	95	29	152.4	56 36.3	95	30	152.1	57 04.9	95	30	151.8
7	55 21.8	95	30	151.1	55 50.2	95	31	150.8	56 18.6	95	31	150.5	56 47.0	94	31	150.2
8	55 03.5	94	32	149.5	55 31.8	94	32	149.2	56 00.0	94	32	148.9	56 28.2	94	33	148.6
9	54 44.3	94	33	148.0	55 12.4	94	34	147.7	55 40.5	93	34	147.4	56 08.5	93	34	147.1
20	54 24.3	93	35	146.5	54 52.3	93	35	146.2	55 20.2	93	35	145.8	55 48.0	93	36	145.5
1	54 03.5	93	36	145.0	54 31.3	92	36	144.7	54 59.0	92	37	144.3	55 26.7	92	37	144.0
2	53 42.0	92	37	143.5	54 09.6	92	38	143.2	54 37.1	92	38	142.8	55 04.6	92	38	142.5
3	53 19.6	92	38	142.1	53 47.1	91	39	141.7	54 14.4	91	39	141.4	54 41.7	91	39	141.0
4	52 56.6	91	40	140.6	53 23.8	91	40	140.3	53 51.0	91	40	139.9	54 18.1	90	40	139.6
25	52 32.8	90	41	139.2	52 59.9	90	41	138.9	53 26.9	90	41	138.5	53 53.8	90	42	138.1
6	52 08.3	90	42	137.8	52 35.2	90	42	137.5	53 02.1	89	42	137.1	53 28.8	89	43	136.7
7	51 43.2	89	43	136.5	52 09.9	89	43	136.1	52 36.6	89	43	135.7	53 03.2	89	44	135.4
8	51 17.4	89	44	135.1	51 44.0	88	44	134.8	52 10.5	88	44	134.4	52 36.9	88	45	134.0
9	50 51.1	88	45	133.8	51 17.5	88	45	133.4	51 43.8	88	45	133.0	52 10.1	87	46	132.7
30	50 24.1	88	46	132.5	50 50.4	87	46	132.1	51 16.5	87	46	131.7	51 42.6	87	47	131.3
1	49 56.6	87	47	131.2	50 22.7	87	47	130.8	50 48.7	86	47	130.5	51 14.6	86	48	130.1
2	49 28.6	86	48	130.0	49 54.5	86	48	129.6	50 20.3	86	48	129.2	50 46.1	86	48	128.8
3	49 00.0	86	48	128.7	49 25.8	86	49	128.3	49 51.4	85	49	127.9	50 17.0	85	49	127.5
4	48 31.0	85	49	127.5	48 56.6	85	49	127.1	49 22.1	85	50	126.7	49 47.5	85	50	126.3
35	48 01.4	85	50	126.3	48 26.9	85	50	125.9	48 52.2	84	50	125.5	49 17.5	84	51	125.1
6	47 31.4	84	51	125.1	47 56.7	84	51	124.7	48 21.9	84	51	124.3	48 47.0	84	51	123.9
7	47 01.0	84	51	124.0	47 26.1	84	52	123.6	47 51.2	83	52	123.1	48 16.2	83	52	122.7
8	46 30.2	83	52	122.8	46 55.2	83	52	122.4	47 20.1	83	53	122.0	47 44.9	83	53	121.6
9	45 58.9	83	53	121.7	46 23.8	83	53	121.3	46 48.5	82	53	120.9	47 13.2	82	53	120.4
40	45 27.3	83	53	120.6	45 52.0	82	54	120.2	46 16.7	82	54	119.7	46 41.2	82	54	119.3
1	44 55.3	82	54	119.5	45 19.9	82	54	119.1	45 44.4	82	54	118.6	46 08.8	81	55	118.2
2	44 23.0	82	54	118.4	44 47.4	81	55	118.0	45 11.8	81	55	117.6	45 36.1	81	55	117.1
3	43 50.3	81	55	117.3	44 14.7	81	55	116.9	44 38.9	81	55	116.5	45 03.1	80	56	116.1
4	43 17.3	81	55	116.3	43 41.6	81	56	115.9	44 05.7	80	56	115.4	44 29.8	80	56	115.0
45	42 44.1	81	56	115.2	43 08.2	80	56	114.8	43 32.2	80	56	114.4	43 56.2	80	56	114.0
6	42 10.5	80	56	114.2	42 34.5	80	57	113.8	42 58.4	80	57	113.4	43 22.3	79	57	113.0
7	41 36.7	80	57	113.2	42 00.6	80	57	112.8	42 24.4	79	57	112.4	42 48.1	79	57	112.0
8	41 02.6	79	57	112.2	41 26.4	79	57	111.8	41 50.1	79	58	111.4	42 13.8	79	58	111.0
9	40 28.3	79	58	111.2	40 52.0	79	58	110.8	41 15.6	79	58	110.4	41 39.2	78	58	110.0
50	39 53.7	79	58	110.2	40 17.3	79	58	109.8	40 40.9	78	58	109.4	41 04.3	78	58	109.0
1	39 19.0	79	58	109.3	39 42.5	78	58	108.9	40 05.9	78	59	108.5	40 29.3	78	59	108.1
2	38 44.0	78	59	108.3	39 07.4	78	59	107.9	39 30.8	78	59	107.5	39 54.1	77	59	107.1
3	38 08.8	78	59	107.4	38 32.2	78	59	107.0	38 55.5	77	59	106.6	39 18.7	77	59	106.2
4	37 33.5	78	59	106.5	37 56.8	78	59	106.1	38 20.0	77	59	105.7	38 43.1	77	60	105.3
55	36 58.0	78	59	105.5	37 21.2	77	60	105.2	37 44.4	77	60	104.7	38 07.4	77	60	104.3
6	36 22.3	77	60	104.6	36 45.5	77	60	104.2	37 08.6	77	60	103.8	37 31.6	77	60	103.4
7	35 46.5	77	60	103.7	36 09.6	77	60	103.3	36 32.6	77	60	103.0	36 55.6	76	60	102.5
8	35 10.6	77	60	102.9	35 33.6	77	60	102.5	35 56.6	76	60	102.1	36 19.5	76	60	101.7
9	34 34.5	77	60	102.0	34 57.5	77	60	101.6	35 20.4	76	60	101.2	35 43.2	76	61	100.8
60	33 58.3	77	60	101.1	34 21.2	76	61	100.7	34 44.1	76	61	100.3	35 06.9	76	61	99.9
1	33 22.0	76	61	100.2	33 44.9	76	61	99.8	34 07.7	76	61	99.5	34 30.5	76	61	99.1
2	32 45.6	76	61	99.4	33 08.4	76	61	99.0	33 31.2	76	61	98.6	33 53.9	76	61	98.2
3	32 09.1	76	61	98.5	32 31.9	76	61	98.1	32 54.7	76	61	97.8	33 17.3	75	61	97.4
4	31 32.5	76	61	97.7	31 55.3	76	61	97.3	32 18.0	76	61	96.9	32 40.7	75	61	96.5
65	30 55.9	76	61	96.9	31 18.6	76	61	96.5	31 41.3	75	61	96.1	32 03.9	75	61	95.7
6	30 19.2	76	61	96.0	30 41.9	76	61	95.6	31 04.6	75	61	95.3	31 27.2	75	61	94.9
7	29 42.4	76	61	95.2	30 05.1	76	61	94.8	30 27.8	75	61	94.4	30 50.3	75	61	94.1
8	29 05.6	76	61	94.4	29 28.3	76	61	94.0	29 50.9	75	61	93.6	30 13.5	75	61	93.3
9	28 28.8	76	61	93.6	28 51.4	75	62	93.2	29 14.0	75	62	92.8	29 36.6	75	62	92.4
70	27 51.9	76	62	92.8	28 14.5	75	62	92.4	28 37.1	75	62	92.0	28 59.7	75	62	91.6
1	27 15.0	76	62	92.0	27 37.6	75	62	91.6	28 00.2	75	62	91.2	28 22.7	75	62	90.9
2	26 38.0	76	62	91.2	27 00.7	75	62	90.8	27 23.3	75	62	90.4	27 45.8	75	62	90.1
3	26 01.1	76	62	90.4	26 23.8	75	62	90.0	26 46.3	75	62	89.6	27 08.9	75	62	89.3
4	25 24.2	76	62	89.6	25 46.8	75	62	89.2	26 09.4	75	62	88.9	26 31.9	75	62	88.5
75	24 47.2	76	62	88.8	25 09.9	75	62	88.4	25 32.5	75	62	88.1	25 55.0	75	62	87.7
6	24 10.3	76	62	88.0	24 33.0	75	62	87.7	24 55.6	75	62	87.3	25 18.1	75	61	86.9
7	23 33.4	76	61	87.2	23 56.1	75	61	86.9	24 18.7	75	61	86.5	24 41.2	75	61	86.2
8	22 56.5	76	61	86.5	23 19.2	75	61	86.1	23 41.8	75	61	85.8	24 04.4	75	61	85.4
9	22 19.7	76	61	85.7	22 42.4	76	61	85.4	23 05.0	75	61	85.0	23 27.6	75	61	84.6
80	21 42.9	76	61	84.9	22 05.6	76	61	84.6	22 28.2	75	61	84.2	22 50.8	75	61	83.9
1	21 06.1	76	61	84.2	21 28.8	76	61	83.8	21 51.5	76	61	83.5	22 14.1	75	61	83.1
2	20 29.4	76	61	83.4	20 52.1	76	61	83.1	21 14.8	76	61	82.7	21 37.5	75	61	82.4
3	19 52.7	76	61	82.6	20 15.5	76	61	82.3	20 38.2	76	61	82.0	21 00.9	76	61	81.6
4	19 16.1	76	61	81.9	19 38.9	76	61	81.5	20 01.7	76	61	81.2	20 24.4	76	61	80.9
85	18 39.6	76	61	81.1	19 02.4	76	61	80.8	19 25.2	76	61	80.4	19 48.0	76	61	80.1
6	18 03.1	76	61	80.4	18 26.0	76	61	80.0	18 48.8	76	60	79.7	19 11.6	76	60	79.4
7	17 26.7	76	60	79.6	17 49.6	76	60	79.3	18 12.5	76	60	78.9	18 35.4	76	60	78.6
8	16 50.4	77	60	78.9	17 13.4	76	60	78.5	17 36.3	76	60	78.2	17 59.2	76	60	77.9
9	16 14.2	77	60	78.1	16 37.2	77	60	77.8	17 00.2	77	60	77.4	17 23.1	76	60	77.1
90	15 38.1	77	60	77.4	16 01.2	77	60	77.0	16 24.2	77	60	76.7	16 47.2	77	60	76.4

22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
° ′			°	° ′			°	° ′			°	° ′			°	°
60 00.0	1.0	01	180.0	60 30.0	1.0	01	180.0	61 00.0	1.0	01	180.0	61 30.0	1.0	01	180.0	00
59 59.4	1.0	03	178.1	60 29.4	1.0	03	178.1	60 59.4	1.0	03	178.1	61 29.4	1.0	03	178.1	1
59 57.6	1.0	05	176.3	60 27.6	1.0	05	176.3	60 57.6	1.0	05	176.2	61 27.5	1.0	05	176.2	2
59 54.6	1.0	07	174.4	60 24.6	1.0	07	174.4	60 54.5	1.0	07	174.3	61 24.4	1.0	07	174.2	3
59 50.5	1.0	09	172.6	60 20.4	1.0	09	172.5	60 50.2	1.0	09	172.4	61 20.1	1.0	09	172.3	4
59 45.1	99	11	170.8	60 14.9	99	11	170.7	60 44.8	99	11	170.6	61 14.6	99	11	170.4	05
59 38.6	99	13	168.9	60 08.4	99	13	168.8	60 38.1	99	13	168.7	61 07.8	99	13	168.5	6
59 31.0	99	15	167.1	60 00.6	99	15	167.0	60 30.3	99	15	166.8	60 59.9	99	15	166.7	7
59 22.2	99	17	165.3	59 51.7	99	17	165.2	60 21.3	98	17	165.0	60 50.8	98	17	164.8	8
59 12.3	98	18	163.5	59 41.7	98	19	163.4	60 11.1	98	19	163.2	60 40.6	98	19	163.0	9
59 01.2	98	20	161.8	59 30.6	98	20	161.6	59 59.9	98	21	161.4	60 29.2	98	21	161.1	10
58 49.2	97	22	160.0	59 18.4	97	22	159.8	59 47.5	97	22	159.6	60 16.7	97	23	159.3	1
58 36.0	97	24	158.3	59 05.1	97	24	158.0	59 34.1	97	24	157.8	60 03.1	97	24	157.5	2
58 21.8	96	25	156.6	58 50.7	96	26	156.3	59 19.6	96	26	156.1	59 48.5	96	26	155.8	3
58 06.6	96	27	154.9	58 35.4	96	27	154.6	59 04.1	96	28	154.3	59 32.8	96	28	154.0	4
57 50.5	95	29	153.2	58 19.1	95	29	152.9	58 47.6	95	29	152.6	59 16.2	95	29	152.3	15
57 33.3	95	30	151.6	58 01.8	95	30	151.3	58 30.2	95	31	150.9	58 58.5	94	31	150.6	6
57 15.3	94	32	149.9	57 43.5	94	32	149.6	58 11.8	94	32	149.3	58 39.9	94	32	149.0	7
56 56.3	94	33	148.3	57 24.4	94	33	148.0	57 52.5	93	34	147.7	58 20.4	93	34	147.3	8
56 36.5	93	34	146.7	57 04.4	93	35	146.4	57 32.3	93	35	146.1	58 00.1	93	35	145.7	9
56 15.8	93	36	145.2	56 43.5	92	36	144.8	57 11.2	92	36	144.5	57 38.8	92	37	144.1	20
55 54.3	92	37	143.6	56 21.9	92	37	143.3	56 49.3	92	38	142.9	57 16.8	91	38	142.6	1
55 32.0	91	38	142.1	55 59.4	91	39	141.8	56 26.7	91	39	141.4	56 53.9	91	39	141.0	2
55 09.0	91	40	140.7	55 36.2	90	40	140.3	56 03.3	90	40	139.9	56 30.3	90	41	139.5	3
54 45.2	90	41	139.2	55 12.2	90	41	138.8	55 39.1	90	41	138.4	56 06.0	89	42	138.0	4
54 20.7	89	42	137.8	54 47.5	89	42	137.4	55 14.2	89	43	137.0	55 40.9	89	43	136.6	25
53 55.5	89	43	136.3	54 22.2	89	43	136.0	54 48.7	88	44	135.6	55 15.2	88	44	135.1	6
53 29.7	88	44	135.0	53 56.2	88	44	134.6	54 22.5	88	45	134.2	54 48.8	87	45	133.7	7
53 03.3	88	45	133.6	53 29.5	87	45	133.2	53 55.7	87	46	132.8	54 21.8	87	46	132.4	8
52 36.2	87	46	132.3	53 02.3	87	46	131.8	53 28.3	87	47	131.4	53 54.2	86	47	131.0	9
52 08.6	87	47	130.9	52 34.5	86	47	130.5	53 00.3	86	48	130.1	53 26.1	86	48	129.7	30
51 40.4	86	48	129.6	52 06.2	86	48	129.2	52 31.8	85	48	128.8	52 57.4	85	49	128.4	1
51 11.7	85	49	128.4	51 37.3	85	49	127.9	52 02.8	85	49	127.5	52 28.1	84	50	127.1	2
50 42.5	85	49	127.1	51 07.9	85	50	126.7	51 33.2	84	50	126.3	51 58.4	84	50	125.8	3
50 12.8	84	50	125.9	50 38.1	84	50	125.5	51 03.2	84	51	125.0	51 28.3	83	51	124.6	4
49 42.7	84	51	124.7	50 07.7	83	51	124.2	50 32.7	83	52	123.8	50 57.6	83	52	123.4	35
49 12.1	83	52	123.5	49 37.0	83	52	123.1	50 01.8	83	52	122.6	50 26.6	82	52	122.2	6
48 41.0	83	52	122.3	49 05.8	82	53	121.9	49 30.5	82	53	121.4	49 55.1	82	53	121.0	7
48 09.6	82	53	121.2	48 34.3	82	53	120.7	48 58.8	82	53	120.3	49 23.2	81	54	119.8	8
47 37.8	82	54	120.0	48 02.3	81	54	119.6	48 26.7	81	54	119.2	48 51.0	81	54	118.7	9
47 05.7	81	54	118.9	47 30.0	81	54	118.5	47 54.3	81	55	118.0	48 18.5	80	55	117.6	40
46 33.2	81	55	117.8	46 57.4	81	55	117.4	47 21.5	80	55	116.9	47 45.6	80	55	116.5	1
46 00.3	81	55	116.7	46 24.4	80	55	116.3	46 48.4	80	56	115.9	47 12.3	80	56	115.4	2
45 27.2	80	56	115.7	45 51.2	80	56	115.2	46 15.0	79	56	114.8	46 38.8	79	56	114.3	3
44 53.7	80	56	114.6	45 17.6	79	56	114.2	45 41.4	79	57	113.7	46 05.0	79	57	113.3	4
44 20.0	79	57	113.6	44 43.8	79	57	113.1	45 07.4	79	57	112.7	45 31.0	78	57	112.3	45
43 46.0	79	57	112.5	44 09.7	79	57	112.1	44 33.2	78	57	111.7	44 56.7	78	58	111.2	6
43 11.8	79	57	111.5	43 35.3	78	58	111.1	43 58.8	78	58	110.7	44 22.1	78	58	110.2	7
42 37.3	78	58	110.5	43 00.8	78	58	110.1	43 24.1	78	58	109.7	43 47.4	77	58	109.3	8
42 02.6	78	58	109.6	42 26.0	78	58	109.1	42 49.2	77	58	108.7	43 12.4	77	59	108.3	9
41 27.7	78	59	108.6	41 51.0	77	59	108.2	42 14.1	77	59	107.7	42 37.2	77	59	107.3	50
40 52.6	77	59	107.6	41 15.8	77	59	107.2	41 38.9	77	59	106.8	42 01.9	76	59	106.4	1
40 17.3	77	59	106.7	40 40.4	77	59	106.3	41 03.4	77	59	105.9	41 26.3	76	59	105.4	2
39 41.8	77	59	105.8	40 04.9	77	60	105.3	40 27.8	76	60	104.9	40 50.6	76	60	104.5	3
39 06.2	77	60	104.8	39 29.2	76	60	104.4	39 52.0	76	60	104.0	40 14.8	76	60	103.6	4
38 30.4	76	60	103.9	38 53.3	76	60	103.5	39 16.1	76	60	103.1	39 38.8	76	60	102.7	55
37 54.5	76	60	103.0	38 17.3	76	60	102.6	38 40.1	76	60	102.2	39 02.7	75	60	101.8	6
37 18.4	76	60	102.1	37 41.2	76	60	101.7	38 03.9	75	60	101.3	38 26.5	75	61	100.9	7
36 42.3	76	60	101.3	37 05.0	76	61	100.9	37 27.6	75	61	100.4	37 50.2	75	61	100.0	8
36 06.0	76	61	100.4	36 28.7	75	61	100.0	36 51.3	75	61	99.6	37 13.8	75	61	99.2	9
35 29.6	76	61	99.5	35 52.2	75	61	99.1	36 14.8	75	61	98.7	36 37.3	75	61	98.3	60
34 53.1	75	61	98.7	35 15.7	75	61	98.3	35 38.2	75	61	97.9	36 00.7	75	61	97.4	1
34 16.6	75	61	97.8	34 39.1	75	61	97.4	35 01.6	75	61	97.0	35 24.0	75	61	96.6	2
33 39.9	75	61	97.0	34 02.5	75	61	96.6	34 24.9	75	61	96.2	34 47.3	74	61	95.8	3
33 03.2	75	61	96.1	33 25.7	75	61	95.7	33 48.2	75	61	95.3	34 10.5	74	61	94.9	4
32 26.5	75	61	95.3	32 49.0	75	61	94.9	33 11.4	75	61	94.5	33 33.7	74	61	94.1	65
31 49.7	75	61	94.5	32 12.1	75	61	94.1	32 34.5	74	61	93.7	32 56.8	74	62	93.3	6
31 12.8	75	61	93.7	31 35.3	75	61	93.3	31 57.6	74	62	92.9	32 19.9	74	62	92.5	7
30 36.0	75	62	92.9	30 58.4	75	62	92.5	31 20.7	74	62	92.1	31 43.0	74	62	91.7	8
29 59.1	75	62	92.1	30 21.5	75	62	91.7	30 43.8	74	62	91.3	31 06.1	74	62	90.9	9
29 22.1	75	62	91.3	29 44.5	75	62	90.9	30 06.9	74	62	90.5	30 29.1	74	62	90.1	70
28 45.2	75	62	90.5	29 07.6	75	62	90.1	29 29.9	74	62	89.7	29 52.2	74	62	89.3	1
28 08.3	75	62	89.7	28 30.7	75	62	89.3	28 53.0	74	62	88.9	29 15.3	74	62	88.5	2
27 31.3	75	62	88.9	27 53.7	75	62	88.5	28 16.1	74	62	88.1	28 38.3	74	62	87.8	3
26 54.4	75	62	88.1	27 16.8	75	62	87.7	27 39.2	74	61	87.4	28 01.4	74	61	87.0	4
26 17.5	75	61	87.3	26 39.9	75	61	87.0	27 02.3	74	61	86.6	27 24.6	74	61	86.2	75
25 40.6	75	61	86.6	26 03.0	75	61	86.2	26 25.4	74	61	85.8	26 47.7	74	61	85.5	6
25 03.7	75	61	85.8	25 26.2	75	61	85.4	25 48.6	75	61	85.1	26 10.9	74	61	84.7	7
24 26.9	75	61	85.0	24 49.4	75	61	84.7	25 11.8	75	61	84.3	25 34.2	74	61	83.9	8
23 50.1	75	61	84.3	24 12.6	75	61	83.9	24 35.1	75	61	83.6	24 57.5	75	61	83.2	9
23 13.4	75	61	83.5	23 35.9	75	61	83.2	23 58.4	75	61	82.8	24 20.8	75	61	82.4	80
22 36.7	75	61	82.8	22 59.3	75	61	82.4	23 21.8	75	61	82.0	23 44.2	75	61	81.7	1
22 00.1	75	61	82.0	22 22.7	75	61	81.7	22 45.2	75	61	81.3	23 07.7	75	61	80.9	2
21 23.6	75	61	81.3	21 46.2	75	61	80.9	22 08.8	75	61	80.5	22 31.3	75	61	80.2	3
20 47.1	76	61	80.5	21 09.7	75	61	80.2	21 32.4	75	60	79.8	21 54.9	75	60	79.4	4
20 10.7	76	60	79.8	20 33.4	76	60	79.4	20 56.0	75	60	79.1	21 18.6	75	60	78.7	85
19 34.4	76	60	79.0	19 57.1	76	60	78.7	20 19.8	76	60	78.3	20 42.5	75	60	78.0	6
18 58.2	76	60	78.3	19 21.0	76	60	77.9	19 43.7	76	60	77.6	20 06.4	76	60	77.2	7
18 22.1	76	60	77.5	18 44.9	76	60	77.2	19 07.7	76	60	76.8	19 30.4	76	60	76.5	8
17 46.1	76	60	76.8	18 08.9	76	60	76.4	18 31.8	76	60	76.1	18 54.6	76	60	75.7	9
17 10.2	76	60	76.0	17 33.1	76	60	75.7	17 56.0	76	59	75.4	18 18.8	76	59	75.0	90

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 52°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	18 00.0	1.0 01	180.0	17 30.0	1.0 01	180.0	17 00.0	1.0 01	180.0	16 30.0	1.0 01	180.0	16 00.0	1.0 01	180.0	15 30.0	1.0 00	180.0	15 00.0	1.0 00	180.0	14 30.0	1.0 00	180.0	00
1	17 59.7	1.0 02	179.0	17 29.7	1.0 02	179.0	16 59.7	1.0 02	179.0	16 29.7	1.0 02	179.0	15 59.7	1.0 02	179.0	15 29.7	1.0 02	179.0	14 59.7	1.0 02	179.0	14 29.7	1.0 02	179.1	1
2	17 58.7	1.0 03	178.0	17 28.7	1.0 03	178.0	16 58.7	1.0 03	178.0	16 28.7	1.0 03	178.1	15 58.8	1.0 03	178.1	15 28.8	1.0 03	178.1	14 58.8	1.0 03	178.1	14 28.8	1.0 03	178.1	2
3	17 57.1	1.0 04	177.0	17 27.2	1.0 04	177.1	16 57.2	1.0 04	177.1	16 27.2	1.0 04	177.1	15 57.2	1.0 04	177.1	15 27.2	1.0 04	177.1	14 57.2	1.0 04	177.1	14 27.3	1.0 04	177.2	3
4	17 54.9	1.0 05	176.0	17 24.9	1.0 05	176.1	16 55.0	1.0 05	176.1	16 25.0	1.0 05	176.1	15 55.0	1.0 05	176.1	15 25.1	1.0 05	176.2	14 55.1	1.0 05	176.2	14 25.1	1.0 05	176.2	4
05	17 52.0	1.0 06	175.1	17 22.1	1.0 06	175.1	16 52.1	1.0 06	175.1	16 22.2	1.0 06	175.2	15 52.2	1.0 06	175.2	15 22.3	1.0 06	175.2	14 52.3	1.0 06	175.2	14 22.4	1.0 06	175.3	05
6	17 48.6	1.0 07	174.1	17 18.6	1.0 07	174.1	16 48.7	1.0 07	174.1	16 18.8	1.0 07	174.2	15 48.8	1.0 07	174.2	15 18.9	1.0 07	174.3	14 49.0	1.0 07	174.3	14 19.0	1.0 07	174.3	6
7	17 44.4	1.0 08	173.1	17 14.5	1.0 08	173.1	16 44.6	1.0 08	173.2	16 14.7	1.0 08	173.2	15 44.8	1.0 08	173.3	15 14.9	1.0 08	173.3	14 45.0	1.0 08	173.3	14 15.1	1.0 08	173.4	7
8	17 39.7	1.0 09	172.1	17 09.8	1.0 09	172.2	16 39.9	1.0 09	172.2	16 10.0	1.0 09	172.3	15 40.1	1.0 09	172.3	15 10.3	1.0 09	172.3	14 40.4	1.0 09	172.4	14 10.5	1.0 09	172.4	8
9	17 34.3	99 10	171.1	17 04.4	99 10	171.2	16 34.6	99 10	171.2	16 04.7	99 10	171.3	15 34.9	99 10	171.3	15 05.0	1.0 10	171.4	14 35.2	1.0 10	171.4	14 05.3	1.0 10	171.5	9
10	17 28.3	99 11	170.2	16 58.5	99 11	170.2	16 28.7	99 11	170.3	15 58.8	99 11	170.3	15 29.0	99 11	170.4	14 59.2	99 11	170.4	14 29.4	99 11	170.5	13 59.6	99 11	170.6	10
1	17 21.6	99 12	169.2	16 51.9	99 12	169.2	16 22.1	99 12	169.3	15 52.3	99 12	169.4	15 22.6	99 12	169.4	14 52.8	99 12	169.5	14 23.0	99 12	169.6	13 53.2	99 12	169.6	1
2	17 14.4	99 13	168.2	16 44.7	99 13	168.3	16 14.9	99 13	168.3	15 45.2	99 13	168.4	15 15.5	99 13	168.5	14 45.7	99 13	168.5	14 16.0	99 13	168.6	13 46.3	99 13	168.7	2
3	17 06.5	99 14	167.2	16 36.9	99 14	167.3	16 07.2	99 14	167.4	15 37.5	99 14	167.4	15 07.8	99 14	167.5	14 38.1	99 14	167.6	14 08.4	99 14	167.7	13 38.7	99 14	167.7	3
4	16 58.1	99 15	166.3	16 28.4	99 15	166.3	15 58.8	99 15	166.4	15 29.2	99 15	166.5	14 59.5	99 15	166.6	14 29.9	99 15	166.7	14 00.2	99 15	166.7	13 30.6	99 15	166.8	4
15	16 49.0	99 16	165.3	16 19.4	99 16	165.4	15 49.8	99 16	165.5	15 20.2	99 16	165.5	14 50.6	99 16	165.6	14 21.0	99 16	165.7	13 51.5	99 16	165.8	13 21.9	99 16	165.9	15
6	16 39.3	98 17	164.3	16 09.8	98 17	164.4	15 40.2	98 17	164.5	15 10.7	98 17	164.6	14 41.2	98 17	164.7	14 11.6	98 17	164.8	13 42.1	98 17	164.9	13 12.6	98 16	165.0	6
7	16 29.0	98 18	163.4	15 59.5	98 18	163.4	15 30.1	98 18	163.5	15 00.6	98 18	163.6	14 31.1	98 18	163.7	14 01.6	98 18	163.8	13 32.2	98 18	163.9	13 02.7	98 17	164.0	7
8	16 18.1	98 19	162.4	15 48.7	98 19	162.5	15 19.3	98 19	162.6	14 49.9	98 19	162.7	14 20.5	98 19	162.8	13 51.1	98 19	162.9	13 21.6	98 18	163.0	12 52.2	98 18	163.1	8
9	16 06.7	98 20	161.4	15 37.3	98 20	161.5	15 08.0	98 20	161.6	14 38.6	98 20	161.8	14 09.3	98 20	161.9	13 39.9	98 20	162.0	13 10.6	98 19	162.1	12 41.2	98 19	162.2	9
20	15 54.6	98 21	160.5	15 25.3	98 21	160.6	14 56.0	98 21	160.7	14 26.8	98 21	160.8	13 57.5	98 21	160.9	13 28.2	98 20	161.0	12 58.9	98 20	161.2	12 29.6	98 20	161.3	20
1	15 42.0	97 22	159.5	15 12.8	97 22	159.6	14 43.6	97 22	159.8	14 14.3	97 22	159.9	13 45.1	97 22	160.0	13 15.9	97 21	160.1	12 46.7	97 21	160.2	12 17.5	97 21	160.3	1
2	15 28.8	97 23	158.6	14 59.6	97 23	158.7	14 30.5	97 23	158.8	14 01.4	97 23	158.9	13 32.2	97 22	159.1	13 03.1	97 22	159.2	12 33.9	97 22	159.3	12 04.8	97 22	159.4	2
3	15 15.0	97 24	157.6	14 45.9	97 24	157.8	14 16.9	97 24	157.9	13 47.8	97 24	158.0	13 18.7	97 23	158.1	12 49.7	97 23	158.3	12 20.6	97 23	158.4	11 51.5	97 23	158.5	3
4	15 00.6	97 25	156.7	14 31.7	97 25	156.8	14 02.7	97 25	157.0	13 33.7	97 24	157.1	13 04.7	97 24	157.2	12 35.7	97 24	157.4	12 06.7	97 24	157.5	11 37.7	97 24	157.6	4
25	14 45.8	96 26	155.8	14 16.9	96 26	155.9	13 48.0	96 25	156.0	13 19.0	96 25	156.2	12 50.1	96 25	156.3	12 21.2	96 25	156.4	11 52.3	96 25	156.6	11 23.4	96 25	156.7	25
6	14 30.3	96 27	154.8	14 01.5	96 27	155.0	13 32.7	96 26	155.1	13 03.9	96 26	155.2	12 35.0	96 26	155.4	12 06.2	96 26	155.5	11 37.4	96 26	155.7	11 08.5	96 26	155.8	6
7	14 14.3	96 28	153.9	13 45.6	96 27	154.0	13 16.9	96 27	154.2	12 48.1	96 27	154.3	12 19.4	96 27	154.5	11 50.6	96 27	154.6	11 21.9	96 27	154.8	10 53.1	96 27	154.9	7
8	13 57.8	95 28	153.0	13 29.2	95 28	153.1	13 00.5	95 28	153.3	12 31.9	96 28	153.4	12 03.2	96 28	153.6	11 34.5	96 28	153.7	11 05.9	96 28	153.9	10 37.2	96 27	154.0	8
9	13 40.7	95 29	152.0	13 12.2	95 29	152.2	12 43.6	95 29	152.4	12 15.1	95 29	152.5	11 46.5	95 29	152.7	11 17.9	95 29	152.8	10 49.3	95 28	153.0	10 20.8	95 28	153.1	9
30	13 23.2	95 30	151.1	12 54.7	95 30	151.3	12 26.2	95 30	151.4	11 57.8	95 30	151.6	11 29.3	95 30	151.8	11 00.8	95 29	151.9	10 32.3	95 29	152.1	10 03.8	95 29	152.2	30
1	13 05.1	95 31	150.2	12 36.7	95 31	150.4	12 08.3	95 31	150.5	11 39.9	95 31	150.7	11 11.5	95 30	150.9	10 43.2	95 30	151.0	10 14.8	95 30	151.2	9 46.4	95 30	151.4	1
2	12 46.4	94 32	149.3	12 18.2	94 32	149.5	11 49.9	94 32	149.6	11 21.6	94 31	149.8	10 53.3	94 31	150.0	10 25.0	94 31	150.1	9 56.7	94 31	150.3	9 28.4	94 31	150.5	2
3	12 27.3	94 33	148.4	11 59.2	94 32	148.6	11 31.0	94 32	148.7	11 02.8	94 32	148.9	10 34.6	94 32	149.1	10 06.4	94 32	149.3	9 38.2	94 32	149.4	9 10.0	94 32	149.6	3
4	12 07.7	94 34	147.5	11 39.6	94 33	147.7	11 11.6	94 33	147.8	10 43.5	94 33	148.0	10 15.4	94 33	148.2	9 47.3	94 33	148.4	9 19.1	94 32	148.6	8 51.0	94 32	148.7	4
35	11 47.6	93 34	146.6	11 19.6	93 34	146.8	10 51.7	93 34	147.0	10 23.7	93 34	147.1	9 55.7	93 34	147.3	9 27.6	93 33	147.5	8 59.6	93 33	147.7	8 31.6	93 33	147.9	35
6	11 27.1	93 35	145.7	10 59.2	93 35	145.9	10 31.3	93 35	146.1	10 03.4	93 35	146.3	9 35.5	93 34	146.4	9 07.6	93 34	146.6	8 39.7	93 34	146.8	8 11.7	93 34	147.0	6
7	11 06.0	93 36	144.8	10 38.2	93 36	145.0	10 10.4	93 36	145.2	9 42.6	93 35	145.4	9 14.8	93 35	145.6	8 47.0	93 35	145.8	8 19.2	93 35	146.0	7 51.4	93 35	146.1	7
8	10 44.5	92 37	143.9	10 16.8	92 36	144.1	9 49.1	92 36	144.3	9 21.4	92 36	144.5	8 53.7	92 36	144.7	8 26.0	92 36	144.9	7 58.3	92 36	145.1	7 30.6	92 35	145.3	8
9	10 22.5	92 37	143.0	9 54.9	92 37	143.2	9 27.3	92 37	143.4	8 59.7	92 37	143.6	8 32.1	92 37	143.8	8 04.5	92 37	144.0	7 36.9	92 36	144.2	7 09.3	92 36	144.4	9
40	10 00.1	92 38	142.2	9 32.6	92 38	142.4	9 05.1	92 38	142.6	8 37.6	92 38	142.8	8 10.1	92 37	143.0	7 42.6	92 37	143.2	7 15.1	92 37	143.4	6 47.6	92 37	143.6	40
1	9 37.2	91 39	141.3	9 09.8	91 39	141.5	8 42.4	91 38	141.7	8 15.1	91 38	141.9	7 47.7	91 38	142.1	7 20.3	91 38	142.3	6 52.9	91 38	142.5	6 25.5	91 38	142.7	1
2	9 13.9	91 40	140.4	8 46.6	91 39	140.6	8 19.3	91 39	140.9	7 52.1	91 39	141.1	7 24.8	91 39	141.3	6 57.5	91 39	141.5	6 30.2	91 39	141.7	6 02.9	91 38	141.9	2
3	8 50.1	91 40	139.6	8 23.0	91 40	139.8	7 55.8	91 40	140.0	7 28.6	91 40	140.2	7 01.4	91 40	140.4	6 34.3	91 39	140.6	6 07.1	91 39	140.8	5 39.9	91 39	141.1	3
4	8 26.0	90 41	138.7	7 58.9	90 41	138.9	7 31.8	90 41	139.1	7 04.8	90 40	139.4	6 37.7	90 40	139.6	6 10.6	90 40	139.8	5 43.5	90 40	140.0	5 16.4	90 40	140.2	4
45	8 01.4	90 42	137.9	7 34.4	90 41	138.1	7 07.5	90 41	138.3	6 40.5	90 41	138.5	6 13.5	90 41	138.7	5 46.6	90 41	139.0	5 19.6	90 41	139.2				45
6	7 36.4	89 42	137.0	7 09.5	89 42	137.2	6 42.7	90 42	137.5	6 15.8	90 42	137.7	5 49.0	90 42	137.9	5 22.1	90 41	138.1							6
7	7 11.0	89 43	136.2	6 44.3	89 43	136.4	6 17.5	89 43	136.6	5 50.8	89 42	136.8	5 24.0	89 42	137.1										7
8	6 45.2	89 44	135.3	6 18.6	89 43	135.5	5 51.9	89 43	135.8	5 25.3	89 43	136.0													8
9	6 19.0	88 44	134.5	5 52.5	88 44	134.7	5 26.0	88 44	134.9																9
50	5 52.5	88 45	133.6	5 26.1	88 44	133.9																			50
1	5 25.6	88 45	132.8																						1

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	15 02.1	77 60	76.6	15 25.2	77 60	76.3	15 48.3	77 60	76.0	16 11.4	77 60	75.6	16 34.4	77 59	75.3	16 57.3	77 59	75.0	17 20.3	76 59	74.6	17 43.2	76 59	74.3	91
2	14 26.3	77 60	75.9	14 49.4	77 60	75.5	15 12.5	77 59	75.2	15 35.6	77 59	74.9	15 58.7	77 59	74.5	16 21.7	77 59	74.2	16 44.7	77 59	73.9	17 07.7	77 59	73.5	2
3	13 50.5	77 59	75.1	14 13.7	77 59	74.8	14 36.9	77 59	74.5	15 00.0	77 59	74.1	15 23.2	77 59	73.8	15 46.2	77 59	73.5	16 09.3	77 59	73.1	16 32.3	77 59	72.8	3
4	13 14.9	78 59	74.4	13 38.1	77 59	74.0	14 01.4	77 59	73.7	14 24.6	77 59	73.4	14 47.7	77 59	73.1	15 10.9	77 59	72.7	15 34.0	77 59	72.4	15 57.1	77 58	72.1	4
95	12 39.3	78 59	73.6	13 02.7	78 59	73.3	13 26.0	78 59	73.0	13 49.2	78 59	72.7	14 12.5	77 59	72.3	14 35.7	77 58	72.0	14 58.9	77 58	71.7	15 22.1	77 58	71.3	95
6	12 04.0	78 59	72.9	12 27.4	78 59	72.6	12 50.7	78 58	72.2	13 14.0	78 58	71.9	13 37.4	78 58	71.6	14 00.6	78 58	71.3	14 23.9	77 58	70.9	14 47.1	77 58	70.6	6
7	11 28.7	78 58	72.1	11 52.2	78 58	71.8	12 15.6	78 58	71.5	12 39.0	78 58	71.2	13 02.4	78 58	70.8	13 25.7	78 58	70.5	13 49.1	78 58	70.2	14 12.4	78 58	69.9	7
8	10 53.7	78 58	71.4	11 17.2	78 58	71.1	11 40.7	78 58	70.7	12 04.1	78 58	70.4	12 27.6	78 58	70.1	12 51.0	78 58	69.8	13 14.4	78 58	69.5	13 37.8	78 57	69.1	8
9	10 18.7	79 58	70.6	10 42.3	79 58	70.3	11 05.9	78 58	70.0	11 29.4	78 58	69.7	11 52.9	78 57	69.4	12 16.4	78 57	69.0	12 39.9	78 57	68.7	13 03.3	78 57	68.4	9
100	9 44.0	79 58	69.9	10 07.6	79 58	69.6	10 31.2	79 57	69.2	10 54.8	79 57	68.9	11 18.4	79 57	68.6	11 42.0	79 57	68.3	12 05.5	78 57	68.0	12 29.1	78 57	67.7	100
1	9 09.4	79 57	69.1	9 33.1	79 57	68.8	9 56.8	79 57	68.5	10 20.5	79 57	68.2	10 44.1	79 57	67.9	11 07.8	79 57	67.6	11 31.4	79 57	67.2	11 55.0	79 56	66.9	1
2	8 34.9	79 57	68.4	8 58.7	79 57	68.1	9 22.5	79 57	67.8	9 46.3	79 57	67.4	10 10.0	79 57	67.1	10 33.7	79 56	66.8	10 57.4	79 56	66.5	11 21.1	79 56	66.2	2
3	8 00.7	80 57	67.6	8 24.6	80 57	67.3	8 48.4	79 56	67.0	9 12.2	79 56	66.7	9 36.1	79 56	66.4	9 59.9	79 56	66.1	10 23.6	79 56	65.8	10 47.4	79 56	65.5	3
4	7 26.6	80 56	66.9	7 50.6	80 56	66.6	8 14.5	80 56	66.2	8 38.4	80 56	65.9	9 02.3	80 56	65.6	9 26.2	80 56	65.3	9 50.1	80 56	65.0	10 13.9	79 56	64.7	4
105	6 52.8	80 56	66.1	7 16.8	80 56	65.8	7 40.8	80 56	65.5	8 04.8	80 56	65.2	8 28.8	80 56	64.9	8 52.7	80 55	64.6	9 16.7	80 55	64.3	9 40.6	80 55	64.0	105
6	6 19.1	80 56	65.3	6 43.2	80 56	65.0	7 07.3	80 56	64.7	7 31.4	80 55	64.4	7 55.4	80 55	64.1	8 19.5	80 55	63.8	8 43.5	80 55	63.5	9 07.5	80 55	63.2	6
7	5 45.6	81 55	64.6	6 09.8	81 55	64.3	6 34.0	81 55	64.0	6 58.1	81 55	63.7	7 22.3	80 55	63.4	7 46.4	80 55	63.1	8 10.5	80 55	62.8	8 34.6	80 54	62.5	7
8	5 12.4	81 55	63.8	5 36.6	81 55	63.5	6 00.9	81 55	63.2	6 25.1	81 55	62.9	6 49.4	81 54	62.6	7 13.6	81 54	62.3	7 37.8	81 54	62.0	8 02.0	81 54	61.7	8
9				5 03.7	81 55	62.8	5 28.0	81 54	62.5	5 52.3	81 54	62.2	6 16.7	81 54	61.9	6 41.0	81 54	61.6	7 05.3	81 54	61.3	7 29.6	81 54	61.0	9
110										5 19.8	81 54	61.4	5 44.2	81 54	61.1	6 08.6	81 54	60.8	6 33.0	81 53	60.5	6 57.4	81 53	60.2	110
1													5 12.0	82 53	60.4	5 36.5	82 53	60.1	6 01.0	82 53	59.8	6 25.4	82 53	59.5	1
2																5 04.6	82 53	59.3	5 29.2	82 53	59.0	5 53.7	82 52	58.7	2
3																						5 22.3	82 52	58.0	3

Digitized by Google

Lat. 52°

H.A.	24° 00′				24° 30′				25° 00′				25° 30′			
	Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.
°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°
00	62 00.0	1.0	01	180.0	62 30.0	1.0	01	180.0	63 00.0	1.0	01	180.0	63 30.0	1.0	01	180.0
1	61 59.4	1.0	03	178.1	62 29.4	1.0	03	178.0	62 59.4	1.0	03	178.0	63 29.3	1.0	03	178.0
2	61 57.5	1.0	05	176.1	62 27.5	1.0	05	176.1	62 57.4	1.0	05	176.0	63 27.4	1.0	05	176.0
3	61 54.4	1.0	07	174.2	62 24.3	1.0	07	174.1	62 54.2	1.0	07	174.0	63 24.1	1.0	08	173.9
4	61 50.0	1.0	09	172.2	62 19.9	1.0	09	172.1	62 49.7	1.0	10	172.0	63 19.6	1.0	10	171.9
05	61 44.4	99	11	170.3	62 14.2	99	12	170.2	62 44.0	99	12	170.1	63 13.8	99	12	169.9
6	61 37.6	99	13	168.4	62 07.3	99	14	168.3	62 37.0	99	14	168.1	63 06.7	99	14	168.0
7	61 29.6	99	15	166.5	61 59.2	99	16	166.3	62 28.8	99	16	166.2	62 58.4	99	16	166.0
8	61 20.3	98	17	164.6	61 49.9	98	18	164.4	62 19.4	98	18	164.2	62 48.8	98	18	164.0
9	61 10.0	98	19	162.8	61 39.4	98	19	162.6	62 08.7	98	20	162.3	62 38.1	98	20	162.1
10	60 58.5	98	21	160.9	61 27.7	97	21	160.7	61 56.9	97	22	160.4	62 26.1	97	22	160.2
1	60 45.8	97	23	159.1	61 14.9	97	23	158.8	61 44.0	97	23	158.6	62 13.1	97	24	158.3
2	60 32.1	97	25	157.3	61 01.1	96	25	157.0	61 30.0	96	25	156.7	61 58.9	96	26	156.5
3	60 17.3	96	26	155.5	60 46.1	96	27	155.2	61 14.8	96	27	154.9	61 43.6	96	27	154.6
4	60 01.5	95	28	153.7	60 30.1	95	28	153.4	60 58.7	95	29	153.1	61 27.2	95	29	152.8
15	59 44.6	95	30	152.0	60 13.1	95	30	151.7	60 41.5	95	30	151.4	61 09.8	94	31	151.0
6	59 26.8	94	31	150.3	59 55.1	94	32	150.0	60 23.3	94	32	149.6	60 51.4	94	32	149.3
7	59 08.1	94	33	148.6	59 36.1	93	33	148.3	60 04.1	93	33	147.9	60 32.1	93	34	147.6
8	58 48.4	93	34	147.0	59 16.2	93	35	146.6	59 44.1	93	35	146.2	60 11.8	92	35	145.9
9	58 27.8	92	36	145.3	58 55.5	92	36	145.0	59 23.1	92	36	144.6	59 50.6	92	37	144.2
20	58 06.4	92	37	143.7	58 33.9	91	37	143.4	59 01.3	91	38	143.0	59 28.6	91	38	142.6
1	57 44.1	91	38	142.2	58 11.4	91	39	141.8	58 38.6	91	39	141.4	59 05.7	90	39	141.0
2	57 21.1	90	40	140.6	57 48.2	90	40	140.2	58 15.2	90	40	139.8	58 42.1	90	41	139.4
3	56 57.3	90	41	139.1	57 24.1	89	41	138.7	57 50.9	89	42	138.3	58 17.7	89	42	137.9
4	56 32.7	89	42	137.6	56 59.4	89	42	137.2	57 26.0	89	43	136.8	57 52.5	88	43	136.3
25	56 07.5	88	43	136.2	56 34.0	88	44	135.7	57 00.4	88	44	135.3	57 26.7	88	44	134.9
6	55 41.6	88	44	134.7	56 07.8	87	45	134.3	56 34.1	87	45	133.9	57 00.2	87	45	133.4
7	55 15.0	87	45	133.3	55 41.1	87	46	132.9	56 07.1	87	46	132.4	56 33.0	86	46	132.0
8	54 47.8	87	46	131.9	55 13.7	86	47	131.5	55 39.5	86	47	131.0	56 05.2	86	47	130.6
9	54 20.0	86	47	130.6	54 45.8	86	48	130.1	55 11.4	85	48	129.7	55 36.9	85	48	129.2
30	53 51.7	85	48	129.2	54 17.2	85	48	128.8	54 42.7	85	49	128.3	55 08.0	84	49	127.9
1	53 22.8	85	49	127.9	53 48.2	84	49	127.5	54 13.4	84	50	127.0	54 38.6	84	50	126.6
2	52 53.4	84	50	126.6	53 18.6	84	50	126.2	53 43.7	83	50	125.7	54 08.7	83	51	125.3
3	52 23.6	84	51	125.4	52 48.6	83	51	124.9	53 13.5	83	51	124.5	53 38.3	82	51	124.0
4	51 53.2	83	51	124.1	52 18.1	83	52	123.7	52 42.8	82	52	123.2	53 07.4	82	52	122.7
35	51 22.4	82	52	122.9	51 47.1	82	52	122.5	52 11.7	82	53	122.0	52 36.1	81	53	121.5
6	50 51.2	82	53	121.7	51 15.7	82	53	121.3	51 40.1	81	53	120.8	52 04.5	81	53	120.3
7	50 19.6	81	53	120.6	50 44.0	81	54	120.1	51 08.2	81	54	119.6	51 32.4	80	54	119.2
8	49 47.6	81	54	119.4	50 11.8	81	54	118.9	50 35.9	80	54	118.5	50 59.9	80	55	118.0
9	49 15.2	80	54	118.3	49 39.3	80	55	117.8	50 03.3	80	55	117.3	50 27.2	79	56	116.9
40	48 42.5	80	55	117.1	49 06.5	80	55	116.7	49 30.3	79	56	116.2	49 54.0	79	56	115.7
1	48 09.5	80	56	116.0	48 33.3	79	56	115.6	48 57.0	79	56	115.1	49 20.6	78	56	114.7
2	47 36.1	79	56	115.0	47 59.8	79	56	114.5	48 23.4	78	56	114.0	48 46.9	78	57	113.6
3	47 02.5	79	57	113.9	47 26.1	78	57	113.4	47 49.6	78	57	113.0	48 12.9	78	57	112.5
4	46 28.6	78	57	112.9	46 52.1	78	57	112.4	47 15.4	78	57	111.9	47 38.7	77	58	111.5
45	45 54.4	78	57	111.8	46 17.8	78	58	111.4	46 41.0	77	58	110.9	47 04.2	77	58	110.4
6	45 20.0	78	58	110.8	45 43.3	77	58	110.4	46 06.4	77	58	109.9	46 29.4	77	58	109.4
7	44 45.4	77	58	109.8	45 08.5	77	58	109.4	45 31.6	77	58	108.9	45 54.5	76	59	108.4
8	44 10.5	77	58	108.8	44 33.6	77	59	108.4	44 56.5	76	59	107.9	45 19.3	76	59	107.5
9	43 35.4	77	59	107.8	43 58.4	76	59	107.4	44 21.3	76	59	106.9	44 44.0	76	59	106.5
50	43 00.2	76	59	106.9	43 23.1	76	59	106.4	43 45.8	76	59	106.0	44 08.5	75	59	105.5
1	42 24.8	76	59	105.9	42 47.6	76	59	105.5	43 10.2	75	60	105.0	43 32.8	75	60	104.6
2	41 49.2	76	60	105.0	42 11.9	76	60	104.6	42 34.5	75	60	104.1	42 57.0	75	60	103.7
3	41 13.4	76	60	104.1	41 36.0	75	60	103.6	41 58.6	75	60	103.2	42 21.0	75	60	102.7
4	40 37.5	75	60	103.2	41 00.1	75	60	102.7	41 22.6	75	60	102.3	41 45.0	74	60	101.8
55	40 01.5	75	60	102.3	40 24.0	75	60	101.8	40 46.4	75	60	101.4	41 08.7	74	61	100.9
6	39 25.3	75	60	101.4	39 47.8	75	61	100.9	40 10.1	74	61	100.5	40 32.4	74	61	100.1
7	38 49.0	75	61	100.5	39 11.4	75	61	100.0	39 33.8	74	61	99.6	39 56.0	74	61	99.2
8	38 12.7	75	61	99.6	38 35.0	74	61	99.2	38 57.3	74	61	98.7	39 19.5	74	61	98.3
9	37 36.2	75	61	98.7	37 58.5	74	61	98.3	38 20.8	74	61	97.9	38 42.9	74	61	97.5
60	36 59.6	74	61	97.9	37 21.9	74	61	97.5	37 44.1	74	61	97.0	38 06.2	74	61	96.6
1	36 23.0	74	61	97.0	36 45.3	74	61	96.6	37 07.4	74	61	96.2	37 29.5	73	61	95.8
2	35 46.3	74	61	96.2	36 08.5	74	61	95.8	36 30.7	74	61	95.4	36 52.7	73	61	94.9
3	35 09.6	74	61	95.4	35 31.8	74	61	95.0	35 53.9	74	61	94.5	36 15.9	73	61	94.1
4	34 32.8	74	61	94.5	34 54.9	74	61	94.1	35 17.0	74	61	93.7	35 39.1	73	61	93.3
65	33 55.9	74	61	93.7	34 18.1	74	62	93.3	34 40.2	73	62	92.9	35 02.2	73	62	92.5
6	33 19.0	74	62	92.9	33 41.2	74	62	92.5	34 03.3	73	62	92.1	34 25.2	73	62	91.7
7	32 42.1	74	62	92.1	33 04.3	74	62	91.7	33 26.3	73	62	91.3	33 48.3	73	62	90.9
8	32 05.2	74	62	91.3	32 27.3	74	62	90.9	32 49.4	73	62	90.5	33 11.4	73	62	90.1
9	31 28.3	74	62	90.5	31 50.4	74	62	90.1	32 12.5	73	62	89.7	32 34.4	73	62	89.3
70	30 51.3	74	62	89.7	31 13.5	74	62	89.3	31 35.5	73	62	88.9	31 57.5	73	62	88.5
1	30 14.4	74	62	88.9	30 36.5	74	62	88.5	30 58.6	73	62	88.2	31 20.6	73	62	87.8
2	29 37.5	74	62	88.2	29 59.6	74	62	87.8	30 21.7	73	61	87.4	30 43.7	73	61	87.0
3	29 00.6	74	62	87.4	29 22.7	74	61	87.0	29 44.8	73	61	86.6	30 06.8	73	61	86.2
4	28 23.7	74	61	86.6	28 45.8	74	61	86.2	29 07.9	74	61	85.8	29 30.0	73	61	85.5
75	27 46.8	74	61	85.8	28 09.0	74	61	85.5	28 31.1	74	61	85.1	28 53.2	73	61	84.7
6	27 10.0	74	61	85.1	27 32.2	74	61	84.7	27 54.3	74	61	84.3	28 16.4	73	61	83.9
7	26 33.2	74	61	84.3	26 55.4	74	61	83.9	27 17.6	74	61	83.6	27 39.7	74	61	83.2
8	25 56.5	74	61	83.6	26 18.7	74	61	83.2	26 40.9	74	61	82.8	27 03.1	74	61	82.4
9	25 19.8	74	61	82.8	25 42.1	74	61	82.4	26 04.3	74	61	82.1	26 26.5	74	61	81.7
80	24 43.2	74	61	82.1	25 05.5	74	61	81.7	25 27.7	74	61	81.3	25 49.9	74	61	81.0
1	24 06.6	75	61	81.3	24 29.0	74	61	81.0	24 51.3	74	61	80.6	25 13.5	74	61	80.2
2	23 30.1	75	61	80.6	23 52.5	75	61	80.2	24 14.9	74	61	79.8	24 37.1	74	60	79.5
3	22 53.7	75	61	79.8	23 16.2	75	60	79.5	23 38.5	75	60	79.1	24 00.9	74	60	78.7
4	22 17.4	75	60	79.1	22 39.9	75	60	78.7	23 02.3	75	60	78.4	23 24.7	74	60	78.0
85	21 41.2	75	60	78.3	22 03.7	75	60	78.0	22 26.2	75	60	77.6	22 48.6	75	60	77.3
6	21 05.1	75	60	77.6	21 27.6	75	60	77.3	21 50.2	75	60	76.9	22 12.6	75	60	76.5
7	20 29.0	75	60	76.9	20 51.7	75	60	76.5	21 14.2	75	60	76.2	21 36.8	75	60	75.8
8	19 53.1	76	60	76.1	20 15.8	75	60	75.8	20 38.4	75	59	75.4	21 01.0	75	59	75.1
9	19 17.3	76	59	75.4	19 40.0	76	59	75.1	20 02.7	76	59	74.7	20 25.4	75	59	74.4
90	18 41.6	76	59	74.7	19 04.4	76	59	74.3	19 27.2	76	59	74.0	19 49.9	76	59	73.6

26° 00′				26° 30′				27° 00′				27° 30′				H.A.
Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.	
° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	°
64 00.0	1.0	01	180.0	64 30.0	1.0	01	180.0	65 00.0	1.0	01	180.0	65 30.0	1.0	01	180.0	00
63 59.3	1.0	03	178.0	64 29.3	1.0	03	177.9	64 59.3	1.0	03	177.9	65 29.3	1.0	03	177.9	1
63 57.4	1.0	05	175.9	64 27.3	1.0	06	175.8	64 57.3	1.0	06	175.8	65 27.2	1.0	06	175.7	2
63 54.1	1.0	08	173.9	64 24.0	1.0	08	173.8	64 53.9	1.0	08	173.7	65 23.8	1.0	08	173.6	3
63 49.5	1.0	10	171.8	64 19.3	1.0	10	171.7	64 49.2	99	10	171.6	65 19.0	99	10	171.5	4
63 43.6	99	12	169.8	64 13.3	99	12	169.7	64 43.1	99	12	169.5	65 12.9	99	12	169.4	05
63 36.4	99	14	167.8	64 06.1	99	14	167.6	64 35.7	99	14	167.5	65 05.4	99	15	167.3	6
63 28.0	99	16	165.8	63 57.5	99	16	165.6	64 27.1	98	17	165.4	64 56.6	98	17	165.2	7
63 18.3	98	18	163.8	63 47.7	98	18	163.6	64 17.1	98	19	163.4	64 46.5	98	19	163.2	8
63 07.4	98	20	161.9	63 36.7	98	20	161.6	64 06.0	98	21	161.4	64 35.2	97	21	161.1	9
62 55.3	97	22	159.9	63 24.5	97	22	159.7	63 53.6	97	23	159.4	64 22.7	97	23	159.1	10
62 42.1	97	24	158.0	63 11.1	97	24	157.8	63 40.0	96	25	157.5	64 08.9	96	25	157.2	1
62 27.7	96	26	156.2	62 56.5	96	26	155.9	63 25.3	96	26	155.5	63 54.0	96	27	155.2	2
62 12.2	95	28	154.3	62 40.8	95	28	154.0	63 09.4	95	28	153.6	63 38.0	95	29	153.3	3
61 55.7	95	29	152.5	62 24.1	95	30	152.1	62 52.5	95	30	151.8	63 20.8	94	30	151.4	4
61 38.1	94	31	150.7	62 06.3	94	31	150.3	62 34.5	94	32	150.0	63 02.6	94	32	149.6	15
61 19.5	94	33	148.9	61 47.5	93	33	148.5	62 15.5	93	33	148.2	62 43.4	93	34	147.8	6
61 00.0	93	34	147.2	61 27.8	93	34	146.8	61 55.5	92	35	146.4	62 23.2	92	35	146.0	7
60 39.5	92	36	145.5	61 07.1	92	36	145.1	61 34.6	92	36	144.7	62 02.1	91	37	144.2	8
60 18.1	91	37	143.8	60 45.5	91	37	143.4	61 12.8	91	38	143.0	61 40.1	91	38	142.5	9
59 55.9	91	38	142.2	60 23.0	90	39	141.7	60 50.1	90	39	141.3	61 17.2	90	40	140.8	20
59 32.8	90	40	140.5	59 59.8	90	40	140.1	60 26.6	89	40	139.7	60 53.4	89	41	139.2	1
59 08.9	89	41	139.0	59 35.7	89	41	138.5	60 02.3	89	42	138.1	60 28.9	88	42	137.6	2
58 44.3	89	42	137.4	59 10.8	88	43	137.0	59 37.3	88	43	136.5	60 03.6	88	43	136.0	3
58 18.9	88	43	135.9	58 45.3	88	44	135.4	59 11.5	87	44	135.0	59 37.6	87	44	134.5	4
57 52.9	87	45	134.4	58 19.0	87	45	133.9	58 45.0	87	45	133.5	59 10.9	86	46	133.0	25
57 26.2	87	46	132.9	57 52.1	86	46	132.5	58 17.9	86	46	132.0	58 43.6	85	47	131.5	6
56 58.8	86	47	131.5	57 24.5	85	47	131.0	57 50.1	85	47	130.6	58 15.6	85	48	130.1	7
56 30.9	85	48	130.1	56 56.4	85	48	129.6	57 21.7	84	48	129.1	57 47.0	84	49	128.6	8
56 02.3	85	48	128.7	56 27.6	84	49	128.3	56 52.8	84	49	127.8	57 17.9	83	49	127.3	9
55 33.2	84	49	127.4	55 58.3	84	50	126.9	56 23.3	83	50	126.4	56 48.2	83	50	125.9	30
55 03.6	83	50	126.1	55 28.6	83	50	125.6	55 53.4	82	51	125.1	56 18.0	82	51	124.6	1
54 33.5	83	51	124.8	54 58.3	82	51	124.3	55 22.9	82	52	123.8	55 47.4	81	52	123.3	2
54 03.0	82	52	123.5	54 27.5	82	52	123.0	54 52.0	81	52	122.5	55 16.3	81	53	122.0	3
53 31.9	82	52	122.3	53 56.3	81	53	121.8	54 20.6	81	53	121.3	54 44.7	80	53	120.8	4
53 00.5	81	53	121.0	53 24.7	81	53	120.6	53 48.8	80	54	120.0	54 12.8	80	54	119.5	35
52 28.6	80	54	119.8	52 52.7	80	54	119.4	53 16.7	80	54	118.9	53 40.5	79	54	118.3	6
51 56.4	80	54	118.7	52 20.3	80	55	118.2	52 44.1	79	55	117.7	53 07.8	79	55	117.2	7
51 23.8	79	55	117.5	51 47.6	79	55	117.0	52 11.2	79	55	116.5	52 34.8	78	56	116.0	8
50 50.9	79	55	116.4	51 14.5	79	56	115.9	51 38.0	78	56	115.4	52 01.4	78	56	114.9	9
50 17.6	79	56	115.3	50 41.1	78	56	114.8	51 04.5	78	56	114.3	51 27.7	77	57	113.8	40
49 44.1	78	56	114.2	50 07.5	78	57	113.7	50 30.7	77	57	113.2	50 53.8	77	57	112.7	1
49 10.3	78	57	113.1	49 33.5	77	57	112.6	49 56.6	77	57	112.1	50 19.6	76	57	111.6	2
48 36.1	77	57	112.0	48 59.3	77	57	111.6	49 22.2	76	58	111.1	49 45.1	76	58	110.6	3
48 01.8	77	58	111.0	48 24.8	76	58	110.5	48 47.7	76	58	110.0	49 10.4	76	58	109.5	4
47 27.2	77	58	110.0	47 50.1	76	58	109.5	48 12.8	76	58	109.0	48 35.5	75	59	108.5	45
46 52.3	76	58	109.0	47 15.1	76	59	108.5	47 37.8	75	59	108.0	48 00.4	75	59	107.5	6
46 17.3	76	59	108.0	46 40.0	75	59	107.5	47 02.6	75	59	107.0	47 25.0	75	59	106.5	7
45 42.1	76	59	107.0	46 04.7	75	59	106.5	46 27.2	75	59	106.0	46 49.5	74	59	105.6	8
45 06.7	75	59	106.0	45 29.2	75	59	105.6	45 51.6	74	60	105.1	46 13.9	74	60	104.6	9
44 31.1	75	60	105.1	44 53.5	75	60	104.6	45 15.8	74	60	104.1	45 38.0	74	60	103.6	50
43 55.3	75	60	104.1	44 17.7	74	60	103.7	44 39.9	74	60	103.2	45 02.1	74	60	102.7	1
43 19.4	75	60	103.2	43 41.7	74	60	102.7	44 03.9	74	60	102.3	44 26.0	73	60	101.8	2
42 43.4	74	60	102.3	43 05.6	74	60	101.8	43 27.8	74	60	101.4	43 49.8	73	61	100.9	3
42 07.2	74	60	101.4	42 29.4	74	61	100.9	42 51.5	73	61	100.5	43 13.4	73	61	100.0	4
41 31.0	74	61	100.5	41 53.1	74	61	100.0	42 15.1	73	61	99.6	42 37.0	73	61	99.1	55
40 54.6	74	61	99.6	41 16.7	73	61	99.2	41 38.6	73	61	98.7	42 00.5	73	61	98.2	6
40 18.1	74	61	98.7	40 40.2	73	61	98.3	41 02.1	73	61	97.8	41 23.9	73	61	97.4	7
39 41.6	73	61	97.9	40 03.6	73	61	97.4	40 25.4	73	61	97.0	40 47.2	72	61	96.5	8
39 05.0	73	61	97.0	39 26.9	73	61	96.6	39 48.8	73	61	96.1	40 10.5	72	61	95.7	9
38 28.3	73	61	96.2	38 50.2	73	61	95.7	39 12.0	73	61	95.3	39 33.7	72	61	94.9	60
37 51.5	73	61	95.3	38 13.4	73	61	94.9	38 35.2	72	61	94.5	38 56.9	72	61	94.0	1
37 14.7	73	61	94.5	37 36.6	73	61	94.1	37 58.3	72	61	93.6	38 20.0	72	61	93.2	2
36 37.9	73	61	93.7	36 59.7	73	61	93.3	37 21.5	72	62	92.8	37 43.1	72	62	92.4	3
36 01.0	73	62	92.9	36 22.8	73	62	92.5	36 44.6	72	62	92.0	37 06.2	72	62	91.6	4
35 24.1	73	62	92.1	35 45.9	73	62	91.6	36 07.6	72	62	91.2	36 29.3	72	62	90.8	65
34 47.1	73	62	91.3	35 09.0	73	62	90.9	35 30.7	72	62	90.4	35 52.3	72	62	90.0	6
34 10.2	73	62	90.5	34 32.0	73	62	90.1	34 53.8	72	62	89.6	35 15.4	72	62	89.2	7
33 33.3	73	62	89.7	33 55.1	73	62	89.3	34 16.8	72	62	88.9	34 38.5	72	62	88.4	8
32 56.3	73	62	88.9	33 18.2	73	62	88.5	33 39.9	72	62	88.1	34 01.6	72	62	87.7	9
32 19.4	73	62	88.1	32 41.2	73	62	87.7	33 03.0	72	61	87.3	33 24.7	72	61	86.9	70
31 42.5	73	61	87.4	32 04.3	73	61	86.9	32 26.1	72	61	86.5	32 47.8	72	61	86.1	1
31 05.6	73	61	86.6	31 27.5	73	61	86.2	31 49.2	72	61	85.8	32 10.9	72	61	85.4	2
30 28.8	73	61	85.8	30 50.6	73	61	85.4	31 12.4	73	61	85.0	31 34.1	72	61	84.6	3
29 51.9	73	61	85.1	30 13.8	73	61	84.7	30 35.6	73	61	84.3	30 57.4	72	61	83.9	4
29 15.2	73	61	84.3	29 37.1	73	61	83.9	29 58.9	73	61	83.5	30 20.7	72	61	83.1	75
28 38.4	73	61	83.6	29 00.4	73	61	83.2	29 22.2	73	61	82.8	29 44.0	73	61	82.4	6
28 01.7	73	61	82.8	28 23.7	73	61	82.4	28 45.6	73	61	82.0	29 07.5	73	61	81.6	7
27 25.1	73	61	82.1	27 47.1	73	61	81.7	28 09.1	73	61	81.3	28 31.0	73	61	80.9	8
26 48.6	74	61	81.3	27 10.6	73	61	80.9	27 32.6	73	61	80.6	27 54.5	73	61	80.2	9
26 12.1	74	61	80.6	26 34.2	74	61	80.2	26 56.2	73	61	79.8	27 18.2	73	60	79.4	80
25 35.7	74	61	79.8	25 57.8	74	60	79.5	26 19.9	73	60	79.1	26 41.9	73	60	78.7	1
24 59.4	74	60	79.1	25 21.5	74	60	78.7	25 43.7	74	60	78.4	26 05.7	73	60	78.0	2
24 23.1	74	60	78.4	24 45.4	74	60	78.0	25 07.5	74	60	77.6	25 29.6	74	60	77.3	3
23 47.0	74	60	77.6	24 09.3	74	60	77.3	24 31.5	74	60	76.9	24 53.7	74	60	76.5	4
23 11.0	74	60	76.9	23 33.3	74	60	76.5	23 55.6	74	60	76.2	24 17.8	74	60	75.8	85
22 35.1	75	60	76.2	22 57.4	75	60	75.8	23 19.8	74	59	75.5	23 42.0	74	59	75.1	6
21 59.2	75	59	75.5	22 21.7	75	59	75.1	22 44.1	75	59	74.7	23 06.4	74	59	74.4	7
21 23.5	75	59	74.7	21 46.0	75	59	74.4	22 08.5	75	59	74.0	22 30.9	75	59	73.7	8
20 48.0	75	59	74.0	21 10.5	75	59	73.7	21 33.0	75	59	73.3	21 55.5	75	59	72.9	9
20 12.5	75	59	73.3	20 35.1	75	59	72.9	20 57.7	75	59	72.6	21 20.3	75	58	72.2	90

Digitized by Google

Lat 52°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	°
00	14 00.0	1.0 00	180.0	13 30.0	1.0 00	180.0	13 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	00
1	13 59.7	1.0 02	179.1	13 29.7	1.0 02	179.1	12 59.7	1.0 02	179.1	12 29.7	1.0 02	179.1	11 59.7	1.0 01	179.1	11 29.7	1.0 01	179.1	10 59.7	1.0 01	179.1	10 29.7	1.0 01	179.1	1
2	13 58.8	1.0 03	178.1	13 28.8	1.0 03	178.1	12 58.8	1.0 02	178.1	12 28.8	1.0 02	178.2	11 58.8	1.0 02	178.2	11 28.8	1.0 02	178.2	10 58.8	1.0 02	178.2	10 28.8	1.0 02	178.2	2
3	13 57.3	1.0 04	177.2	13 27.3	1.0 04	177.2	12 57.3	1.0 04	177.2	12 27.3	1.0 03	177.2	11 57.3	1.0 03	177.2	11 27.4	1.0 03	177.3	10 57.4	1.0 03	177.3	10 27.4	1.0 03	177.3	3
4	13 55.1	1.0 05	176.2	13 25.2	1.0 05	176.3	12 55.2	1.0 04	176.3	12 25.2	1.0 04	176.3	11 55.3	1.0 04	176.3	11 25.3	1.0 04	176.3	10 55.3	1.0 04	176.4	10 25.3	1.0 04	176.4	4
05	13 52.4	1.0 06	175.3	13 22.5	1.0 06	175.3	12 52.5	1.0 06	175.4	12 22.6	1.0 05	175.4	11 52.6	1.0 05	175.4	11 22.6	1.0 05	175.4	10 52.7	1.0 05	175.5	10 22.7	1.0 05	175.5	05
6	13 49.1	1.0 07	174.4	13 19.2	1.0 06	174.4	12 49.2	1.0 06	174.4	12 19.3	1.0 06	174.5	11 49.4	1.0 06	174.5	11 19.4	1.0 06	174.5	10 49.5	1.0 06	174.6	10 19.5	1.0 06	174.6	6
7	13 45.2	1.0 08	173.4	13 15.2	1.0 08	173.5	12 45.3	1.0 07	173.5	12 15.4	1.0 07	173.5	11 45.5	1.0 07	173.6	11 15.6	1.0 07	173.6	10 45.7	1.0 07	173.7	10 15.8	1.0 07	173.7	7
8	13 40.6	1.0 09	172.5	13 10.7	1.0 08	172.5	12 40.9	1.0 08	172.6	12 11.0	1.0 08	172.6	11 41.1	1.0 08	172.7	11 11.2	1.0 08	172.7	10 41.3	1.0 08	172.8	10 11.4	1.0 08	172.8	8
9	13 35.5	1.0 10	171.5	13 05.6	1.0 09	171.6	12 35.8	1.0 09	171.6	12 05.9	1.0 09	171.7	11 36.1	1.0 09	171.7	11 06.2	1.0 09	171.8	10 36.4	1.0 09	171.8	10 06.5	1.0 09	171.9	9
10	13 29.8	99 11	170.6	12 59.9	99 10	170.7	12 30.1	99 10	170.7	12 00.3	99 10	170.8	11 30.5	99 10	170.8	11 00.7	99 10	170.9	10 30.8	99 10	170.9	10 01.0	99 10	171.0	10
1	13 23.4	99 12	169.7	12 53.7	99 11	169.7	12 23.9	99 11	169.8	11 54.1	99 11	169.9	11 24.3	99 11	169.9	10 54.5	99 11	170.0	10 24.7	99 11	170.0	9 55.0	99 11	170.1	1
2	13 16.5	99 12	168.7	12 46.8	99 12	168.8	12 17.0	99 12	168.9	11 47.3	99 12	168.9	11 17.6	99 12	169.0	10 47.8	99 12	169.1	10 18.1	99 12	169.1	9 48.3	99 12	169.2	2
3	13 09.0	99 13	167.8	12 39.3	99 13	167.9	12 09.6	99 13	168.0	11 39.9	99 13	168.0	11 10.2	99 13	168.1	10 40.5	99 13	168.2	10 10.8	99 13	168.2	9 41.1	99 13	168.3	3
4	13 00.9	99 14	166.9	12 31.3	99 14	167.0	12 01.6	99 14	167.0	11 32.0	99 14	167.1	11 02.3	99 14	167.2	10 32.7	99 14	167.3	10 03.0	99 14	167.4	9 33.4	99 14	167.4	4
15	12 52.3	99 15	166.0	12 22.7	99 15	166.0	11 53.1	99 15	166.1	11 23.5	99 15	166.2	10 53.9	99 15	166.3	10 24.3	99 15	166.4	9 54.7	99 15	166.5	9 25.1	99 15	166.5	15
6	12 43.0	98 16	165.0	12 13.5	98 16	165.1	11 43.9	98 16	165.2	11 14.4	98 16	165.3	10 44.8	98 16	165.4	10 15.3	99 16	165.5	9 45.7	99 16	165.6	9 16.2	99 16	165.7	6
7	12 33.2	98 17	164.1	12 03.7	98 17	164.2	11 34.2	98 17	164.3	11 04.7	98 17	164.4	10 35.2	98 17	164.5	10 05.7	98 17	164.6	9 36.2	98 17	164.7	9 06.8	98 17	164.8	7
8	12 22.8	98 18	163.2	11 53.4	98 18	163.3	11 23.9	98 18	163.4	10 54.5	98 18	163.5	10 25.1	98 18	163.6	9 55.6	98 18	163.7	9 26.2	98 18	163.8	8 56.8	98 18	163.9	8
9	12 11.8	98 19	162.3	11 42.5	98 19	162.4	11 13.1	98 19	162.5	10 43.7	98 19	162.6	10 14.4	98 19	162.7	9 45.0	98 19	162.8	9 15.6	98 19	162.9	8 46.3	98 18	163.0	9
20	12 00.3	98 20	161.4	11 31.0	98 20	161.5	11 01.7	98 20	161.6	10 32.4	98 20	161.7	10 03.1	98 20	161.8	9 33.8	98 20	161.9	9 04.5	98 19	162.0	8 35.2	98 19	162.1	20
1	11 48.2	97 21	160.5	11 19.0	97 21	160.6	10 49.8	97 21	160.7	10 20.5	97 21	160.8	9 51.3	97 21	160.9	9 22.1	97 20	161.0	8 52.8	97 20	161.1	8 23.6	97 20	161.3	1
2	11 35.6	97 22	159.6	11 06.5	97 22	159.7	10 37.3	97 22	159.8	10 08.1	97 22	159.9	9 39.0	97 21	160.0	9 09.8	97 21	160.1	8 40.6	97 21	160.3	8 11.4	97 21	160.4	2
3	11 22.4	97 23	158.6	10 53.4	97 23	158.8	10 24.3	97 23	158.9	9 55.2	97 22	159.0	9 26.1	97 22	159.1	8 57.0	97 22	159.3	8 27.9	97 22	159.4	7 58.8	97 22	159.5	3
4	11 08.7	97 24	157.7	10 39.7	97 24	157.9	10 10.7	97 24	158.0	9 41.7	97 23	158.1	9 12.7	97 23	158.3	8 43.6	97 23	158.4	8 14.6	97 23	158.5	7 45.6	97 23	158.6	4
25	10 54.5	96 25	156.8	10 25.5	96 25	157.0	9 56.6	96 24	157.1	9 27.7	96 24	157.2	8 58.7	96 24	157.4	8 29.8	96 24	157.5	8 00.8	96 24	157.6	7 31.9	96 24	157.8	25
6	10 39.7	96 26	156.0	10 10.8	96 25	156.1	9 42.0	96 25	156.2	9 13.1	96 25	156.4	8 44.3	96 25	156.5	8 15.4	96 25	156.6	7 46.5	96 25	156.8	7 17.7	96 25	156.9	6
7	10 24.4	96 26	155.1	9 55.6	96 26	155.2	9 26.8	96 26	155.3	8 58.0	96 26	155.5	8 29.3	96 26	155.6	8 00.5	96 26	155.8	7 31.7	96 26	155.9	7 02.9	96 25	156.1	7
8	10 08.5	96 27	154.2	9 39.8	96 27	154.3	9 11.2	96 27	154.5	8 42.5	96 27	154.6	8 13.8	96 27	154.8	7 45.1	96 27	154.9	7 16.4	96 26	155.1	6 47.7	96 26	155.2	8
9	9 52.2	95 28	153.3	9 23.6	95 28	153.4	8 55.0	95 28	153.6	8 26.4	95 28	153.7	7 57.8	95 28	153.9	7 29.2	95 27	154.0	7 00.6	95 27	154.2	6 31.9	95 27	154.4	9
30	9 35.3	95 29	152.4	9 06.8	95 29	152.6	8 38.3	95 29	152.7	8 09.8	95 28	152.9	7 41.3	95 28	153.0	7 12.8	95 28	153.2	6 44.2	95 28	153.3	6 15.7	95 28	153.5	30
1	9 17.9	95 30	151.5	8 49.5	95 30	151.7	8 21.1	95 29	151.8	7 52.7	95 29	152.0	7 24.3	95 29	152.2	6 55.8	95 29	152.3	6 27.4	95 29	152.5	5 59.0	95 29	152.7	1
2	9 00.1	94 31	150.6	8 31.8	94 30	150.8	8 03.4	94 30	151.0	7 35.1	94 30	151.1	7 06.8	94 30	151.3	6 38.5	94 30	151.5	6 10.1	94 30	151.6	5 41.8	94 30	151.8	2
3	8 41.7	94 31	149.8	8 13.5	94 31	150.0	7 45.3	94 31	150.1	7 17.1	94 31	150.3	6 48.8	94 31	150.5	6 20.6	94 31	150.6	5 52.3	94 30	150.8	5 24.1	94 30	151.0	3
4	8 22.9	94 32	148.9	7 54.8	94 32	149.1	7 26.6	94 32	149.3	6 58.5	94 32	149.4	6 30.4	94 32	149.6	6 02.2	94 31	149.8	5 34.1	94 31	150.0	5 05.9	94 31	150.1	4
35	8 03.6	93 33	148.0	7 35.6	93 33	148.2	7 07.5	93 33	148.4	6 39.5	93 32	148.6	6 11.4	93 32	148.8	5 43.4	93 32	148.9	5 15.4	94 32	149.1				35
6	7 43.8	93 34	147.2	7 15.9	93 34	147.4	6 47.9	93 33	147.6	6 20.0	93 33	147.7	5 52.1	93 33	147.9	5 24.1	93 33	148.1							6
7	7 23.6	93 34	146.3	6 55.7	93 34	146.5	6 27.9	93 34	146.7	6 00.1	93 34	146.9	5 32.2	93 34	147.1	5 04.4	93 34	147.3							7
8	7 02.8	92 35	145.5	6 35.1	92 35	145.7	6 07.4	92 35	145.9	5 39.6	92 35	146.1	5 11.9	92 34	146.2										8
9	6 41.7	92 36	144.6	6 14.1	92 36	144.8	5 46.4	92 36	145.0	5 18.8	92 35	145.2													9
40	6 20.1	92 37	143.8	5 52.6	92 37	144.0	5 25.0	92 36	144.2																40
1	5 58.0	91 37	142.9	5 30.6	91 37	143.1	5 03.2	91 37	143.4																1
2	5 35.6	91 38	142.1	5 08.3	91 38	142.3																			2
3	5 12.7	91 39	141.3																						3

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	°
91	18 06.1	76 59	73.9	18 28.9	76 59	73.6	18 51.7	76 59	73.3	19 14.5	76 59	72.9	19 37.2	76 59	72.6	19 59.9	76 58	72.2	20 22.5	75 58	71.9	20 45.2	75 58	71.5	91
2	17 30.6	76 59	73.2	17 53.5	76 59	72.9	18 16.4	76 59	72.5	18 39.2	76 58	72.2	19 02.0	76 58	71.8	19 24.8	76 58	71.5	19 47.5	76 58	71.2	20 10.2	76 58	70.8	2
3	16 55.3	77 59	72.5	17 18.3	77 58	72.1	17 41.3	76 58	71.8	18 04.2	76 58	71.5	18 27.0	76 58	71.1	18 49.8	76 58	70.8	19 12.6	76 58	70.4	19 35.4	76 58	70.1	3
4	16 20.2	77 58	71.7	16 43.2	77 58	71.4	17 06.2	77 58	71.1	17 29.2	77 58	70.7	17 52.1	76 58	70.4	18 15.0	76 58	70.1	18 37.9	76 58	69.7	19 00.7	76 58	69.4	4
95	15 45.2	77 58	71.0	16 08.3	77 58	70.7	16 31.4	77 58	70.3	16 54.4	77 58	70.0	17 17.4	77 58	69.7	17 40.4	77 57	69.3	18 03.3	76 57	69.0	18 26.2	76 57	68.7	95
6	15 10.3	77 58	70.3	15 33.5	77 58	70.0	15 56.7	77 58	69.6	16 19.8	77 57	69.3	16 42.9	77 57	69.0	17 05.9	77 57	68.6	17 28.9	77 57	68.3	17 51.9	77 57	67.9	6
7	14 35.6	78 58	69.5	14 58.9	77 57	69.2	15 22.1	77 57	68.9	15 45.3	77 57	68.6	16 08.5	77 57	68.2	16 31.6	77 57	67.9	16 54.7	77 57	67.6	17 17.8	77 57	67.2	7
8	14 01.1	78 57	68.8	14 24.4	78 57	68.5	14 47.7	78 57	68.2	15 11.0	78 57	67.8	15 34.2	77 57	67.5	15 57.5	77 57	67.2	16 20.6	77 56	66.9	16 43.8	77 56	66.5	8
9	13 26.8	78 57	68.1	13 50.2	78 57	67.8	14 13.5	78 57	67.4	14 36.9	78 57	67.1	15 00.2	78 56	66.8	15 23.5	78 56	66.5	15 46.8	78 56	66.1	16 10.0	77 56	65.8	9
100	12 52.6	78 57	67.3	13 16.1	78 57	67.0	13 39.5	78 56	66.7	14 02.9	78 56	66.4	14 26.4	78 56	66.1	14 49.7	78 56	65.7	15 13.1	78 56	65.4	15 36.4	78 56	65.1	100
1	12 18.6	79 56	66.6	12 42.1	78 56	66.3	13 05.7	78 56	66.0	13 29.2	78 56	65.7	13 52.7	78 56	65.3	14 16.1	78 56	65.0	14 39.6	78 55	64.7	15 03.0	78 55	64.4	1
2	11 44.8	79 56	65.9	12 08.4	79 56	65.6	12 32.0	79 56	65.3	12 55.6	79 56	64.9	13 19.2	79 55	64.6	13 42.8	78 55	64.3	14 06.3	78 55	64.0	14 29.8	78 55	63.7	2
3	11 11.2	79 56	65.1	11 34.9	79 56	64.8	11 58.6	79 55	64.5	12 22.3	79 55	64.2	12 45.9	79 55	63.9	13 09.6	79 55	63.6	13 33.2	79 55	63.3	13 56.8	79 55	62.9	3
4	10 37.7	79 55	64.4	11 01.5	79 55	64.1	11 25.3	79 55	63.8	11 49.1	79 55	63.5	12 12.9	79 55	63.2	12 36.6	79 55	62.9	13 00.3	79 54	62.5	13 24.0	79 54	62.2	4
105	10 04.5	80 55	63.7	10 28.4	80 55	63.4	10 52.3	80 55	63.1	11 16.2	80 55	62.7	11 40.0	79 54	62.4	12 03.8	79 54	62.1	12 27.6	79 54	61.8	12 51.4	79 54	61.5	105
6	9 31.5	80 55	62.9	9 55.5	80 54	62.6	10 19.5	80 54	62.3	10 43.4	80 54	62.0	11 07.4	80 54	61.7	11 31.3	80 54	61.4	11 55.2	80 54	61.1	12 19.1	80 54	60.8	6
7	8 58.7	80 54	62.2	9 22.8	80 54	61.9	9 46.9	80 54	61.6	10 10.9	80 54	61.3	10 35.0	80 54	61.0	10 59.0	80 53	60.7	11 23.0	80 53	60.4	11 47.0	80 53	60.1	7
8	8 26.2	81 54	61.4	8 50.4	81 54	61.1	9 14.5	81 54	60.8	9 38.7	80 53	60.5	10 02.8	80 53	60.2	10 26.9	80 53	59.9	10 51.0	80 53	59.6	11 15.1	80 53	59.3	8
9	7 53.9	81 54	60.7	8 18.1	81 53	60.4	8 42.4	81 53	60.1	9 06.6	81 53	59.8	9 30.8	81 53	59.5	9 55.0	81 53	59.2	10 19.2	81 52	58.9	10 43.4	81 52	58.6	9
110	7 21.8	81 53	60.0	7 46.1	81 53	59.7	8 10.5	81 53	59.4	8 34.8	81 53	59.1	8 59.1	81 52	58.8	9 23.4	81 52	58.5	9 47.7	81 52	58.2	10 12.0	81 52	57.9	110
1	6 49.9	82 53	59.2	7 14.4	82 53	58.9	7 38.8	81 52	58.6	8 03.2	81 52	58.3	8 27.7	81 52	58.0	8 52.1	81 52	57.7	9 16.5	81 52	57.4	9 40.8	81 52	57.1	1
2	6 18.3	82 52	58.4	6 42.9	82 52	58.2	7 07.4	82 52	57.9	7 31.9	82 52	57.6	7 56.5	82 52	57.3	8 21.0	82 51	57.0	8 45.5	82 51	56.7	9 09.9	82 51	56.4	2
3	5 46.9	82 52	57.7	6 11.6	82 52	57.4	6 36.2	82 52	57.1	7 00.9	82 51	56.8	7 25.5	82 51	56.5	7 50.1	82 51	56.3	8 14.7	82 51	56.0	8 39.3	82 51	55.7	3
4	5 15.9	83 52	56.9	5 40.6	82 51	56.7	6 05.4	82 51	56.4	6 30.1	82 51	56.1	6 54.8	82 51	55.8	7 19.5	82 51	55.5	7 44.2	82 50	55.2	8 08.9	82 50	54.9	4
115				5 09.9	83 51	55.9	5 34.7	83 51	55.6	5 59.6	83 50	55.3	6 24.4	83 50	55.1	6 49.2	83 50	54.8	7 14.0	83 50	54.5	7 38.8	83 50	54.2	115
6							5 04.4	83 50	54.9	5 29.3	83 50	54.6	5 54.3	83 50	54.3	6 19.2	83 50	54.0	6 44.1	83 49	53.7	7 09.0	83 49	53.5	6
7													5 24.4	83 49	53.6	5 49.4	83 49	53.3	6 14.5	83 49	53.0	6 39.5	83 49	52.7	7
8																5 20.0	84 49	52.5	5 45.1	84 48	52.2	6 10.2	84 48	52.0	8
9																			5 16.0	84 48	51.5	5 41.3	84 48	51.2	9
120																						5 12.6	84 47	50.5	120

Digitized by Google

Lat. 52°

H.A.	28° 00′		28° 30′		29° 00′		30° 00′		32° 00′		34° 00′		34° 30′		35° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	66 00.0 1.0 01	180.0	66 30.0 1.0 01	180.0	67 00.0 1.0 01	180.0	68 00.0 1.0 01	180.0	70 00.0 1.0 01	180.0	72 00.0 1.0 01	180.0	72 30.0 1.0 01	180.0	73 30.0 1.0 02	180.0	00
1	65 59.3 1.0 04	177.8	66 29.3 1.0 04	177.8	66 59.3 1.0 04	177.8	67 59.3 1.0 04	177.7	69 59.2 1.0 04	177.5	71 59.1 1.0 04	177.3	72 29.1 1.0 04	177.3	73 29.1 1.0 05	177.1	1
2	65 57.2 1.0 06	175.7	66 27.2 1.0 06	175.6	66 57.1 1.0 06	175.5	67 57.0 1.0 06	175.4	69 56.8 1.0 07	175.0	71 56.5 1.0 07	174.6	72 26.5 1.0 07	174.5	73 26.3 1.0 08	174.3	2
3	65 53.7 1.0 08	173.5	66 23.6 1.0 08	173.4	66 53.5 1.0 08	173.3	67 53 3 1.0 09	173.1	69 52.8 1.0 09	172.6	71 52.2 99 10	172.0	72 22.1 99 10	171.8	73 21.7 99 11	171.4	3
4	65 48.8 99 10	171.4	66 18.7 99 11	171.2	66 48.5 99 11	171.1	67 48.1 99 11	170.8	69 47.3 99 12	170.1	71 46.3 99 13	169.3	72 16.0 99 13	169.1	73 15.3 99 14	168.6	4
05	65 42.6 99 13	169.2	66 12.4 99 13	169.1	66 42.1 99 13	168.9	67 41.5 99 13	168.5	69 40.2 99 14	167.7	71 38.6 99 15	166.7	72 08.2 98 16	166.5	73 07.2 98 16	165.9	05
6	65 35.0 99 15	167.1	66 04.7 99 15	166.9	66 34.3 99 15	166.7	67 33.4 99 16	166.3	69 31.6 98 17	165.3	71 29.3 98 18	164.2	71 58.7 98 18	163.8	72 57.3 98 19	163.1	6
7	65 26.1 98 17	165.0	65 55.6 98 17	164.8	66 25.1 98 18	164.5	67 24.0 98 18	164.1	69 21.5 98 19	163.0	71 18.4 97 21	161.6	71 47.6 97 21	161.2	72 45.7 97 22	160.4	7
8	65 15.9 98 19	162.9	65 45.3 98 19	162.7	66 14.6 98 20	162.4	67 13.2 98 20	161.9	69 09.9 97 22	160.6	71 06.0 96 23	159.1	71 34.9 96 24	158.7	72 32.6 96 25	157.8	8
9	65 04.4 97 21	160.9	65 33.6 97 22	160.6	66 02.8 97 22	160.3	67 01.0 97 22	159.7	68 57.0 96 24	158.3	70 52.1 96 26	156.7	71 20.8 95 26	156.2	72 17.9 95 27	155.2	9
10	64 51.7 97 23	158.8	65 20.7 97 24	158.5	65 49.7 97 24	158.2	66 47.6 96 25	157.6	68 42.7 96 26	156.1	70 36.8 95 28	154.3	71 05.2 94 28	153.8	72 01.7 94 29	152.7	10
1	64 37.8 96 26	156.8	65 06.6 96 26	156.5	65 35.4 96 26	156.2	66 32.8 96 27	155.5	68 27.0 95 28	153.9	70 20.1 94 30	152.0	70 48.2 93 31	151.4	71 44.0 93 32	150.3	1
2	64 22.7 96 27	154.9	64 51.3 95 27	154.5	65 19.9 95 28	154.2	66 16.9 95 29	153.4	68 10.1 94 30	151.7	70 02.1 93 32	149.7	70 29.9 92 33	149.1	71 25.1 92 34	147.9	2
3	64 06.4 95 29	152.9	64 34.9 95 29	152.6	65 03.2 94 30	152.2	65 59.8 94 30	151.4	67 52.0 93 32	149.6	69 42.8 92 34	147.5	70 10.3 91 35	146.9	71 04.8 90 36	145.6	3
4	63 49.1 94 31	151.0	64 17.3 94 31	150.7	64 45.4 94 31	150.3	65 41.5 93 32	149.4	67 32.7 92 34	147.5	69 22.4 91 36	145.3	69 49.5 90 37	144.7	70 43.4 89 38	143.4	4
15	63 30.7 93 32	149.2	63 58.7 93 33	148.8	64 26.6 93 33	148.4	65 22.2 92 34	147.5	67 12.3 91 36	145.5	69 00.8 90 38	143.2	69 27.6 89 38	142.6	70 20.8 88 39	141.2	15
6	63 11.2 93 34	147.3	63 39.0 92 34	146.9	64 06.7 92 35	146.5	65 01.8 92 36	145.6	66 50.9 90 37	143.5	68 38.2 88 39	141.2	69 04.6 88 40	140.5	69 57.1 87 41	139.1	6
7	62 50.8 92 36	145.6	63 18.4 92 36	145.1	63 45.8 91 36	144.7	64 40.4 91 37	143.7	66 28.4 89 39	141.6	68 14.5 87 41	139.2	68 40.6 87 42	138.5	69 32.4 86 43	137.1	7
8	62 29.5 91 37	143.8	62 56.8 91 38	143.3	63 24.0 91 38	142.9	64 18.1 90 39	141.9	66 05.0 88 41	139.7	67 49.9 86 43	137.2	68 15.7 86 43	136.6	69 06.8 85 44	135.1	8
9	62 07.2 90 39	142.1	62 34.3 90 39	141.6	63 01.2 90 39	141.1	63 54.8 89 40	140.1	65 40.7 87 42	137.9	67 24.3 85 44	135.4	67 49.9 85 44	134.7	68 40.3 83 46	133.2	9
20	61 44.1 90 40	140.4	62 10.9 89 40	139.9	62 37.6 89 41	139.4	63 30.7 88 42	138.4	65 15.5 86 43	136.1	66 58.0 84 45	133.6	67 23.2 84 46	132.9	68 13.0 82 47	131.4	20
1	61 20.1 89 41	138.7	61 46.7 88 42	138.2	62 13.2 88 42	137.7	63 05.8 87 43	136.7	64 49.5 85 45	134.4	66 30.8 83 46	131.8	66 55.7 83 47	131.1	67 44.9 81 48	129.6	1
2	60 55.3 88 43	137.1	61 21.7 88 43	136.6	61 47.9 87 43	136.1	62 40.1 86 44	135.0	64 22.7 85 46	132.7	66 02.9 82 48	130.1	66 27.5 82 48	129.4	67 16.1 80 49	127.9	2
3	60 29.8 87 44	135.5	60 56.0 87 44	135.0	61 22.0 86 44	134.5	62 13.6 86 45	133.4	63 55.2 84 47	131.1	65 34.3 81 49	128.4	65 58.6 81 49	127.7	66 46.6 79 50	126.2	3
4	60 03.6 87 45	134.0	60 29.5 86 45	133.5	60 55.3 86 46	132.9	61 46.4 85 46	131.9	63 27.1 83 48	129.5	65 05.1 80 50	126.8	65 29.1 80 50	126.1	66 16.5 78 51	124.6	4
25	59 36.7 86 46	132.5	60 02.4 85 46	132.0	60 27.9 85 47	131.4	61 18.6 84 47	130.3	62 58.2 82 49	127.9	64 35.2 80 51	125.3	64 59.0 79 51	124.6	65 45.8 77 52	123.1	25
6	59 09.1 85 47	131.0	59 34.6 85 47	130.5	59 59.9 84 48	129.9	60 50.1 83 48	128.8	62 28.8 81 50	126.4	64 04.8 79 52	123.8	64 28.3 78 52	123.0	65 14.6 76 53	121.5	6
7	58 40.9 84 48	129.5	59 06.2 84 48	129.0	59 31.3 83 49	128.5	60 21.1 83 49	127.4	61 58.8 80 51	125.0	63 33.8 78 52	122.3	63 57.0 77 53	121.6	64 42.9 76 54	120.1	7
8	58 12.2 84 49	128.1	58 37.2 83 49	127.6	59 02.1 83 50	127.1	59 51.4 82 50	125.9	61 28.3 80 52	123.5	63 02.3 77 53	120.9	63 25.3 76 54	120.1	64 10.7 75 54	118.7	8
9	57 42.8 83 50	126.7	58 07.6 82 50	126.2	58 32.3 82 50	125.7	59 21.2 81 51	124.5	60 57.2 79 52	122.1	62 30.4 76 54	119.5	62 53.2 76 54	118.8	63 38.1 74 55	117.3	9
30	57 13.0 82 51	125.4	57 37.6 82 51	124.9	58 02.0 81 51	124.3	58 50.6 80 52	123.2	60 25.7 78 53	120.8	61 58.0 76 55	118.1	62 20.6 75 55	117.4	63 05.0 73 56	115.9	30
1	56 42.6 82 51	124.1	57 07.0 81 52	123.5	57 31.3 81 52	123.0	58 19.4 80 53	121.9	59 53.8 77 54	119.4	61 25.2 75 55	116.8	61 47.6 74 56	116.1	62 31.6 73 56	114.6	1
2	56 11.8 81 52	122.8	56 36.0 81 52	122.2	57 00.1 80 53	121.7	57 47.8 79 53	120.6	59 21.4 77 55	118.2	60 52.1 74 56	115.5	61 14.2 74 56	114.8	61 57.9 72 57	113.4	2
3	55 40.5 80 53	121.5	56 04.5 80 53	121.0	56 28.4 79 53	120.4	57 15.8 78 54	119.3	58 48.6 76 55	116.9	60 18.6 74 56	114.3	60 40.5 73 57	113.6	61 23.8 71 57	112.2	3
4	55 08.8 80 54	120.2	55 32.6 79 54	119.7	55 56.4 79 54	119.2	56 43.4 78 55	118.0	58 15.5 76 56	115.7	59 44.7 73 57	113.1	60 06.5 72 57	112.4	60 49.5 71 58	111.0	4
35	54 36.6 79 54	119.0	55 00.4 79 54	118.5	55 23.9 78 55	117.9	56 10.6 77 55	116.8	57 42.1 75 56	114.5	59 10.6 72 57	111.9	59 32.2 72 58	111.2	60 14.8 70 58	109.8	35
6	54 04.2 79 55	117.8	54 27.7 78 55	117.3	54 51.1 78 55	116.7	55 37.5 77 56	115.6	57 08.3 75 57	113.3	58 36.2 72 58	110.7	58 57.7 71 58	110.0	59 40.0 70 58	108.6	6
7	53 31.3 78 55	116.6	53 54.7 78 56	116.1	54 18.0 77 56	115.6	55 04.0 76 56	114.5	56 34.2 74 57	112.1	58 01.5 71 58	109.6	58 22.8 71 58	108.9	59 04.8 69 59	107.5	7
8	52 58.1 78 56	115.5	53 21.4 77 56	115.0	53 44.5 77 56	114.4	54 30.2 76 57	113.3	55 59.8 74 58	111.0	57 26.6 71 59	108.5	57 47.8 70 59	107.8	58 29.5 69 59	106.5	8
9	52 24.6 77 56	114.4	52 47.7 77 57	113.8	53 10.7 76 57	113.3	53 56.2 75 57	112.2	55 25.2 73 58	109.9	56 51.4 71 59	107.4	57 12.5 70 59	106.7	57 54.0 68 60	105.4	9
40	51 50.8 77 57	113.3	52 13.8 76 57	112.7	52 36.6 76 57	112.2	53 21.8 75 58	111.1	54 50.4 73 58	108.8	56 16.1 70 59	106.3	56 37.0 69 59	105.7	57 18.3 68 60	104.4	40
1	51 16.8 76 57	112.2	51 39.6 76 57	111.7	52 02.3 75 58	111.1	52 47.3 74 58	110.0	54 15.3 72 59	107.8	55 40.5 70 60	105.3	56 01.4 69 60	104.7	56 42.4 68 60	103.3	1
2	50 42.4 76 58	111.1	51 05.1 75 58	110.6	51 27.7 75 58	110.1	52 12.4 74 58	109.0	53 40.0 72 59	106.7	55 04.8 69 60	104.3	55 25.6 69 60	103.6	56 06.4 67 60	102.3	2
3	50 07.8 76 58	110.1	50 30.4 75 58	109.5	50 52.9 75 58	109.0	51 37.4 74 59	107.9	53 04.5 72 59	105.7	54 28.9 69 60	103.3	54 49.6 68 60	102.7	55 30.3 67 60	101.4	3
4	49 33.0 75 58	109.0	49 55.5 75 59	108.5	50 17.9 74 59	108.0	51 02.2 73 59	106.9	52 28.9 71 60	104.7	53 52.9 69 60	102.3	54 13.5 68 60	101.7	54 54.0 67 61	100.4	4
45	48 58.0 75 59	108.0	49 20.4 74 59	107.5	49 42.7 74 59	107.0	50 26.7 73 59	105.9	51 53.1 71 60	103.7	53 16.8 69 60	101.4	53 37.2 68 61	100.7	54 17.6 67 61	99.5	45
6	48 22.8 75 59	107.0	48 45.1 74 59	106.5	49 07.2 74 59	106.0	49 51.1 73 60	104.9	51 17.1 71 60	102.7	52 40.5 68 61	100.4	53 00.9 68 61	99.8	53 41.1 66 61	98.6	6
7	47 47.4 74 59	106.0	48 09.6 74 59	105.5	48 31.6 73 60	105.0	49 15.4 72 60	104.0	50 41.0 70 60	101.8	52 04.1 68 61	99.5	52 24.4 67 61	98.9	53 04.5 66 61	97.7	7
8	47 11.8 74 60	105.1	47 33.9 74 60	104.6	47 55.9 73 60	104.1	48 39.4 72 60	103.0	50 04.8 70 61	100.9	51 27.6 68 61	98.6	51 47.9 67 61	98.0	52 27.9 66 61	96.8	8
9	46 36.0 74 60	104.1	46 58.1 73 60	103.6	47 20.0 73 60	103.1	48 03.4 72 60	102.1	49 28.5 70 61	99.9	50 51.1 68 61	97.7	51 11.3 67 61	97.1	51 51.2 66 61	95.9	9
50	46 00.1 73 60	103.2	46 22.1 73 60	102.7	46 43.9 73 60	102.2	47 27.2 72 60	101.2	48 52.0 70 61	99.0	50 14.4 68 61	96.8	50 34.6 67 61	96.2	51 14.4 66 61	95.0	50
1	45 24.1 73 60	102.2	45 46.0 73 60	101.7	46 07.8 72 60	101.3	46 50.9 71 61	100.2	48 15.5 70 61	98.1	49 37.7 67 61	95.9	49 57.8 67 61	95.4	50 37.6 66 61	94.2	1
2	44 47.9 73 60	101.3	45 09.8 73 61	100.8	45 31.5 72 61	100.3	46 14.5 71 61	99.3	47 38.9 69 61	97.3	49 00.9 67 61	95.1	49 21.0 67 61	94.5	50 00.7 66 61	93.3	2
3	44 11.7 73 61	100.4	44 33.4 72 61	99.9	44 55.1 72 61	99.5	45 38.0 71 61	98.5	47 02.2 69 61	96.4	48 24.1 67 61	94.2	48 44.2 67 61	93.7	49 23.8 66 62	92.5	3
4	43 35.3 73 61	99.5	43 57.0 72 61	99.1	44 18.6 72 61	98.6	45 01.4 71 61	97.6	46 25.5 69 61	95.5	47 47.3 67 61	93.4	48 07.3 67 62	92.8	48 46.9 65 62	91.7	4
55	42 58.8 72 61	98.7	43 20.5 72 61	98.2	43 42.0 72 61	97.7	44 24.8 71 61	96.7	45 48.7 69 61	94.7	47 10.4 67 62	92.6	47 30.4 67 62	92.0	48 10.0 65 62	90.9	55
6	42 22.2 72 61	97.8	42 43.9 72 61	97.3	43 05.4 72 61	96.8	43 48.1 71 61	95.9	45 11.9 69 61	93.9	46 33.5 67 62	91.8	46 53.5 66 62	91.2	47 33.1 65 62	90.1	6
7	41 45.6 72 61	96.9	42 07.2 72 61	96.5	42 28.7 71 61	96.0	43 11.3 71 61	95.0	44 35.0 69 62	93.0	45 56.5 67 62	91.0	46 16.5 66 62	90.4	46 56.1 65 62	89.3	7
8	41 08.9 72 61	96.1	41 30.5 72 61	95.6	41 51.9 71 61	95.1	42 34.5 71 61	94.2	43 58.1 69 62	92.2	45 19.6 67 62	90.2	45 39.6 66 62	89.6	46 19.2 65 62	88.5	8
9	40 32.1 72 61	95.2	40 53.7 72 61	94.8	41 15.1 71 61	94.3	41 57.6 70 61	93.4	43 21.2 69 62	91.4	44 42.6 67 62	89.4	45 02.7 66 62	88.8	45 42.3 65 62	87.8	9
60	39 55.3 72 61	94.4	40 16.8 72 61	93.9	40 38.2 71 61	93.5	41 20.7 70 62	92.5	42 44.2 69 62	90.6	44 05.7 67 62	88.6	44 25.7 67 62	88.1	45 05.4 66 61	87.0	60
1	39 18.5 72 61	93.6	39 40.0 71 61	93.1	40 01.4 71 62	92.7	40 43.8 70 62	91.7	42 07.3 69 62	89.8	43 28.8 67 62	87.8	43 48.8 67 61	87.3	44 28.5 66 61	86.3	1
2	38 41.6 72 62	92.8	39 03.1 71 62	92.3	39 24.4 71 62	91.9	40 06.9 70 62	90.9	41 30.4 69 62	89.0	42 51.9 67 61	87.1	43 11.9 67 61	86.6	43 51.6 66 61	85.5	2
3	38 04.7 72 62	92.0	38 26.2 71 62	91.5	38 47.5 71 62	91.1	39 29.9 70 62	90.1	40 53.4 69 62	88.3	42 15.0 67 61	86.3	42 35.1 67 61	85.8	43 14.8 66 61	84.8	3
4	37 27.8 72 62	91.2	37 49.2 71 62	90.7	38 10.6 71 62	90.3	38 53.0 70 62	89.4	40 16.5 69 62	87.5	41 38.2 67 61	85.6	41 58.3 67 61	85.1	42 38.1 66 61	84.0	4
65	36 50.8 72 62	90.4	37 12.3 71 62	89.9	37 33.6 71 62	89.5	38 16.1 70 62	88.6	39 39.6 69 61	86.7	41 01.4 67 61	84.8	41 21.5 67 61	84.3	42 01.4 66 61	83.3	65
6	36 13.9 72 62	89.6	36 35.3 71 62	89.1	36 56.7 71 62	88.7	37 39.1 70 62	87.8	39 02.8 69 61	86.0	40 24.6 67 61	84.1	40 44.8 67 61	83.6	41 24.7 66 61	82.6	6
7	35 37.0 72 62	88.8	35 58.4 71 62	88.4	36 19.8 71 62	87.9	37 02.2 70 61	87.0	38 25.9 69 61	85.2	39 47.9 68 61	83.3	40 08.1 67 61	82.9	40 48.1 66 61	81.9	7
8	35 00.9 72 62	88.0	35 21.5 71 62	87.6	35 42.9 71 61	87.2	36 25.4 70 61	86.3	37 49.1 69 61	84.5	39 11.2 68 61	82.6	39 31.4 67 61	82.1	40 11.6 66 61	81.2	8
9	34 23.1 72 61	87.2	34 44.6 71 61	86.8	35 06.0 71 61	86.4	35 48.5 71 61	85.5	37 12.4 69 61	83.7	38 34.6 68 61	81.9	38 54.9 67 61	81.4	39 35.1 67 61	80.5	9
70	33 46.2 72 61	86.5	34 07.7 72 61	86.1	34 29.2 71 61	85.6	35 11.7 71 61	84.8	36 35.7 69 61	83.0	37 58.1 68 61	81.2	38 18.4 68 61	80.7	38 58.7 67 60	79.8	70
1	33 09.4 72 61	85.7	33 30.9 72 61	85.3	33 52.3 71 61	84.9	34 34.9 71 61	84.0	35 59.1 69 61	82.3	37 21.6 68 61	80.5	37 42.0 68 61	80.0	38 22.4 67 60	79.1	1
2	32 32.6 72 61	85.0	32 54.1 72 61	84.5	33 15.6 71 61	84.1	33 58.2 71 61	83.3	35 22.5 70 61	81.6	36 45.2 68 61	79.8	37 05.6 68 60	79.3	37 46.2 67 60	78.4	2
3	31 55.8 72 61	84.2	32 17.4 72 61	83.8	32 38.8 71 61	83.4	33 21.6 71 61	82.5	34 46.0 70 61	80.8	36 08.9 68 60	79.1	36 29.4 68 60	78.6	37 10.0 67 60	77.7	3
4	31 19.1 72 61	83.5	31 40.7 72 61	83.1	32 02.2 72 61	82.6	32 45.0 71 61	81.8	34 09.6 70 61	80.1	35 32.7 69 60	78.4	35 53.2 68 60	77.9	36 34.0 68 60	77.0	4
75	30 42.4 72 61	82.7	31 04.0 72 61	82.3	31 25.6 72 61	81.9	32 08.4 71 61	81.1	33 33.2 70 60	79.4	34 56.5 69 60	77.7	35 17.1 69 60	77.2	35 58.0 68 60	76.3	75
6	30 05.8 72 61	82.0	30 27.4 72 61	81.6	30 49.0 72 61	81.2	31 32.0 71 61	80.4	32 56.9 70 60	78.7	34 20.5 69 60	77.0	34 41.2 69 60	76.5	35 22.2 68 60	75.6	6
7	29 29.2 72 61	81.2	29 50.9 72 61	80.8	30 12.6 72 61	80.4	30 55.6 71 60	79.6	32 20.8 70 60	78.0	33 44.6 69 60	76.3	34 05.3 69 60	75.8	34 46.5 68 59	75.0	7
8	28 52.8 73 61	80.5	29 14.5 72 61	80.1	29 36.2 72 60	79.7	30 19.3 72 60	78.9	31 44.7 71 60	77.3	33 08.7 69 60	75.6	33 29.5 69 59	75.2	34 10.9 69 59	74.3	8
9	28 16.4 73 60	79.8	28 38.2 73 60	79.4	28 59.9 72 60	79.0	29 43.1 72 60	78.2	31 08.7 71 60	76.6	32 33.0 70 59	74.9	32 53.9 69 59	74.5	33 35.4 69 59	73.6	9
80	27 40.1 73 60	79.1	28 01.9 73 60	78.7	28 23.7 72 60	78.3	29 07.0 72 60	77.5	30 32.8 71 60	75.9	31 57.4 70 59	74.2	32 18.4 70 59	73.8	33 00.0 69 59	72.9	80
1	27 03.8 73 60	78.3	27 25.7 73 60	77.9	27 47.5 73 60	77.6	28 31.0 72 60	76.8	29 57.1 71 59	75.2	31 21.9 70 59	73.5	31 42.9 70 59	73.1	32 24.7 69 59	72.3	1
2	26 27.7 73 60	77.6	26 49.7 73 60	77.2	27 11.5 73 60	76.8	27 55.1 72 60	76.1	29 21.4 71 59	74.5	30 46.6 70 59	72.8	31 07.7 70 59	72.4	31 49.6 70 58	71.6	2
3	25 51.7 73 60	76.9	26 13.7 73 60	76.5	26 35.6 73 60	76.1	27 19.3 73 59	75.4	28 45.9 72 59	73.8	30 11.3 71 58	72.2	30 32.5 70 58	71.8	31 14.6 70 58	70.9	3
4	25 15.8 74 60	76.2	25 37.8 73 60	75.8	25 59.8 73 59	75.4	26 43.6 73 59	74.6	28 10.5 72 59	73.1	29 36.2 71 58	71.5	29 57.5 71 58	71.1	30 39.8 70 58	70.3	4
85	24 40.0 74 59	75.4	25 02.1 74 59	75.1	25 24.1 73 59	74.7	26 08.1 73 59	73.9	27 35.2 72 59	72.4	29 01.3 71 58	70.8	29 22.6 71 58	70.4	30 05.1 71 58	69.6	85
6	24 04.3 74 59	74.7	24 26.4 74 59	74.4	24 48.5 74 59	74.0	25 32.6 73 59	73.2	27 00.0 72 58	71.7	28 26.5 72 58	70.1	28 47.9 71 58	69.7	29 30.6 71 57	68.9	6
7	23 28.7 74 59	74.0	23 50.9 74 59	73.6	24 13.1 74 59	73.3	24 57.3 73 59	72.5	26 25.0 73 58	71.0	27 51.8 72 58	69.5	28 13.3 72 57	69.1	28 56.2 71 57	68.3	7
8	22 53.2 74 59	73.3	23 15.5 74 59	72.9	23 37.8 74 59	72.6	24 22.1 74 58	71.8	25 50.2 73 58	70.3	27 17.3 72 57	68.8	27 38.9 72 57	68.4	28 21.9 71 57	67.6	8
9	22 17.9 75 59	72.6	22 40.3 74 59	72.2	23 02.6 74 58	71.9	23 47.1 74 58	71.1	25 15.5 73 58	69 6	26 42.9 72 57	68.1	27 04.6 72 57	67.7	27 47.8 72 57	67.0	9
90	21 42.7 75 58	71.9	22 05.2 75 58	71.5	22 27.6 75 58	71.2	23 12.2 74 58	70.4	24 40.9 74 57	69.0	26 08.7 73 57	67.4	26 30.5 73 57	67.1	27 13.9 72 56	66.3	90

Digitized by Google

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	9 00.0	1.0 00	180.0	8 00.0	1.0 00	180.0	6 00.0	1.0 00	180.0										00
1	9 59.7	1.0 01	179.1	9 29.7	1.0 01	179.1	8 59.7	1.0 01	179.1	7 59.7	1.0 01	179.1	5 59.7	1.0 01	179.1										1
2	9 58.8	1.0 02	178.2	9 28.9	1.0 02	178.2	8 58.9	1.0 02	178.2	7 58.9	1.0 02	178.3	5 58.9	1.0 02	178.3										2
3	9 57.4	1.0 03	177.3	9 27.4	1.0 03	177.3	8 57.4	1.0 03	177.3	7 57.5	1.0 03	177.4	5 57.5	1.0 03	177.4										3
4	9 55.4	1.0 04	176.4	9 25.4	1.0 04	176.4	8 55.4	1.0 04	176.5	7 55.5	1.0 04	176.5	5 55.6	1.0 04	176.6										4
05	9 52.8	1.0 05	175.5	9 22.8	1.0 05	175.5	8 52.9	1.0 05	175.6	7 53.0	1.0 05	175.6	5 53.1	1.0 05	175.7										05
6	9 49.6	1.0 06	174.6	9 19.7	1.0 06	174.7	8 49.7	1.0 06	174.7	7 49.9	1.0 06	174.8	5 50.1	1.0 06	174.9										6
7	9 45.9	1.0 07	173.7	9 15.9	1.0 07	173.8	8 46.0	1.0 07	173.8	7 46.2	1.0 07	173.9	5 46.6	1.0 07	174.0										7
8	9 41.5	1.0 08	172.8	9 11.7	1.0 08	172.9	8 41.8	1.0 08	172.9	7 42.0	1.0 08	173.0	5 42.4	1.0 08	173.2										8
9	9 36.7	1.0 09	171.9	9 06.8	1.0 09	172.0	8 36.9	1.0 09	172.0	7 37.2	1.0 09	172.1	5 37.8	1.0 09	172.3										9
10	9 31.2	99 10	171.1	9 01.4	99 10	171.1	8 31.5	99 10	171.2	7 31.9	99 10	171.3	5 32.6	99 10	171.5										10
1	9 25.2	99 11	170.2	8 55.4	99 11	170.2	8 25.6	99 11	170.3	7 26.0	99 11	170.4	5 26.9	99 10	170.6										1
2	9 18.6	99 12	169.3	8 48.8	99 12	169.3	8 19.1	99 12	169.4	7 19.6	99 12	169.5	5 20.6	99 11	169.8										2
3	9 11.4	99 13	168.4	8 41.7	99 13	168.5	8 12.0	99 13	168.5	7 12.6	99 13	168.7	5 13.8	99 12	169.0										3
4	9 03.7	99 14	167.5	8 34.1	99 14	167.6	8 04.4	99 14	167.7	7 05.1	99 13	167.8	5 06.4	99 13	168.1										4
15	8 55.4	99 15	166.6	8 25.8	99 15	166.7	7 56.2	99 15	166.8	6 57.0	99 14	166.9													15
6	8 46.6	99 16	165.7	8 17.1	99 16	165.8	7 47.5	99 15	165.9	6 48.4	99 15	166.1													6
7	8 37.3	98 17	164.9	8 07.8	98 16	165.0	7 38.3	98 16	165.0	6 39.2	98 16	165.2													7
8	8 27.3	98 17	164.0	7 57.9	98 17	164.1	7 28.5	98 17	164.2	6 29.6	98 17	164.4													8
9	8 16.9	98 18	163.1	7 47.5	98 18	163.2	7 18.1	98 18	163.3	6 19.4	98 18	163.5													9
20	8 05.9	98 19	162.2	7 36.6	98 19	162.3	7 07.2	98 19	162.5	6 08.6	98 19	162.7													20
1	7 54.3	97 20	161.4	7 25.1	97 20	161.5	6 55.8	97 20	161.6	5 57.3	98 20	161.8													1
2	7 42.3	97 21	160.5	7 13.1	97 21	160.6	6 43.9	97 21	160.7	5 45.6	97 20	161.0													2
3	7 29.7	97 22	159.6	7 00.6	97 22	159.8	6 31.5	97 22	159.9	5 33.3	97 21	160.1													3
4	7 16.6	97 23	158.8	6 47.5	97 23	158.9	6 18.5	97 22	159.0	5 20.4	97 22	159.3													4
25	7 02.9	97 24	157.9	6 34.0	97 23	158.0	6 05.0	97 23	158.2	5 07.1	97 23	158.4													25
6	6 48.8	96 24	157.1	6 19.9	96 24	157.2	5 51.0	96 24	157.3																6
7	6 34.1	96 25	156.2	6 05.4	96 25	156.3	5 36.6	96 25	156.5																7
8	6 19.0	96 26	155.4	5 50.3	96 26	155.5	5 21.6	96 25	155.6																8
9	6 03.3	95 27	154.5	5 34.7	95 27	154.7	5 06.1	95 27	154.8																9
30	5 47.2	95 28	153.7	5 18.7	95 28	153.8																			30
1	5 30.5	95 29	152.8	5 02.1	95 28	153.0																			1
2	5 13.4	94 29	152.0																						2

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	21 07.7	75 58	71.2	21 30.2	75 58	70.8	21 52.7	75 58	70.5	22 37.5	75 58	69.7	24 06.5	74 57	68.3	25 34.7	73 56	66.8	25 56.6	73 56	66.4	26 40.2	72 56	65.6	91
2	20 32.8	75 58	70.5	20 55.4	75 58	70.1	21 18.0	75 58	69.7	22 02.9	75 57	69.0	23 32.3	74 57	67.6	25 00.8	73 56	66.1	25 22.8	73 56	65.7	26 06.6	73 56	65.0	2
3	19 58.1	76 58	69.7	20 20.8	76 58	69.4	20 43.4	75 57	69.0	21 28.5	75 57	68.3	22 58.2	74 56	66.9	24 27.1	74 56	65.4	24 49.2	74 56	65.1	25 33.3	73 55	64.3	3
4	19 23.5	76 57	69.0	19 46.3	76 57	68.7	20 09.0	76 57	68.3	20 54.3	75 57	67.6	22 24.3	75 56	66.2	23 53.6	74 56	64.8	24 15.8	74 55	64.4	25 00.1	74 55	63.6	4
95	18 49.1	76 57	68.3	19 11.9	76 57	68.0	19 34.7	76 57	67.6	20 20.2	76 56	66.9	21 50.6	75 56	65.5	23 20.3	74 55	64.1	23 42.6	74 55	63.7	24 27.1	74 55	63.0	95
6	18 14.9	76 57	67.6	18 37.8	76 57	67.3	19 00.7	76 56	66.9	19 46.3	76 56	66.2	21 17.1	75 56	64.8	22 47.2	75 55	63.4	23 09.6	75 55	63.1	23 54.3	74 54	62.3	6
7	17 40.8	77 56	66.9	18 03.8	77 56	66.6	18 26.8	76 56	66.2	19 12.6	76 56	65.5	20 43.8	76 55	64.2	22 14.3	75 55	62.7	22 36.8	75 54	62.4	23 21.6	75 54	61.7	7
8	17 06.9	77 56	66.2	17 30.0	77 56	65.9	17 53.1	77 56	65.5	18 39.1	77 56	64.8	20 10.6	76 55	63.5	21 41.5	75 54	62.1	22 04.1	75 54	61.7	22 49.2	75 54	61.0	8
9	16 33.2	77 56	65.5	16 56.4	77 56	65.1	17 19.5	77 56	64.8	18 05.7	77 55	64.1	19 37.7	76 55	62.8	21 09.0	76 54	61.4	21 31.7	76 54	61.0	22 17.0	75 53	60.3	9
100	15 59.7	78 56	64.8	16 23.0	78 55	64.4	16 46.2	77 55	64.1	17 32.6	77 55	63.4	19 04.9	77 54	62.1	20 36.7	76 54	60.7	20 59.5	76 53	60.4	21 45.0	76 53	59.7	100
1	15 26.4	78 55	64.0	15 49.7	78 55	63.7	16 13.1	78 55	63.4	16 59.6	78 55	62.7	18 32.4	77 54	61.4	20 04.5	77 53	60.0	20 27.5	76 53	59.7	21 13.2	76 53	59.0	1
2	14 53.3	78 55	63.3	15 16.7	78 55	63.0	15 40.1	78 55	62.7	16 26.9	78 54	62.0	18 00.0	77 54	60.7	19 32.6	77 53	59.4	19 55.7	77 53	59.0	20 41.7	77 52	58.3	2
3	14 20.4	79 54	62.6	14 43.9	78 54	62.3	15 07.4	78 54	62.0	15 54.4	78 54	61.3	17 27.9	78 53	60.0	19 01.0	77 52	58.7	19 24.1	77 52	58.4	20 10.4	77 52	57.7	3
4	13 47.7	79 54	61.9	14 11.3	79 54	61.6	14 34.9	79 54	61.3	15 22.1	78 53	60.6	16 56.0	78 53	59.3	18 29.5	78 52	58.0	18 52.8	78 52	57.7	19 39.3	77 51	57.0	4
105	13 15.2	79 54	61.2	13 38.9	79 54	60.9	14 02.6	79 53	60.6	14 50.0	79 53	59.9	16 24.4	78 52	58.6	17 58.3	78 52	57.3	18 21.7	78 51	57.0	19 08.4	78 51	56.3	105
6	12 42.9	79 53	60.5	13 06.8	79 53	60.2	13 30.6	79 53	59.8	14 18.2	79 53	59.2	15 53.0	79 52	57.9	17 27.3	78 51	56.7	17 50.8	78 51	56.3	18 37.8	78 51	55.7	6
7	12 10.9	80 53	59.7	12 34.9	80 53	59.4	12 58.8	80 53	59.1	13 46.5	80 52	58.5	15 21.8	79 52	57.3	16 56.6	79 51	56.0	17 20.2	79 51	55.7	18 07.4	79 50	55.0	7
8	11 39.1	80 53	59.0	12 03.2	80 52	58.7	12 27.2	80 52	58.4	13 15.2	80 52	57.8	14 50.8	80 51	56.6	16 26.1	79 50	55.3	16 49.8	79 50	55.0	17 37.2	79 50	54.3	8
9	11 07.6	81 52	58.3	11 31.7	80 52	58.0	11 55.8	80 52	57.7	12 44.0	80 51	57.1	14 20.1	80 51	55.9	15 55.9	80 50	54.6	16 19.7	80 50	54.3	17 07.4	79 49	53.7	9
110	10 36.3	81 52	57.6	11 00.5	81 52	57.3	11 24.7	81 51	57.0	12 13.1	81 51	56.4	13 49.7	80 50	55.2	15 25.9	80 50	53.9	15 49.9	80 49	53.6	16 37.7	80 49	53.0	110
1	10 05.2	81 51	56.8	10 29.6	81 51	56.6	10 53.9	81 51	56.3	11 42.5	81 51	55.7	13 19.5	81 50	54.5	14 56.1	80 49	53.2	15 20.3	80 49	52.9	16 08.4	80 48	52.3	1
2	9 34.4	82 51	56.1	9 58.9	81 51	55.8	10 23.3	81 51	55.5	11 12.1	81 50	54.9	12 49.6	81 49	53.7	14 26.7	81 49	52.5	14 50.9	81 48	52.2	15 39.3	81 48	51.6	2
3	9 03.9	82 50	55.4	9 28.4	82 50	55.1	9 53.0	82 50	54.8	10 42.0	82 50	54.2	12 19.9	81 49	53.0	13 57.5	81 48	51.8	14 21.8	81 48	51.5	15 10.5	81 48	50.9	3
4	8 33.6	82 50	54.7	8 58.3	82 50	54.4	9 22.9	82 50	54.1	10 12.2	82 49	53.5	11 50.5	82 48	52.3	13 28.6	82 48	51.2	13 53.1	82 48	50.9	14 41.9	81 47	50.3	4
115	8 03.6	83 50	53.9	8 28.4	83 49	53.6	8 53.2	83 49	53.4	9 42.6	82 49	52.8	11 21.4	82 48	51.6	13 00.0	82 47	50.5	13 24.6	82 47	50.2	14 13.7	82 47	49.6	115
6	7 33.9	83 49	53.2	7 58.8	83 49	52.9	8 23.7	83 49	52.6	9 13.4	83 48	52.1	10 52.6	83 48	50.9	12 31.6	82 47	49.8	12 56.3	82 47	49.5	13 45.7	82 46	48.9	6
7	7 04.5	83 49	52.4	7 29.5	83 48	52.2	7 54.5	83 48	51.9	8 44.4	83 48	51.3	10 24.1	83 47	50.2	12 03.6	83 46	49.1	12 28.4	83 46	48.8	13 18.0	83 46	48.2	7
8	6 35.3	84 48	51.7	7 00.4	84 48	51.4	7 25.5	84 48	51.1	8 15.7	84 47	50.6	9 55.9	83 47	49.5	11 35.8	83 46	48.4	12 00.8	83 46	48.1	12 50.6	83 45	47.5	8
9	6 06.5	84 48	51.0	6 31.7	84 47	50.7	6 56.9	84 47	50.4	7 47.3	84 47	49.9	9 27.9	84 46	48.8	11 08.4	84 45	47.6	11 33.4	84 45	47.4	12 23.5	83 45	46.8	9
120	5 38.0	84 47	50.2	6 03.3	84 47	49.9	6 28.6	84 47	49.7	7 19.2	84 46	49.1	9 00.3	84 46	48.0	10 41.2	84 45	46.9	11 06.4	84 44	46.7	11 56.8	84 44	46.1	120
1	5 09.7	85 47	49.5	5 35.2	85 46	49.2	6 00.6	85 46	48.9	6 51.4	85 46	48.4	8 33.0	85 45	47.3	10 14.4	84 44	46.2	10 39.7	84 44	46.0	11 30.3	84 44	45.4	1
2				5 07.4	85 46	48.4	5 32.9	85 46	48.2	6 24.0	85 45	47.6	8 06.0	85 44	46.6	9 47.9	85 44	45.5	10 13.3	85 43	45.2	11 04.2	85 43	44.7	2
3							5 05.5	86 45	47.4	5 56.8	85 45	46.9	7 39.3	85 44	45.9	9 21.7	85 43	44.8	9 47.2	85 43	44.5	10 38.3	85 42	44.0	3
4										5 30.0	86 44	46.2	7 13.0	86 43	45.1	8 55.8	86 43	44.1	9 21.5	86 42	43.8	10 12.8	86 42	43.3	4
125										5 03.6	86 44	45.4	6 47.0	86 43	44.4	8 30.3	86 42	43.4	8 56.1	86 42	43.1	9 47.7	86 41	42.6	125
6													6 21.3	87 42	43.7	8 05.1	86 41	42.6	8 31.0	86 41	42.4	9 22.8	86 41	41.9	6
7													5 56.0	87 42	42.9	7 40.2	87 41	41.9	8 06.3	87 41	41.7	8 58.3	87 40	41.2	7
8													5 31.0	87 41	42.2	7 15.7	87 40	41.2	7 41.9	87 40	40.9	8 34.2	87 40	40.4	8
9													5 06.4	88 40	41.4	6 51.6	88 40	40.5	7 17.9	88 39	40.2	8 10.4	88 39	39.7	9
130																6 27.8	88 39	39.7	6 54.2	88 39	39.5	7 47.0	88 38	39.0	130
1																6 04.4	88 38	39.0	6 30.9	88 38	38.8	7 23.9	88 38	38.3	1
2																5 41.3	89 38	38.3	6 08.0	89 38	38.0	7 01.2	89 37	37.6	2
3																5 18.6	89 37	37.5	5 45.4	89 37	37.3	6 38.9	89 37	36.8	3
4																			5 23.2	90 36	36.5	6 16.9	90 36	36.1	4
135																			5 01.4	90 36	35.8	5 55.4	90 35	35.4	135
6																						5 34.2	90 35	34.6	6
7																						5 13.4	91 34	33.9	7

Digitized by Google

Lat. 52°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	
00	74 00.0	1.0 02	180.0	75 00.0	1.0 02	180.0	76 30.0	1.0 02	180.0	78 00.0	1.0 02	180.0	80 00.0	1.0 02	180.0	80 30.0	1.0 02	180.0	81 00.0	1.0 02	180.0	83 00.0	1.0 03	180.0	00
1	73 59.1	1.0 05	177.1	74 59.0	1.0 06	176.9	76 28.9	1.0 05	176.7	77 58.8	1.0 06	176.3	79 58.6	1.0 07	175.7	80 28.6	1.0 07	175.5	80 58.5	1.0 08	175.3	82 58.1	1.0 09	174.2	1
2	73 56.2	1.0 08	174.1	74 56.0	1.0 08	173.8	76 25.7	1.0 09	173.3	77 55.3	99 10	172.7	79 54.5	99 11	171.5	80 24.3	99 12	171.1	80 54.0	99 12	170.7	82 52.6	98 15	168.5	2
3	73 51.5	99 11	171.2	74 51.1	99 11	170.8	76 20.3	99 12	170.0	77 49.4	99 14	169.0	79 47.7	98 16	167.3	80 17.2	98 16	166.8	80 46.6	98 17	166.2	82 43.5	97 21	163.0	3
4	73 45.0	99 14	168.4	74 44.2	99 15	167.8	76 12.9	98 16	166.8	77 41.2	98 17	165.5	79 38.3	97 20	163.2	80 07.4	97 21	162.6	80 36.4	96 21	161.8	82 31.1	94 26	157.7	4
05	73 36.6	98 17	165.5	74 35.5	98 18	164.8	76 03.4	97 19	163.6	77 30.9	97 21	162.0	79 26.5	96 24	159.3	79 55.1	95 25	158.5	80 23.6	95 26	157.5	82 15.6	92 30	152.8	05
6	73 26.5	97 20	162.7	74 24.9	97 21	161.9	75 52.0	96 22	160.4	77 18.5	96 24	158.6	79 12.3	94 27	155.5	79 40.4	93 28	154.5	80 08.3	93 29	153.5	81 57.4	89 34	148.1	6
7	73 14.7	97 22	160.0	74 12.5	96 23	159.0	75 38.7	95 25	157.4	77 04.0	94 27	155.3	78 55.9	92 31	151.9	79 23.4	91 32	150.8	79 50.7	90 33	149.6	81 36.7	86 38	143.8	7
8	73 01.3	96 25	157.3	73 58.5	95 26	156.3	75 23.6	94 28	154.4	76 47.7	93 30	152.2	78 37.5	90 34	148.4	79 04.4	89 35	147.2	79 31.0	88 36	146.0	81 13.8	83 41	139.8	8
9	72 46.3	95 28	154.7	73 42.8	94 29	153.5	75 06.8	93 31	151.5	76 29.6	91 33	149.1	78 17.2	88 37	145.1	78 43.4	87 38	143.9	79 09.4	86 39	142.5	80 49.1	80 44	136.1	9
10	72 29.8	93 30	152.2	73 25.6	93 31	150.9	74 48.4	91 33	148.8	76 09.8	89 36	146.2	77 55.2	86 39	141.9	78 20.8	85 40	140.7	78 46.1	84 41	139.3	80 22.7	77 46	132.7	10
1	72 11.8	92 32	149.7	73 06.9	91 33	148.4	74 28.5	90 36	146.1	75 48.5	88 38	143.4	77 31.7	84 42	139.0	77 56.7	83 43	137.7	78 21.3	81 44	136.3	79 54.9	74 48	129.6	1
2	71 52.5	91 34	147.3	72 46.9	90 36	145.9	74 07.2	88 38	143.5	75 25.8	86 40	140.7	77 06.7	82 44	136.2	77 31.1	81 45	134.8	77 55.1	79 46	133.4	79 25.8	72 50	126.7	2
3	71 31.9	90 36	144.9	72 25.5	89 38	143.5	73 44.6	87 40	141.0	75 01.8	84 42	138.2	76 40.5	80 46	133.5	77 04.3	79 47	132.2	77 27.7	77 48	130.7	78 55.7	69 52	124.1	3
4	71 10.0	89 38	142.7	72 02.9	88 40	141.2	73 20.8	85 42	138.7	74 36.6	83 44	135.7	76 13.2	78 47	131.0	76 36.4	77 48	129.6	76 59.1	75 49	128.2	78 24.7	67 53	121.6	4
15	70 47.1	87 40	140.5	71 39.2	86 41	139.0	72 55.9	84 43	136.4	74 10.2	81 46	133.4	75 44.8	76 49	128.6	76 07.5	75 50	127.3	76 29.6	73 51	125.9	77 52.8	65 54	119.3	15
6	70 23.1	86 42	138.4	71 14.4	85 43	136.8	72 29.9	83 45	134.2	73 42.9	80 47	131.2	75 15.5	75 50	126.4	75 37.6	73 51	125.0	75 59.3	71 52	123.6	77 20.3	63 55	117.2	6
7	69 58.0	85 43	136.3	70 48.7	84 44	134.7	72 02.9	81 46	132.1	73 14.6	78 48	129.0	74 45.4	73 51	124.3	75 07.0	71 52	122.9	75 28.2	70 53	121.5	76 47.2	62 56	115.3	7
8	69 32.1	84 45	134.4	70 22.0	82 46	132.7	71 35.0	80 48	130.0	72 45.5	77 50	127.0	74 14.5	71 53	122.3	74 35.7	70 53	120.9	74 56.4	68 54	119.6	76 13.5	60 57	113.4	8
9	69 05.2	83 46	132.4	69 54.4	81 47	130.8	71 06.4	79 49	128.1	72 15.6	75 51	125.1	73 42.9	70 54	120.4	74 03.7	68 54	119.1	74 23.9	67 55	117.7	75 39.4	59 58	111.7	9
20	68 37.6	82 47	130.6	69 26.1	80 48	129.0	70 36.9	77 50	126.2	71 45.1	74 52	123.2	73 10.8	69 55	118.6	73 31.1	67 55	117.3	73 51.0	65 56	115.9	75 04.9	58 58	110.1	20
1	68 09.2	81 49	128.8	68 57.0	79 50	127.2	70 06.8	76 51	124.5	71 13.8	73 53	121.4	72 38.1	67 55	116.8	72 58.0	66 56	115.6	73 17.5	64 56	114.3	74 30.0	56 59	108.5	1
2	67 40.0	79 50	127.1	68 27.2	78 51	125.4	69 36.0	75 52	122.7	70 42.0	72 54	119.7	72 04.9	66 56	115.2	72 24.5	65 57	114.0	72 43.6	63 57	112.7	73 54.8	55 59	107.1	2
3	67 10.3	78 51	125.4	67 56.8	77 52	123.8	69 04.7	74 53	121.1	70 09.7	71 55	118.1	71 31.2	65 57	113.6	71 50.5	64 57	112.4	72 09.4	62 58	111.2	73 19.4	55 59	105.7	3
4	66 39.9	77 52	123.8	67 25.9	76 53	122.2	68 32.8	73 54	119.5	69 36.9	70 55	116.6	70 57.2	64 57	112.1	71 16.2	63 58	111.0	71 34.7	61 58	109.7	72 43.7	54 60	104.4	4
25	66 08.9	77 52	122.3	66 54.3	75 53	120.6	68 00.4	72 55	118.0	69 03.6	69 56	115.1	70 22.8	63 58	110.7	70 41.5	62 58	109.5	70 59.8	60 59	108.3	72 07.8	53 60	103.1	25
6	65 37.4	76 53	120.8	66 22.3	74 54	119.1	67 27.6	71 55	116.5	68 30.0	68 57	113.6	69 48.1	62 58	109.3	70 06.6	61 59	108.2	70 24.6	59 59	107.0	71 31.8	52 60	101.9	6
7	65 05.4	75 54	119.3	65 49.8	73 55	117.7	66 54.3	70 56	115.1	67 56.0	67 57	112.2	69 13.1	62 59	108.0	69 31.4	60 59	106.9	69 49.2	59 59	105.7	70 55.6	52 61	100.8	7
8	64 33.0	74 55	117.9	65 16.9	72 56	116.3	66 20.6	69 57	113.7	67 21.6	66 58	110.9	68 37.9	61 59	106.8	68 55.9	59 59	105.7	69 13.5	58 60	104.5	70 19.2	51 61	99.7	8
9	64 00.1	73 55	116.5	64 43.6	72 56	114.9	65 46.6	69 57	112.4	66 47.0	65 58	109.6	68 02.4	60 59	105.5	68 20.2	59 60	104.5	68 37.7	57 60	103.4	69 42.7	51 61	98.6	9
30	63 26.9	73 56	115.2	64 09.9	71 57	113.6	65 12.3	68 58	111.1	66 12.0	65 59	108.3	67 26.7	60 60	104.4	67 44.4	58 60	103.3	68 01.7	57 60	102.2	69 06.2	51 61	97.6	30
1	62 53.3	72 57	113.9	63 35.9	70 57	112.3	64 37.7	67 58	109.8	65 36.8	64 59	107.1	66 50.8	59 60	103.2	67 08.4	58 60	102.2	67 25.5	56 61	101.1	68 29.5	50 61	96.6	1
2	62 19.4	71 57	112.6	63 01.6	69 58	111.1	64 02.8	67 59	108.6	65 01.4	63 59	106.0	66 14.8	59 60	102.1	66 32.2	57 61	101.1	66 49.2	56 61	100.1	67 52.8	50 61	95.7	2
3	61 45.1	71 58	111.4	62 27.0	69 58	109.9	63 27.7	66 59	107.4	64 25.8	63 60	104.8	65 38.6	58 61	101.1	65 55.9	57 61	100.1	66 12.7	56 61	99.1	67 16.0	50 61	94.7	3
4	61 10.6	70 58	110.2	61 52.1	68 59	108.7	62 52.4	66 59	106.3	63 50.0	62 60	103.7	65 02.3	58 61	100.0	65 19.4	57 61	99.1	65 36.2	55 61	98.1	66 39.2	50 61	93.8	4
35	60 35.8	69 58	109.1	61 17.0	68 59	107.6	62 16.8	65 60	105.2	63 14.1	62 60	102.7	64 25.9	57 61	99.0	64 42.9	56 61	98.1	64 59.6	55 61	97.1	66 02.3	49 62	93.0	35
6	60 00.8	69 59	107.9	60 41.7	67 59	106.5	61 41.1	65 60	104.1	62 37.9	62 60	101.6	63 49.3	57 61	98.1	64 06.3	56 61	97.1	64 22.9	55 61	96.2	65 25.4	49 62	92.1	6
7	59 25.5	69 59	106.8	60 06.1	67 60	105.4	61 05.2	64 60	103.1	62 01.7	61 61	100.6	63 12.7	57 61	97.1	63 29.6	56 61	96.2	63 46.2	55 61	95.2	64 48.5	49 62	91.3	7
8	58 50.1	68 59	105.8	59 30.4	66 60	104.3	60 29.1	64 60	102.0	61 25.3	61 61	99.6	62 36.0	57 61	96.2	62 52.8	56 61	95.3	63 09.3	54 61	94.4	64 11.5	49 62	90.5	8
9	58 14.4	68 60	104.7	58 54.6	66 60	103.3	59 52.9	64 61	101.0	60 48.9	61 61	98.7	61 59.3	57 61	95.3	62 16.0	55 61	94.4	62 32.5	54 61	93.5	63 34.6	49 62	89.7	9
40	57 38.6	67 60	103.7	58 18.5	66 60	102.3	59 16.6	63 61	100.1	60 12.3	60 61	97.7	61 22.4	56 61	94.4	61 39.2	55 62	93.5	61 55.6	54 62	92.6	62 57.7	49 62	88.9	40
1	57 02.6	67 60	102.7	57 42.4	65 60	101.3	58 40.2	63 61	99.1	59 35.7	60 61	96.8	60 45.6	56 61	93.5	61 02.3	55 62	92.7	61 18.7	54 62	91.8	62 20.7	49 62	88.2	1
2	56 26.5	67 60	101.7	57 06.1	65 61	100.3	58 03.7	63 61	98.2	58 58.9	60 61	95.9	60 08.7	56 62	92.7	60 25.4	55 62	91.8	60 41.8	54 62	91.0	61 43.8	49 62	87.4	2
3	55 50.3	66 61	100.7	56 29.7	65 61	99.4	57 27.1	63 61	97.2	58 22.2	60 61	95.0	59 31.8	56 62	91.8	59 48.5	55 62	91.0	60 04.8	54 62	90.2	61 06.9	49 61	86.7	3
4	55 13.9	66 61	99.8	55 53.2	65 61	98.4	56 50.4	62 61	96.3	57 45.3	60 61	94.1	58 54.9	56 62	91.0	59 11.5	55 62	90.2	59 27.9	54 62	89.4	60 30.1	50 61	86.0	4
45	54 37.5	66 61	98.8	55 16.6	64 61	97.5	56 13.6	62 61	95.5	57 08.5	60 62	93.3	58 17.9	56 62	90.2	58 34.6	55 62	89.4	58 51.0	54 62	88.6	59 53.2	50 61	85.3	45
6	54 00.9	66 61	97.9	54 39.9	64 61	96.6	55 36.8	62 61	94.6	56 31.6	60 62	92.5	57 41.0	56 62	89.4	57 57.7	55 62	88.7	58 14.0	54 62	87.9	59 16.4	50 61	84.6	6
7	53 24.3	66 61	97.0	54 03.2	64 61	95.7	55 00.0	62 61	93.7	55 54.7	60 62	91.6	57 04.1	56 62	88.7	57 20.7	55 62	87.9	57 37.1	54 61	87.1	58 39.7	50 61	83.9	7
8	52 47.6	65 61	96.1	53 26.4	64 61	94.9	54 23.1	62 62	92.9	55 17.7	60 62	90.8	56 27.1	56 62	87.9	56 43.8	55 61	87.2	57 00.2	54 61	86.4	58 03.0	50 61	83.2	8
9	52 10.9	65 61	95.3	52 49.6	64 61	94.0	53 46.2	62 62	92.1	54 40.8	60 62	90.0	55 50.2	56 61	87.2	56 07.0	55 61	86.4	56 23.4	54 61	85.7	57 26.3	50 61	82.6	9
50	51 34.1	65 61	94.4	52 12.7	64 62	93.2	53 09.3	62 62	91.3	54 03.9	60 62	89.2	55 13.4	56 61	86.4	55 30.1	55 61	85.7	55 46.6	54 61	85.0	56 49.7	51 61	81.9	50
1	50 57.2	65 61	93.6	51 35.9	64 62	92.4	52 32.3	62 62	90.5	53 26.9	60 62	88.5	54 36.5	56 61	85.7	54 53.3	56 61	85.0	55 09.8	55 61	84.3	56 13.2	51 61	81.2	1
2	50 20.3	65 62	92.8	50 58.9	64 62	91.5	51 55.4	62 62	89.7	52 50.0	60 62	87.7	53 59.7	56 61	85.0	54 16.5	56 61	84.3	54 33.1	55 61	83.6	55 36.7	51 61	80.6	2
3	49 43.4	65 62	91.9	50 22.0	64 62	90.7	51 18.5	62 62	88.9	52 13.1	60 61	87.0	53 22.9	57 61	84.3	53 39.8	56 61	83.6	53 56.4	55 61	82.9	55 00.3	51 61	80.0	3
4	49 06.5	65 62	91.1	49 45.1	64 62	89.9	50 41.5	62 62	88.1	51 36.2	60 61	86.2	52 46.2	57 61	83.6	53 03.1	56 61	82.9	53 19.8	55 61	82.2	54 24.0	52 60	79.3	4
55	48 29.5	65 62	90.3	49 08.1	64 62	89.2	50 04.6	62 61	87.4	50 59.4	60 61	85.5	52 09.5	57 61	82.9	52 26.5	56 61	82.2	52 43.2	55 61	81.5	53 47.7	52 60	78.7	55
6	47 52.6	65 62	89.5	48 31.2	64 62	88.4	49 27.7	62 61	86.6	50 22.6	60 61	84.8	51 32.9	57 61	82.2	51 49.9	56 61	81.5	52 06.7	56 61	80.9	53 11.5	52 60	78.1	6
7	47 15.7	65 62	88.8	47 54.3	64 62	87.6	48 50.9	62 61	85.9	49 45.8	60 61	84.0	50 56.3	57 61	81.5	51 13.4	57 61	80.9	51 30.3	56 61	80.2	52 35.4	53 60	77.5	7
8	46 38.7	65 62	88.0	47 17.4	64 61	86.9	48 14.1	62 61	85.1	49 09.1	60 61	83.3	50 19.8	58 61	80.8	50 37.0	57 61	80.2	50 53.9	56 60	79.5	51 59.4	53 60	76.9	8
9	46 01.8	65 61	87.2	46 40.5	64 61	86.1	47 37.3	62 61	84.4	48 32.4	60 61	82.6	49 43.4	58 61	80.2	50 00.6	57 60	79.5	50 17.6	56 60	78.9	51 23.5	53 60	76.2	9
60	45 25.0	65 61	86.5	46 03.7	64 61	85.4	47 00.5	62 61	83.7	47 55.8	61 61	81.9	49 07.0	58 60	79.5	49 24.3	57 60	78.9	49 41.4	57 60	78.3	50 47.6	54 60	75.6	60
1	44 48.1	65 61	85.7	45 26.9	64 61	84.7	46 23.8	62 61	83.0	47 19.3	61 61	81.3	48 30.7	58 60	78.9	48 48.1	58 60	78.2	49 05.3	57 60	77.6	50 11.9	54 59	75.0	1
2	44 11.3	65 61	85.0	44 50.1	64 61	83.9	45 47.2	63 61	82.3	46 42.8	61 61	80.6	47 54.5	59 60	78.2	48 12.0	58 60	77.6	48 29.2	57 60	77.0	49 36.3	54 59	74.4	2
3	43 34.5	65 61	84.3	44 13.4	64 61	83.2	45 10.6	63 61	81.6	46 06.4	61 61	79.9	47 18.4	59 60	77.6	47 35.9	58 60	77.0	47 53.3	58 60	76.4	49 00.7	55 59	73.9	3
4	42 57.8	65 61	83.5	43 36.8	64 61	82.5	44 34.1	63 61	80.9	45 30.1	61 60	79.2	46 42.4	59 60	76.9	47 00.0	58 60	76.3	47 17.4	58 60	75.7	48 25.3	55 59	73.3	4
65	42 21.1	66 61	82.8	43 00.2	65 61	81.8	43 57.7	63 61	80.2	44 53.8	62 60	78.5	46 06.4	59 60	76.3	46 24.2	59 60	75.7	46 41.7	58 59	75.1	47 50.0	56 59	72.7	65
6	41 44.5	66 61	82.1	42 23.6	65 61	81.1	43 21.3	63 60	79.5	44 17.7	62 60	77.9	45 30.6	60 60	75.6	45 48.4	59 59	75.1	46 06.1	58 59	74.5	47 14.8	56 58	72.1	6
7	41 07.9	66 61	81.4	41 47.2	65 61	80.4	42 45.0	64 60	78.8	43 41.6	62 60	77.2	44 54.9	60 59	75.0	45 12.8	59 59	74.4	45 30.5	59 59	73.9	46 39.7	56 58	71.5	7
8	40 31.4	66 61	80.7	41 10.8	65 60	79.7	42 08.9	64 60	78.2	43 05.6	62 60	76.6	44 19.2	60 59	74.4	44 37.2	60 59	73.8	44 55.1	59 59	73.3	46 04.7	57 58	70.9	8
9	39 55.0	66 61	80.0	40 34.5	65 60	79.0	41 32.7	64 60	77.5	42 29.8	63 60	75.9	43 43.7	61 59	73.8	44 01.8	60 59	73.2	44 19.8	60 59	72.6	45 29.8	57 58	70.4	9
70	39 18.7	66 60	79.3	39 58.3	66 60	78.3	40 56.7	64 60	76.8	41 54.0	63 59	75.3	43 08.3	61 59	73.1	43 26.5	60 59	72.6	43 44.6	60 58	72.0	44 55.1	58 58	69.8	70
1	38 42.4	67 60	78.6	39 22.2	66 60	77.6	40 20.8	65 60	76.1	41 18.3	63 59	74.6	42 33.0	61 59	72.5	42 51.3	61 58	72.0	43 09.5	60 58	71.4	44 20.5	58 57	69.2	1
2	38 06.3	67 60	77.9	38 46.1	66 60	77.0	39 45.0	65 60	75.5	40 42.7	64 59	74.0	41 57.8	62 58	71.9	42 16.3	61 58	71.4	42 34.5	61 58	70.8	43 46.1	59 57	68.6	2
3	37 30.2	67 60	77.2	38 10.2	66 60	76.3	39 09.3	65 59	74.8	40 07.3	64 59	73.3	41 22.8	62 58	71.3	41 41.3	62 58	70.8	41 59.7	61 58	70.2	43 11.7	59 57	68.1	3
4	36 54.2	67 60	76.5	37 34.3	67 60	75.6	38 33.7	65 59	74.2	39 32.0	64 59	72.7	40 47.9	62 58	70.7	41 06.5	62 58	70.2	41 25.0	61 58	69.6	42 37.5	59 57	67.5	4
75	36 18.3	67 60	75.9	36 58.6	67 59	74.9	37 58.2	66 59	73.5	38 56.8	64 58	72.1	40 13.1	63 58	70.1	40 31.8	62 58	69.5	40 50.4	62 57	69.0	42 03.5	60 57	66.9	75
6	35 42.6	68 59	75.2	36 23.0	67 59	74.3	37 22.9	66 59	72.9	38 21.7	65 58	71.4	39 38.4	63 58	69.5	39 57.3	63 57	68.9	40 16.0	62 57	68.4	41 29.6	60 56	66.3	6
7	35 06.9	68 59	74.5	35 47.5	67 59	73.6	36 47.6	66 59	72.2	37 46.7	65 58	70.8	39 03.9	63 57	68.8	39 22.9	63 57	68.3	39 41.7	63 57	67.8	40 55.8	61 56	65.8	7
8	34 31.4	68 59	73.8	35 12.1	68 59	72.9	36 12.5	67 58	71.6	37 11.9	65 58	70.2	38 29.5	64 57	68.2	38 48.6	63 57	67.7	39 07.6	63 57	67.2	40 22.2	61 56	65.2	8
9	33 56.0	69 59	73.2	34 36.9	68 59	72.3	35 37.5	67 58	70.9	36 37.2	66 58	69.5	37 55.3	64 57	67.6	38 14.5	64 57	67.1	38 33.6	63 56	66.7	39 48.7	62 56	64.6	9
80	33 20.7	69 59	72.5	34 01.8	68 58	71.6	35 02.7	67 58	70.3	36 02.7	66 57	68.9	37 21.2	65 57	67.0	37 40.6	64 56	66.5	37 59.8	64 56	66.1	39 15.4	62 55	64.1	80
1	32 45.5	69 58	71.8	33 26.8	68 58	71.0	34 28.0	68 58	69.6	35 28.3	67 57	68.3	36 47.3	65 56	66.4	37 06.7	65 56	65.9	37 26.1	64 56	65.5	38 42.3	63 55	63.5	1
2	32 10.5	69 58	71.2	32 51.9	69 58	70.3	33 53.4	68 57	69.0	34 54.1	67 57	67.7	36 13.5	65 56	65.8	36 33.1	65 56	65.3	36 52.6	65 56	64.9	38 09.3	63 55	62.9	2
3	31 35.6	70 58	70.5	32 17.2	69 58	69.7	33 19.0	68 57	68.4	34 20.0	67 57	67.0	35 39.9	66 56	65.2	35 59.6	66 56	64.8	36 19.2	65 55	64.3	37 36.5	64 54	62.4	3
4	31 00.8	70 58	69.8	31 42.6	69 57	69.0	32 44.7	69 57	67.7	33 46.0	68 56	66.4	35 06.4	66 56	64.6	35 26.3	66 55	64.2	35 46.0	66 55	63.7	37 03.9	64 54	61.8	4
85	30 26.2	70 57	69.2	31 08.2	70 57	68.4	32 10.6	69 57	67.1	33 12.3	68 56	65.8	34 33.1	67 55	64.0	34 53.1	66 55	63.6	35 13.0	66 55	63.1	36 31.4	65 54	61.2	85
6	29 51.8	71 57	68.5	30 34.0	70 57	67.7	31 36.7	69 56	66.5	32 38.7	68 56	65.2	34 00.0	67 55	63.4	34 20.1	67 55	63.0	34 40.1	67 54	62.5	35 59.1	65 54	60.7	6
7	29 17.5	71 57	67.9	29 59.9	70 57	67.1	31 02.9	70 56	65.8	32 05.2	69 55	64.5	33 27.1	68 55	62.8	33 47.3	67 54	62.4	34 07.4	67 54	61.9	35 27.0	66 53	60.1	7
8	28 43.3	71 57	67.2	29 25.9	71 56	66.4	30 29.3	70 56	65.2	31 32.0	69 55	63.9	32 54.3	68 54	62.2	33 14.7	68 54	61.8	33 34.9	67 54	61.3	34 55.1	66 53	59.5	8
9	28 09.4	72 56	66.6	28 52.2	71 56	65.8	29 55.9	70 55	64.5	30 58.9	70 55	63.3	32 21.7	68 54	61.6	32 42.2	68 54	61.2	33 02.6	68 54	60.7	34 23.3	67 53	59.0	9
90	27 35.6	72 56	65.9	28 18.6	71 56	65.1	29 22.6	71 55	63.9	30 26.0	70 55	62.7	31 49.3	69 54	61.0	32 10.0	69 53	60.6	32 30.5	68 53	60.1	33 51.8	67 52	58.4	90

Lat 52°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	27 01.9	72 56	65.2	27 45.2	72 55	64.5	28 49.5	71 55	63.3	29 53.2	70 54	62.1	31 17.1	69 53	60.4	31 37.9	69 53	60.0	31 58.6	69 53	59.5	33 20.4	68 52	57.8	91
2	26 28.5	73 55	64.6	27 11.9	72 55	63.8	28 16.6	71 55	62.6	29 20.7	71 54	61.4	30 45.1	70 53	59.8	31 06.0	70 53	59.4	31 26.8	69 53	59.0	32 49.3	68 52	57.2	2
3	25 55.2	73 55	63.9	26 38.9	73 55	63.2	27 43.9	72 54	62.0	28 48.3	71 54	60.8	30 13.3	70 53	59.2	30 34.3	70 52	58.8	30 55.3	70 52	58.4	32 18.3	69 51	56.7	3
4	25 22.1	73 55	63.3	26 06.0	73 54	62.5	27 11.4	72 54	61.4	28 16.2	72 53	60.2	29 41.6	71 52	58.6	30 02.8	70 52	58.2	30 23.9	70 52	57.8	31 47.5	69 51	56.1	4
95	24 49.2	74 54	62.6	25 33.3	73 54	61.9	26 39.1	73 54	60.7	27 44.2	72 53	59.6	29 10.2	71 52	58.0	29 31.5	71 52	57.6	29 52.8	71 52	57.2	31 17.0	70 51	55.5	95
6	24 16.5	74 54	62.0	25 00.8	74 54	61.2	26 06.9	73 53	60.1	27 12.5	73 53	58.9	28 39.0	72 52	57.4	29 00.5	71 51	57.0	29 21.8	71 51	56.6	30 46.6	70 50	54.9	6
7	23 44.0	74 54	61.3	24 28.6	74 53	60.6	25 35.0	74 53	59.5	26 41.0	73 52	58.3	28 08.0	72 51	56.8	28 29.6	72 51	56.4	28 51.1	72 51	56.0	30 16.5	71 50	54.4	7
8	23 11.7	75 54	60.6	23 56.5	74 53	59.9	25 03.3	74 52	58.8	26 09.6	73 52	57.7	27 37.2	73 51	56.2	27 58.9	72 51	55.8	28 20.6	72 50	55.4	29 46.6	71 49	53.8	8
9	22 39.6	75 53	60.0	23 24.6	75 53	59.3	24 31.8	74 52	58.2	25 38.5	74 52	57.1	27 06.6	73 51	55.5	27 28.5	73 50	55.2	27 50.3	73 50	54.8	29 16.9	72 49	53.2	9
100	22 07.7	76 53	59.3	22 53.0	75 52	58.6	24 00.5	75 52	57.5	25 07.6	74 51	56.4	26 36.3	73 50	54.9	26 58.3	73 50	54.6	27 20.3	73 50	54.2	28 47.4	72 49	52.6	100
1	21 36.1	76 52	58.7	22 21.6	76 52	58.0	23 29.5	75 51	56.9	24 37.0	75 51	55.8	26 06.2	74 50	54.3	26 28.3	74 50	53.9	26 50.4	74 49	53.6	28 18.2	73 48	52.0	1
2	21 04.6	76 52	58.0	21 50.4	76 52	57.3	22 58.7	76 51	56.3	24 06.5	75 50	55.2	25 36.3	74 49	53.7	25 58.6	74 49	53.3	26 20.8	74 49	53.0	27 49.2	73 48	51.4	2
3	20 33.4	77 52	57.3	21 19.4	77 51	56.7	22 28.1	76 51	55.6	23 36.3	76 50	54.5	25 06.6	75 49	53.1	25 29.1	75 49	52.7	25 51.4	75 49	52.4	27 20.4	74 48	50.9	3
4	20 02.4	77 51	56.7	20 48.7	77 51	56.0	21 57.7	76 50	55.0	23 06.3	76 50	53.9	24 37.2	75 49	52.5	24 59.8	75 48	52.1	25 22.3	75 48	51.8	26 51.9	74 47	50.3	4
105	19 31.7	78 51	56.0	20 18.2	77 50	55.3	21 27.6	77 50	54.3	22 36.6	76 49	53.3	24 08.0	76 48	51.9	24 30.7	76 48	51.5	24 53.4	76 48	51.1	26 23.6	75 47	49.7	105
6	19 01.2	78 50	55.3	19 47.9	78 50	54.7	20 57.7	77 49	53.7	22 07.1	77 49	52.6	23 39.1	76 48	51.2	24 02.0	76 48	50.9	24 24.8	76 47	50.5	25 55.6	75 46	49.1	6
7	18 30.9	78 50	54.7	19 17.9	78 50	54.0	20 28.1	78 49	53.0	21 37.9	77 48	52.0	23 10.4	77 47	50.6	23 33.4	77 47	50.3	23 56.4	76 47	49.9	25 27.8	76 46	48.5	7
8	18 00.9	79 50	54.0	18 48.1	79 49	53.4	19 58.7	78 49	52.4	21 08.9	78 48	51.4	22 42.0	77 47	50.0	23 05.1	77 47	49.7	23 28.3	77 46	49.3	25 00.2	76 45	47.9	8
9	17 31.1	79 49	53.3	18 18.6	79 49	52.7	19 29.5	79 48	51.7	20 40.2	78 47	50.7	22 13.8	78 46	49.4	22 37.1	78 46	49.0	23 00.4	77 46	48.7	24 33.0	77 45	47.3	9
110	17 01.6	80 49	52.7	17 49.3	79 48	52.0	19 00.7	79 48	51.1	20 11.7	79 47	50.1	21 45.9	78 46	48.8	22 09.3	78 46	48.4	22 32.7	78 46	48.1	24 05.9	77 45	46.7	110
1	16 32.4	80 48	52.0	17 20.4	80 48	51.4	18 32.1	80 47	50.4	19 43.5	79 47	49.4	21 18.3	79 46	48.1	21 41.8	79 45	47.8	22 05.4	78 45	47.5	23 39.2	78 44	46.1	1
2	16 03.4	80 48	51.3	16 51.6	80 47	50.7	18 03.8	80 47	49.8	19 15.6	80 46	48.8	20 50.9	79 45	47.5	21 14.6	79 45	47.2	21 38.3	79 45	46.8	23 12.7	78 44	45.5	2
3	15 34.7	81 47	50.6	16 23.2	81 47	50.0	17 35.7	80 46	49.1	18 47.9	80 46	48.1	20 23.8	80 45	46.9	20 47.7	80 44	46.5	21 11.5	79 44	46.2	22 46.5	79 43	44.9	3
4	15 06.3	81 47	50.0	15 55.0	81 46	49.3	17 07.9	81 46	48.4	18 20.6	81 45	47.5	19 57.0	80 44	46.2	20 21.0	80 44	45.9	20 45.0	80 44	45.6	22 20.5	79 43	44.3	4
115	14 38.2	82 46	49.3	15 27.2	82 46	48.7	16 40.4	81 45	47.8	17 53.5	81 45	46.8	19 30.4	81 44	45.6	19 54.6	80 44	45.3	20 18.7	80 43	45.0	21 54.9	80 42	43.7	115
6	14 10.3	82 46	48.6	14 59.6	82 46	48.0	16 13.2	82 45	47.1	17 26.7	81 44	46.2	19 04.2	81 43	45.0	19 28.5	81 43	44.7	19 52.8	81 43	44.3	21 29.5	80 42	43.1	6
7	13 42.8	83 45	47.9	14 32.3	82 45	47.3	15 46.3	82 44	46.4	17 00.1	82 44	45.5	18 38.2	82 43	44.3	19 02.7	81 43	44.0	19 27.1	81 42	43.7	21 04.4	81 41	42.5	7
8	13 15.5	83 45	47.2	14 05.2	83 44	46.6	15 19.7	83 44	45.8	16 33.9	82 43	44.9	18 12.5	82 42	43.7	18 37.1	82 42	43.4	19 01.7	82 42	43.1	20 39.6	81 41	41.9	8
9	12 48.6	83 44	46.5	13 38.5	83 44	46.0	14 53.4	83 43	45.1	16 08.0	83 43	44.2	17 47.2	82 42	43.0	18 11.9	82 42	42.7	18 36.6	82 41	42.5	20 15.1	82 40	41.2	9
120	12 21.9	84 44	45.8	13 12.1	84 43	45.3	14 27.4	83 43	44.4	15 42.4	83 42	43.6	17 22.1	83 41	42.4	17 47.0	83 41	42.1	18 11.8	83 41	41.8	19 50.9	82 40	40.6	120
1	11 55.6	84 43	45.1	12 46.1	84 43	44.6	14 01.7	84 42	43.7	15 17.1	84 42	42.9	16 57.4	83 41	41.8	17 22.4	83 41	41.5	17 47.4	83 40	41.2	19 27.0	83 39	40.0	1
2	11 29.5	85 43	44.4	12 20.3	85 42	43.9	13 36.3	84 42	43.1	14 52.1	84 41	42.2	16 32.9	84 40	41.1	16 58.1	84 40	40.8	17 23.2	84 40	40.5	19 03.4	83 39	39.4	2
3	11 03.8	85 42	43.7	11 54.8	85 42	43.2	13 11.2	85 41	42.4	14 27.4	85 41	41.6	16 08.8	84 40	40.5	16 34.1	84 39	40.2	16 59.3	84 39	39.9	18 40.2	84 38	38.8	3
4	10 38.5	85 42	43.0	11 29.7	85 41	42.5	12 46.5	85 41	41.7	14 03.1	85 40	40.9	15 45.0	85 39	39.8	16 10.4	85 39	39.5	16 35.8	85 39	39.2	18 17.2	84 38	38.1	4
125	10 13.4	86 41	42.3	11 04.9	86 41	41.8	12 22.1	86 40	41.0	13 39.1	85 39	40.2	15 21.5	85 39	39.1	15 47.1	85 38	38.9	16 12.6	85 38	38.6	17 54.5	85 37	37.5	125
6	9 48.7	86 41	41.6	10 40.5	86 40	41.1	11 58.0	86 40	40.3	13 15.4	86 39	39.5	14 58.3	86 38	38.5	15 24.0	86 38	38.2	15 49.7	86 38	38.0	17 32.2	85 37	36.9	6
7	9 24.4	87 40	40.9	10 16.4	87 40	40.4	11 34.3	86 39	39.6	12 52.0	86 38	38.9	14 35.5	86 37	37.8	15 01.4	86 37	37.6	15 27.2	86 37	37.3	17 10.2	86 36	36.2	7
8	9 00.3	87 39	40.2	9 52.6	87 39	39.7	11 10.9	87 38	38.9	12 29.0	87 38	38.2	14 13.0	87 37	37.2	14 39.0	87 37	36.9	15 05.0	86 36	36.6	16 48.6	86 36	35.6	8
9	8 36.7	88 39	39.5	9 29.2	87 38	39.0	10 47.8	87 38	38.3	12 06.4	87 37	37.5	13 50.9	87 36	36.5	14 17.0	87 36	36.2	14 43.1	87 36	36.0	16 27.2	87 35	35.0	9
130	8 13.4	88 38	38.8	9 06.1	88 38	38.3	10 25.1	88 37	37.6	11 44.0	88 37	36.8	13 29.1	87 36	35.8	13 55.3	87 36	35.6	14 21.5	87 35	35.3	16 06.2	87 34	34.3	130
1	7 50.4	88 38	38.0	8 43.4	88 37	37.6	10 02.8	88 37	36.9	11 22.1	88 36	36.1	13 07.6	88 35	35.2	13 34.0	88 35	34.9	14 00.3	88 35	34.7	15 45.6	88 34	33.7	1
2	7 27.8	89 37	37.3	8 21.0	89 37	36.9	9 40.8	89 36	36.2	11 00.5	88 35	35.4	12 46.6	88 35	34.5	13 13.0	88 34	34.3	13 39.5	88 34	34.0	15 25.3	88 33	33.0	2
3	7 05.6	89 36	36.6	7 59.1	89 36	36.1	9 19.2	89 35	35.5	10 39.2	89 35	34.8	12 25.8	89 34	33.8	12 52.4	89 34	33.6	13 19.0	89 34	33.3	15 05.3	88 33	32.4	3
4	6 43.8	90 36	35.9	7 37.5	89 35	35.4	8 58.0	89 35	34.7	10 18.4	89 34	34.1	12 05.4	89 33	33.1	12 32.2	89 33	32.9	12 58.9	89 33	32.7	14 45.7	89 32	31.7	4
135	6 22.3	90 35	35.1	7 16.3	90 35	34.7	8 37.1	90 34	34.0	9 57.9	90 34	33.4	11 45.4	90 33	32.5	12 12.3	90 33	32.2	12 39.1	89 32	32.0	14 26.4	89 31	31.1	135
6	6 01.3	90 34	34.4	6 55.4	90 34	34.0	8 16.6	90 34	33.3	9 37.7	90 33	32.7	11 25.8	90 32	31.8	11 52.8	90 32	31.6	12 19.7	90 32	31.3	14 07.5	90 31	30.4	6
7	5 40.6	91 34	33.7	6 35.0	91 33	33.2	7 56.5	91 33	32.6	9 18.0	90 32	32.0	11 06.5	90 31	31.1	11 33.6	90 31	30.9	12 00.7	90 31	30.7	13 49.0	90 30	29.8	7
8	5 20.3	91 33	32.9	6 14.9	91 33	32.5	7 36.8	91 32	31.9	8 58.6	91 32	31.3	10 47.6	91 31	30.4	11 14.9	91 31	30.2	11 42.1	91 30	30.0	13 30.9	91 30	29.1	8
9	5 00.4	91 33	32.2	5 55.2	91 32	31.8	7 17.5	91 32	31.2	8 39.6	91 31	30.6	10 29.1	91 30	29.7	10 56.5	91 30	29.5	11 23.8	91 30	29.3	13 13.1	91 29	28.5	9
140				5 36.0	92 31	31.1	6 58.6	92 31	30.5	8 21.1	92 30	29.8	10 11.0	92 30	29.0	10 38.5	92 29	28.8	11 05.9	92 29	28.6	12 55.7	91 28	27.8	140
1				5 17.1	92 31	30.3	6 40.0	92 30	29.7	8 02.9	92 30	29.1	9 53.3	92 29	28.3	10 20.8	92 29	28.1	10 48.4	92 29	27.9	12 38.6	92 28	27.1	1
2							6 21.9	92 30	29.0	7 45.1	92 29	28.4	9 35.9	92 28	27.6	10 03.6	92 28	27.5	10 31.3	92 28	27.3	12 22.0	92 27	26.5	2
3							6 04.2	93 29	28.3	7 27.7	93 28	27.7	9 19.0	93 28	27.0	9 46.8	93 27	26.8	10 14.6	93 27	26.6	12 05.7	93 26	25.8	3
4							5 46.9	93 28	27.5	7 10.7	93 28	27.0	9 02.4	93 27	26.3	9 30.4	93 27	26.1	9 58.3	93 27	25.9	11 49.8	93 26	25.1	4
145							5 30.1	93 27	26.8	6 54.2	93 27	26.3	8 46.3	93 26	25.5	9 14.3	93 26	25.4	9 42.3	93 26	25.2	11 34.3	93 25	24.5	145
6							5 13.6	94 27	26.1	6 38.0	94 26	25.5	8 30.6	94 26	24.8	8 58.7	94 25	24.7	9 26.8	94 25	24.5	11 19.2	94 24	23.8	6
7										6 22.3	94 26	24.8	8 15.3	94 25	24.1	8 43.5	94 25	24.0	9 11.7	94 24	23.8	11 04.5	94 24	23.1	7
8										6 07.0	94 25	24.1	8 00.4	94 24	23.4	8 28.7	94 24	23.3	8 57.0	94 24	23.1	10 50.2	94 23	22.4	8
9										5 52.2	95 24	23.4	7 45.9	95 23	22.7	8 14.3	95 23	22.6	8 42.7	95 23	22.4	10 36.3	95 22	21.7	9
150										5 37.7	95 23	22.6	7 31.8	95 23	22.0	8 00.3	95 23	21.9	8 28.9	95 22	21.7	10 22.9	95 22	21.1	150
1										5 23.7	95 23	21.9	7 18.2	95 22	21.3	7 46.8	95 22	21.1	8 15.4	95 22	21.0	10 09.8	95 21	20.4	1
2										5 10.2	96 22	21.2	7 05.0	96 21	20.6	7 33.7	96 21	20.4	8 02.4	96 21	20.3	9 57.1	96 20	19.7	2
3													6 52.2	96 21	19.9	7 21.0	96 20	19.7	7 49.8	96 20	19.6	9 44.9	96 20	19.0	3
4													6 39.9	96 20	19.1	7 08.8	96 20	19.0	7 37.6	96 20	18.9	9 33.1	96 19	18.3	4
155													6 28.0	97 19	18.4	6 56.9	97 19	18.3	7 25.9	96 19	18.2	9 21.7	96 18	17.6	155
6													6 16.5	97 18	17.7	6 45.6	97 18	17.6	7 14.6	97 18	17.4	9 10.7	97 18	16.9	6
7													6 05.5	97 18	17.0	6 34.6	97 17	16.9	7 03.7	97 17	16.7	9 00.1	97 17	16.2	7
8													5 55.0	97 17	16.3	6 24.1	97 17	16.1	6 53.3	97 17	16.0	8 50.0	97 16	15.5	8
9													5 44.9	98 16	15.5	6 14.1	98 16	15.4	6 43.4	98 16	15.3	8 40.3	97 15	14.9	9
160													5 35.2	98 15	14.8	6 04.5	98 15	14.7	6 33.8	98 15	14.6	8 31.1	98 15	14.2	160
1													5 26.0	98 15	14.1	5 55.4	98 14	14.0	6 24.8	98 14	13.9	8 22.3	98 14	13.5	1
2													5 17.2	98 14	13.3	5 46.7	98 14	13.2	6 16.1	98 14	13.1	8 13.9	98 13	12.8	2
3													5 08.9	98 13	12.6	5 38.5	98 13	12.5	6 08.0	98 13	12.4	8 06.0	98 12	12.1	3
4													5 01.1	99 12	11.9	5 30.7	99 12	11.8	6 00.2	99 12	11.7	7 58.5	99 12	11.4	4
165																5 23.4	99 11	11.0	5 53.0	99 11	11.0	7 51.4	99 11	10.6	165
6																5 16.5	99 11	10.3	5 46.2	99 11	10.2	7 44.8	99 10	09.9	6
7																5 10.1	99 10	09.6	5 39.8	99 10	09.5	7 38.7	99 10	09.2	7
8																5 04.2	99 09	08.9	5 34.0	99 09	08.8	7 33.0	99 09	08.5	8
9																			5 28.6	99 08	08.1	7 27.7	99 08	07.8	9
170																			5 23.6	99 07	07.3	7 22.9	99 07	07.1	170
1																			5 19.1	1.0 07	06.6	7 18.6	1.0 06	06.4	1
2																			5 15.1	1.0 06	05.9	7 14.7	1.0 06	05.7	2
3																			5 11.6	1.0 05	05.1	7 11.2	1.0 05	05.0	3
4																			5 08.5	1.0 04	04.4	7 08.3	1.0 04	04.3	4
175																			5 05.9	1.0 04	03.7	7 05.7	1.0 03	03.6	175
6																			5 03.8	1.0 03	02.9	7 03.7	1.0 03	02.8	6
7																			5 02.1	1.0 02	02.2	7 02.1	1.0 02	02.1	7
8																			5 00.9	1.0 01	01.5	7 00.9	1.0 01	01.4	8
9																			5 00.2	1.0 00	00.7	7 00.2	1.0 00	00.7	9
180																			5 00.0	1.0 00	00.0	7 00.0	1.0 00	00.0	180

Digitized by Google

Lat. 52°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	84 00.0	1.0 04	180.0	85 00.0	1.0 04	180.0	86 30.0	1.0 06	180.0	87 30.0	1.0 08	180.0	88 30.0	1.0 13	180.0	89 30.0	1.0 30	180.0	89 30.0	1.0 29	00.0	88 00.0	1.0 09	00.0	00
1	83 57.9	99 11	173.4	84 57.5	99 12	172.2	86 26.5	98 17	169.3	87 25.3	97 22	165.4	88 22.5	93 33	157.0	89 12.2	63 54	128.5	89 12.5	63 53	50.4	87 54.7	96 25	16.3	1
2	83 51.5	98 17	166.9	84 50.1	97 20	164.7	86 16.4	94 26	159.2	87 11.9	90 34	152.4	88 02.8	78 45	139.4	88 39.9	39 59	111.2	88 40.7	37 58	67.0	87 40.0	85 36	30.2	2
3	83 41.2	96 23	160.7	84 38.1	94 27	157.6	86 00.6	89 34	150.1	86 51.7	81 42	141.6	87 35.8	64 52	127.4	88 04.6	28 60	103.9	88 05.8	24 60	73.6	87 18.4	73 43	40.9	3
4	83 27.2	93 29	154.8	84 22.0	90 33	151.0	85 40.0	82 40	142.3	86 26.6	72 47	133.1	87 04.9	54 55	119.4	87 28.4	22 61	99.8	87 30.0	17 60	76.9	86 52.3	62 48	48.7	4
05	83 09.9	89 34	149.4	84 02.5	86 38	145.1	85 15.7	76 45	135.6	85 58.2	65 51	126.4	86 31.8	46 57	113.6	86 51.9	19 61	97.2	86 53.9	13 60	78.8	86 23.3	52 51	54.4	05
6	82 49.8	86 38	144.4	83 39.9	81 42	139.8	84 48.6	70 49	130.0	85 27.4	58 54	121.0	85 57.4	41 59	109.4	86 15.2	17 61	95.3	86 17.6	09 61	79.9	85 52.4	45 53	58.6	6
7	82 27.1	82 41	139.9	83 14.9	77 45	135.0	84 19.3	65 52	125.3	84 55.0	53 56	116.7	85 22.3	37 60	106.1	85 38.4	16 62	93.8	85 41.2	07 61	80.6	85 20.4	38 55	61.8	7
8	82 02.3	79 44	135.7	82 47.8	73 48	130.8	83 48.4	61 54	121.3	84 21.5	49 57	113.1	84 46.6	34 60	103.5	85 01.5	15 62	92.6	85 04.8	05 61	81.0	84 47.4	33 56	64.3	8
9	81 35.6	75 47	132.0	82 19.1	69 50	127.0	83 16.3	57 55	117.8	83 47.2	46 58	110.2	84 10.5	32 61	101.4	84 24.6	15 62	91.6	84 28.3	03 61	81.3	84 13.9	29 57	66.2	9
10	81 07.4	72 49	128.6	81 49.0	66 52	123.7	82 43.2	54 56	114.8	83 12.2	43 59	107.6	83 34.2	30 61	99.5	83 47.6	15 62	90.7	83 51.7	01 61	81.4	83 39.9	25 57	67.7	10
1	80 37.9	69 51	125.5	81 17.7	63 54	120.7	82 09.3	51 58	112.1	82 36.8	41 60	105.4	82 57.6	28 61	98.0	83 10.7	15 62	89.9	83 15.2	00 61	81.4	83 05.6	21 58	68.8	1
2	80 07.3	67 53	122.7	80 45.5	60 55	118.0	81 34.8	49 58	109.8	82 01.1	39 60	103.5	82 21.0	27 61	96.6	82 33.8	15 62	89.1	82 38.7	02 61	81.4	82 31.0	18 58	69.8	2
3	79 35.8	64 54	120.1	80 12.5	58 56	115.6	80 59.8	47 59	107.7	81 25.0	37 60	101.8	81 44.3	27 61	95.3	81 56.8	15 62	88.4	82 02.2	03 61	81.3	81 56.3	16 58	70.5	3
4	79 03.4	62 55	117.7	79 38.9	56 57	113.3	80 24.4	45 59	105.9	80 48.8	36 61	100.3	81 07.4	26 61	94.2	81 19.9	15 62	87.8	81 25.7	04 61	81.1	81 21.4	13 58	71.1	4
15	78 30.4	60 56	115.5	79 04.7	54 58	111.3	79 48.8	43 60	104.2	80 12.3	35 61	98.9	80 30.6	26 62	93.2	80 43.0	16 61	87.2	80 49.2	05 61	81.0	80 46.4	11 58	71.6	15
6	77 56.8	58 57	113.5	78 30.1	52 58	109.4	79 12.8	42 60	102.6	79 35.8	34 61	97.6	79 53.7	25 62	92.2	80 06.1	16 61	86.6	80 12.7	06 61	80.8	80 11.3	09 59	71.9	6
7	77 22.7	57 58	111.6	77 55.1	51 59	107.7	78 36.7	41 61	101.2	78 59.1	34 61	96.4	79 16.8	25 62	91.3	79 29.3	16 61	86.0	79 36.3	07 61	80.5	79 36.1	07 59	72.2	7
8	76 48.2	55 58	109.9	77 19.7	50 59	106.1	78 00.3	40 61	99.8	78 22.4	33 61	95.3	78 39.8	25 62	90.5	78 52.4	17 61	85.5	78 59.8	08 61	80.3	79 00.9	06 59	72.4	8
9	76 13.3	54 59	108.3	76 44.1	49 60	104.6	77 23.9	39 61	98.6	77 45.5	33 61	94.3	78 02.9	25 62	89.7	78 15.6	17 61	84.9	78 23.4	09 61	80.0	78 25.7	04 59	72.6	9
20	75 38.0	53 59	106.8	76 08.2	48 60	103.2	76 47.3	39 61	97.4	77 08.7	32 62	93.3	77 26.0	25 62	88.9	77 38.8	18 61	84.4	77 47.1	10 61	79.7	77 50.5	02 59	72.6	20
1	75 02.5	52 60	105.3	75 32.2	47 60	101.9	76 10.6	38 61	96.3	76 31.8	32 62	92.4	76 49.0	25 62	88.2	77 02.1	18 61	83.9	77 10.7	11 60	79.5	77 15.2	01 59	72.7	1
2	74 26.8	51 60	104.0	74 56.0	46 61	100.6	75 33.9	38 61	95.3	75 54.9	32 62	91.5	76 12.1	25 62	87.5	76 25.4	19 61	83.4	76 34.4	12 60	79.2	76 39.9	01 59	72.7	2
3	73 50.8	50 60	102.7	74 19.6	46 61	99.5	74 57.1	38 61	94.3	75 17.9	32 62	90.7	75 35.2	26 61	86.9	75 48.7	19 61	82.9	75 58.2	12 60	78.9	76 04.7	02 59	72.7	3
4	73 14.7	50 60	101.4	73 43.1	45 61	98.3	74 20.2	37 62	93.4	74 41.0	32 62	89.9	74 58.3	26 61	86.2	75 12.1	20 61	82.4	75 22.0	13 60	78.5	75 29.4	03 59	72.6	4
25	72 38.4	49 61	100.3	73 06.5	45 61	97.3	73 43.3	37 62	92.5	74 04.1	32 62	89.1	74 21.5	26 61	85.6	74 35.5	20 61	81.9	74 45.8	14 60	78.2	74 54.2	05 59	72.5	25
6	72 02.0	48 61	99.2	72 29.8	44 61	96.3	73 06.4	37 62	91.6	73 27.1	32 62	88.4	73 44.7	27 61	85.0	73 58.9	21 61	81.5	74 09.6	15 60	77.9	74 19.0	06 59	72.4	6
7	71 25.5	48 61	98.1	71 53.1	44 61	95.3	72 29.5	37 62	90.8	72 50.2	32 62	87.6	73 07.9	27 61	84.4	73 22.4	21 61	81.0	73 33.5	16 60	77.6	73 43.8	07 59	72.3	7
8	70 48.9	48 61	97.1	71 16.2	44 61	94.3	71 52.5	37 62	90.0	72 13.3	32 61	86.9	72 31.2	27 61	83.8	72 45.9	22 61	80.5	72 57.5	17 60	77.2	73 08.6	08 59	72.1	8
9	70 12.2	47 61	96.1	70 39.4	43 62	93.4	71 15.6	37 62	89.2	71 36.4	32 61	86.3	71 54.5	28 61	83.2	72 09.5	23 61	80.1	72 21.5	17 60	76.9	72 33.5	09 58	71.9	9
30	69 35.4	47 61	95.1	70 02.5	43 62	92.5	70 38.7	37 62	88.5	70 59.6	33 61	85.6	71 17.8	28 61	82.7	71 33.2	23 61	79.6	71 45.6	18 60	76.5	71 58.4	10 58	71.7	30
1	68 58.6	47 61	94.2	69 25.6	43 62	91.7	70 01.7	37 62	87.7	70 22.8	33 61	85.0	70 41.2	28 61	82.1	70 56.9	24 60	79.2	71 09.7	19 60	76.2	71 23.3	11 58	71.5	1
2	68 21.8	47 61	93.3	68 48.7	43 62	90.9	69 24.8	37 61	87.0	69 46.0	33 61	84.3	70 04.6	29 61	81.6	70 20.6	24 60	78.7	70 33.8	20 60	75.8	70 48.3	12 58	71.3	2
3	67 44.9	46 62	92.5	68 11.7	43 62	90.1	68 48.0	37 61	86.3	69 09.3	33 61	83.7	69 28.1	29 61	81.0	69 44.4	25 60	78.3	69 58.0	20 60	75.4	70 13.3	13 58	71.1	3
4	67 07.9	46 62	91.6	67 34.8	43 62	89.3	68 11.1	38 61	85.6	68 32.6	34 61	83.1	68 51.6	30 61	80.5	69 08.3	26 60	77.8	69 22.3	21 59	75.1	69 38.4	14 58	70.9	4
35	66 31.0	46 62	90.8	66 57.8	43 62	88.5	67 34.3	38 61	85.0	67 55.9	34 61	82.5	68 15.2	30 61	80.0	68 32.2	26 60	77.4	68 46.6	22 59	74.7	69 03.5	15 58	70.6	35
6	65 54.1	46 62	90.0	66 20.9	43 62	87.8	66 57.5	38 61	84.3	67 19.3	35 61	81.9	67 38.9	31 60	79.5	67 56.2	27 60	76.9	68 11.0	23 59	74.3	68 28.7	16 58	70.4	6
7	65 17.1	46 62	89.2	65 44.0	43 61	87.1	66 20.8	38 61	83.7	66 42.8	35 61	81.4	67 02.6	31 60	79.0	67 20.2	27 60	76.5	67 35.5	24 59	74.0	67 53.9	17 58	70.1	7
8	64 40.2	46 62	88.5	65 07.1	43 61	86.4	65 44.1	39 61	83.1	66 06.3	35 61	80.8	66 26.4	32 60	78.4	66 44.3	28 60	76.0	67 00.0	24 59	73.6	67 19.2	18 58	69.8	8
9	64 03.3	46 62	87.7	64 30.3	44 61	85.7	65 07.5	39 61	82.4	65 29.8	36 61	80.2	65 50.2	32 60	77.9	66 08.5	29 60	75.6	66 24.6	25 59	73.2	66 44.6	19 58	69.5	9
40	63 26.4	47 61	87.0	63 53.5	44 61	85.0	64 30.9	39 61	81.8	64 53.5	36 60	79.7	65 14.1	33 60	77.4	65 32.8	29 59	75.2	65 49.3	26 59	72.8	66 10.0	20 58	69.2	40
1	62 49.5	47 61	86.3	63 16.7	44 61	84.3	63 54.3	40 61	81.2	64 17.2	37 60	79.1	64 38.1	33 60	76.9	64 57.1	30 59	74.7	65 14.1	27 59	72.4	65 35.5	21 57	68.9	1
2	62 12.7	47 61	85.6	62 40.0	44 61	83.6	63 17.8	40 61	80.6	63 40.9	37 60	78.6	64 02.2	34 60	76.5	64 21.5	31 59	74.3	64 38.9	27 58	72.1	65 01.1	22 57	68.6	2
3	61 35.9	47 61	84.9	62 03.3	44 61	83.0	62 41.4	40 61	80.1	63 04.7	37 60	78.0	63 26.3	34 60	76.0	63 46.0	31 59	73.8	64 03.8	28 58	71.7	64 26.7	23 57	68.3	3
4	60 59.1	47 61	84.2	61 26.6	45 61	82.3	62 05.1	41 60	79.5	62 28.6	38 60	77.5	62 50.5	35 60	75.5	63 10.6	32 59	73.4	63 28.8	29 58	71.3	63 52.4	24 57	68.0	4
45	60 22.4	47 61	83.5	60 50.1	45 61	81.7	61 28.8	41 60	78.9	61 52.6	38 60	77.0	62 14.8	36 59	75.0	62 35.2	33 59	73.0	62 53.8	29 58	70.9	63 18.2	25 57	67.7	45
6	59 45.7	48 61	82.9	60 13.5	45 61	81.1	60 52.6	41 60	78.3	61 16.7	39 60	76.4	61 39.1	36 59	74.5	61 59.9	33 59	72.5	62 19.0	30 58	70.5	62 44.1	26 57	67.4	6
7	59 09.1	48 61	82.2	59 37.1	46 61	80.5	60 16.4	42 60	77.8	60 40.8	39 60	75.9	61 03.6	37 59	74.0	61 24.7	34 58	72.1	61 44.2	31 58	70.1	62 10.0	26 57	67.0	7
8	58 32.5	48 61	81.6	59 00.7	46 61	79.9	59 40.4	42 60	77.2	60 05.0	40 60	75.4	60 28.1	37 59	73.5	60 49.6	34 58	71.6	61 09.5	32 58	69.7	61 36.1	27 56	66.7	8
9	57 56.0	48 61	80.9	58 24.4	46 60	79.3	59 04.4	43 60	76.7	59 29.3	40 59	74.9	59 52.7	38 59	73.1	60 14.6	35 58	71.2	60 34.9	32 58	69.3	61 02.2	28 56	66.4	9
50	57 19.5	49 61	80.3	57 48.1	47 60	78.7	58 28.5	43 60	76.1	58 53.7	41 59	74.4	59 17.4	38 59	72.6	59 39.7	36 58	70.8	60 00.4	33 57	68.9	60 28.4	29 56	66.0	50
1	56 43.2	49 60	79.7	57 11.9	47 60	78.1	57 52.7	44 60	75.6	58 18.2	41 59	73.9	58 42.2	39 59	72.1	59 04.9	36 58	70.3	59 26.0	34 57	68.5	59 54.7	30 56	65.7	1
2	56 06.8	49 60	79.1	56 35.8	47 60	77.5	57 16.9	44 59	75.0	57 42.7	42 59	73.3	58 07.1	40 58	71.6	58 30.1	37 58	69.9	58 51.7	35 57	68.1	59 21.1	31 56	65.3	2
3	55 30.6	50 60	78.4	55 59.8	48 60	76.9	56 41.3	45 59	74.5	57 07.4	42 59	72.8	57 32.1	40 58	71.2	57 55.5	38 58	69.4	58 17.4	35 57	67.7	58 47.6	32 56	65.0	3
4	54 54.5	50 60	77.8	55 23.9	48 60	76.3	56 05.8	45 59	74.0	56 32.1	43 59	72.3	56 57.2	41 58	70.7	57 21.0	38 57	69.0	57 43.3	36 57	67.3	58 14.1	32 56	64.6	4
55	54 18.4	50 60	77.2	54 48.0	48 60	75.7	55 30.3	45 59	73.4	55 57.0	43 58	71.8	56 22.4	41 58	70.2	56 46.5	39 57	68.5	57 09.3	37 56	66.8	57 40.8	33 55	64.2	55
6	53 42.4	51 60	76.6	54 12.3	49 59	75.2	54 54.9	46 59	72.9	55 21.9	44 58	71.3	55 47.7	42 58	69.7	56 12.2	40 57	68.1	56 35.4	38 56	66.4	57 07.6	34 55	63.9	6
7	53 06.5	51 60	76.0	53 36.6	49 59	74.6	54 19.7	46 59	72.4	54 47.0	45 58	70.8	55 13.1	43 58	69.3	55 38.0	40 57	67.7	56 01.6	38 56	66.0	56 34.5	35 55	63.5	7
8	52 30.7	51 60	75.5	53 01.0	50 59	74.0	53 44.5	47 58	71.8	54 12.2	45 58	70.3	54 38.6	43 57	68.8	55 03.9	41 57	67.2	55 27.9	39 56	65.6	56 01.5	36 55	63.1	8
9	51 55.0	52 59	74.9	52 25.6	50 59	73.5	53 09.5	47 58	71.3	53 37.4	46 58	69.8	54 04.2	44 57	68.3	54 29.9	42 56	66.8	54 54.3	40 56	65.2	55 28.6	36 55	62.7	9
60	51 19.4	52 59	74.3	51 50.2	51 59	72.9	52 34.6	48 58	70.8	53 02.8	46 58	69.3	53 30.0	44 57	67.8	53 56.0	42 56	66.3	54 20.8	40 56	64.8	54 55.8	37 54	62.4	60
1	50 43.9	53 59	73.7	51 15.0	51 59	72.4	51 59.7	48 58	70.3	52 28.3	47 57	68.8	52 55.8	45 57	67.4	53 22.2	43 56	65.9	53 47.5	41 55	64.3	54 23.1	38 54	62.0	1
2	50 08.5	53 59	73.1	50 39.8	51 58	71.8	51 25.0	49 58	69.7	51 53.9	47 57	68.3	52 21.8	46 57	66.9	52 48.6	44 56	65.4	53 14.3	42 55	63.9	53 50.6	39 54	61.6	2
3	49 33.2	53 59	72.6	50 04.8	52 58	71.2	50 50.4	50 57	69.2	51 19.7	48 57	67.8	51 47.9	46 56	66.4	52 15.1	44 56	65.0	52 41.1	43 55	63.5	53 18.2	40 54	61.2	3
4	48 58.0	54 58	72.0	49 29.9	52 58	70.7	50 15.9	50 57	68.7	50 45.5	48 57	67.3	51 14.1	47 56	65.9	51 41.6	45 55	64.5	52 08.2	43 55	63.1	52 45.8	40 54	60.8	4
65	48 22.9	54 58	71.4	48 55.0	53 58	70.1	49 41.6	51 57	68.2	50 11.5	49 56	66.8	50 40.4	47 56	65.5	51 08.4	46 55	64.1	51 35.3	44 55	62.6	52 13.7	41 53	60.4	65
6	47 48.0	55 58	70.9	48 20.4	53 58	69.6	49 07.4	51 57	67.7	49 37.6	50 56	66.3	50 06.9	48 56	65.0	50 35.2	46 55	63.6	51 02.5	45 54	62.2	51 41.6	42 53	60.0	6
7	47 13.1	55 58	70.3	47 45.8	54 57	69.1	48 33.3	52 57	67.1	49 03.8	50 56	65.8	49 33.5	49 55	64.5	50 02.2	47 55	63.1	50 29.9	45 54	61.8	51 09.7	43 53	59.6	7
8	46 38.4	56 58	69.7	47 11.4	54 57	68.5	47 59.3	52 56	66.6	48 30.2	51 56	65.3	49 00.2	49 55	64.0	49 29.3	48 55	62.7	49 57.5	46 54	61.3	50 37.9	44 53	59.2	8
9	46 03.8	56 57	69.2	46 37.1	55 57	68.0	47 25.4	53 56	66.1	47 56.7	51 56	64.8	48 27.1	50 55	63.5	48 56.6	48 54	62.2	49 25.1	47 54	60.9	50 06.2	44 53	58.8	9
70	45 29.4	56 57	68.6	46 02.9	55 57	67.4	46 51.7	53 56	65.6	47 23.3	52 55	64.3	47 54.1	51 55	63.1	48 23.9	49 54	61.8	48 52.9	48 53	60.4	49 34.6	45 52	58.4	70
1	44 55.0	57 57	68.1	45 28.8	56 56	66.9	46 18.2	54 56	65.1	46 50.1	53 55	63.8	47 21.2	51 55	62.6	47 51.5	50 54	61.3	48 20.9	48 53	60.0	49 03.3	46 52	58.0	1
2	44 20.8	57 57	67.5	44 54.9	56 56	66.3	45 44.7	54 55	64.6	46 17.0	53 55	63.3	46 48.5	52 54	62.1	47 19.1	50 54	60.8	47 48.9	49 53	59.6	48 32.0	47 52	57.6	2
3	43 46.8	58 57	66.9	44 21.2	57 56	65.8	45 11.5	55 55	64.0	45 44.1	54 55	62.8	46 15.9	52 54	61.6	46 46.9	51 53	60.4	47 17.2	50 53	59.1	48 00.9	47 52	57.2	3
4	43 12.9	58 56	66.4	43 47.6	57 56	65.3	44 38.3	56 55	63.5	45 11.3	54 54	62.3	45 43.5	53 54	61.1	46 14.9	52 53	59.9	46 45.5	50 52	58.7	47 29.9	48 51	56.8	4
75	42 39.1	59 56	65.8	43 14.1	58 56	64.7	44 05.3	56 55	63.0	44 38.6	55 54	61.8	45 11.2	54 54	60.7	45 43.0	52 53	59.5	46 14.1	51 52	58.2	46 59.1	49 51	56.3	75
6	42 05.5	59 56	65.3	42 40.8	58 55	64.2	43 32.5	57 54	62.5	44 06.1	55 54	61.3	44 39.1	54 53	60.2	45 11.3	53 53	59.0	45 42.7	52 52	57.8	46 28.4	50 51	55.9	6
7	41 32.0	60 56	64.7	42 07.6	59 55	63.6	42 59.8	57 54	62.0	43 33.8	56 54	60.8	44 07.1	55 53	59.7	44 39.7	54 52	58.5	45 11.6	52 52	57.3	45 57.9	51 51	55.5	7
8	40 58.7	60 55	64.2	41 34.6	59 55	63.1	42 27.3	58 54	61.5	43 01.6	57 53	60.3	43 35.3	56 53	59.2	44 08.3	54 52	58.0	44 40.5	53 51	56.9	45 27.6	51 50	55.1	8
9	40 25.5	61 55	63.6	41 01.7	60 54	62.6	41 54.9	58 54	60.9	42 29.6	57 53	59.8	43 03.6	56 52	58.7	43 37.0	55 52	57.6	44 09.7	54 51	56.4	44 57.4	52 50	54.6	9
80	39 52.5	61 55	63.0	40 29.0	60 54	62.0	41 22.7	59 53	60.4	41 57.7	58 53	59.3	42 32.1	57 52	58.2	43 05.9	56 52	57.1	43 39.0	55 51	56.0	44 27.3	53 50	54.2	80
1	39 19.6	62 54	62.5	39 56.5	61 54	61.5	40 50.6	59 53	59.9	41 26.0	58 53	58.8	42 00.8	57 52	57.7	42 35.0	56 51	56.6	43 08.5	55 51	55.5	43 57.4	54 50	53.8	1
2	38 47.0	62 54	61.9	39 24.1	61 54	60.9	40 18.8	60 53	59.4	40 54.5	59 52	58.3	41 29.7	58 52	57.2	42 04.2	57 51	56.1	42 38.1	56 50	55.0	43 27.7	54 49	53.3	2
3	38 14.4	63 54	61.4	38 51.9	62 53	60.4	39 47.1	61 53	58.9	40 23.2	60 52	57.8	40 58.7	59 51	56.7	41 33.6	58 51	55.7	42 07.9	57 50	54.6	42 58.2	55 49	52.9	3
4	37 42.1	63 54	60.8	38 19.9	63 53	59.8	39 15.5	61 52	58.3	39 52.0	60 52	57.3	40 27.9	59 51	56.3	41 03.2	58 50	55.2	41 37.9	57 50	54.1	42 28.8	56 49	52.4	4
85	37 09.9	64 53	60.3	37 48.0	63 53	59.3	38 44.2	62 52	57.8	39 21.0	61 51	56.8	39 57.3	60 51	55.8	40 33.0	59 50	54.7	41 08.1	58 49	53.6	41 59.6	56 48	52.0	85
6	36 38.0	64 53	59.7	37 16.3	64 52	58.8	38 13.0	62 52	57.3	38 50.2	62 51	56.3	39 26.8	61 50	55.3	40 02.9	60 50	54.2	40 38.4	59 49	53.2	41 30.6	57 48	51.5	6
7	36 06.1	65 53	59.2	36 44.8	64 52	58.2	37 42.0	63 51	56.8	38 19.6	62 51	55.8	38 56.6	61 50	54.8	39 33.0	60 50	53.7	40 09.0	59 49	52.7	41 01.8	58 48	51.1	7
8	35 34.5	65 52	58.6	36 13.5	65 52	57.7	37 11.2	64 51	56.2	37 49.1	63 50	55.2	38 26.5	62 50	54.3	39 03.4	61 49	53.2	39 39.7	60 48	52.2	40 33.1	59 47	50.6	8
9	35 03.1	66 52	58.0	35 42.4	65 52	57.1	36 40.6	64 51	55.7	37 18.9	63 50	54.7	37 56.6	63 49	53.8	38 33.9	62 49	52.8	39 10.6	61 48	51.7	40 04.7	59 47	50.2	9
90	34 31.8	66 52	57.5	35 11.5	66 51	56.6	36 10.2	65 50	55.2	36 48.8	64 50	54.2	37 26.9	63 49	53.2	38 04.5	62 49	52.3	38 41.7	61 48	51.3	39 36.4	60 47	49.7	90

Digitized by Google

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	34 00.8	67 51	56.9	34 40.8	66 51	56.0	35 40.0	65 50	54.6	36 18.9	65 49	53.7	36 57.4	64 49	52.7	37 35.4	63 48	51.8	38 13.0	62 48	50.8	39 08.3	61 46	49.3	91
2	33 29.9	67 51	56.4	34 10.2	67 51	55.5	35 10.0	66 50	54.1	35 49.3	65 49	53.2	36 28.1	64 48	52.2	37 06.5	64 48	51.3	37 44.5	63 47	50.3	38 40.4	62 46	48.8	2
3	32 59.3	68 51	55.8	33 39.9	67 50	54.9	34 40.1	66 49	53.6	35 19.8	66 49	52.7	35 59.0	65 48	51.7	36 37.8	64 48	50.8	37 16.1	63 47	49.8	38 12.7	62 46	48.3	3
4	32 28.8	69 50	55.2	33 09.8	68 50	54.4	34 10.5	67 49	53.0	34 50.5	66 48	52.1	35 30.1	66 48	51.2	36 09.3	65 47	50.3	36 48.0	64 47	49.3	37 45.2	63 46	47.9	4
95	31 58.6	69 50	54.7	32 39.9	69 50	53.8	33 41.1	68 49	52.5	34 21.5	67 48	51.6	35 01.4	66 47	50.7	35 41.0	66 47	49.8	36 20.1	65 46	48.8	37 17.9	64 45	47.4	95
6	31 28.6	70 50	54.1	32 10.2	69 49	53.3	33 11.9	68 48	52.0	33 52.6	68 48	51.1	34 33.0	67 47	50.2	35 12.9	66 46	49.3	35 52.4	66 46	48.3	36 50.9	64 45	46.9	6
7	30 58.8	70 49	53.5	31 40.7	70 49	52.7	32 42.9	69 48	51.4	33 24.0	68 47	50.5	34 04.7	68 47	49.7	34 45.0	67 46	48.8	35 24.9	66 45	47.9	36 24.0	65 44	46.5	7
8	30 29.2	71 49	53.0	31 11.4	70 48	52.1	32 14.2	69 48	50.9	32 55.6	69 47	50.0	33 36.6	68 46	49.1	34 17.3	67 46	48.3	34 57.6	67 45	47.4	35 57.3	66 44	46.0	8
9	29 59.8	71 49	52.4	30 42.4	71 48	51.6	31 45.6	70 47	50.3	32 27.4	69 47	49.5	33 08.8	69 46	48.6	33 49.9	68 45	47.7	34 30.6	67 45	46.9	35 30.8	66 44	45.5	9
100	29 30.6	72 48	51.8	30 13.5	71 48	51.0	31 17.3	70 47	49.8	31 59.4	70 46	48.9	32 41.2	69 46	48.1	33 22.6	69 45	47.2	34 03.7	68 44	46.4	35 04.6	67 43	45.0	100
1	29 01.7	72 48	51.2	29 44.9	72 47	50.5	30 49.2	71 46	49.2	31 31.7	71 46	48.4	32 13.8	70 45	47.6	32 55.6	69 45	46.7	33 37.1	69 44	45.9	34 38.6	68 43	44.5	1
2	28 33.0	73 47	50.7	29 16.6	72 47	49.9	30 21.3	72 46	48.7	31 04.2	71 45	47.9	31 46.7	71 45	47.0	32 28.9	70 44	46.2	33 10.7	69 44	45.4	34 12.8	69 43	44.0	2
3	28 04.6	73 47	50.1	28 48.4	73 46	49.3	29 53.7	72 46	48.1	30 36.9	72 45	47.3	31 19.8	71 44	46.5	32 02.3	71 44	45.7	32 44.5	70 43	44.8	33 47.2	69 42	43.6	3
4	27 36.3	74 47	49.5	28 20.5	73 46	48.8	29 26.3	73 45	47.6	30 09.8	72 45	46.8	30 53.1	72 44	46.0	31 36.0	71 43	45.2	32 18.6	71 43	44.3	33 21.9	70 42	43.1	4
105	27 08.4	74 46	48.9	27 52.9	74 46	48.2	28 59.2	73 45	47.0	29 43.0	73 44	46.2	30 26.6	72 44	45.5	31 09.9	72 43	44.6	31 52.9	71 42	43.8	32 56.8	71 41	42.6	105
6	26 40.6	75 46	48.4	27 25.5	75 45	47.6	28 32.3	74 44	46.5	29 16.5	73 44	45.7	30 00.4	73 43	44.9	30 44.1	73 43	44.1	31 27.4	72 42	43.3	32 31.9	71 41	42.1	6
7	26 13.2	75 45	47.8	26 58.3	75 45	47.0	28 05.6	74 44	45.9	28 50.2	74 43	45.2	29 34.5	74 43	44.4	30 18.5	73 42	43.6	31 02.2	73 42	42.8	32 07.3	72 41	41.6	7
8	25 45.9	76 45	47.2	26 31.4	76 44	46.5	27 39.2	75 44	45.4	28 24.1	75 43	44.6	29 08.8	74 42	43.8	29 53.1	74 42	43.1	30 37.2	73 41	42.3	31 42.9	73 40	41.1	8
9	25 19.0	77 45	46.6	26 04.8	76 44	45.9	27 13.0	76 43	44.8	27 58.3	75 43	44.1	28 43.3	75 42	43.3	29 28.0	74 41	42.5	30 12.5	74 41	41.8	31 18.7	73 40	40.6	9
110	24 52.3	77 44	46.0	25 38.4	77 44	45.3	26 47.2	76 43	44.2	27 32.7	76 42	43.5	28 18.1	75 42	42.8	29 03.2	75 41	42.0	29 48.0	75 40	41.2	30 54.8	74 39	40.1	110
1	24 25.8	78 44	45.4	25 12.2	77 43	44.7	26 21.5	77 42	43.7	27 07.4	76 42	42.9	27 53.1	76 41	42.2	28 38.6	76 41	41.5	29 23.8	75 40	40.7	30 31.2	74 39	39.6	1
2	23 59.6	78 43	44.8	24 46.4	78 43	44.1	25 56.2	77 42	43.1	26 42.4	77 41	42.4	27 28.5	77 41	41.7	28 14.3	76 40	40.9	28 59.9	76 40	40.2	30 07.8	75 39	39.1	2
3	23 33.7	79 43	44.2	24 20.8	78 42	43.6	25 31.0	78 41	42.5	26 17.6	77 41	41.8	27 04.0	77 40	41.1	27 50.2	77 40	40.4	28 36.1	76 39	39.7	29 44.6	76 38	38.5	3
4	23 08.1	79 42	43.6	23 55.5	79 42	43.0	25 06.2	78 41	41.9	25 53.1	78 40	41.3	26 39.9	78 40	40.6	27 26.4	77 39	39.9	28 12.7	77 39	39.1	29 21.7	76 38	38.0	4
115	22 42.7	80 42	43.0	23 30.4	79 41	42.4	24 41.7	79 40	41.4	25 28.9	79 40	40.7	26 16.0	78 39	40.0	27 02.9	78 39	39.3	27 49.5	78 38	38.6	28 59.1	77 37	37.5	115
6	22 17.7	80 41	42.4	23 05.7	80 41	41.8	24 17.4	79 40	40.8	25 05.0	79 39	40.1	25 52.4	79 39	39.4	26 39.6	79 38	38.8	27 26.6	78 38	38.1	28 36.7	78 37	37.0	6
7	21 52.9	81 41	41.8	22 41.2	80 40	41.2	23 53.4	80 40	40.2	24 41.3	80 39	39.6	25 29.0	79 38	38.9	26 16.6	79 38	38.2	27 04.0	79 37	37.5	28 14.6	78 36	36.5	7
8	21 28.4	81 40	41.2	22 17.0	81 40	40.6	23 29.7	81 39	39.6	24 17.9	80 38	39.0	25 06.0	80 38	38.3	25 53.9	80 37	37.7	26 41.6	79 37	37.0	27 52.8	79 36	36.0	8
9	21 04.2	82 40	40.6	21 53.1	81 39	40.0	23 06.3	81 39	39.1	23 54.8	81 38	38.4	24 43.2	81 37	37.8	25 31.5	80 37	37.1	26 19.5	80 36	36.4	27 31.3	79 35	35.4	9
120	20 40.3	82 39	40.0	21 29.5	82 39	39.4	22 43.1	82 38	38.5	23 32.0	81 38	37.8	24 20.8	81 37	37.2	25 09.3	81 36	36.6	25 57.7	81 36	35.9	27 10.0	80 35	34.9	120
1	20 16.7	83 39	39.4	21 06.2	82 38	38.8	22 20.3	82 38	37.9	23 09.5	82 37	37.3	23 58.6	82 36	36.6	24 47.5	81 36	36.0	25 36.2	81 35	35.4	26 49.0	81 35	34.4	1
2	19 53.4	83 38	38.8	20 43.2	83 38	38.2	21 57.8	83 37	37.3	22 47.3	82 37	36.7	23 36.7	82 36	36.1	24 25.9	82 35	35.4	25 15.0	82 35	34.8	26 28.3	81 34	33.8	2
3	19 30.4	84 38	38.2	20 20.6	83 37	37.6	21 35.5	83 37	36.7	22 25.4	83 36	36.1	23 15.1	83 36	35.5	24 04.6	82 35	34.9	24 54.0	82 34	34.3	26 07.8	82 34	33.3	3
4	19 07.7	84 37	37.6	19 58.2	84 37	37.0	21 13.6	84 36	36.1	22 03.8	83 36	35.5	22 53.8	83 35	34.9	23 43.7	83 34	34.3	24 33.4	83 34	33.7	25 47.7	82 33	32.8	4
125	18 45.4	85 37	36.9	19 36.1	84 36	36.4	20 52.0	84 36	35.5	21 42.5	84 35	34.9	22 32.8	84 34	34.3	23 23.0	84 34	33.8	24 13.0	83 33	33.1	25 27.9	83 33	32.2	125
6	18 23.3	85 36	36.3	19 14.4	85 36	35.8	20 30.7	85 35	34.9	21 21.5	84 34	34.3	22 12.1	84 34	33.8	23 02.6	84 33	33.2	23 53.0	84 33	32.6	25 08.3	84 32	31.7	6
7	18 01.6	86 36	35.7	18 52.9	85 35	35.1	20 09.7	85 34	34.3	21 00.8	85 34	33.8	21 51.7	85 33	33.2	22 42.5	85 33	32.6	23 33.3	84 32	32.0	24 49.1	84 32	31.1	7
8	17 40.2	86 35	35.1	18 31.8	86 35	34.5	19 49.1	86 34	33.7	20 40.4	86 33	33.2	21 31.7	85 33	32.6	22 22.8	85 32	32.0	23 13.8	85 32	31.5	24 30.1	85 31	30.6	8
9	17 19.2	87 35	34.4	18 11.1	86 34	33.9	19 28.7	86 33	33.1	20 20.4	86 33	32.6	21 11.9	86 32	32.0	22 03.4	86 32	31.5	22 54.7	85 31	30.9	24 11.5	85 31	30.1	9
130	16 58.5	87 34	33.8	17 50.6	87 34	33.3	19 08.7	87 33	32.5	20 00.6	86 32	32.0	20 52.5	86 32	31.4	21 44.2	86 31	30.9	22 35.9	86 31	30.3	23 53.1	86 30	29.5	130
1	16 38.1	87 33	33.2	17 30.5	87 33	32.7	18 49.0	87 32	31.9	19 41.2	87 32	31.4	20 33.4	87 31	30.8	21 25.4	87 31	30.3	22 17.4	86 30	29.8	23 35.1	86 30	28.9	1
2	16 18.0	88 33	32.5	17 10.7	88 32	32.0	18 29.7	88 32	31.3	19 22.2	87 31	30.8	20 14.6	87 31	30.3	21 06.9	87 30	29.7	21 59.2	87 30	29.2	23 17.3	87 29	28.4	2
3	15 58.3	88 32	31.9	16 51.3	88 32	31.4	18 10.7	88 31	30.7	19 03.5	88 31	30.2	19 56.2	88 30	29.7	20 48.8	88 30	29.1	21 41.3	87 29	28.6	22 59.9	87 28	27.8	3
4	15 39.0	89 32	31.3	16 32.2	89 31	30.8	17 52.0	89 31	30.1	18 45.1	88 30	29.6	19 38.1	88 30	29.1	20 31.0	88 29	28.6	21 23.8	88 29	28.1	22 42.8	88 28	27.3	4
135	15 20.0	89 31	30.6	16 13.5	89 31	30.1	17 33.7	89 30	29.4	18 27.0	89 30	29.0	19 20.3	89 29	28.5	20 13.5	89 29	28.0	21 06.6	88 28	27.5	22 26.1	88 27	26.7	135
6	15 01.4	90 30	30.0	15 55.1	90 30	29.5	17 15.7	89 29	28.8	18 09.3	89 29	28.3	19 02.8	89 28	27.9	19 56.3	89 28	27.4	20 49.7	89 28	26.9	22 09.6	89 27	26.2	6
7	14 43.1	90 30	29.3	15 37.1	90 29	28.9	16 58.1	90 29	28.2	17 51.9	90 28	27.7	18 45.7	90 28	27.3	19 39.5	90 27	26.8	20 33.2	89 27	26.3	21 53.5	89 26	25.6	7
8	14 25.2	91 29	28.7	15 19.5	90 29	28.2	16 40.8	90 28	27.6	17 34.9	90 28	27.1	18 29.0	90 27	26.7	19 23.0	90 27	26.2	20 16.9	90 26	25.7	21 37.7	90 26	25.0	8
9	14 07.6	91 29	28.0	15 02.2	91 28	27.6	16 23.9	91 28	26.9	17 18.3	91 27	26.5	18 12.6	91 27	26.1	19 06.9	90 26	25.6	20 01.1	90 26	25.2	21 22.2	90 25	24.5	9
140	13 50.5	91 28	27.4	14 45.2	91 28	27.0	16 07.3	91 27	26.3	17 01.9	91 27	25.9	17 56.5	91 26	25.5	18 51.1	91 26	25.0	19 45.5	91 25	24.6	21 07.1	91 25	23.9	140
1	13 33.7	92 27	26.7	14 28.7	92 27	26.3	15 51.1	92 26	25.7	16 46.0	91 26	25.3	17 40.8	91 26	24.8	18 35.6	91 25	24.4	19 30.4	91 25	24.0	20 52.3	91 24	23.3	1
2	13 17.2	92 27	26.1	14 12.5	92 26	25.7	15 35.3	92 26	25.1	16 30.4	92 25	24.6	17 25.5	92 25	24.2	18 20.5	92 25	23.8	19 15.5	92 24	23.4	20 37.9	91 24	22.7	2
3	13 01.2	92 26	25.4	13 56.7	92 26	25.0	15 19.8	92 25	24.4	16 15.2	92 25	24.0	17 10.5	92 24	23.6	18 05.8	92 24	23.2	19 01.0	92 24	22.8	20 23.8	92 23	22.2	3
4	12 45.5	93 25	24.7	13 41.2	93 25	24.4	15 04.7	93 25	23.8	16 00.3	93 24	23.4	16 55.9	93 24	23.0	17 51.4	92 23	22.6	18 46.9	92 23	22.2	20 10.0	92 22	21.6	4
145	12 30.3	93 25	24.1	13 26.2	93 24	23.7	14 50.0	93 24	23.2	15 45.8	93 24	22.8	16 41.6	93 23	22.4	17 37.4	93 23	22.0	18 33.1	93 22	21.6	19 56.6	93 22	21.0	145
6	12 15.4	94 24	23.4	13 11.5	94 24	23.1	14 35.7	93 23	22.5	15 31.7	93 23	22.1	16 27.8	93 22	21.8	17 23.7	93 22	21.4	18 19.7	93 22	21.0	19 43.5	93 21	20.4	6
7	12 00.9	94 23	22.8	12 57.3	94 23	22.4	14 21.7	94 23	21.9	15 18.0	94 22	21.5	16 14.2	94 22	21.2	17 10.4	94 22	20.8	18 06.6	94 21	20.4	19 30.8	93 21	19.9	7
8	11 46.8	94 23	22.1	12 43.4	94 22	21.7	14 08.2	94 22	21.2	15 04.6	94 22	20.9	16 01.1	94 21	20.5	16 57.5	94 21	20.2	17 53.9	94 21	19.8	19 18.4	94 20	19.3	8
9	11 33.1	95 22	21.4	12 29.9	95 22	21.1	13 55.0	95 21	20.6	14 51.7	94 21	20.2	15 48.3	94 21	19.9	16 45.0	94 20	19.6	17 41.6	94 20	19.2	19 06.4	94 19	18.7	9
150	11 19.8	95 21	20.7	12 16.8	95 21	20.4	13 42.2	95 21	19.9	14 39.1	95 20	19.6	15 35.9	95 20	19.3	16 32.8	95 20	18.9	17 29.6	95 19	18.6	18 54.7	95 19	18.1	150
1	11 07.0	95 21	20.1	12 04.1	95 20	19.8	13 29.8	95 20	19.3	14 26.9	95 20	19.0	15 23.9	95 19	18.7	16 21.0	95 19	18.3	17 18.0	95 19	18.0	18 43.4	95 18	17.5	1
2	10 54.5	96 20	19.4	11 51.8	96 20	19.1	13 17.8	95 19	18.6	14 15.1	95 19	18.3	15 12.3	95 19	18.0	16 09.5	95 18	17.7	17 06.8	95 18	17.4	18 32.5	95 18	16.9	2
3	10 42.4	96 19	18.7	11 39.9	96 19	18.4	13 06.2	96 19	18.0	14 03.6	96 18	17.7	15 01.1	96 18	17.4	15 58.5	96 18	17.1	16 55.9	96 17	16.8	18 21.9	96 17	16.3	3
4	10 30.8	96 19	18.0	11 28.5	96 18	17.8	12 55.0	96 18	17.3	13 52.6	96 18	17.1	14 50.2	96 17	16.8	15 47.8	96 17	16.5	16 45.4	96 17	16.2	18 11.7	96 16	15.7	4
155	10 19.5	96 18	17.4	11 17.4	96 18	17.1	12 44.2	96 17	16.7	13 42.0	96 17	16.4	14 39.8	96 17	16.1	15 37.5	96 16	15.9	16 35.3	96 16	15.6	18 01.9	96 16	15.1	155
6	10 08.7	97 17	16.7	11 06.7	97 17	16.4	12 33.8	97 17	16.0	13 31.7	97 16	15.8	14 29.7	97 16	15.5	15 27.7	97 16	15.2	16 25.6	97 16	15.0	17 52.4	96 15	14.5	6
7	9 58.3	97 17	16.0	10 56.5	97 16	15.7	12 23.8	97 16	15.4	13 21.9	97 16	15.1	14 20.0	97 15	14.9	15 18.1	97 15	14.6	16 16.2	97 15	14.3	17 43.3	97 15	14.0	7
8	9 48.4	97 16	15.3	10 46.7	97 16	15.1	12 14.2	97 15	14.7	13 12.5	97 15	14.5	14 10.8	97 15	14.2	15 09.0	97 15	14.0	16 07.3	97 14	13.7	17 34.6	97 14	13.4	8
9	9 38.8	97 15	14.6	10 37.3	97 15	14.4	12 05.0	97 15	14.1	13 03.4	97 14	13.8	14 01.9	97 14	13.6	15 00.3	97 14	13.4	15 58.7	97 14	13.1	17 26.3	97 13	12.8	9
160	9 29.7	98 14	13.9	10 28.3	98 14	13.7	11 56.2	98 14	13.4	12 54.8	98 14	13.2	13 53.4	98 13	13.0	14 52.0	98 13	12.7	15 50.5	98 13	12.5	17 18.3	98 13	12.2	160
1	9 21.0	98 14	13.2	10 19.8	98 14	13.0	11 47.9	98 13	12.7	12 46.6	98 13	12.5	13 45.3	98 13	12.3	14 44.0	98 13	12.1	15 42.7	98 12	11.9	17 10.7	98 12	11.6	1
2	9 12.8	98 13	12.6	10 11.7	98 13	12.4	11 39.9	98 13	12.1	12 38.8	98 12	11.9	13 37.6	98 12	11.7	14 36.5	98 12	11.5	15 35.3	98 12	11.3	17 03.5	98 11	11.0	2
3	9 05.0	98 12	11.9	10 04.0	98 12	11.7	11 32.4	98 12	11.4	12 31.4	98 12	11.2	13 30.4	98 11	11.0	14 29.3	98 11	10.8	15 28.3	98 11	10.6	16 56.7	98 11	10.3	3
4	8 57.6	99 12	11.2	9 56.7	99 11	11.0	11 25.3	98 11	10.7	12 24.4	98 11	10.6	13 23.5	98 11	10.4	14 22.6	98 11	10.2	15 21.7	98 10	10.0	16 50.2	98 10	09.7	4
165	8 50.6	99 11	10.5	9 49.9	99 11	10.3	11 18.7	99 10	10.1	12 17.9	99 10	09.9	13 17.1	99 10	09.7	14 16.2	99 10	09.6	15 15.4	99 10	09.4	16 44.2	99 09	09.1	165
6	8 44.1	99 10	09.8	9 43.5	99 10	09.6	11 12.4	99 10	09.4	12 11.7	99 10	09.2	13 11.0	99 09	09.1	14 10.3	99 09	08.9	15 09.6	99 09	08.8	16 38.5	99 09	08.5	6
7	8 38.1	99 09	09.1	9 37.5	99 09	09.0	11 06.6	99 09	08.7	12 06.0	99 09	08.6	13 05.4	99 09	08.4	14 04.8	99 09	08.3	15 04.2	99 08	08.2	16 33.2	99 08	07.9	7
8	8 32.5	99 09	08.4	9 32.0	99 08	08.3	11 01.2	99 08	08.1	12 00.7	99 08	07.9	13 00.2	99 08	07.8	13 59.6	99 08	07.7	14 59.1	99 08	07.5	16 28.3	99 08	07.3	8
9	8 27.3	99 08	07.7	9 26.9	99 08	07.6	10 56.2	99 08	07.4	11 55.8	99 07	07.3	12 55.4	99 07	07.2	13 54.9	99 07	07:0	14 54.5	99 07	06.9	16 23.8	99 07	06.7	9
170	8 22.6	99 07	07.0	9 22.2	99 07	06.9	10 51.7	99 07	06.7	11 51.3	99 07	06.6	12 51.0	99 07	06.5	13 50.6	99 06	06.4	14 50.2	99 06	06.3	16 19.7	99 06	06.1	170
1	8 18.3	1.0 06	06.3	9 18.0	1.0 06	06.2	10 47.6	1.0 06	06.1	11 47.3	1.0 06	06.0	12 47.0	1.0 06	05.9	13 46.7	1.0 06	05.8	14 46.4	1.0 06	05.7	16 15.9	99 06	05.5	1
2	8 14.5	1.0 06	05.6	9 14.2	1.0 06	05.5	10 43.9	1.0 05	05.4	11 43.7	1.0 05	05.3	12 43.4	1.0 05	05.2	13 43.2	1.0 05	05.1	14 43.0	1.0 05	05.0	16 12.6	1.0 05	04.9	2
3	8 11.1	1.0 05	04.9	9 10.9	1.0 05	04.8	10 40.6	1.0 05	04.7	11 40.5	1.0 05	04.6	12 40.3	1.0 05	04.6	13 40.1	1.0 04	04.5	14 39.9	1.0 04	04.4	16 09.7	1.0 04	04.3	3
4	8 08.1	1.0 04	04.2	9 08.0	1.0 04	04.1	10 37.8	1.0 04	04.0	11 37.7	1.0 04	04.0	12 37.6	1.0 04	03.9	13 37.4	1.0 04	03.8	14 37.3	1.0 04	03.8	16 07.1	1.0 04	03.7	4
175	8 05.6	1.0 03	03.5	9 05.6	1.0 03	03.5	10 35.4	1.0 03	03.4	11 35.3	1.0 03	03.3	12 35.2	1.0 03	03.3	13 35.2	1.0 03	03.2	14 35.1	1.0 03	03.1	16 04.9	1.0 03	03.1	175
6	8 03.6	1.0 03	02.8	9 03.6	1.0 03	02.8	10 33.5	1.0 03	02.7	11 33.4	1.0 02	02.7	12 33.4	1.0 02	02.6	13 33.3	1.0 02	02.6	14 33.2	1.0 02	02.5	16 03.2	1.0 02	02.4	6
7	8 02.0	1.0 02	02.1	9 02.0	1.0 02	02.1	10 32.0	1.0 02	02.0	11 31.9	1.0 02	02.0	12 31.9	1.0 02	02.0	13 31.9	1.0 02	01.9	14 31.8	1.0 02	01.9	16 01.8	1.0 02	01.8	7
8	8 00.9	1.0 01	01.4	9 00.9	1.0 01	01.4	10 30.9	1.0 01	01.3	11 30.9	1.0 01	01.3	12 30.8	1.0 01	01.3	13 30.8	1.0 01	01.3	14 30.8	1.0 01	01.3	16 00.8	1.0 01	01.2	8
9	8 00.2	1.0 00	00.7	9 00.2	1.0 00	00.7	10 30.2	1.0 00	00.7	11 30.2	1.0 00	00.7	12 30.2	1.0 00	00.7	13 30.2	1.0 00	00.6	14 30.2	1.0 00	00.6	16 00.2	1.0 00	00.6	9
180	8 00.0	1.0 00	00.0	9 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 30.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 30.0	1.0 00	00.0	16 00.0	1.0 00	00.0	180

Lat. 52°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			58° 00′			58° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	87 30.9	1.0 07	00.0	87 00.0	1.0 06	00.0	86 00.0	1.0 04	00.0	85 30.0	1.0 04	00.0	85 00.0	1.0 03	00.0	84 30.0	1.0 03	00.0	83 00.0	1.0 02	00.0	82 30.0	1.0 02	00.0	00
1	87 25.8	97 20	13.1	86 56.5	98 17	10.8	85 57.4	99 13	08.0	85 27.7	99 11	07.0	84 58.0	99 10	06.2	84 28.2	99 09	05.6	82 58.6	1.0 07	04.2	82 28.8	1.0 06	03.9	1
2	87 13.7	90 31	24.8	86 46.4	92 26	20.8	85 49.9	96 20	15.6	85 21.1	96 18	13.7	84 52.0	97 16	12.3	84 22.8	98 15	11.0	82 54.6	98 11	08.4	82 25.0	99 10	07.7	2
3	86 55.4	80 38	34.5	86 30.6	85 34	29.5	85 37.8	91 27	22.6	85 10.3	92 24	20.1	84 42.4	94 22	18.0	84 14.1	95 20	16.3	82 47.9	97 15	12.4	82 18.9	97 14	11.5	3
4	86 32.4	70 44	42.2	86 10.3	77 39	36.8	85 21.7	85 32	28.8	84 55.9	87 29	25.8	84 29.3	89 27	23.3	84 02.3	91 24	21.2	82 38.7	94 19	16.3	82 10.4	95 18	15.1	4
05	86 06.2	61 48	48.1	85 46.6	66 44	42.8	85 02.4	78 37	34.3	84 38.3	82 34	31.0	84 13.3	85 31	28.1	83 47.6	87 29	25.7	82 27.2	91 23	20.0	81 59.7	92 21	18.5	05
6	85 37.7	54 50	52.8	85 20.4	61 47	47.6	84 40.3	72 40	39.0	84 18.0	76 38	35.5	83 54.6	79 35	32.5	83 30.4	82 32	29.8	82 13.6	88 26	23.5	81 47.0	89 24	21.8	6
7	85 07.5	47 52	56.4	84 52.3	54 49	51.4	84 16.0	66 43	43.0	83 55.5	71 41	39.5	83 33.8	74 38	36.3	83 11.0	77 35	33.5	81 57.9	84 29	26.7	81 32.3	86 27	24.9	7
8	84 36.2	41 54	59.3	84 22.8	48 51	54.6	83 50.0	60 46	46.4	83 31.2	65 43	42.9	83 11.0	69 41	39.7	82 49.7	73 38	36.8	81 40.4	81 32	29.7	81 16.0	83 30	27.7	8
9	84 04.1	36 55	61.5	83 52.2	43 52	57.2	83 22.6	55 48	49.3	83 05.3	60 45	45.9	82 46.7	64 43	42.7	82 26.8	68 40	39.8	81 21.4	77 34	32.4	80 58.0	79 32	30.4	9
10	83 31.4	32 55	63.4	83 20.8	39 53	59.3	82 54.0	50 49	51.8	82 38.2	55 47	48.4	82 21.0	60 45	45.3	82 02.5	64 42	42.4	81 00.9	73 36	34.9	80 38.6	75 34	32.8	10
1	82 58.1	28 56	64.8	82 48.7	34 54	61.0	82 24.6	46 50	53.9	82 10.1	51 48	50.6	81 54.3	55 46	47.6	81 37.1	59 44	44.7	80 39.1	69 38	37.2	80 18.0	72 36	35.1	1
2	82 24.5	25 56	66.1	82 16.2	31 55	62.4	81 54.4	42 51	55.7	81 41.2	47 49	52.5	81 26.6	51 47	49.6	81 10.6	55 46	46.7	80 16.2	65 40	39.3	79 56.2	68 38	37.2	2
3	81 50.6	22 57	67.0	81 43.3	27 55	63.6	81 23.6	38 52	57.2	81 11.5	43 50	54.2	80 58.1	47 49	51.3	80 43.3	51 47	48.6	79 52.4	62 41	41.2	79 33.4	65 40	39.0	3
4	81 16.5	19 57	67.8	81 10.0	24 56	64.6	80 52.3	34 53	58.5	80 41.3	39 51	55.6	80 28.9	43 50	52.8	80 15.3	48 48	50.2	79 27.6	58 43	42.9	79 09.7	61 41	40.8	4
15	80 42.2	16 57	68.5	80 36.5	22 56	65.5	80 20.7	31 53	59.6	80 10.6	36 52	56.9	79 59.2	40 50	54.2	79 46.6	44 49	51.6	79 02.1	55 44	44.5	78 45.2	58 42	42.3	15
6	80 07.8	14 58	69.0	80 02.8	19 56	66.2	79 48.6	28 54	60.6	79 39.5	33 52	57.9	79 29.1	37 51	55.3	79 17.4	41 49	52.8	78 35.9	51 45	45.9	78 20.0	54 43	43.8	6
7	79 33.2	12 58	69.5	79 29.0	17 57	66.7	79 16.3	25 54	61.4	79 08.0	30 53	58.9	78 58.5	34 52	56.4	78 47.8	38 50	53.9	78 09.0	48 46	47.2	77 54.1	51 44	45.1	7
8	78 58.6	10 58	69.8	78 55.0	14 57	67.2	78 43.7	23 55	62.1	78 36.3	27 53	59.7	78 27.6	31 52	57.3	78 17.7	35 51	54.9	77 41.7	45 46	48.3	77 27.7	48 45	46.3	8
9	78 23.9	08 58	70.1	78 20.9	12 57	67.6	78 11.0	20 55	62.8	78 04.3	24 54	60.4	77 56.4	28 52	58.1	77 47.3	32 51	55.8	77 13.9	42 47	49.3	77 00.8	45 46	47.3	9
20	77 49.2	06 58	70.3	77 46.7	10 57	67.9	77 38.1	18 55	63.3	77 32.0	22 54	61.0	77 24.9	26 53	58.7	77 16.6	29 52	56.6	76 45.7	39 48	50.3	76 33.4	42 46	48.3	20
1	77 14.4	05 58	70.4	77 12.4	09 57	68.2	77 05.0	16 55	63.7	76 59.7	20 54	61.5	76 53.2	23 53	59.3	76 45.7	27 52	57.2	76 17.1	37 48	51.1	76 05.6	40 47	49.2	1
2	76 39.6	03 58	70.5	76 38.1	07 57	68.4	76 31.8	14 55	64.1	76 27.1	18 54	62.0	76 21.3	21 53	59.9	76 14.5	24 52	57.8	75 48.2	34 49	51.9	75 37.5	37 47	50.0	2
3	76 04.7	02 58	70.6	76 03.7	05 57	68.5	75 58.6	12 56	64.4	75 54.5	15 55	62.3	75 49.3	19 54	60.3	75 43.2	22 53	58.3	75 19.0	32 49	52.6	75 09.1	34 48	50.7	3
4	75 29.9	00 58	70.6	75 29.3	03 57	68.6	75 25.2	10 56	64.6	75 21.7	13 55	62.7	75 17.2	17 54	60.7	75 11.7	20 53	58.8	74 49.5	29 49	53.2	74 40.3	32 48	51.3	4
25	74 55.0	01 58	70.6	74 54.9	02 57	68.7	74 51.8	08 56	64.8	74 48.8	12 55	62.9	74 44.9	15 54	61.0	74 40.0	18 53	59.2	74 19.8	27 50	53.7	74 11.4	30 49	51.9	25
6	74 20.2	03 58	70.5	74 20.5	00 57	68.7	74 18.4	07 56	65.0	74 15.9	10 55	63.2	74 12.5	13 54	61.3	74 08.2	16 53	59.5	73 50.0	25 50	54.2	73 42.2	27 49	52.5	6
7	73 45.4	04 58	70.5	73 46.1	01 57	68.7	73 44.9	05 56	65.1	73 42.9	08 55	63.3	73 40.1	11 54	61.6	73 36.3	14 53	59.8	73 20.0	22 50	54.6	73 12.8	25 49	52.9	7
8	73 10.6	05 58	70.4	73 11.7	02 57	68.7	73 11.4	03 56	65.2	73 09.9	06 55	63.5	73 07.6	09 54	61.7	73 04.4	12 53	60.0	72 49.8	20 51	55.0	72 43.3	23 50	53.3	8
9	72 35.8	06 58	70.3	72 37.3	04 57	68.6	72 37.8	02 56	65.2	72 36.8	05 55	63.6	72 35.0	07 54	61.9	72 32.3	10 54	60.2	72 19.4	18 51	55.3	72 13.6	21 50	53.7	9
30	72 01.0	08 58	70.1	72 02.9	05 57	68.5	72 04.3	00 56	65.3	72 03.7	03 55	63.6	72 02.4	06 54	62.0	72 00.2	09 54	60.4	71 49.0	16 51	55.6	71 43.7	19 50	54.0	30
1	71 26.3	09 58	70.0	71 28.6	06 57	68.4	71 30.7	01 56	65.3	71 30.6	02 55	63.7	71 29.8	04 54	62.1	71 28.1	07 54	60.5	71 18.5	15 51	55.9	71 13.8	17 50	54.3	1
2	70 51.6	10 58	69.8	70 54.2	07 57	68.3	70 57.2	02 56	65.2	70 57.5	00 55	63.7	70 57.1	03 54	62.2	70 55.9	05 54	60.6	70 47.9	13 51	56.1	70 43.7	15 50	54.6	2
3	70 17.0	11 58	69.6	70 19.9	09 57	68.2	70 23.6	04 56	65.2	70 24.4	01 55	63.7	70 24.4	01 54	62.2	70 23.7	04 54	60.7	70 17.2	11 51	56.3	70 13.6	13 50	54.8	3
4	69 42.4	12 58	69.4	69 45.7	10 57	68.0	69 50.1	05 56	65.1	69 51.3	03 55	63.7	69 51.7	00 54	62.2	69 51.5	02 54	60.8	69 46.4	09 51	56.4	69 43.3	11 50	55.0	4
35	69 07.8	13 58	69.2	69 11.4	11 57	67.8	69 16.6	06 56	65.0	69 18.2	04 55	63.6	69 19.1	02 54	62.2	69 19.3	01 54	60.8	69 15.6	07 51	56.5	69 13.1	10 51	55.1	35
6	68 33.3	14 57	69.0	68 37.2	12 57	67.6	68 43.2	08 56	64.9	68 45.1	05 55	63.5	68 46.4	03 54	62.2	68 47.0	01 54	60.8	68 44.8	06 51	56.6	68 42.7	08 51	55.3	6
7	67 58.8	15 57	68.8	68 03.1	13 57	67.4	68 09.7	09 56	64.8	68 12.1	07 55	63.4	68 13.7	05 54	62.1	68 14.8	02 54	60.7	68 13.9	04 51	56.7	68 12.4	06 51	55.4	7
8	67 24.4	16 57	68.5	67 29.0	14 57	67.2	67 36.3	10 56	64.6	67 39.0	08 55	63.3	67 41.1	06 54	62.0	67 42.6	04 54	60.7	67 43.1	03 52	56.7	67 42.0	05 51	55.4	8
9	66 50.1	17 57	68.3	66 55.0	15 57	67.0	67 03.0	11 56	64.5	67 06.0	09 55	63.2	67 08.5	07 54	61.9	67 10.4	05 54	60.6	67 12.2	01 52	56.8	67 11.5	03 51	55.5	9
40	66 15.8	18 57	68.0	66 21.0	16 57	66.8	66 29.6	12 55	64.3	66 33.1	10 55	63.1	66 35.9	08 54	61.8	66 38.2	06 54	60.6	66 41.3	00 52	56.8	66 41.1	02 51	55.5	40
1	65 41.6	19 57	67.8	65 47.1	17 56	66.6	65 56.4	14 55	64.1	66 00.2	12 55	62.9	66 03.4	10 54	61.7	66 06.0	08 54	60.5	66 10.4	02 52	56.8	66 10.6	00 51	55.5	1
2	65 07.4	20 57	67.5	65 13.2	18 56	66.3	65 23.2	15 55	63.9	65 27.3	13 55	62.8	65 30.9	11 54	61.6	65 33.9	09 53	60.4	65 39.5	03 51	56.7	65 40.2	01 51	55.5	2
3	64 33.3	21 57	67.2	64 39.4	19 56	66.0	64 50.0	16 55	63.7	64 54.5	14 55	62.6	64 58.4	12 54	61.4	65 01.8	10 53	60.2	65 08.6	05 51	56.7	65 09.7	03 51	55.5	3
4	63 59.3	22 57	66.9	64 05.7	20 56	65.8	64 16.9	17 55	63.5	64 21.7	15 54	62.4	64 26.0	13 54	61.2	64 29.8	12 53	60.1	64 37.7	06 51	56.6	64 39.3	04 51	55.4	4
45	63 25.4	23 56	66.6	63 32.1	21 56	65.5	63 43.9	18 55	63.3	63 49.0	16 54	62.2	63 53.7	15 54	61.1	63 57.8	13 53	59.9	64 06.9	07 51	56.5	64 08.9	06 51	55.4	45
6	62 51.5	24 56	66.3	62 58.5	22 56	65.2	63 10.9	19 55	63.1	63 16.4	17 54	62.0	63 21.4	16 54	60.9	63 25.8	14 53	59.8	63 36.1	09 51	56.4	63 38.5	07 51	55.3	6
7	62 17.7	25 56	66.0	62 25.0	23 56	64.9	62 38.0	20 55	62.8	62 43.8	19 54	61.8	62 49.1	17 54	60.7	62 53.9	15 53	59.6	63 05.3	10 51	56.3	63 08.1	08 51	55.2	7
8	61 44.0	26 56	65.7	61 51.5	24 56	64.7	62 05.2	21 55	62.6	62 11.3	20 54	61.5	62 16.9	18 54	60.5	62 22.1	16 53	59.4	62 34.6	11 51	56.2	62 37.8	10 50	55.1	8
9	61 10.4	27 56	65.4	61 18.2	25 55	64.4	61 32.4	22 54	62.3	61 38.9	21 54	61.3	61 44.8	19 53	60.3	61 50.3	18 53	59.2	62 03.9	13 51	56.1	62 07.5	11 50	55.0	9
50	60 36.9	28 56	65.0	60 44.9	26 55	64.1	60 59.8	23 54	62.1	61 06.5	22 54	61.1	61 12.8	20 53	60.0	61 18.6	19 53	59.0	61 33.3	14 51	55.9	61 37.3	12 50	54.9	50
1	60 03.4	28 56	64.7	60 11.8	27 55	63.7	60 27.2	24 54	61.8	60 34.2	23 54	60.8	60 40.8	21 53	59.8	60 47.0	20 53	58.8	61 02.8	15 51	55.8	61 07.1	14 50	54.7	1
2	59 30.1	29 55	64.4	59 38.7	28 55	63.4	59 54.7	25 54	61.5	60 02.0	24 54	60.5	60 08.9	22 53	59.6	60 15.4	21 52	58.6	60 32.2	16 51	55.6	60 37.0	15 50	54.6	2
3	58 56.8	30 55	64.0	59 05.7	29 55	63.1	59 22.2	26 54	61.2	59 29.9	25 53	60.3	59 37.1	23 53	59.3	59 43.9	22 52	58.4	60 01.8	18 51	55.4	60 06.9	16 50	54.4	3
4	58 23.7	31 55	63.7	58 32.8	30 55	62.8	58 49.9	27 54	60.9	58 57.8	26 53	60.0	59 05.4	24 53	59.1	59 12.5	23 52	58.1	59 31.4	19 51	55.2	59 36.9	17 50	54.3	4
55	57 50.6	32 55	63.3	58 00.0	31 55	62.5	58 17.7	28 54	60.6	58 25.9	27 53	59.7	58 33.7	26 53	58.8	58 41.2	24 52	57.9	59 01.1	20 50	55.0	59 06.9	19 50	54.1	55
6	57 17.6	33 55	63.0	57 27.3	32 54	62.1	57 45.5	29 53	60.3	57 54.0	28 53	59.4	58 02.2	27 52	58.5	58 10.0	25 52	57.6	58 30.9	21 50	54.8	58 37.0	20 50	53.9	6
7	56 44.8	34 55	62.6	56 54.7	32 54	61.8	57 13.5	30 53	60.0	57 22.3	29 53	59.1	57 30.7	28 52	58.3	57 38.8	26 52	57.4	58 00.7	22 50	54.6	58 07.2	21 50	53.7	7
8	56 12.0	35 54	62.3	56 22.2	33 54	61.4	56 41.5	31 53	59.7	56 50.6	30 53	58.9	56 59.4	29 52	58.0	57 07.7	27 52	57.1	57 30.6	23 50	54.4	57 37.5	22 49	53.5	8
9	55 39.4	35 54	61.9	55 49.8	34 54	61.1	56 09.7	32 53	59.4	56 19.1	31 52	58.5	56 28.1	30 52	57.7	56 36.8	28 51	56.8	57 00.6	25 50	54.2	57 07.8	23 49	53.3	9
60	55 06.8	36 54	61.6	55 17.5	35 54	60.7	55 37.9	33 53	59.1	55 47.6	32 52	58.2	55 56.9	31 52	57.4	56 05.9	29 51	56.5	56 30.7	26 50	53.9	56 38.3	24 49	53.1	60
1	54 34.4	37 54	61.2	54 45.4	36 53	60.4	55 06.3	34 53	58.8	55 16.2	33 52	57.9	55 25.9	32 52	57.1	55 35.2	30 51	56.3	56 00.9	27 50	53.7	56 08.8	26 49	52.8	1
2	54 02.1	38 54	60.8	54 13.3	37 53	60.0	54 34.8	35 52	58.4	54 45.0	34 52	57.6	54 54.9	32 51	56.8	55 04.5	31 51	56.0	55 31.2	28 49	53.4	55 39.4	27 49	52.6	2
3	53 29.9	39 53	60.4	53 41.4	38 53	59.7	54 03.3	36 52	58.1	54 13.9	35 52	57.3	54 24.1	33 51	56.5	54 33.9	32 51	55.7	55 01.6	29 49	53.2	55 10.1	28 49	52.3	3
4	52 57.8	39 53	60.1	53 09.5	39 53	59.3	53 32.0	36 52	57.7	53 42.8	35 52	57.0	53 53.3	34 51	56.2	54 03.5	33 51	55.4	54 32.0	30 49	52.9	54 40.9	29 48	52.1	4
65	52 25.9	40 53	59.7	52 37.8	39 53	58.9	53 00.9	37 52	57.4	53 11.9	36 51	56.6	53 22.7	35 51	55.8	53 33.1	34 50	55.1	54 02.6	31 49	52.7	54 11.8	30 48	51.8	65
6	51 54.1	41 53	59.3	52 06.3	40 52	58.5	52 29.8	38 52	57.0	52 41.1	37 51	56.3	52 52.2	36 51	55.5	53 02.9	35 50	54.7	53 33.3	32 49	52.4	53 42.8	31 48	51.6	6
7	51 22.4	42 53	58.9	51 34.8	41 52	58.2	51 58.9	39 51	56.7	52 10.5	38 51	55.9	52 21.8	37 50	55.2	52 32.8	36 50	54.4	53 04.1	33 48	52.1	53 13.9	32 48	51.3	7
8	50 50.8	43 52	58.5	51 03.5	42 52	57.8	51 28.1	40 51	56.3	51 39.9	39 51	55.6	51 51.5	38 50	54.8	52 02.8	37 50	54.1	52 35.0	34 48	51.8	52 45.1	33 48	51.0	8
9	50 19.4	44 52	58.1	50 32.3	43 52	57.4	50 57.4	41 51	56.0	51 09.5	40 50	55.2	51 21.4	39 50	54.5	51 33.0	38 50	53.8	52 06.0	35 48	51.5	52 16.5	34 48	50.7	9
70	49 48.1	44 52	57.7	50 01.2	44 52	57.0	50 26.8	42 51	55.6	50 39.2	41 50	54.9	50 51.4	40 50	54.2	51 03.2	39 49	53.4	51 37.2	36 48	51.2	51 47.9	35 47	50.5	70
1	49 16.9	45 52	57.3	49 30.3	44 51	56.6	49 56.4	43 50	55.2	50 09.1	42 50	54.5	50 21.5	41 50	53.8	50 33.6	40 49	53.1	51 08.5	37 48	50.9	51 19.5	36 47	50.2	1
2	48 45.9	46 51	56.9	48 59.5	45 51	56.2	49 26.1	44 50	54.9	49 39.1	43 50	54.2	49 51.7	42 49	53.5	50 04.2	41 49	52.8	50 39.8	38 47	50.6	50 51.2	37 47	49.9	2
3	48 15.0	47 51	56.5	48 28.9	46 51	55.8	48 56.0	44 50	54.5	49 09.2	44 50	53.8	49 22.1	43 49	53.1	49 34.8	42 49	52.4	50 11.4	39 47	50.3	50 23.0	38 47	49.6	3
4	47 44.3	47 51	56.1	47 58.4	47 51	55.4	48 25.0	45 50	54.1	48 39.4	44 49	53.4	48 52.7	44 49	52.8	49 05.6	43 48	52.1	49 43.0	40 47	50.0	49 55.0	39 47	49.3	4
75	47 13.7	48 51	55.7	47 28.1	48 50	55.0	47 56.2	46 50	53.7	48 09.9	45 49	53.1	48 23.3	45 49	52.4	48 36.6	44 48	51.7	49 14.8	41 47	49.6	49 27.0	40 46	48.9	75
6	46 43.3	49 50	55.3	46 57.9	48 50	54.6	47 26.4	47 49	53.3	47 40.4	46 49	52.7	47 54.1	45 48	52.0	48 07.6	45 48	51.4	48 46.7	42 47	49.3	48 59.3	41 46	48.6	6
7	46 13.0	50 50	54.9	46 27.8	49 50	54.2	46 56.9	48 49	53.0	47 11.1	47 49	52.3	47 25.1	46 48	51.7	47 38.9	46 48	51.0	48 18.8	43 46	49.0	48 31.6	42 46	48.3	7
8	45 42.8	51 50	54.4	45 57.9	50 50	53.8	46 27.5	49 49	52.6	46 41.9	48 48	51.9	46 56.2	47 48	51.3	47 10.2	46 47	50.6	47 51.0	44 46	48.7	48 04.1	43 46	48.0	8
9	45 12.9	51 50	54.0	45 28.2	51 49	53.4	45 58.2	49 48	52.2	46 12.9	49 48	51.5	46 27.4	48 48	50.9	46 41.7	47 47	50.3	47 23.3	45 46	48.3	47 36.7	44 45	47.6	9
80	44 43.1	52 49	53.6	44 58.6	52 49	53.0	45 29.1	50 48	51.8	45 44.1	50 48	51.1	45 58.9	49 47	50.5	46 13.4	48 47	49.9	46 55.8	46 46	48.0	47 09.5	45 45	47.3	80
1	44 13.4	53 49	53.2	44 29.2	52 49	52.6	45 00.2	51 48	51.4	45 15.4	50 48	50.8	45 30.4	50 47	50.1	45 45.2	49 47	49.5	46 28.4	47 45	47.6	46 42.4	46 45	47.0	1
2	43 43.9	54 49	52.7	43 59.9	53 48	52.1	44 31.4	52 48	51.0	44 46.9	51 47	50.4	45 02.1	51 47	49.7	45 17.2	50 46	49.1	46 01.2	48 45	47.3	46 15.5	47 45	46.6	2
3	43 14.6	54 49	52.3	43 30.9	54 48	51.7	44 02.8	53 47	50.6	44 18.5	52 47	50.0	44 34.0	51 47	49.4	44 49.4	51 46	48.8	45 34.2	49 45	46.9	45 48.7	48 44	46.3	3
4	42 45.5	55 48	51.9	43 01.9	55 48	51.3	43 34.4	53 47	50.1	43 50.3	53 47	49.6	44 06.1	52 46	49.0	44 21.7	52 46	48.4	45 07.3	50 45	46.5	45 22.1	49 44	45.9	4
85	42 16.5	56 48	51.4	42 33.2	55 48	50.9	43 06.1	54 47	49.7	43 22.3	54 46	49.1	43 38.3	53 46	48.6	43 54.1	52 46	48.0	44 10.5	51 44	46.2	44 25.6	50 44	45.6	85
6	41 47.7	57 48	51.0	42 04.6	56 47	50.4	42 38.0	55 47	49.3	42 54.4	54 46	48.7	43 10.7	54 46	48.2	43 26.8	53 45	47.6	44 14.0	52 44	45.8	44 29.3	51 44	45.2	6
7	41 19.1	57 47	50.5	41 36.3	57 47	50.0	42 10.1	56 46	48.9	42 26.8	55 46	48.3	42 43.3	55 45	47.8	42 59.6	54 45	47.2	43 47.6	52 44	45.4	44 03.2	52 43	44.8	7
8	40 50.7	58 47	50.1	41 08.1	58 47	49.6	41 42.3	57 46	48.5	41 59.3	56 46	47.9	42 16.0	56 45	47.4	42 32.6	55 45	46.8	43 21.3	53 43	45.1	43 37.2	53 43	44.5	8
9	40 22.4	59 47	49.7	40 40.0	58 46	49.1	41 14.8	57 46	48.0	41 31.9	57 45	47.5	41 48.9	56 45	46.9	42 05.8	56 44	46.4	42 55.3	54 43	44.7	43 11.4	54 43	44.1	9
90	39 54.4	60 46	49.2	40 12.2	59 46	48.7	40 47.4	58 45	47.6	41 04.8	58 45	47.1	41 22.0	57 45	46.5	41 39.1	57 44	46.0	42 29.4	55 43	44.3	42 45.8	54 42	43.7	90

Digitized by Google

Lat 52°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	39 26.5	60 46	48.7	39 44.5	60 46	48.2	40 20.2	59 45	47.2	40 37.8	58 45	46.6	40 55.3	58 44	46.1	41 12.6	57 44	45.6	42 03.7	56 43	43.9	42 20.4	55 42	43.4	91
2	38 58.8	61 46	48.3	39 17.1	61 45	47.8	39 53.2	60 45	46.7	40 11.1	59 44	46.2	40 28.8	59 44	45.7	40 46.3	58 44	45.2	41 38.1	57 42	43.5	41 55.1	56 42	43.0	2
3	38 31.3	62 45	47.8	38 49.8	61 45	47.3	39 26.4	61 44	46.3	39 44.5	60 44	45.8	40 02.4	60 44	45.3	40 20.3	59 43	44.7	41 12.8	58 42	43.1	41 30.0	57 42	42.6	3
4	38 04.1	63 45	47.4	38 22.8	62 45	46.9	38 59.8	61 44	45.9	39 18.1	61 44	45.4	39 36.3	60 43	44.8	39 54.3	60 43	44.3	40 47.6	58 42	42.7	41 05.1	58 41	42.2	4
95	37 37.0	63 45	46.9	37 55.9	63 44	46.4	38 33.4	62 44	45.4	38 51.9	62 43	44.9	39 10.3	61 43	44.4	39 28.6	61 43	43.9	40 22.7	59 41	42.3	40 40.4	59 41	41.8	95
6	37 10.1	64 44	46.4	37 29.3	64 44	46.0	38 07.2	63 43	45.0	38 25.9	62 43	44.5	38 44.6	62 43	44.0	39 03.1	62 42	43.5	39 57.9	60 41	41.9	40 15.8	60 41	41.4	6
7	36 43.4	65 44	46.0	37 02.8	64 44	45.5	37 41.2	64 43	44.5	38 00.2	63 43	44.0	38 19.0	63 42	43.6	38 37.8	62 42	43.1	39 33.3	61 41	41.5	39 51.5	61 40	41.0	7
8	36 17.0	65 44	45.5	36 36.6	65 43	45.0	37 15.4	64 43	44.1	37 34.6	64 42	43.6	37 53.7	63 42	43.1	38 12.7	63 42	42.6	39 08.9	62 40	41.1	39 27.4	61 40	40.6	8
9	35 50.7	66 43	45.0	36 10.5	66 43	44.6	36 49.8	65 42	43.6	37 09.2	65 42	43.2	37 28.6	64 42	42.7	37 47.8	64 41	42.2	38 44.7	63 40	40.7	39 03.4	62 40	40.2	9
100	35 24.7	67 43	44.6	35 44.7	66 43	44.1	36 24.4	66 42	43.2	36 44.1	65 42	42.7	37 03.6	65 41	42.2	37 23.1	65 41	41.8	38 20.7	63 40	40.3	38 39.7	63 39	39.8	100
1	34 58.9	68 43	44.1	35 19.1	67 42	43.6	35 59.2	66 42	42.7	36 19.1	66 41	42.3	36 38.9	66 41	41.8	36 58.6	65 40	41.3	37 56.9	64 39	39.9	38 16.1	64 39	39.4	1
2	34 33.3	68 42	43.6	34 53.7	68 42	43.2	35 34.3	67 41	42.3	35 54.4	67 41	41.8	36 14.4	67 40	41.3	36 34.3	66 40	40.9	37 33.3	65 39	39.5	37 52.8	65 39	39.0	2
3	34 07.9	69 42	43.1	34 28.6	69 42	42.7	35 09.5	68 41	41.8	35 29.9	68 40	41.3	35 50.1	67 40	40.9	36 10.2	67 40	40.4	37 10.0	66 39	39.0	37 29.7	65 38	38.6	3
4	33 42.8	70 42	42.6	34 03.6	69 41	42.2	34 45.0	69 40	41.3	35 05.6	68 40	40.9	35 26.0	68 40	40.4	35 46.4	68 39	40.0	36 46.8	67 38	38.6	37 06.7	66 38	38.1	4
105	33 17.9	70 41	42.2	33 38.9	70 41	41.7	34 20.7	69 40	40.9	34 41.5	69 40	40.4	35 02.2	69 39	40.0	35 22.8	68 39	39.5	36 23.9	67 38	38.2	36 44.0	67 37	37.7	105
6	32 53.2	71 41	41.7	33 14.5	71 40	41.2	33 56.7	70 40	40.4	34 17.7	70 39	40.0	34 38.6	69 39	39.5	34 59.4	69 39	39.1	36 01.1	68 38	37.7	36 21.5	68 37	37.3	6
7	32 28.8	72 40	41.2	32 50.2	71 40	40.8	33 32.9	71 39	39.9	33 54.1	70 39	39.5	34 15.2	70 39	39.1	34 36.2	70 38	38.6	35 38.6	69 37	37.3	35 59.3	69 37	36.9	7
8	32 04.6	72 40	40.7	32 26.2	72 40	40.3	33 09.3	71 39	39.4	33 30.7	71 39	39.0	33 52.0	71 38	38.6	34 13.2	71 38	38.2	35 16.4	70 37	36.9	35 37.2	69 36	36.4	8
9	31 40.6	73 40	40.2	32 02.5	73 39	39.8	32 45.9	72 39	39.0	33 07.6	72 38	38.5	33 29.1	72 38	38.1	33 50.5	71 37	37.7	34 54.3	70 36	36.4	35 15.4	70 36	36.0	9
110	31 16.9	74 39	39.7	31 39.0	73 39	39.3	32 22.8	73 38	38.5	32 44.7	73 38	38.1	33 06.4	72 37	37.7	33 28.0	72 37	37.2	34 32.5	71 36	36.0	34 53.8	71 36	35.6	110
1	30 53.5	74 39	39.2	31 15.7	74 38	38.8	32 00.0	74 38	38.0	32 22.0	73 37	37.6	32 43.9	73 37	37.2	33 05.8	73 37	36.8	34 10.9	72 36	35.5	34 32.4	72 35	35.1	1
2	30 30.3	75 38	38.7	30 52.7	75 38	38.3	31 37.4	74 37	37.5	31 59.6	74 37	37.1	32 21.7	74 37	36.7	32 43.8	73 36	36.3	33 49.6	73 35	35.1	34 11.3	72 35	34.7	2
3	30 07.3	76 38	38.2	30 29.9	75 38	37.8	31 15.0	75 37	37.0	31 37.4	75 37	36.6	31 59.8	74 36	36.2	32 22.1	74 36	35.8	33 28.4	73 35	34.6	33 50.4	73 34	34.2	3
4	29 44.6	76 37	37.7	30 07.4	76 37	37.3	30 52.9	76 36	36.5	31 15.5	75 36	36.1	31 38.1	75 36	35.8	32 00.6	75 35	35.4	33 07.6	74 34	34.2	33 29.8	74 34	33.8	4
115	29 22.2	77 37	37.2	29 45.2	77 37	36.8	30 31.0	76 36	36.0	30 53.8	76 36	35.7	31 16.6	76 35	35.3	31 39.3	76 35	34.9	32 46.9	75 34	33.7	33 09.3	75 34	33.3	115
6	29 00.0	77 36	36.6	29 23.2	77 36	36.3	30 09.4	77 36	35.5	30 32.4	77 35	35.2	30 55.4	76 35	34.8	31 18.3	76 35	34.4	32 26.6	76 34	33.3	32 49.2	75 33	32.9	6
7	28 38.1	78 36	36.1	29 01.5	78 36	35.8	29 48.1	77 35	35.0	30 11.3	77 35	34.7	30 34.4	77 34	34.3	30 57.5	77 34	33.9	32 06.4	76 33	32.8	32 29.2	76 33	32.4	7
8	28 16.4	79 36	35.6	28 40.0	78 35	35.3	29 27.0	78 35	34.5	29 50.4	78 34	34.2	30 13.8	78 34	33.8	30 37.0	78 34	33.5	31 46.5	77 33	32.3	32 09.6	77 32	32.0	8
9	27 55.1	79 35	35.1	28 18.8	79 35	34.7	29 06.2	79 34	34.0	29 29.8	79 34	33.7	29 53.3	78 34	33.3	30 16.8	78 33	33.0	31 26.9	78 32	31.9	31 50.1	77 32	31.5	9
120	27 34.0	80 35	34.6	27 57.9	80 34	34.2	28 45.6	79 34	33.5	29 09.4	79 33	33.2	29 33.2	79 33	32.8	29 56.8	79 33	32.5	31 07.5	78 32	31.4	31 31.0	78 32	31.0	120
1	27 13.2	80 34	34.0	27 37.3	80 34	33.7	28 25.4	80 33	33.0	28 49.4	80 33	32.7	29 13.3	80 33	32.3	29 37.1	79 32	32.0	30 48.4	79 31	30.9	31 12.0	79 31	30.6	1
2	26 52.6	81 34	33.5	27 16.9	81 33	33.2	28 05.4	81 33	32.5	28 29.5	80 33	32.2	28 53.6	80 32	31.8	29 17.7	80 32	31.5	30 29.6	80 31	30.5	30 53.4	79 31	30.1	2
3	26 32.4	82 33	33.0	26 56.8	82 33	32.7	27 45.7	81 32	32.0	28 10.0	81 32	31.7	28 34.3	81 32	31.3	28 58.5	81 31	31.0	30 11.0	80 31	30.0	30 35.0	80 30	29.6	3
4	26 12.4	82 33	32.5	26 37.1	82 32	32.1	27 26.2	82 32	31.5	27 50.7	82 32	31.2	28 15.2	82 31	30.8	28 39.6	81 31	30.5	29 52.6	81 30	29.5	30 16.9	81 30	29.2	4
125	25 52.7	83 32	31.9	26 17.6	83 32	31.6	27 07.1	82 31	31.0	27 31.8	82 31	30.7	27 56.4	82 31	30.3	28 21.0	82 31	30.0	29 34.6	81 30	29.0	29 59.0	81 29	28.7	125
6	25 33.3	83 32	31.4	25 58.3	83 32	31.1	26 48.2	83 31	30.5	27 13.1	83 31	30.1	27 37.9	83 30	29.8	28 02.7	83 30	29.5	29 16.8	82 29	28.5	29 41.4	82 29	28.2	6
7	25 14.3	84 31	30.8	25 39.4	84 31	30.5	26 29.6	84 30	29.9	26 54.7	83 30	29.6	27 19.7	83 30	29.3	27 44.6	83 30	29.0	28 59.3	83 29	28.1	29 24.1	83 28	27.7	7
8	24 55.5	84 31	30.3	25 20.8	84 31	30.0	26 11.3	84 30	29.4	26 36.6	84 30	29.1	27 01.7	84 29	28.8	27 26.9	84 29	28.5	28 42.1	83 28	27.6	29 07.0	83 28	27.2	8
9	24 37.0	85 30	29.8	25 02.5	85 30	29.5	25 53.4	85 30	28.9	26 18.7	85 29	28.6	26 44.1	84 29	28.3	27 09.4	84 29	28.0	28 25.1	84 28	27.1	28 50.3	84 27	26.8	9
130	24 18.8	86 30	29.2	24 44.4	85 30	28.9	25 35.7	85 29	28.4	26 01.2	85 29	28.1	26 26.7	85 28	27.8	26 52.2	85 28	27.5	28 08.4	84 27	26.6	28 33.8	84 27	26.3	130
1	24 00.9	86 29	28.7	24 26.7	86 29	28.4	25 18.3	86 28	27.8	25 44.0	86 28	27.5	26 09.7	86 28	27.3	26 35.3	85 28	27.0	27 52.0	85 27	26.1	28 17.5	85 27	25.8	1
2	23 43.3	87 29	28.1	24 09.3	87 28	27.8	25 01.2	86 28	27.3	25 27.0	86 28	27.0	25 52.9	86 27	26.7	26 18.7	86 27	26.5	27 35.9	86 26	25.6	28 01.6	86 26	25.3	2
3	23 26.1	87 28	27.6	23 52.2	87 28	27.3	24 44.4	87 27	26.8	25 10.4	87 27	26.5	25 36.4	87 27	26.2	26 02.4	87 27	25.9	27 20.1	86 26	25.1	27 46.0	86 26	24.8	3
4	23 09.2	88 28	27.0	23 35.4	88 27	26.8	24 27.9	87 27	26.2	24 54.1	87 27	26.0	25 20.3	87 26	25.7	25 46.4	87 26	25.4	27 04.6	87 25	24.6	27 30.6	87 25	24.3	4
135	22 52.5	88 27	26.5	23 19.0	88 27	26.2	24 11.7	88 26	25.7	24 38.1	88 26	25.4	25 04.4	88 26	25.2	25 30.7	88 26	24.9	26 49.4	87 25	24.1	27 15.6	87 25	23.8	135
6	22 36.2	89 27	25.9	23 02.8	89 26	25.7	23 55.9	88 26	25.1	24 22.4	88 26	24.9	24 48.9	88 25	24.6	25 15.3	88 25	24.4	26 34.5	88 24	23.6	27 00.8	88 24	23.3	6
7	22 20.2	89 26	25.4	22 47.0	89 26	25.1	23 40.3	89 25	24.6	24 07.0	89 25	24.4	24 33.6	89 25	24.1	25 00.2	89 25	23.8	26 19.8	88 24	23.1	26 46.3	88 24	22.8	7
8	22 04.6	90 26	24.8	22 31.5	90 25	24.6	23 25.1	89 25	24.1	23 51.9	89 25	23.8	24 18.7	89 24	23.6	24 45.4	89 24	23.3	26 05.5	89 23	22.6	26 32.2	89 23	22.3	8
9	21 49.3	90 25	24.2	22 16.3	90 25	24.0	23 10.2	90 24	23.5	23 37.2	90 24	23.3	24 04.1	90 24	23.0	24 31.0	90 24	22.8	25 51.5	89 23	22.1	26 18.3	89 23	21.8	9
140	21 34.3	90 24	23.7	22 01.4	90 24	23.4	22 55.6	90 24	23.0	23 22.7	90 24	22.7	23 49.8	90 23	22.5	24 16.8	90 23	23.3	25 37.8	90 22	21.5	26 04.7	90 22	21.3	140
1	21 19.6	91 24	23.1	21 46.9	91 24	22.9	22 41.4	91 23	22.4	23 08.6	91 23	22.2	23 35.8	91 23	22.0	24 03.0	91 23	21.7	25 24.4	90 22	21.0	25 51.5	90 22	20.8	1
2	21 05.3	91 23	22.5	21 32.7	91 23	22.3	22 27.5	91 23	21.9	22 54.8	91 22	21.6	23 22.1	91 22	21.4	23 49.5	91 22	21.2	25 11.3	91 21	20.5	25 38.5	91 21	20.3	2
3	20 51.3	92 23	22.0	21 18.8	92 23	21.7	22 13.9	92 22	21.3	22 41.3	92 22	21.1	23 08.8	92 22	20.9	23 36.3	91 21	20.7	24 58.5	91 21	20.0	25 25.9	91 21	19.8	3
4	20 37.7	92 22	21.4	21 05.3	92 22	21.2	22 00.6	92 22	20.8	22 28.2	92 21	20.6	22 55.8	92 21	20.3	23 23.4	92 21	20.1	24 46.0	92 20	19.5	25 13.5	92 20	19.3	4
145	20 24.4	93 22	20.8	20 52.1	93 21	20.6	21 47.7	92 21	20.2	22 15.4	92 21	20.0	22 43.1	92 21	19.8	23 10.8	92 20	19.6	24 33.9	92 20	19.0	25 01.5	92 20	18.7	145
6	20 11.4	93 21	20.2	20 39.3	93 21	20.0	21 35.1	93 20	19.7	22 02.9	93 20	19.5	22 30.8	93 20	19.2	22 58.6	93 20	19.0	24 22.0	93 19	18.4	24 49.8	93 19	18.2	6
7	19 58.8	93 20	19.7	20 26.8	93 20	19.5	21 22.8	93 20	19.1	21 50.8	93 20	18.9	22 18.8	93 19	18.7	22 46.7	93 19	18.5	24 10.5	93 19	17.9	24 38.4	93 18	17.7	7
8	19 46.5	94 20	19.1	20 14.7	94 20	18.9	21 10.9	94 19	18.5	21 39.0	94 19	18.3	22 07.1	94 19	18.2	22 35.2	94 19	18.0	23 59.3	93 18	17.4	24 27.3	93 18	17.2	8
9	19 34.6	94 19	18.5	20 02.9	94 19	18.3	20 59.3	94 19	18.0	21 27.6	94 18	17.8	21 55.8	94 18	17.6	22 23.9	94 18	17.4	23 48.4	94 18	16.9	24 16.6	94 17	16.7	9
150	19 23.1	95 19	17.9	19 51.4	94 18	17.8	20 48.1	94 18	17.4	21 16.4	94 18	17.2	21 44.8	94 18	17.0	22 13.1	94 18	16.9	23 37.9	94 17	16.3	24 06.1	94 17	16.1	150
1	19 11.9	95 18	17.3	19 40.4	95 18	17.2	20 37.3	95 18	16.8	21 05.7	95 17	16.7	21 34.1	95 17	16.5	22 02.5	95 17	16.3	23 27.7	95 16	15.8	23 56.0	95 16	15.6	1
2	19 01.1	95 17	16.8	19 29.6	95 17	16.6	20 26.7	95 17	16.3	20 55.3	95 17	16.1	21 23.8	95 17	15.9	21 52.3	95 16	15.8	23 17.8	95 16	15.3	23 46.2	95 16	15.1	2
3	18 50.6	96 17	16.2	19 19.3	96 17	16.0	20 16.6	95 16	15.7	20 45.2	95 16	15.5	21 13.8	95 16	15.4	21 42.4	95 16	15.2	23 08.2	95 15	14.7	23 36.8	95 15	14.6	3
4	18 40.5	96 16	15.6	19 09.2	96 16	15.4	20 06.7	96 16	15.1	20 35.5	96 16	15.0	21 04.2	96 15	14.8	21 32.9	96 15	14.7	22 59.0	96 15	14.2	23 27.7	96 15	14.0	4
155	18 30.8	96 16	15.0	18 59.6	96 16	14.9	19 57.3	96 15	14.6	20 26.1	96 15	14.4	20 54.9	96 15	14.3	21 23.7	96 15	14.1	22 50.1	96 14	13.7	23 18.9	96 14	13.5	155
6	18 21.4	96 15	14.4	18 50.3	96 15	14.3	19 48.2	96 15	14.0	20 17.1	96 14	13.8	20 46.0	96 14	13.7	21 14.9	96 14	13.6	22 41.5	96 14	13.1	23 10.4	96 14	13.0	6
7	18 12.4	97 14	13.8	18 41.4	97 14	13.7	19 39.4	97 14	13.4	20 08.4	97 14	13.3	20 37.4	97 14	13.1	21 06.4	97 14	13.0	22 33.3	97 13	12.6	23 02.3	97 13	12.4	7
8	18 03.7	97 14	13.2	18 32.8	97 14	13.1	19 31.0	97 13	12.8	20 00.1	97 13	12.7	20 29.2	97 13	12.6	20 58.3	97 13	12.4	22 25.4	97 13	12.0	22 54.5	97 12	11.9	8
9	17 55.5	97 13	12.6	18 24.6	97 13	12.5	19 23.0	97 13	12.3	19 52.2	97 13	12.1	20 21.3	97 13	12.0	20 50.5	97 12	11.9	22 17.9	97 12	11.5	22 47.0	97 12	11.4	9
160	17 47.6	98 13	12.0	18 16.8	98 12	11.9	19 15.3	97 12	11.7	19 44.6	97 12	11.6	20 13.8	97 12	11.5	20 43.0	97 12	11.3	22 10.7	97 11	11.0	22 39.9	97 11	10.8	160
1	17 40.1	98 12	11.4	18 09.4	98 12	11.3	19 08.0	98 12	11.1	19 37.3	98 11	11.0	20 06.6	98 11	10.9	20 36.0	98 11	10.8	22 03.8	98 11	10.4	22 33.1	98 11	10.3	1
2	17 32.9	98 11	10.8	18 02.3	98 11	10.7	19 01.1	98 11	10.5	19 30.5	98 11	10.4	19 59.9	98 11	10.3	20 29.2	98 11	10.2	21 57.3	98 10	09.9	22 26.7	98 10	09.8	2
3	17 26.1	98 11	10.3	17 55.6	98 11	10.2	18 54.5	98 10	10.0	19 24.0	98 10	09.9	19 53.4	98 10	09.7	20 22.9	98 10	09.6	21 51.2	98 10	09.3	22 20.6	98 10	09.2	3
4	17 19.8	98 10	09.7	17 49.3	98 10	09.6	18 48.3	98 10	09.4	19 17.8	98 10	09.3	19 47.3	98 10	09.2	20 16.8	98 09	09.1	21 45.3	98 09	08.8	22 14.8	98 09	08.7	4
165	17 13.8	99 09	09.1	17 43.3	99 09	09.0	18 42.5	99 09	08.8	19 12.1	99 09	08.7	19 41.6	99 09	08.6	20 11.2	99 09	08.5	21 39.9	99 09	08.2	22 09.4	99 08	08.2	165
6	17 08.1	99 09	08.5	17 37.8	99 09	08.4	18 37.0	99 08	08.2	19 06.7	99 08	08.1	19 36.3	99 08	08.0	20 05.9	99 08	08.0	21 34.8	99 08	07.7	22 04.4	99 08	07.6	6
7	17 02.9	99 08	07.9	17 32.6	99 08	07.8	18 31.9	99 08	07.6	19 01.6	99 08	07.5	19 31.3	99 08	07.5	20 01.0	99 08	07.4	21 30.0	99 07	07.2	21 59.6	99 07	07.1	7
8	16 58.0	99 07	07.3	17 27.8	99 07	07.2	18 27.2	99 07	07.0	18 57.0	99 07	07.0	19 26.7	99 07	06.9	19 56.4	99 07	06.8	21 25.6	99 07	06.6	21 55.3	99 07	06.5	8
9	16 53.6	99 07	06.6	17 23.3	99 07	06.6	18 22.9	99 07	06.5	18 52.7	99 07	06.4	19 22.4	99 06	06.3	19 52.2	99 06	06.3	21 21.5	99 06	06.1	21 51.2	99 06	06.0	9
170	16 49.5	99 06	06.0	17 19.3	99 06	06.0	18 18.9	99 06	05.9	18 48.7	99 06	05.8	19 18.5	99 06	05.8	19 48.3	99 06	05.7	21 17.8	99 06	05.5	21 47.6	99 06	05.4	170
1	16 45.8	99 06	05.4	17 15.6	99 05	05.4	18 15.3	99 05	05.3	18 45.2	99 05	05.2	19 15.0	99 05	05.2	19 44.9	99 05	05.1	21 14.4	99 05	05.0	21 44.2	99 05	04.9	1
2	16 42.5	1 00 5	04.8	17 12.4	1 00 5	04.8	18 12.1	1 00 5	04.7	18 42.0	1 00 5	04.7	19 11.9	1 00 5	04.6	19 41.7	1 00 5	04.6	21 11.4	1 00 4	04.4	21 41.2	1 00 4	04.4	2
3	16 39.6	1 00 4	04.2	17 09.5	1 00 4	04.2	18 09.3	1 00 4	04.1	18 39.2	1 00 4	04.1	19 09.1	1 00 4	04.0	19 39.0	1 00 4	04.0	21 08.7	1 00 4	03.9	21 38.6	1 00 4	03.8	3
4	16 37.0	1 00 4	03.6	17 07.0	1 00 4	03.6	18 06.8	1 00 3	03.5	18 36.8	1 00 3	03.5	19 06.7	1 00 3	03.5	19 36.6	1 00 3	03.4	21 06.4	1 00 3	03.3	21 36.3	1 00 3	03.3	4
175	16 34.9	1 00 3	03.0	17 04.8	1 00 3	03.0	18 04.7	1 00 3	02.9	18 34.7	1 00 3	02.9	19 04.6	1 00 3	02.9	19 34.6	1 00 3	02.8	21 04.4	1 00 3	02.8	21 34.4	1 00 3	02.7	175
6	16 33.1	1 00 2	02.4	17 03.1	1 00 2	02.4	18 03.0	1 00 2	02.4	18 33.0	1 00 2	02.3	19 03.0	1 00 2	02.3	19 32.9	1 00 2	02.3	21 02.8	1 00 2	02.2	21 32.8	1 00 2	02.2	6
7	16 31.8	1 00 2	01.8	17 01.7	1 00 2	01.8	18 01.7	1 00 2	01.8	18 31.7	1 00 2	01.7	19 01.7	1 00 2	01.7	19 31.7	1 00 2	01.7	21 01.6	1 00 1	01.7	21 31.6	1 00 1	01.6	7
8	16 30.8	1 00 1	01.2	17 00.8	1 00 1	01.2	18 00.8	1 00 1	01.2	18 30.8	1 00 1	01.2	19 00.7	1 00 1	01.2	19 30.7	1 00 1	01.1	21 00.7	1 00 1	01.1	21 30.7	1 00 1	01.1	8
9	16 30.2	1 00 0	00.6	17 00.2	1 00 0	00.6	18 00.2	1 00 0	00.6	18 30.2	1 00 0	00.6	19 00.2	1 00 0	00.6	19 30.2	1 00 0	00.6	21 00.2	1 00 0	00.6	21 30.2	1 00 0	00.5	9
180	16 30.0	1 00 0	00.0	17 00.0	1 00 0	00.0	18 00.0	1 00 0	00.0	18 30.0	1 00 0	00.0	19 00.0	1 00 0	00.0	19 30.0	1 00 0	00.0	21 00.0	1 00 0	00.0	21 30.0	1 00 0	00.0	180

Digitized by Google

Lat. 52°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	82 00.0	1.0 02	00.0	81 30.0	1.0 02	00.0	80 00.0	1.0 01	00.0	79 30.0	1.0 01	00.0	79 00.0	1.0 01	00.0	73 00.0	1.0 01	00.0	72 30.0	1.0 01	00.0	67 30.0	1.0 00	00.0	00
1	81 58.8	1.0 06	03.6	81 28.9	1.0 05	03.3	79 59.1	1.0 04	02.7	79 29.2	1.0 04	02.5	78 59.2	1.0 04	02.4	72 59.6	1.0 02	01.2	72 29.6	1.0 02	01.2	67 29.8	1.0 01	00.7	1
2	81 55.4	99 10	07.1	81 25.7	99 09	06.6	79 56.5	99 07	05.4	79 26.7	99 07	05.0	78 56.9	99 06	04.7	72 58.4	1.0 03	02.4	72 28.5	1.0 03	02.3	67 29.1	1.0 02	01.4	2
3	81 49.7	97 13	10.6	81 20.4	98 12	09.9	79 52.2	98 10	08.0	79 22.7	98 09	07.5	78 53.1	99 09	07.1	72 56.4	99 05	03.7	72 26.6	99 04	03.5	67 28.0	1.0 03	02.1	3
4	81 41.8	95 17	14.0	81 13.1	96 15	13.0	79 46.2	97 13	10.6	79 17.1	97 12	10.0	78 47.8	98 11	09.4	72 53.7	99 06	04.9	72 24.0	99 06	04.6	67 26.4	99 03	02.8	4
05	81 31.9	93 20	17.2	81 03.8	94 19	16.0	79 38.6	95 15	13.2	79 09.9	96 14	12.4	78 41.1	96 14	11.6	72 50.2	98 07	06.1	72 20.7	98 07	05.8	67 24.4	99 04	03.5	05
6	81 20.0	90 23	20.3	80 52.7	91 21	18.9	79 29.4	94 18	15.6	79 01.3	94 17	14.7	78 33.0	95 16	13.8	72 45.9	98 08	07.3	72 16.6	98 08	06.9	67 21.9	99 05	04.2	6
7	81 06.3	87 26	23.2	80 39.9	89 24	21.7	79 18.8	91 20	18.0	78 51.2	92 19	16.9	78 23.5	93 18	16.0	72 40.8	97 10	08.4	72 11.8	97 09	08.0	67 19.0	98 06	04.8	7
8	80 50.9	84 28	25.9	80 25.4	86 27	24.3	79 06.7	89 22	20.2	78 39.8	90 21	19.1	78 12.7	91 20	18.0	72 35.0	96 11	09.6	72 06.3	96 10	09.1	67 15.7	98 06	05.5	8
9	80 34.0	81 31	28.5	80 09.5	83 29	26.8	78 53.2	87 24	22.4	78 27.1	88 23	21.1	78 00.6	89 22	20.0	72 28.5	95 12	10.7	72 00.1	95 12	10.2	67 11.9	97 07	06.2	9
10	80 15.7	77 33	30.9	79 52.2	79 31	29.1	78 38.5	84 26	24.5	78 13.2	85 25	23.1	77 47.4	86 24	21.9	72 21.3	94 13	11.8	71 53.2	94 13	11.3	67 07.7	96 08	06.9	10
1	79 56.1	74 35	33.1	79 33.6	76 33	31.2	78 22.7	81 28	26.4	77 58.1	83 27	25.0	77 33.1	84 26	23.7	72 13.4	92 14	12.9	71 45.6	93 14	12.3	67 03.1	95 08	07.5	1
2	79 35.4	71 36	35.1	79 13.9	73 35	33.2	78 05.7	78 30	28.2	77 42.0	80 29	26.8	77 17.8	81 27	25.4	72 04.8	91 15	14.0	71 37.4	91 15	13.4	66 58.1	94 09	08.2	2
3	79 13.7	67 38	37.0	78 53.2	70 36	35.1	77 47.7	76 32	30.0	77 24.8	77 30	28.5	77 01.4	79 29	27.1	71 55.5	89 17	15.1	71 28.6	90 16	14.4	66 52.6	94 10	08.8	3
4	78 51.0	64 39	38.7	78 31.5	66 38	36.8	77 28.8	73 33	31.6	77 06.8	74 32	30.1	76 44.2	76 30	28.6	71 45.6	88 18	16.1	71 19.1	89 17	15.3	66 46.8	93 10	09.4	4
15	78 27.5	60 40	40.3	78 09.0	63 39	38.4	77 09.1	70 34	33.1	76 47.8	72 33	31.6	76 26.1	73 32	30.1	71 35.0	86 19	17.1	71 09.0	87 18	16.3	66 40.5	92 11	10.1	15
6	78 03.2	57 42	41.7	77 45.7	60 40	39.8	76 48.5	67 36	34.5	76 28.1	69 34	33.0	76 07.2	71 33	31.4	71 23.9	85 20	18.0	70 58.4	85 19	17.2	66 33.8	90 12	10.7	6
7	77 38.3	54 43	43.1	77 21.7	57 41	41.1	76 27.2	64 37	35.9	76 07.7	66 35	34.3	75 47.6	68 34	32.7	71 12.2	83 20	19.0	70 47.2	84 20	18.1	66 26.8	89 12	11.3	7
8	77 12.8	51 43	44.3	76 57.1	54 42	42.4	76 05.2	61 38	37.1	75 46.5	63 36	35.5	75 27.3	65 35	34.0	70 59.9	81 21	19.9	70 35.4	82 20	19.0	66 19.4	88 13	11.9	8
9	76 46.8	48 44	45.4	76 31.9	51 43	43.5	75 42.6	58 39	38.3	75 24.8	61 37	36.6	75 06.3	63 36	35.1	70 47.0	79 22	20.8	70 23.1	80 21	19.9	66 11.6	87 14	12.4	9
20	76 20.2	45 45	46.4	76 06.2	48 44	44.5	75 19.5	56 39	39.3	75 02.5	58 38	37.7	74 44.8	60 37	36.2	70 33.7	77 23	21.6	70 10.3	78 22	20.7	66 03.5	85 14	13.0	20
1	75 53.3	43 46	47.3	75 40.1	45 44	45.5	74 55.8	53 40	40.3	74 39.6	55 39	38.7	74 22.7	57 38	37.2	70 19.8	76 24	22.4	69 57.0	77 23	21.5	65 55.0	84 15	13.6	1
2	75 26.0	40 46	48.1	75 13.6	43 45	46.3	74 31.7	50 41	41.2	74 16.3	53 40	39.6	74 00.2	55 38	38.1	70 05.5	74 25	23.2	69 43.3	75 24	22.2	65 46.2	83 15	14.1	2
3	74 58.3	37 47	48.9	74 46.7	40 45	47.1	74 07.1	48 42	42.1	73 52.5	50 40	40.5	73 37.1	52 39	39.0	69 50.7	72 25	24.0	69 29.1	73 24	23.0	65 37.0	81 16	14.7	3
4	74 30.3	35 47	49.6	74 19.4	38 46	47.8	73 42.2	45 42	42.9	73 28.3	47 41	41.3	73 13.7	50 40	39.8	69 35.5	70 26	24.7	69 14.4	71 25	23.7	65 27.5	80 16	15.2	4
25	74 02.1	32 48	50.2	73 51.9	35 46	48.5	73 16.9	43 43	43.6	73 03.7	45 42	42.1	72 49.9	47 40	40.5	69 19.8	68 27	25.4	68 59.4	69 26	24.4	65 17.6	78 17	15.7	25
6	73 33.6	30 48	50.8	73 24.1	33 47	49.1	72 51.2	40 43	44.3	72 38.8	43 42	42.7	72 25.7	45 41	41.2	69 03.8	66 27	26.1	68 43.9	67 26	25.0	65 07.5	77 17	16.2	6
7	73 04.9	28 48	51.3	72 56.1	30 47	49.6	72 25.3	38 44	44.9	72 13.6	40 42	43.4	72 01.2	42 41	41.9	68 47.4	63 28	26.7	68 28.1	65 27	25.7	64 57.1	75 18	16.7	7
8	72 35.9	26 48	51.7	72 27.9	28 47	50.1	71 59.1	36 44	45.5	71 48.1	38 43	44.0	71 36.4	40 42	42.5	68 30.6	61 29	27.3	68 11.9	63 28	26.3	64 46.3	73 18	17.1	8
9	72 06.9	24 49	52.1	71 59.4	26 48	50.5	71 32.7	33 44	46.0	71 22.3	36 43	44.5	71 11.3	38 42	43.0	68 13.4	59 29	27.9	67 55.4	61 28	26.9	64 35.3	72 19	17.6	9
30	71 37.6	21 49	52.5	71 30.8	24 48	50.9	71 06.0	31 45	46.4	70 56.3	33 44	45.0	70 46.0	36 43	43.6	67 56.0	57 30	28.5	67 38.6	59 29	27.4	64 24.0	70 19	18.0	30
1	71 08.3	19 49	52.8	71 02.1	22 48	51.3	70 39.1	29 45	46.9	70 30.1	31 44	45.4	70 20.4	33 43	44.0	67 38.2	55 30	29.0	67 21.4	57 29	27.9	64 12.5	68 20	18.4	1
2	70 38.8	18 49	53.1	70 33.2	20 48	51.6	70 12.1	27 45	47.3	70 03.7	29 44	45.9	69 54.6	31 43	44.5	67 20.2	53 31	29.5	67 04.0	55 30	28.4	64 00.7	67 20	18.9	2
3	70 09.2	16 49	53.3	70 04.2	18 49	51.9	69 44.9	25 46	47.6	69 37.1	27 45	46.2	69 28.7	29 44	44.9	67 01.8	51 31	30.0	66 46.2	53 30	28.9	63 48.6	65 20	19.3	3
4	69 39.5	14 50	53.5	69 35.1	16 49	52.1	69 17.5	23 46	47.9	69 10.3	25 45	46.6	69 02.5	27 44	45.2	66 43.2	49 31	30.5	66 28.2	51 30	29.4	63 36.3	63 21	19.6	4
35	69 09.8	12 50	53.7	69 05.8	14 49	52.3	68 50.0	21 46	48.2	68 43.4	23 45	46.9	68 36.2	25 44	45.5	66 24.4	47 32	30.9	66 10.0	49 31	29.8	63 23.8	61 21	20.0	35
6	68 40.0	10 50	53.9	68 36.6	12 49	52.5	68 22.4	19 46	48.5	68 16.4	21 45	47.2	68 09.8	23 44	45.8	66 05.3	45 32	31.3	65 51.5	47 31	30.2	63 11.0	60 22	20.4	6
7	68 10.1	09 50	54.0	68 07.2	11 49	52.7	67 54.7	17 46	48.7	67 49.3	19 45	47.4	67 43.2	21 44	46.1	65 46.0	43 33	31.7	65 32.8	45 32	30.6	62 58.1	58 22	20.7	7
8	67 40.2	07 50	54.1	67 37.8	09 49	52.8	67 26.9	15 46	48.9	67 22.0	17 46	47.6	67 16.6	19 45	46.3	65 26.5	41 33	32.1	65 13.9	43 32	31.0	62 44.9	56 22	21.1	8
9	67 10.3	05 50	54.2	67 08.4	07 49	52.9	66 59.0	13 47	49.1	66 54.7	15 46	47.8	66 49.8	17 45	46.6	65 06.8	39 33	32.4	64 54.8	41 32	31.3	62 31.5	54 23	21.4	9
40	66 40.3	04 50	54.3	66 38.9	06 49	53.0	66 31.1	12 47	49.2	66 27.3	14 46	48.0	66 22.9	16 45	46.8	64 46.9	37 33	32.7	64 35.5	39 32	31.6	62 18.0	52 23	21.7	40
1	66 10.3	02 50	54.3	66 09.4	04 49	53.1	66 03.1	10 47	49.4	65 59.8	12 46	48.1	65 56.0	14 45	46.9	64 26.8	35 34	33.0	64 16.0	37 33	32.0	62 04.2	51 23	22.0	1
2	65 40.3	01 50	54.3	65 39.9	02 49	53.1	65 35.0	08 47	49.5	65 32.3	10 46	48.3	65 29.0	12 45	47.1	64 06.6	33 34	33.3	63 56.4	35 33	32.2	61 50.3	49 23	22.3	2
3	65 10.3	01 50	54.3	65 10.3	01 49	53.1	65 06.9	07 47	49.5	65 04.7	08 46	48.4	65 01.9	10 45	47.2	63 46.2	31 34	33.6	63 36.6	33 33	32.5	61 36.2	47 24	22.5	3
4	64 40.3	02 50	54.3	64 40.8	01 49	53.1	64 38.8	05 47	49.6	64 37.1	07 46	48.4	64 34.8	09 45	47.3	63 25.7	29 34	33.8	63 16.7	31 33	32.8	61 22.0	45 24	22.8	4
45	64 10.3	04 50	54.2	64 11.2	02 49	53.1	64 10.7	03 47	49.7	64 09.4	05 46	48.5	64 07.6	07 45	47.4	63 05.1	27 35	34.0	62 56.7	29 34	33.0	61 07.6	43 24	23.0	45
6	63 40.4	05 50	54.2	63 41.7	04 49	53.1	63 42.5	02 47	49.7	63 41.7	03 46	48.6	63 40.4	05 45	47.4	62 44.4	26 35	34.3	62 36.5	27 34	33.2	60 53.1	41 24	23.3	6
7	63 10.4	07 50	54.1	63 12.2	05 49	53.0	63 14.4	00 47	49.7	63 14.0	02 46	48.6	63 13.2	04 45	47.5	62 23.6	24 35	34.4	62 16.2	25 34	33.4	60 38.4	40 25	23.5	7
8	62 40.5	08 50	54.0	62 42.7	06 49	53.0	62 46.2	01 47	49.7	62 46.3	00 46	48.6	62 46.0	02 45	47.5	62 02.6	22 35	34.6	61 55.8	23 34	33.6	60 23.6	38 25	23.7	8
9	62 10.6	09 50	53.9	62 13.2	08 49	52.9	62 18.0	03 47	49.7	62 18.6	01 46	48.6	62 18.7	00 45	47.5	61 41.6	20 35	34.8	61 35.4	22 34	33.7	60 08.7	36 25	23.9	9
50	61 40.8	11 50	53.8	61 43.8	09 49	52.8	61 49.9	04 47	49.6	61 50.9	03 46	48.6	61 51.5	01 45	47.5	61 20.5	18 35	34.9	61 14.8	20 34	33.9	59 53.7	34 25	24.1	50
1	61 11.0	12 50	53.7	61 14.4	11 49	52.7	61 21.7	06 47	49.6	61 23.2	04 46	48.5	61 24.3	03 45	47.5	60 59.3	16 35	35.0	60 54.2	18 35	34.0	59 38.6	32 25	24.3	1
2	60 41.2	13 50	53.6	60 45.0	12 49	52.6	60 53.6	07 47	49.5	60 55.6	06 46	48.5	60 57.0	04 45	47.5	60 38.1	15 36	35.2	60 33.5	16 35	34.2	59 23.3	30 26	24.4	2
3	60 11.5	15 49	53.4	60 15.7	13 49	52.4	60 25.6	09 47	49.4	60 27.9	07 46	48.4	60 29.8	06 45	47.4	60 16.8	13 36	35.3	60 12.7	14 35	34.3	59 08.0	29 26	24.6	3
4	59 41.9	16 49	53.3	59 46.4	15 49	52.3	59 57.5	10 47	49.3	60 00.3	09 46	48.4	60 02.7	07 45	47.4	59 55.4	11 36	35.3	59 51.9	13 35	34.4	58 52.6	27 26	24.7	4
55	59 12.3	17 49	53.1	59 17.2	16 49	52.2	59 29.5	11 47	49.2	59 32.7	10 46	48.3	59 35.5	09 45	47.3	59 34.0	09 36	35.4	59 31.0	11 35	34.4	58 37.1	25 26	24.9	55
6	58 42.8	18 49	53.0	58 48.1	17 48	52.0	59 01.5	13 47	49.1	59 05.2	11 46	48.2	59 08.4	10 45	47.2	59 12.6	08 36	35.5	59 10.1	09 35	34.5	58 21.6	23 26	25.0	6
7	58 13.3	20 49	52.8	58 19.0	18 48	51.8	58 33.6	14 46	49.0	58 37.7	13 46	48.1	58 41.3	11 45	47.1	58 51.1	06 36	35.5	58 49.1	07 35	34.6	58 05.9	21 26	25.1	7
8	57 43.9	21 49	52.6	57 50.0	20 48	51.7	58 05.8	15 46	48.9	58 10.2	14 46	47.9	58 14.2	13 45	47.0	58 29.7	04 36	35.6	58 28.2	06 35	34.6	57 50.2	19 26	25.2	8
9	57 14.6	22 49	52.4	57 21.1	21 48	51.5	57 38.0	17 46	48.7	57 42.8	15 46	47.8	57 47.3	14 45	46.9	58 08.2	03 36	35.6	58 07.2	04 35	34.6	57 34.5	18 26	25.3	9
60	56 45.4	23 49	52.2	56 52.2	22 48	51.3	57 10.2	18 46	48.6	57 15.5	17 45	47.7	57 20.3	15 45	46.8	57 46.7	01 36	35.6	57 46.2	02 35	34.7	57 18.7	16 26	25.4	60
1	56 16.3	24 48	52.0	56 23.4	23 48	51.1	56 42.6	19 46	48.4	56 48.2	18 45	47.5	56 53.4	17 45	46.6	57 25.2	01 36	35.6	57 25.2	01 35	34.7	57 02.8	14 26	25.4	1
2	55 47.2	26 48	51.7	55 54.7	24 48	50.9	56 15.0	21 46	48.3	56 21.0	19 45	47.4	56 26.6	18 45	46.5	57 03.7	02 36	35.6	57 04.2	01 35	34.7	56 46.9	12 27	25.5	2
3	55 18.3	27 48	51.5	55 26.1	26 48	50.7	55 47.5	22 46	48.1	55 53.8	21 45	47.2	55 59.9	19 44	46.3	56 42.2	04 36	35.6	56 43.2	03 35	34.7	56 31.0	11 27	25.6	3
4	54 49.4	28 48	51.3	54 57.6	27 47	50.4	55 20.0	23 46	47.9	55 26.8	22 45	47.0	55 33.2	21 44	46.2	56 20.7	05 36	35.5	56 22.2	04 35	34.6	56 15.0	09 27	25.6	4
65	54 20.6	29 48	51.0	54 29.2	28 47	50.2	54 52.6	24 45	47.7	54 59.8	23 45	46.8	55 06.6	22 44	46.0	55 59.2	07 36	35.5	56 01.2	06 35	34.6	55 59.1	07 27	25.7	65
6	53 52.0	30 48	50.8	54 00.8	29 47	50.0	54 25.4	26 45	47.5	54 32.9	24 45	46.7	54 40.0	23 44	45.8	55 37.8	09 36	35.4	55 40.2	07 35	34.6	55 43.1	05 27	25.7	6
7	53 23.4	31 47	50.5	53 32.6	30 47	49.7	53 58.2	27 45	47.3	54 06.1	26 45	46.5	54 13.6	25 44	45.6	55 16.4	10 36	35.4	55 19.3	09 35	34.5	55 27.0	04 27	25.7	7
8	52 55.0	32 47	50.2	53 04.5	31 47	49.5	53 31.1	28 45	47.1	53 39.3	27 44	46.3	53 47.2	26 44	45.4	54 55.0	12 36	35.3	54 58.3	10 35	34.5	55 11.0	02 27	25.7	8
9	52 26.6	33 47	50.0	52 36.5	32 46	49.2	53 04.1	29 45	46.8	53 12.7	28 44	46.0	53 21.0	27 44	45.2	54 33.7	13 36	35.2	54 37.5	12 35	34.4	54 55.0	00 27	25.7	9
70	51 58.4	34 47	49.7	52 08.5	33 46	48.9	52 37.2	30 45	46.6	52 46.1	29 44	45.8	52 54.8	28 43	45.0	54 12.4	15 35	35.2	54 16.6	13 35	34.3	54 38.9	01 27	25.7	70
1	51 30.3	35 47	49.4	51 40.7	34 46	48.7	52 10.4	31 44	46.4	52 19.7	30 44	45.6	52 28.7	29 43	44.8	53 51.2	16 35	35.1	53 55.8	15 35	34.2	54 22.9	03 27	25.7	1
2	51 02.3	36 46	49.1	51 13.1	36 46	48.4	51 43.7	33 44	46.1	51 53.4	32 44	45.4	52 02.7	31 43	44.6	53 30.0	18 35	35.0	53 35.1	16 34	34.1	54 06.9	05 27	25.7	2
3	50 34.4	37 46	48.8	50 45.5	37 46	48.1	51 17.2	34 44	45.9	51 27.1	33 44	45.1	51 36.8	32 43	44.4	53 08.8	19 35	34.8	53 14.4	18 34	34.0	53 50.9	06 27	25.7	3
4	50 06.7	39 46	48.5	50 18.1	38 46	47.8	50 50.7	35 44	45.6	51 01.0	34 43	44.9	51 11.0	33 43	44.1	52 47.8	21 35	34.7	52 53.7	19 34	33.9	53 34.9	08 27	25.6	4
75	49 39.0	40 46	48.2	49 50.8	39 45	47.5	50 24.4	36 44	45.4	50 35.0	35 43	44.6	50 45.4	34 43	43.9	52 26.7	22 35	34.6	52 33.2	21 34	33.8	53 18.9	10 27	25.6	75
6	49 11.5	41 46	47.9	49 23.6	40 45	47.2	49 58.1	37 44	45.1	50 09.1	36 43	44.4	50 19.8	35 42	43.6	52 05.8	23 35	34.5	52 12.6	22 34	33.7	53 03.0	11 27	25.6	6
7	48 44.2	42 45	47.6	48 56.5	41 45	46.9	49 32.0	38 43	44.8	49 43.4	37 43	44.1	49 54.4	36 42	43.4	51 44.9	25 35	34.3	51 52.2	24 34	33.5	52 47.0	13 26	25.5	7
8	48 17.0	43 45	47.3	48 29.6	42 45	46.6	49 06.1	39 43	44.5	49 17.7	38 43	43.8	49 29.1	38 42	43.1	51 24.1	26 35	34.2	51 31.8	25 34	33.4	52 31.2	14 26	25.4	8
9	47 49.9	44 45	47.0	48 02.8	43 44	46.3	48 40.2	40 43	44.3	48 52.2	39 42	43.6	49 03.9	39 42	42.9	51 03.4	27 34	34.0	51 11.5	26 34	33.3	52 15.3	16 26	25.4	9
80	47 23.0	45 45	46.7	47 36.2	44 44	46.0	48 14.5	41 43	44.0	48 26.8	41 42	43.3	48 38.8	40 42	42.6	50 42.8	29 34	33.9	50 51.3	28 34	33.1	51 59.5	17 26	25.3	80
1	46 56.2	45 44	46.3	47 09.7	45 44	45.7	47 48.9	42 42	43.7	48 01.5	42 42	43.0	48 13.9	41 41	42.3	50 22.2	30 34	33.7	50 31.1	29 33	33.0	51 43.7	19 26	25.2	1
2	46 29.5	46 44	46.0	46 43.4	46 44	45.3	47 23.5	43 42	43.4	47 36.4	43 42	42.7	47 49.1	42 41	42.0	50 01.8	32 34	33.5	50 11.1	31 33	32.8	51 28.0	21 26	25.1	2
3	46 03.0	47 44	45.6	46 17.2	47 43	45.0	46 58.2	45 42	43.1	47 11.4	44 41	42.4	47 24.4	43 41	41.7	49 41.4	33 34	33.4	49 51.1	32 33	32.6	51 12.4	22 26	25.0	3
4	45 36.7	48 44	45.3	45 51.1	48 43	44.7	46 33.0	46 42	42.8	46 46.6	45 41	42.1	46 59.9	44 41	41.5	49 21.2	34 34	33.2	49 31.3	33 33	32.4	50 56.7	24 26	24.9	4
85	45 10.5	49 43	45.0	45 25.2	49 43	44.3	46 08.0	47 41	42.4	46 21.9	46 41	41.8	46 35.5	45 40	41.2	49 01.0	35 33	33.0	49 11.5	35 33	32.3	50 41.2	25 26	24.8	85
6	44 44.5	50 43	44.6	44 59.5	50 43	44.0	45 43.2	48 41	42.1	45 57.4	47 41	41.5	46 11.3	46 40	40.9	48 40.9	37 33	32.8	48 51.8	36 33	32.1	50 25.7	27 26	24.7	6
7	44 18.6	51 43	44.3	44 33.9	51 42	43.6	45 18.5	49 41	41.8	45 33.0	48 40	41.2	45 47.2	47 40	40.6	48 21.0	38 33	32.6	48 32.3	37 32	31.9	50 10.3	28 26	24.6	7
8	43 52.9	52 43	43.9	44 08.5	51 42	43.3	44 53.9	50 41	41.5	45 08.7	49 40	40.9	45 23.3	48 40	40.2	48 01.2	39 33	32.4	48 12.8	38 32	31.7	49 54.9	29 25	24.5	8
9	43 27.4	53 42	43.5	43 43.2	52 42	42.9	44 29.6	51 40	41.1	44 44.6	50 40	40.5	44 59.5	49 39	39.9	47 41.4	40 33	32.2	47 53.5	40 32	31.5	49 39.6	31 25	24.4	9
90	43 02.1	54 42	43.2	43 18.1	53 42	42.6	44 05.3	52 40	40.8	44 20.7	51 40	40.2	44 35.9	50 39	39.6	47 21.8	42 32	31.9	47 34.2	41 32	31.3	49 24.4	32 25	24.2	90

Digitized by Google

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	42 36.9	55 42	42.8	42 53.2	54 41	42.2	43 41.3	52 40	40.5	43 56.9	52 39	39.9	44 12.4	51 39	39.3	47 02.4	43 32	31.7	47 15.1	42 32	31.1	49 09.3	34 26	24.1	91
2	42 11.9	56 41	42.4	42 28.5	55 41	41.9	43 17.4	53 40	40.1	43 33.3	53 39	39.6	43 49.1	52 39	39.0	46 43.0	44 32	31.5	46 56.1	43 31	30.8	48 54.2	35 25	24.0	2
3	41 47.1	57 41	42.0	42 03.9	56 41	41.5	42 53.6	54 39	39.8	43 09.9	54 39	39.2	43 25.9	53 38	38.6	46 23.8	45 32	31.3	46 37.2	45 31	30.6	48 39.3	37 25	23.8	3
4	41 22.4	57 41	41.7	41 39.6	57 40	41.1	42 30.1	55 39	39.4	42 46.6	55 38	38.9	43 02.9	54 38	38.3	46 04.7	46 32	31.0	46 18.5	46 31	30.4	48 24.4	38 25	23.7	4
95	40 57.9	58 40	41.3	41 15.4	58 40	40.7	42 06.7	56 39	39.1	42 23.5	56 38	38.5	42 40.1	55 38	38.0	45 45.7	48 31	30.8	45 59.9	47 31	30.1	48 09.6	39 24	23.5	95
6	40 33.7	59 40	40.9	40 51.4	59 40	40.4	41 43.5	57 38	38.7	42 00.6	57 38	38.2	42 17.5	56 37	37.6	45 26.9	49 31	30.5	45 41.4	48 31	29.9	47 54.9	41 24	23.4	6
7	40 09.6	60 40	40.5	40 27.5	60 39	40.0	41 20.5	58 38	38.4	41 37.9	58 38	37.8	41 55.0	57 37	37.3	45 08.2	50 31	30.3	45 23.0	49 30	29.7	47 40.3	42 24	23.2	7
8	39 45.7	61 40	40.1	40 03.9	60 39	39.6	40 57.7	59 38	38.0	41 15.3	59 37	37.5	41 32.8	58 37	36.9	44 49.6	51 31	30.0	45 04.8	50 30	29.4	47 25.8	43 24	23.0	8
9	39 22.0	62 39	39.7	39 40.5	61 39	39.2	40 35.0	60 37	37.6	40 52.9	59 37	37.1	41 10.7	59 37	36.6	44 31.2	52 30	29.8	44 46.8	52 30	29.2	47 11.4	45 24	22.9	9
100	38 58.5	63 39	39.3	39 17.2	62 38	38.8	40 12.6	61 37	37.3	40 30.7	60 37	36.7	40 48.8	60 36	36.2	44 12.9	53 30	29.5	44 28.8	53 30	28.9	46 57.1	46 24	22.7	100
1	38 35.2	63 38	38.9	38 54.2	63 38	38.4	39 50.3	62 37	36.9	40 08.7	61 36	36.4	40 27.0	61 36	35.8	43 54.8	54 30	29.2	44 11.1	54 29	28.6	46 42.9	47 23	22.5	1
2	38 12.1	64 38	38.5	38 31.3	64 38	38.0	39 28.2	63 36	36.5	39 46.9	62 36	36.0	40 05.5	62 36	35.5	43 36.9	56 30	29.0	43 53.4	55 29	28.4	46 28.8	48 23	22.3	2
3	37 49.2	65 38	38.1	38 08.7	65 37	37.6	39 06.3	63 36	36.1	39 25.3	63 36	35.6	39 44.1	63 35	35.1	43 19.0	57 29	28.7	43 35.9	56 29	28.1	46 14.9	50 23	22.1	3
4	37 26.6	66 37	37.7	37 46.3	65 37	37.2	38 44.7	64 36	35.7	39 03.9	64 35	35.2	39 23.0	63 35	34.7	43 01.4	58 29	28.4	43 18.6	57 29	27.8	46 01.0	51 23	21.9	4
105	37 04.1	67 37	37.2	37 24.0	66 37	36.8	38 23.2	65 35	35.3	38 42.7	65 35	34.9	39 02.0	64 35	34.4	42 43.9	59 29	28.1	43 01.4	58 28	27.6	45 47.3	52 23	21.7	105
6	36 41.8	67 37	36.8	37 02.0	67 36	36.4	38 01.9	66 35	35.0	38 21.7	66 35	34.5	38 41.3	65 34	34.0	42 26.6	60 29	27.8	42 44.4	59 28	27.3	45 33.7	53 22	21.5	6
7	36 19.8	68 36	36.4	36 40.2	68 36	36.0	37 40.9	67 35	34.6	38 00.9	66 34	34.1	38 20.7	66 34	33.6	42 09.4	61 28	27.5	42 27.6	60 28	27.0	45 20.2	55 22	21.3	7
8	35 58.0	69 36	36.0	36 18.7	69 36	35.5	37 20.0	68 34	34.2	37 40.3	67 34	33.7	38 00.4	67 34	33.2	41 52.4	62 28	27.2	42 10.9	61 28	26.7	45 06.8	56 22	21.1	8
9	35 36.4	70 36	35.6	35 57.3	69 35	35.1	36 59.4	68 34	33.8	37 19.9	68 34	33.3	37 40.3	68 33	32.8	41 35.6	63 28	26.9	41 54.4	62 27	26.4	44 53.6	57 22	20.9	9
110	35 15.0	71 35	35.1	35 36.2	70 35	34.7	36 39.0	69 34	33.4	36 59.7	69 33	32.9	37 20.3	69 33	32.5	41 19.0	64 27	26.6	41 38.0	63 27	26.1	44 40.5	58 22	20.7	110
1	34 53.9	71 35	34.7	35 15.2	71 34	34.3	36 18.8	70 33	33.0	36 39.7	70 33	32.5	37 00.6	69 32	32.1	41 02.5	65 27	26.3	41 21.8	64 27	25.8	44 27.5	59 21	20.5	1
2	34 33.0	72 34	34.3	34 54.6	72 34	33.8	35 58.8	71 33	32.5	36 20.0	71 33	32.1	36 41.1	70 32	31.7	40 46.2	66 27	26.0	41 05.8	65 26	25.5	44 14.7	60 21	20.2	2
3	34 12.3	73 34	33.8	34 34.1	73 34	33.4	35 39.0	72 33	32.1	36 00.5	71 32	31.7	36 21.8	71 32	31.3	40 30.1	67 27	25.7	40 50.0	66 26	25.2	44 01.9	62 21	20.0	3
4	33 51.9	74 34	33.4	34 13.9	73 33	33.0	35 19.5	72 32	31.7	35 41.2	72 32	31.3	36 02.8	72 31	30.9	40 14.1	68 26	25.4	40 34.4	67 26	24.9	43 49.4	63 21	19.8	4
115	33 31.7	74 33	32.9	33 53.9	74 33	32.5	35 00.2	73 32	31.3	35 22.1	73 31	30.9	35 43.9	73 31	30.5	39 58.4	69 26	25.1	40 18.9	68 25	24.6	43 36.9	64 20	19.5	115
6	33 11.7	75 33	32.5	33 34.2	75 32	32.1	34 41.1	74 31	30.9	35 03.3	74 31	30.5	35 25.3	73 31	30.0	39 42.8	69 26	24.8	40 03.6	69 25	24.3	43 24.7	65 20	19.3	6
7	32 52.0	76 32	32.0	33 14.7	75 32	31.6	34 22.3	75 31	30.4	34 44.7	74 31	30.0	35 06.9	74 30	29.6	39 27.5	70 25	24.4	39 48.5	70 25	24.0	43 12.5	66 20	19.1	7
8	32 32.5	76 32	31.6	32 55.4	76 32	31.2	34 03.7	75 31	30.0	34 26.3	75 30	29.6	34 48.8	75 30	29.2	39 12.3	71 25	24.1	39 33.6	71 25	23.6	43 00.5	67 20	18.8	8
9	32 13.3	77 32	31.1	32 36.4	77 31	30.7	33 45.3	76 30	29.6	34 08.1	76 30	29.2	34 30.9	76 29	28.8	38 57.3	72 25	23.8	39 18.9	72 24	23.3	42 48.7	68 20	18.6	9
120	31 54.3	78 31	30.7	32 17.7	78 31	30.3	33 27.2	77 30	29.2	33 50.2	77 29	28.8	34 13.2	76 29	28.4	38 42.5	73 24	23.4	39 04.3	73 24	23.0	42 37.0	69 19	18.3	120
1	31 35.6	78 31	30.2	31 59.1	78 30	29.8	33 09.3	78 29	28.7	33 32.6	77 29	28.4	33 55.7	77 29	28.0	38 27.9	74 24	23.1	38 50.0	74 24	22.7	42 25.4	70 19	18.1	1
2	31 17.2	79 30	29.7	31 40.9	79 30	29.4	32 51.7	78 29	28.3	33 15.1	78 29	27.9	33 38.5	78 28	27.5	38 13.5	75 24	22.8	38 35.9	74 23	22.3	42 14.1	71 19	17.8	2
3	30 59.0	80 30	29.3	31 22.9	80 30	28.9	32 34.3	79 29	27.9	32 58.0	79 28	27.5	33 21.6	79 28	27.1	37 59.3	76 23	22.4	38 21.9	75 23	22.0	42 02.8	72 18	17.6	3
4	30 41.0	80 29	28.8	31 05.1	80 29	28.5	32 17.2	80 28	27.4	32 41.0	80 28	27.1	33 04.9	79 27	26.7	37 45.3	76 23	22.1	38 08.2	76 23	21.7	41 51.8	73 18	17.3	4
125	30 23.4	81 29	28.3	30 47.7	81 29	28.0	32 00.3	80 28	27.0	32 24.4	80 27	26.6	32 48.4	80 27	26.3	37 31.6	77 23	21.7	37 54.7	77 22	21.3	41 40.9	74 18	17.0	125
6	30 06.0	82 29	27.9	30 30.5	82 28	27.5	31 43.7	81 27	26.5	32 07.9	81 27	26.2	32 32.2	81 27	25.8	37 18.0	78 22	21.4	37 41.3	78 22	21.0	41 30.1	75 18	16.8	6
7	29 48.8	82 28	27.4	30 13.5	82 28	27.1	31 27.3	82 27	26.1	31 51.8	82 27	25.7	32 16.2	81 26	25.4	37 04.6	79 22	21.0	37 28.2	78 22	20.6	41 19.5	76 17	16.5	7
8	29 32.0	83 28	26.9	29 56.8	83 27	26.6	31 11.2	82 26	25.6	31 35.9	82 26	25.3	32 00.5	82 26	25.0	36 51.5	80 22	20.7	37 15.3	79 21	20.3	41 09.1	76 17	16.2	8
9	29 15.4	84 27	26.4	29 40.4	83 27	26.1	30 55.3	83 26	25.2	31 20.2	83 26	24.8	31 45.0	83 26	24.5	36 38.6	80 21	20.3	37 02.6	80 21	19.9	40 58.9	77 17	16.0	9
130	28 59.0	84 27	26.0	29 24.3	84 26	25.7	30 39.8	84 26	24.7	31 04.8	83 25	24.4	31 29.8	83 26	24.1	36 25.8	81 21	20.0	36 50.1	81 20	19.6	40 48.8	78 16	15.7	130
1	28 43.0	85 26	25.5	29 08.4	85 26	25.2	30 24.5	84 25	24.3	30 49.7	84 25	23.9	31 14.9	84 24	23.6	36 13.4	82 20	19.6	36 37.8	82 20	19.2	40 38.9	79 16	15.4	1
2	28 27.3	85 26	25.0	28 52.9	85 26	24.7	30 09.4	85 25	23.8	30 34.8	85 24	23.5	31 00.2	85 24	23.2	36 01.1	82 20	19.2	36 25.8	82 20	18.9	40 29.2	80 16	15.1	2
3	28 11.8	86 25	24.5	28 37.6	86 25	24.2	29 54.6	85 24	23.3	30 20.3	85 24	23.0	30 45.8	85 24	22.7	35 49.0	83 20	18.9	36 13.9	83 19	18.5	40 19.6	81 16	14.9	3
4	27 56.6	87 25	24.0	28 22.5	86 25	23.7	29 40.2	86 24	22.9	30 05.9	86 23	22.6	30 31.7	86 23	22.3	35 37.2	84 19	18.5	36 02.3	84 19	18.2	40 10.2	81 15	14.6	4
135	27 41.7	87 24	23.5	28 07.8	87 24	23.3	29 25.9	87 23	22.4	29 51.9	86 23	22.1	30 17.8	86 23	21.8	35 25.6	85 19	18.1	35 50.9	84 19	17.8	40 01.0	82 15	14.3	135
6	27 27.1	88 24	23.0	27 53.4	88 24	22.8	29 12.0	87 23	21.9	29 38.1	87 22	21.7	30 04.2	87 22	21.4	35 14.2	85 19	17.7	35 39.8	85 18	17.4	39 52.0	83 15	14.0	6
7	27 12.8	88 23	22.5	27 39.2	88 23	22.3	28 58.3	88 22	21.5	29 24.6	88 22	21.2	29 50.9	88 22	20.9	35 03.1	86 18	17.4	35 28.8	86 18	17.1	39 43.1	84 14	13.7	7
8	26 58.8	89 23	22.1	27 25.4	89 23	21.8	28 45.0	88 22	21.0	29 11.4	88 22	20.7	29 37.9	88 21	20.5	34 52.2	86 18	17.0	35 18.1	86 17	16.7	39 34.5	85 14	13.4	8
9	26 45.1	89 22	21.6	27 11.8	89 22	21.3	28 31.9	89 21	20.5	28 58.5	89 21	20.3	29 25.1	89 21	20.0	34 41.5	87 17	16.6	35 07.6	87 17	16.3	39 26.0	85 14	13.1	9
140	26 31.6	90 22	21.1	26 58.5	90 22	20.8	28 19.1	89 21	20.0	28 45.8	89 21	19.8	29 12.6	89 20	19.5	34 31.0	88 17	16.2	34 57.3	88 17	15.9	39 17.7	86 14	12.8	140
1	26 18.5	90 21	20.5	26 45.6	90 21	20.3	28 06.5	90 20	19.6	28 33.5	90 20	19.3	29 00.4	90 20	19.1	34 20.8	88 17	15.9	34 47.3	88 16	15.6	39 09.6	87 13	12.5	1
2	26 05.7	91 21	20.0	26 32.9	91 21	19.8	27 54.3	90 20	19.1	28 21.4	90 20	18.8	28 48.5	90 19	18.6	34 10.9	89 16	15.5	34 37.5	89 16	15.2	39 01.7	87 13	12.2	2
3	25 53.2	91 20	19.5	26 20.5	91 20	19.3	27 42.4	91 19	18.6	28 09.6	91 19	18.4	28 36.8	91 19	18.1	34 01.1	89 16	15.1	34 27.9	89 16	14.8	38 54.0	88 13	11.9	3
4	25 41.0	92 20	19.0	26 08.5	92 20	18.8	27 30.7	91 19	18.1	27 58.1	91 19	17.9	28 25.5	91 18	17.7	33 51.6	90 15	14.7	34 18.6	90 15	14.4	38 46.4	89 12	11.6	4
145	25 29.1	92 19	18.5	25 56.7	92 19	18.3	27 19.4	92 18	17.6	27 46.9	92 18	17.4	28 14.4	92 18	17.2	33 42.4	91 15	14.3	34 09.5	90 15	14.0	38 39.1	89 12	11.3	145
6	25 17.5	92 19	18.0	25 45.3	92 19	17.8	27 08.3	92 18	17.2	27 36.0	92 18	16.9	28 03.6	92 17	16.7	33 33.4	91 15	13.9	34 00.7	91 14	13.7	38 31.9	90 12	11.0	6
7	25 06.3	93 18	17.5	25 34.1	93 18	17.3	26 57.6	93 17	16.7	27 25.4	93 17	16.5	27 53.1	93 17	16.2	33 24.6	92 14	13.5	33 52.1	91 14	13.3	38 25.0	90 11	10.7	7
8	24 55.3	93 18	17.0	25 23.3	93 18	16.8	26 47.1	93 17	16.2	27 15.1	93 17	16.0	27 43.0	93 16	15.8	33 16.1	92 14	13.1	33 43.7	92 14	12.9	38 18.2	91 11	10.4	8
9	24 44.7	94 17	16.5	25 12.8	94 17	16.3	26 37.0	93 16	15.7	27 05.0	93 16	15.5	27 33.1	93 16	15.3	33 07.8	93 13	12.7	33 35.6	92 13	12.5	38 11.6	91 11	10.1	9
150	24 34.4	94 17	16.0	25 02.6	94 16	15.8	26 27.2	94 16	15.2	26 55.3	94 16	15.0	27 23.5	94 16	14.8	32 59.8	93 13	12.3	33 27.7	93 13	12.1	38 05.3	92 10	09.8	150
1	24 24.4	94 16	15.4	24 52.7	94 16	15.3	26 17.6	94 15	14.7	26 45.9	94 15	14.5	27 14.2	94 15	14.3	32 52.1	93 13	11.9	33 20.1	93 12	11.7	37 59.1	93 10	09.5	1
2	24 14.7	95 16	14.9	24 43.1	95 15	14.7	26 08.4	95 15	14.2	26 36.8	95 15	14.0	27 05.2	95 14	13.9	32 44.5	94 12	11.5	33 12.7	94 12	11.3	37 53.1	93 10	09.1	2
3	24 05.4	95 15	14.4	24 33.9	95 15	14.2	25 59.5	95 14	13.7	26 28.0	95 14	13.5	26 56.5	95 14	13.4	32 37.3	94 12	11.1	33 05.6	94 12	10.9	37 47.3	94 09	08.8	3
4	23 56.3	96 14	13.9	24 25.0	96 14	13.7	25 50.9	95 14	13.2	26 19.5	95 14	13.1	26 48.1	95 13	12.9	32 30.3	95 11	10.7	32 58.7	95 11	10.5	37 41.8	94 09	08.5	4
155	23 47.6	96 14	13.4	24 16.4	96 14	13.2	25 42.6	96 13	12.7	26 11.3	96 13	12.6	26 40.0	96 13	12.4	32 23.5	95 11	10.3	32 52.1	95 11	10.1	37 36.4	94 09	08.2	155
6	23 39.3	96 13	12.8	24 08.1	96 13	12.7	25 34.6	96 13	12.2	26 03.4	96 13	12.1	26 32.2	96 12	11.9	32 17.0	96 10	09.9	32 45.7	95 10	09.8	37 31.2	95 08	07.9	6
7	23 31.2	96 13	12.3	24 00.2	96 13	12.2	25 27.0	96 12	11.7	25 55.9	96 12	11.6	26 24.8	96 12	11.4	32 10.8	96 10	09.5	32 39.5	96 10	09.4	37 26.3	95 08	07.6	7
8	23 23.5	97 12	11.8	23 52.6	97 12	11.6	25 19.6	97 12	11.2	25 48.6	97 12	11.1	26 17.6	97 11	10.9	32 04.8	96 10	09.1	32 33.7	96 09	09.0	37 21.5	96 08	07.2	8
9	23 16.2	97 12	11.2	23 45.3	97 12	11.1	25 12.6	97 11	10.7	25 41.7	97 11	10.6	26 10.8	97 11	10.4	31 59.1	97 09	08.7	32 28.0	97 09	08.6	37 17.0	96 07	06.9	9
160	23 09.1	97 11	10.7	23 38.3	97 11	10.6	25 05.9	97 11	10.2	25 35.1	97 10	10.1	26 04.2	97 10	10.0	31 53.6	97 09	08.3	32 22.7	97 08	08.2	37 12.6	96 07	06.6	160
1	23 02.4	98 11	10.2	23 31.7	98 10	10.1	24 59.5	98 10	09.7	25 28.7	98 10	09.6	25 58.0	97 10	09.5	31 48.4	97 08	07.9	32 17.6	97 08	07.8	37 08.5	97 07	06.3	1
2	22 56.0	98 10	09.7	23 25.4	98 10	09.5	24 53.4	98 10	09.2	25 22.8	98 09	09.1	25 52.1	98 09	09.0	31 43.5	97 08	07.5	32 12.7	97 08	07.3	37 04.6	97 06	05.9	2
3	22 50.0	98 09	09.1	23 19.4	98 09	09.0	24 47.7	98 09	08.7	25 17.1	98 09	08.6	25 46.5	98 09	08.5	31 38.8	98 07	07.1	32 08.1	98 07	06.9	37 00.8	97 06	05.6	3
4	22 44.3	98 09	08.6	23 13.8	98 09	08.5	24 42.3	98 08	08.2	25 11.7	98 08	08.1	25 41.2	98 08	08.0	31 34.4	98 07	06.7	32 03.8	98 07	06.5	36 57.3	98 06	05.3	4
165	22 39.0	98 08	08.1	23 08.5	98 08	08.0	24 37.2	98 08	07.7	25 06.7	98 08	07.6	25 36.2	98 08	07.5	31 30.2	98 06	06.2	31 59.7	98 06	06.1	36 54.0	98 05	05.0	165
6	22 34.0	99 08	07.5	23 03.6	99 08	07.4	24 32.4	99 07	07.2	25 02.0	99 07	07.1	25 31.6	99 07	07.0	31 26.3	98 06	05.8	31 55.9	98 06	05.7	36 50.9	98 05	04.6	6
7	22 29.3	99 07	07.0	22 59.0	99 07	06.9	24 27.9	99 07	06.7	24 57.6	99 07	06.6	25 27.2	99 07	06.5	31 22.7	99 06	05.4	31 52.3	99 05	05.3	36 48.1	98 04	04.3	7
8	22 25.0	99 07	06.5	22 54.7	99 07	06.4	24 23.8	99 06	06.2	24 53.5	99 06	06.1	25 23.2	99 06	06.0	31 19.4	99 05	05.0	31 49.0	99 05	04.9	36 45.4	99 04	04.0	8
9	22 21.0	99 06	05.9	22 50.8	99 06	05.9	24 20.0	99 06	05.6	24 49.8	99 06	05.6	25 19.5	99 06	05.5	31 16.3	99 05	04.6	31 46.0	99 05	04.5	36 42.9	99 04	03.6	9
170	22 17.4	99 05	05.4	22 47.2	99 05	05.3	24 16.5	99 05	05.1	24 46.3	99 05	05.1	25 16.1	99 05	05.0	31 13.5	99 04	04.2	31 43.2	99 04	04.1	36 40.7	99 03	03.3	170
1	22 14.1	99 05	04.8	22 43.9	99 05	04.8	24 13.4	99 05	04.6	24 43.2	99 05	04.6	25 13.1	99 05	04.5	31 10.9	99 04	03.8	31 40.7	99 04	03.7	36 38.7	99 03	03.0	1
2	22 11.1	1.0 04	04.3	22 41.0	1.0 04	04.3	24 10.6	1.0 04	04.1	24 40.5	1.0 04	04.1	25 10.3	1.0 04	04.0	31 08.6	99 03	03.3	31 38.5	99 03	03.3	36 36.9	99 03	02.7	2
3	22 08.5	1.0 04	03.8	22 38.4	1.0 04	03.7	24 08.1	1.0 04	03.6	24 38.0	1.0 04	03.5	25 07.9	1.0 03	03.5	31 06.6	1.0 03	02.9	31 36.5	1.0 03	02.9	36 35.2	1.0 02	02.3	3
4	22 06.3	1.0 03	03.2	22 36.2	1.0 03	03.2	24 06.0	1.0 03	03.1	24 35.9	1.0 03	03.0	25 05.8	1.0 03	03.0	31 04.8	1.0 02	02.5	31 34.8	1.0 02	02.5	36 33.9	1.0 02	02.0	4
175	22 04.3	1.0 03	02.7	22 34.3	1.0 03	02.7	24 04.1	1.0 02	02.6	24 34.1	1.0 02	02.5	25 04.0	1.0 02	02.5	31 03.4	1.0 02	02.1	31 33.3	1.0 02	02.1	36 32.7	1.0 02	01.7	175
6	22 02.8	1.0 02	02.2	22 32.7	1.0 02	02.1	24 02.7	1.0 02	02.1	24 32.6	1.0 02	02.0	25 02.6	1.0 02	02.0	31 02.2	1.0 02	01.7	31 32.1	1.0 02	01.6	36 31.7	1.0 01	01.3	6
7	22 01.6	1.0 01	01.6	22 31.5	1.0 01	01.6	24 01.5	1.0 01	01.5	24 31.5	1.0 01	01.5	25 01.5	1.0 01	01.5	31 01.2	1.0 01	01.3	31 31.2	1.0 01	01.2	36 31.0	1.0 01	01.0	7
8	22 00.7	1.0 01	01.1	22 30.7	1.0 01	01.1	24 00.7	1.0 01	01.0	24 30.7	1.0 01	01.0	25 00.6	1.0 01	01.0	31 00.5	1.0 01	00.8	31 30.5	1.0 01	00.8	36 30.4	1.0 01	00.7	8
9	22 00.2	1.0 00	00.5	22 30.2	1.0 00	00.5	24 00.2	1.0 00	00.5	24 30.2	1.0 00	00.5	25 00.2	1.0 00	00.5	31 00.1	1.0 00	00.4	31 30.1	1.0 00	00.4	36 30.1	1.0 00	00.3	9
180	22 00.0	1.0 00	00.0	22 30.0	1.0 00	00.0	24 00.0	1.0 00	00.0	24 30.0	1.0 00	00.0	25 00.0	1.0 00	00.0	31 00.0	1.0 00	00.0	31 30.0	1.0 00	00.0	36 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 52°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	42	180	46	180	50	180	54	180	58	180	62	180	66	180	70	180	74	180	78	180	82	180	00
4	42	175	46	174	50	174	54	173	58	173	62	172	66	171	70	170	74	168	78	165	82	160	4
8	42	169	46	169	49	168	53	167	57	166	61	165	65	163	69	161	73	157	77	152	80	143	8
12	41	164	45	163	49	162	53	161	57	159	61	157	64	155	68	152	72	147	75	141	79	130	12
16	40	159	44	158	48	156	52	155	56	153	59	150	63	147	67	144	70	138	74	131	77	121	16
20	39	154	43	152	47	151	51	149	54	146	58	144	62	140	65	136	69	131	72	123	74	113	20
24	38	149	42	147	46	145	49	143	53	141	57	138	60	134	63	129	67	124	70	117	72	107	24
28	37	144	40	142	44	140	48	138	51	135	55	132	58	128	61	124	65	118	67	111	70	102	28
32	35	140	39	138	42	135	46	133	49	130	53	127	56	123	59	118	62	113	65	106	67	98	32
36	33	135	37	133	41	131	44	128	48	125	51	122	54	118	57	113	60	108	63	102	65	94	36
40	32	131	35	129	39	126	42	124	45	121	49	117	52	113	55	109	58	104	60	98	62	91	40
44	30	127	33	125	37	122	40	119	43	116	46	113	50	109	52	105	55	100	58	94	60	88	44
48	28	123	31	121	35	118	38	115	41	112	44	109	47	105	50	101	53	96	55	91	58	85	48
52	26	119	29	117	32	114	36	111	39	108	42	105	45	101	48	97	50	93	53	88	55	82	52
56	23	116	27	113	30	110	33	108	36	105	39	101	42	98	45	94	48	90	50	85	53	79	56
60	21	112	24	110	28	107	31	104	34	101	37	98	40	94	43	91	45	86	48	82	50	77	60
64	19	109	22	106	25	103	28	101	32	98	35	95	37	91	40	87	43	84	46	79	48	75	64
68	17	105	20	103	23	100	26	97	29	94	32	91	35	88	38	84	41	81	43	77	46	72	68
72	14	102	17	99	20	97	24	94	27	91	30	88	33	85	35	82	38	78	41	74	43	70	72
76	12	99	15	96	18	94	21	91	24	88	27	85	30	82	33	79	36	75	38	71	41	67	76
80	09	95	12	93	16	90	19	88	22	85	25	82	28	79	31	76	33	73	36	69	39	65	80
84	07	92	10	90	13	87	16	85	19	82	22	79	25	76	28	73	31	70	34	66	36	63	84
88	04	89	08	87	11	84	14	82	17	79	20	76	23	73	26	70	29	67	32	64	34	60	88
92	02	86	05	83	08	81	11	78	14	76	18	73	21	70	24	68	26	65	29	61	32	58	92
96	*01*	83	03	80	06	78	09	75	12	73	15	70	18	68	21	65	24	62	27	59	30	56	96
100	*03*	80	00	77	03	75	07	72	10	70	13	67	16	65	19	62	22	59	25	56	28	53	100
104	*05*	76	*02*	74	01	72	04	69	07	67	11	64	14	62	17	59	20	57	23	54	26	51	104
108	*08*	73	*05*	71	*01*	69	02	66	05	64	08	61	12	59	15	57	18	54	21	51	24	49	108
112	*10*	70	*07*	68	*04*	65	*00*	63	03	61	06	58	10	56	13	54	16	51	19	49	22	46	112
116	*12*	67	*09*	64	*06*	62	*02*	60	01	58	04	55	08	53	11	51	14	49	17	46	21	44	116
120	*15*	63	*11*	61	*08*	59	*05*	57	*01*	54	02	52	06	50	09	48	12	46	16	44	19	41	120
124	*17*	60	*13*	58	*10*	55	*07*	53	*03*	51	00	49	04	47	07	45	11	43	14	41	17	39	124
128	*19*	56	*15*	54	*12*	52	*08*	50	*05*	48	*01*	46	02	44	06	42	09	40	12	38	16	36	128
132	*21*	52	*17*	50	*14*	48	*10*	47	*07*	45	*03*	43	00	41	04	39	07	37	11	35	15	34	132
136	*23*	49	*19*	47	*16*	45	*12*	43	*08*	41	*05*	40	*01*	38	02	36	06	34	10	33	13	31	136
140	*25*	45	*21*	43	*17*	41	*14*	39	*10*	38	*06*	36	*03*	35	01	33	05	31	08	30	12	28	140
144	*26*	41	*23*	39	*19*	37	*15*	36	*11*	34	*08*	33	*04*	31	*00*	30	03	28	07	27	11	26	144
148	*28*	37	*24*	35	*20*	34	*17*	32	*13*	31	*09*	29	*05*	28	*01*	27	02	25	06	24	10	23	148
152	*29*	32	*25*	31	*22*	30	*18*	28	*14*	27	*10*	26	*06*	25	*02*	23	01	22	05	21	09	20	152
156	*30*	28	*27*	27	*23*	26	*19*	24	*15*	23	*11*	22	*07*	21	*03*	20	00	19	04	18	08	17	156
160	*31*	24	*28*	22	*24*	21	*20*	20	*16*	20	*12*	19	*08*	18	*04*	17	*00*	16	04	15	08	14	160
164	*32*	19	*28*	18	*25*	17	*21*	16	*17*	16	*13*	14	*09*	14	*05*	14	*01*	13	03	12	07	12	164
168	*33*	14	*29*	14	*25*	13	*21*	12	*17*	12	*13*	11	*09*	11	*05*	10	*01*	10	03	09	07	09	168
172	*34*	10	*30*	09	*26*	09	*22*	08	*18*	08	*14*	08	*10*	07	*06*	07	*02*	06	02	06	06	06	172
176	*34*	05	*30*	05	*26*	04	*22*	04	*18*	04	*14*	04	*10*	04	*06*	03	*02*	03	02	03	06	03	176
180	*34*	00	*30*	00	*26*	00	*22*	00	*18*	00	*14*	00	*10*	00	*06*	00	*02*	00	02	00	06	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	86	180	90	....	86	00	82	00	78	00	74	00	70	00	66	00	62	00	58	00	54	00	00
4	85	146	88	88	85	29	82	14	78	08	74	05	70	04	66	02	62	01	58	01	54	00	4
8	83	125	85	87	84	46	81	26	77	16	74	11	70	07	66	05	62	03	58	02	54	00	8
12	81	113	83	85	82	56	80	35	76	23	73	15	69	10	66	07	62	04	58	02	54	01	12
16	79	105	80	84	80	61	78	42	75	29	72	20	69	14	65	09	61	06	58	03	54	01	16
20	77	99	78	82	78	63	76	46	74	33	71	24	68	17	65	11	61	07	58	04	54	01	20
24	74	95	75	80	75	65	75	50	73	37	70	27	67	19	64	13	61	08	57	05	54	01	24
28	72	91	73	79	73	65	73	52	71	40	69	30	67	21	64	15	61	10	57	05	54	02	28
32	69	88	70	77	71	65	71	53	70	42	68	32	66	23	63	16	60	11	57	06	54	02	32
36	67	86	68	76	69	65	69	54	68	43	67	34	65	25	62	18	60	12	57	06	54	02	36
40	64	83	66	74	66	64	67	54	66	44	65	35	64	26	61	19	59	13	56	07	54	02	40
44	62	80	63	72	64	64	65	54	64	45	64	36	62	28	61	20	59	13	56	07	53	02	44
48	59	78	61	71	62	63	63	54	63	45	62	37	61	29	60	21	58	14	56	08	53	02	48
52	57	76	59	69	60	62	61	54	61	45	61	37	60	29	59	22	57	15	55	08	53	03	52
56	55	74	56	67	58	60	59	53	59	45	59	37	59	30	58	22	57	15	55	09	53	03	56
60	52	72	54	66	56	59	57	52	57	45	58	37	58	30	57	23	56	16	55	09	53	03	60
64	50	69	52	64	54	58	55	51	56	44	56	37	56	30	56	23	55	16	54	09	53	03	64
68	48	67	50	62	51	56	53	50	54	44	55	37	55	30	55	23	55	16	54	09	53	03	68
72	45	65	48	60	49	55	51	49	52	43	53	37	54	30	54	23	54	16	53	10	53	03	72
76	43	63	45	58	47	53	49	48	51	42	52	36	53	30	53	23	53	16	53	10	52	03	76
80	41	61	43	57	45	52	47	47	49	41	50	35	51	29	52	23	53	16	53	10	52	03	80
84	39	59	41	55	44	50	46	45	47	40	49	35	50	29	51	23	52	16	52	10	52	03	84
88	37	57	39	53	42	48	44	44	46	39	48	34	49	28	50	22	51	16	52	10	52	03	88
92	35	55	37	51	40	47	42	42	44	38	46	33	48	27	49	22	51	16	51	10	52	03	92
96	33	52	36	49	38	45	41	41	43	36	45	32	47	27	49	21	50	16	51	10	52	03	96
100	31	50	34	47	36	43	39	39	41	35	44	31	46	26	48	21	49	15	51	09	52	03	100
104	29	48	32	45	35	41	37	38	40	34	42	30	45	25	47	20	49	15	50	09	51	03	104
108	27	46	30	43	33	39	36	36	39	32	41	28	44	24	46	19	48	14	50	09	51	03	108
112	26	43	29	41	32	38	35	34	37	31	40	27	43	23	45	19	47	14	49	09	51	03	112
116	24	41	27	38	30	36	33	32	36	29	39	26	42	22	44	18	47	13	49	08	51	03	116
120	22	39	26	36	29	34	32	31	35	28	38	24	41	21	44	17	46	13	49	08	51	03	120
124	21	36	24	34	27	31	31	29	34	26	37	23	40	20	43	16	46	12	48	07	51	03	124
128	19	34	23	32	26	29	30	27	33	24	36	21	39	18	42	15	45	11	48	07	51	02	128
132	18	32	22	29	25	27	28	25	32	23	35	20	38	17	42	14	45	10	48	07	51	02	132
136	17	29	20	27	24	25	27	23	31	21	34	18	38	16	41	13	44	10	48	06	51	02	136
140	16	27	19	25	23	23	27	21	30	19	34	17	37	14	41	12	44	09	47	06	50	02	140
144	15	24	18	22	22	21	26	19	29	17	33	15	37	13	40	11	44	08	47	05	50	02	144
148	14	21	17	20	21	19	25	17	29	15	32	14	36	12	40	10	43	07	47	05	50	02	148
152	13	19	17	18	20	16	24	15	28	13	32	12	36	10	39	08	43	06	47	04	50	01	152
156	12	16	16	15	20	14	24	13	27	12	31	10	35	09	39	07	43	06	46	04	50	01	156
160	11	14	15	13	19	12	23	11	27	10	31	09	35	07	39	06	42	05	46	03	50	01	160
164	11	11	15	10	19	09	23	09	27	08	31	07	35	06	38	05	42	04	46	02	50	01	164
168	11	08	14	08	18	07	22	06	26	06	30	05	34	04	38	04	42	03	46	02	50	01	168
172	10	05	14	05	18	05	22	04	26	04	30	03	34	03	38	02	42	02	46	01	50	00	172
176	10	03	14	03	18	02	22	02	26	02	30	02	34	01	38	01	42	01	46	01	50	00	176
180	10	00	14	00	18	00	22	00	26	00	30	00	34	00	38	00	42	00	46	00	50	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

Lat. 53°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′ °	Δt	°	′ °	Δt	°	′ °	Δt	°	′ °	Δt	°	′ °	Δt	°	′ °	Δt	°	′ °	Δt	°	′ °	Δt	°	°
00	37 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	38 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	39 00.0	1.0 01	180.0	39 30.0	1.0 01	180.0	40 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	00
1	36 59.6	1.0 02	178.7	37 29.6	1.0 02	178.7	37 59.6	1.0 02	178.7	38 29.6	1.0 02	178.7	38 59.6	1.0 02	178.7	39 29.6	1.0 02	178.7	39 59.6	1.0 02	178.7	40 29.6	1.0 02	178.7	1
2	36 58.4	1.0 03	177.5	37 28.4	1.0 03	177.5	37 58.4	1.0 03	177.5	38 28.4	1.0 03	177.4	38 58.4	1.0 03	177.4	39 28.4	1.0 03	177.4	39 58.4	1.0 03	177.4	40 28.3	1.0 03	177.4	2
3	36 56.5	1.0 05	176.2	37 26.4	1.0 05	176.2	37 56.4	1.0 05	176.2	38 26.4	1.0 05	176.2	38 56.4	1.0 05	176.1	39 26.3	1.0 05	176.1	39 56.3	1.0 05	176.1	40 26.3	1.0 05	176.1	3
4	36 53.7	1.0 06	175.0	37 23.7	1.0 06	175.0	37 53.6	1.0 06	174.9	38 23.6	1.0 06	174.9	38 53.5	1.0 06	174.9	39 23.5	1.0 06	174.8	39 53.4	1.0 06	174.8	40 23.4	1.0 06	174.8	4
05	36 50.2	1.0 07	173.7	37 20.1	1.0 07	173.7	37 50.0	1.0 07	173.7	38 20.0	1.0 07	173.6	38 49.9	1.0 07	173.6	39 19.8	1.0 07	173.5	39 49.7	1.0 08	173.5	40 19.7	1.0 08	173.4	05
6	36 45.8	1.0 08	172.5	37 15.7	1.0 09	172.5	37 45.6	1.0 09	172.4	38 15.5	1.0 09	172.4	38 45.4	1.0 09	172.3	39 15.4	1.0 09	172.2	39 45.3	1.0 09	172.2	40 15.2	1.0 09	172.1	6
7	36 40.7	1.0 10	171.3	37 10.6	1.0 10	171.2	37 40.5	1.0 10	171.1	38 10.3	1.0 10	171.1	38 40.2	1.0 10	171.0	39 10.1	1.0 10	171.0	39 39.9	1.0 10	170.9	40 09.8	1.0 10	170.8	7
8	36 34.9	99 11	170.0	37 04.7	99 11	170.0	37 34.5	99 11	169.9	38 04.4	99 11	169.8	38 34.2	99 11	169.8	39 04.0	99 11	169.7	39 33.8	99 12	169.6	40 03.7	99 12	169.5	8
9	36 28.2	99 12	168.8	36 58.0	99 12	168.7	37 27.8	99 12	168.6	37 57.6	99 13	168.6	38 27.4	99 13	168.5	38 57.2	99 13	168.4	39 26.9	99 13	168.3	39 56.7	99 13	168.2	9
10	36 20.8	99 14	167.5	36 50.6	99 14	167.5	37 20.3	99 14	167.4	37 50.0	99 14	167.3	38 19.8	99 14	167.2	38 49.5	99 14	167.1	39 19.2	99 14	167.0	39 49.0	99 14	167.0	10
1	36 12.6	99 15	166.3	36 42.3	99 15	166.2	37 12.0	99 15	166.1	37 41.7	99 15	166.1	38 11.4	99 15	166.0	38 41.1	99 15	165.9	39 10.7	99 15	165.8	39 40.4	99 16	165.7	1
2	36 03.7	99 16	165.1	36 33.4	99 16	165.0	37 03.0	99 16	164.9	37 32.6	99 16	164.8	38 02.3	99 16	164.7	38 31.9	99 17	164.6	39 01.5	99 17	164.5	39 31.1	99 17	164.4	2
3	35 54.1	99 17	163.9	36 23.7	99 17	163.8	36 53.2	99 18	163.7	37 22.8	99 18	163.6	37 52.3	99 18	163.5	38 21.9	98 18	163.3	38 51.4	98 18	163.2	39 21.0	98 18	163.1	3
4	35 43.7	98 19	162.7	36 13.2	98 19	162.6	36 42.7	98 19	162.4	37 12.2	98 19	162.3	37 41.7	98 19	162.2	38 11.2	98 19	162.1	38 40.6	98 19	162.0	39 10.1	98 19	161.9	4
15	35 32.6	98 20	161.5	36 02.0	98 20	161.3	36 31.4	98 20	161.2	37 00.9	98 20	161.1	37 30.3	98 20	161.0	37 59.7	98 20	160.8	38 29.1	98 20	160.7	38 58.5	98 21	160.6	15
6	35 20.7	98 21	160.2	35 50.1	98 21	160.1	36 19.4	98 21	160.0	36 48.8	98 21	159.9	37 18.1	98 21	159.7	37 47.5	98 22	159.6	38 16.8	98 22	159.5	38 46.1	98 22	159.3	6
7	35 08.2	98 22	159.1	35 37.5	98 22	158.9	36 06.7	98 22	158.8	36 36.0	98 22	158.7	37 05.3	98 23	158.5	37 34.5	98 23	158.4	38 03.8	97 23	158.2	38 33.0	97 23	158.1	7
8	34 54.9	97 23	157.9	35 24.1	97 23	157.7	35 53.3	97 24	157.6	36 22.5	97 24	157.4	36 51.7	97 24	157.3	37 20.9	97 24	157.1	37 50.0	97 24	157.0	38 19.2	97 24	156.9	8
9	34 40.9	97 24	156.7	35 10.1	97 25	156.5	35 39.2	97 25	156.4	36 08.3	97 25	156.2	36 37.4	97 25	156.1	37 06.5	97 25	155.9	37 35.6	97 25	155.8	38 04.6	97 25	155.6	9
20	34 26.3	97 26	155.5	34 55.4	97 26	155.3	35 24.4	97 26	155.2	35 53.4	97 26	155.0	36 22.4	97 26	154.9	36 51.4	97 26	154.7	37 20.4	97 26	154.6	37 49.4	97 27	154.4	20
1	34 11.0	97 27	154.3	34 40.0	97 27	154.2	35 08.9	96 27	154.0	35 37.8	96 27	153.8	36 06.7	96 27	153.7	36 35.7	96 27	153.5	37 04.5	96 28	153.3	37 33.4	96 28	153.2	1
2	33 55.0	96 28	153.2	34 23.9	96 28	153.0	34 52.7	96 28	152.8	35 21.6	96 28	152.7	35 50.4	96 28	152.5	36 19.2	96 28	152.3	36 48.0	96 29	152.1	37 16.8	96 29	152.0	2
3	33 38.4	96 29	152.0	34 07.2	96 29	151.8	34 35.9	96 29	151.7	35 04.7	96 29	151.5	35 33.4	96 29	151.3	36 02.1	96 30	151.1	36 30.8	96 30	151.0	36 59.5	96 30	150.8	3
4	33 21.1	96 30	150.9	33 49.8	96 30	150.7	34 18.5	96 30	150.5	34 47.1	95 30	150.3	35 15.7	95 30	150.1	35 44.4	95 31	150.0	36 13.0	95 31	149.8	36 41.5	95 31	149.6	4
25	33 03.2	95 31	149.7	33 31.8	95 31	149.5	34 00.4	95 31	149.4	34 28.9	95 31	149.2	34 57.5	95 32	149.0	35 26.0	95 32	148.8	35 54.5	95 32	148.6	36 22.9	95 32	148.4	25
6	32 44.7	95 32	148.6	33 13.2	95 32	148.4	33 41.7	95 32	148.2	34 10.1	95 32	148.0	34 38.5	95 33	147.8	35 06.9	95 33	147.6	35 35.3	95 33	147.4	36 03.7	95 33	147.2	6
7	32 25.6	95 33	147.5	32 54.0	95 33	147.3	33 22.3	94 33	147.1	33 50.7	94 33	146.9	34 19.0	94 34	146.7	34 47.3	94 34	146.5	35 15.6	94 34	146.3	35 43.8	94 34	146.1	7
8	32 05.9	94 34	146.3	32 34.2	94 34	146.1	33 02.4	94 34	145.9	33 30.7	94 34	145.7	33 58.9	94 35	145.5	34 27.1	94 35	145.3	34 55.2	94 35	145.1	35 23.4	94 35	144.9	8
9	31 45.6	94 35	145.2	32 13.8	94 35	145.0	32 41.9	94 35	144.8	33 10.0	94 35	144.6	33 38.1	94 36	144.4	34 06.2	94 36	144.2	34 34.3	94 36	144.0	35 02.3	93 36	143.8	9
30	31 24.7	94 36	144.1	31 52.8	94 36	143.9	32 20.8	93 36	143.7	32 48.8	93 36	143.5	33 16.8	93 36	143.3	33 44.8	93 37	143.1	34 12.8	93 37	142.9	34 40.7	93 37	142.6	30
1	31 03.3	93 37	143.0	31 31.2	93 37	142.8	31 59.2	93 37	142.6	32 27.1	93 37	142.4	32 55.0	93 37	142.2	33 22.8	93 38	142.0	33 50.7	93 38	141.7	34 18.5	93 38	141.5	1
2	30 41.3	93 38	142.0	31 09.2	93 38	141.7	31 37.0	93 38	141.5	32 04.8	93 38	141.3	32 32.6	93 38	141.1	33 00.3	92 38	140.9	33 28.1	92 39	140.6	33 55.8	92 39	140.4	2
3	30 18.8	93 38	140.9	30 46.5	92 39	140.7	31 14.2	92 39	140.4	31 41.9	92 39	140.2	32 09.6	92 39	140.0	32 37.3	92 39	139.8	33 04.9	92 40	139.5	33 32.5	92 40	139.3	3
4	29 55.7	92 39	139.8	30 23.4	92 39	139.6	30 51.0	92 40	139.4	31 18.6	92 40	139.1	31 46.1	92 40	138.9	32 13.7	92 40	138.7	32 41.2	92 40	138.4	33 08.7	92 41	138.2	4
35	29 32.2	92 40	138.8	29 59.7	92 40	138.5	30 27.2	92 40	138.3	30 54.7	92 41	138.1	31 22.1	91 41	137.8	31 49.6	91 41	137.6	32 17.0	91 41	137.4	32 44.3	91 41	137.1	35
6	29 08.1	91 41	137.7	29 35.6	91 41	137.5	30 02.9	91 41	137.2	30 30.3	91 41	137.0	30 57.7	91 42	136.8	31 25.0	91 42	136.5	31 52.3	91 42	136.3	32 19.5	91 42	136.0	6
7	28 43.6	91 42	136.7	29 10.9	91 42	136.4	29 38.2	91 42	136.2	30 05.4	91 42	135.9	30 32.7	91 42	135.7	30 59.9	91 43	135.5	31 27.1	91 43	135.2	31 54.2	90 43	135.0	7
8	28 18.6	91 42	135.6	28 45.8	91 43	135.4	29 13.0	91 43	135.1	29 40.1	90 43	134.9	30 07.2	90 43	134.7	30 34.3	90 43	134.4	31 01.4	90 44	134.2	31 28.4	90 44	133.9	8
9	27 53.1	90 43	134.6	28 20.2	90 43	134.4	28 47.3	90 44	134.1	29 14.3	90 44	133.9	29 41.3	90 44	133.6	30 08.3	90 44	133.4	30 35.3	90 44	133.1	31 02.2	90 44	132.9	9
40	27 27.2	90 44	133.6	27 54.2	90 44	133.3	28 21.1	90 44	133.1	28 48.0	90 44	132.8	29 14.9	90 45	132.6	29 41.8	90 45	132.3	30 08.7	89 45	132.1	30 35.5	89 45	131.8	40
1	27 00.8	90 45	132.6	27 27.7	90 45	132.3	27 54.5	89 45	132.1	28 21.4	89 45	131.8	28 48.1	89 45	131.6	29 14.9	89 46	131.3	29 41.7	89 46	131.0	30 08.4	89 46	130.8	1
2	26 34.0	89 45	131.6	27 00.8	89 46	131.3	27 27.5	89 46	131.1	27 54.2	89 46	130.8	28 20.9	89 46	130.5	28 47.6	89 46	130.3	29 14.2	89 46	130.0	29 40.8	89 47	129.8	2
3	26 06.8	89 46	130.6	26 33.4	89 46	130.3	27 00.1	89 46	130.1	27 26.7	89 47	129.8	27 53.3	89 47	129.5	28 19.8	88 47	129.3	28 46.4	88 47	129.0	29 12.8	88 47	128.7	3
4	25 39.1	89 47	129.6	26 05.7	89 47	129.3	26 32.2	88 47	129.1	26 58.8	88 47	128.8	27 25.2	88 47	128.5	27 51.7	88 48	128.3	28 18.1	88 48	128.0	28 44.5	88 48	127.7	4
45	25 11.1	88 47	128.6	25 37.6	88 48	128.4	26 04.0	88 48	128.1	26 30.4	88 48	127.8	26 56.8	88 48	127.6	27 23.1	88 48	127.3	27 49.5	88 48	127.0	28 15.7	88 49	126.7	45
6	24 42.7	88 48	127.6	25 09.1	88 48	127.4	25 35.4	88 48	127.1	26 01.7	88 48	126.8	26 28.0	88 49	126.6	26 54.2	87 49	126.3	27 20.4	87 49	126.0	27 46.6	87 49	125.8	6
7	24 13.9	88 49	126.7	24 40.2	87 49	126.4	25 06.4	87 49	126.1	25 32.6	87 49	125.9	25 58.8	87 49	125.6	26 24.9	87 49	125.3	26 51.1	87 50	125.1	27 17.1	87 50	124.8	7
8	23 44.8	87 49	125.7	24 11.0	87 49	125.5	24 37.1	87 50	125.2	25 03.2	87 50	124.9	25 29.3	87 50	124.6	25 55.3	87 50	124.4	26 21.3	87 50	124.1	26 47.3	87 50	123.8	8
9	23 15.3	87 50	124.8	23 41.4	87 50	124.5	24 07.4	87 50	124.2	24 33.4	87 50	124.0	24 59.4	87 50	123.7	25 25.3	86 50	123.4	25 51.3	86 51	123.1	26 17.1	86 51	122.8	9
50	22 45.5	87 50	123.8	23 11.4	87 50	123.6	23 37.4	86 51	123.3	24 03.3	86 51	123.0	24 29.2	86 51	122.7	24 55.0	86 51	122.4	25 20.8	86 51	122.2	25 46.6	86 51	121.9	50
1	22 15.3	86 51	122.9	22 41.2	86 51	122.6	23 07.0	86 51	122.3	23 32.9	86 51	122.1	23 58.6	86 51	121.8	24 24.4	86 52	121.5	24 50.1	86 52	121.2	25 15.8	86 52	120.9	1
2	21 44.8	86 51	122.0	22 10.6	86 51	121.7	22 36.4	86 52	121.4	23 02.1	86 52	121.1	23 27.8	86 52	120.8	23 53.5	85 52	120.6	24 19.1	85 52	120.3	24 44.7	85 52	120.0	2
3	21 14.1	86 52	121.0	21 39.7	86 52	120.8	22 05.4	85 52	120.5	22 31.0	85 52	120.2	22 56.6	85 52	119.9	23 22.2	85 53	119.6	23 47.8	85 53	119.4	24 13.3	85 53	119.1	3
4	20 43.0	85 52	120.1	21 08.6	85 52	119.8	21 34.1	85 53	119.6	21 59.7	85 53	119.3	22 25.2	85 53	119.0	22 50.7	85 53	118.7	23 16.1	85 53	118.4	23 41.6	85 53	118.1	4
55	20 11.6	85 53	119.2	20 37.1	85 53	118.9	21 02.6	85 53	118.7	21 28.1	85 53	118.4	21 53.5	85 53	118.1	22 18.9	85 53	117.8	22 44.3	85 54	117.5	23 09.6	84 54	117.2	55
6	19 39.9	85 53	118.3	20 05.4	85 53	118.0	20 30.8	85 53	117.7	20 56.1	85 54	117.5	21 21.5	84 54	117.2	21 46.8	84 54	116.9	22 12.1	84 54	116.6	22 37.4	84 54	116.3	6
7	19 08.0	85 54	117.4	19 33.4	84 54	117.1	19 58.7	84 54	116.8	20 24.0	84 54	116.6	20 49.2	84 54	116.3	21 14.5	84 54	116.0	21 39.7	84 54	115.7	22 04.9	84 55	115.4	7
8	18 35.8	84 54	116.5	19 01.1	84 54	116.2	19 26.3	84 54	116.0	19 51.6	84 54	115.7	20 16.7	84 55	115.4	20 41.9	84 55	115.1	21 07.0	84 55	114.8	21 32.1	84 55	114.5	8
9	18 03.4	84 54	115.6	18 28.6	84 55	115.3	18 53.8	84 55	115.1	19 18.9	84 55	114.8	19 44.0	84 55	114.5	20 09.1	84 55	114.2	20 34.1	83 55	113.9	20 59.1	83 55	113.6	9
60	17 30.7	84 55	114.8	17 55.8	84 55	114.5	18 20.9	84 55	114.2	18 46.0	83 55	113.9	19 11.0	83 55	113.6	19 36.0	83 55	113.3	20 01.0	83 56	113.0	20 25.9	83 56	112.7	60
1	16 57.8	83 55	113.9	17 22.9	83 55	113.6	17 47.9	83 55	113.3	18 12.9	83 56	113.0	18 37.8	83 56	112.7	19 02.7	83 56	112.4	19 27.7	83 56	112.1	19 52.5	83 56	111.8	1
2	16 24.7	83 56	113.0	16 49.7	83 56	112.7	17 14.6	83 56	112.4	17 39.5	83 56	112.1	18 04.4	83 56	111.8	18 29.3	83 56	111.5	18 54.1	83 56	111.3	19 18.9	83 56	111.0	2
3	15 51.4	83 56	112.1	16 16.2	83 56	111.9	16 41.1	83 56	111.6	17 06.0	83 56	111.3	17 30.8	83 56	111.0	17 55.6	83 56	110.7	18 20.3	83 57	110.4	18 45.1	82 57	110.1	3
4	15 17.8	83 56	111.3	15 42.6	83 56	111.0	16 07.4	83 56	110.7	16 32.2	83 57	110.4	16 57.0	82 57	110.1	17 21.7	82 57	109.8	17 46.4	82 57	109.5	18 11.1	82 57	109.2	4
65	14 44.1	83 57	110.4	15 08.8	83 57	110.1	15 33.6	82 57	109.8	15 58.3	82 57	109.5	16 23.0	82 57	109.2	16 47.6	82 57	109.0	17 12.3	82 57	108.7	17 36.9	82 57	108.4	65
6	14 10.1	82 57	109.6	14 34.8	82 57	109.3	14 59.5	82 57	109.0	15 24.2	82 57	108.7	15 48.8	82 57	108.4	16 13.4	82 57	108.1	16 38.0	82 57	107.8	17 02.5	82 58	107.5	6
7	13 36.0	82 57	108.7	14 00.7	82 57	108.4	14 25.3	82 57	108.1	14 49.9	82 57	107.8	15 14.4	82 58	107.5	15 39.0	82 58	107.2	16 03.5	82 58	106.9	16 28.0	82 58	106.6	7
8	13 01.7	82 57	107.9	13 26.3	82 58	107.6	13 50.9	82 58	107.3	14 15.4	82 58	107.0	14 39.9	82 58	106.7	15 04.4	82 58	106.4	15 28.9	82 58	106.1	15 53.4	81 58	105.8	8
9	12 27.3	82 58	107.0	12 51.8	82 58	106.7	13 16.3	82 58	106.5	13 40.8	82 58	106.2	14 05.3	82 58	105.9	14 29.7	81 58	105.6	14 54.1	81 58	105.3	15 18.5	81 58	105.0	9
70	11 52.7	82 58	106.2	12 17.2	82 58	105.9	12 41.6	81 58	105.6	13 06.1	81 58	105.3	13 30.5	81 58	105.0	13 54.9	81 58	104.7	14 19.2	81 58	104.4	14 43.6	81 58	104.1	70
1	11 17.9	81 58	105.4	11 42.4	81 58	105.1	12 06.8	81 58	104.8	12 31.2	81 58	104.5	12 55.5	81 58	104.2	13 19.9	81 59	103.9	13 44.2	81 59	103.6	14 08.5	81 59	103.3	1
2	10 43.1	81 58	104.5	11 07.4	81 58	104.3	11 31.8	81 58	104.0	11 56.1	81 59	103.7	12 20.5	81 59	103.4	12 44.8	81 59	103.1	13 09.0	81 59	102.8	13 33.3	81 59	102.5	2
3	10 08.0	81 59	103.7	10 32.4	81 59	103.4	10 56.7	81 59	103.1	11 21.0	81 59	102.8	11 45.3	81 59	102.5	12 09.5	81 59	102.2	12 33.8	81 59	101.9	12 58.0	81 59	101.6	3
4	9 32.9	81 59	102.9	9 57.2	81 59	102.6	10 21.5	81 59	102.3	10 45.7	81 59	102.0	11 10.0	81 59	101.7	11 34.2	81 59	101.4	11 58.4	81 59	101.1	12 22.6	81 59	100.8	4
75	8 57.7	81 59	102.1	9 21.9	81 59	101.8	9 46.1	81 59	101.5	10 10.4	81 59	101.2	10 34.6	81 59	100.9	10 58.7	81 59	100.6	11 22.9	81 59	100.3	11 47.1	80 59	100.0	75
6	8 22.3	81 59	101.3	8 46.5	81 59	101.0	9 10.7	81 59	100.7	9 34.9	81 59	100.4	9 59.0	81 59	100.1	10 23.2	80 59	99.8	10 47.3	80 59	99.5	11 11.4	80 60	99.2	6
7	7 46.8	81 59	100.4	8 11.0	81 59	100.1	8 35.2	81 59	99.8	8 59.3	80 59	99.5	9 23.5	80 59	99.2	9 47.6	80 60	98.9	10 11.7	80 60	98.6	10 35.8	80 60	98.3	7
8	7 11.3	80 59	99.6	7 35.4	80 59	99.3	7 59.6	80 60	99.0	8 23.7	80 60	98.7	8 47.8	80 60	98.4	9 11.9	80 60	98.1	9 35.9	80 60	97.8	10 00.0	80 60	97.5	8
9	6 35.6	80 60	98.8	6 59.7	80 60	98.5	7 23.9	80 60	98.2	7 47.9	80 60	97.9	8 12.0	80 60	97.6	8 36.1	80 60	97.3	9 00.1	80 60	97.0	9 24.2	80 60	96.7	9
80	5 59.9	80 60	98.0	6 24.0	80 60	97.7	6 48.1	80 60	97.4	7 12.1	80 60	97.1	7 36.2	80 60	96.8	8 00.2	80 60	96.5	8 24.3	80 60	96.2	8 48.3	80 60	95.9	80
1	5 24.1	80 60	97.2	5 48.2	80 60	96.9	6 12.2	80 60	96.6	6 36.3	80 60	96.3	7 00.3	80 60	96.0	7 24.3	80 60	95.7	7 48.3	80 60	95.4	8 12.3	80 60	95.1	1
2				5 12.3	80 60	96.1	5 36.3	80 60	95.8	6 00.4	80 60	95.5	6 24.4	80 60	95.2	6 48.4	80 60	94.9	7 12.4	80 60	94.6	7 36.3	80 60	94.3	2
3							5 00.4	80 60	95.0	5 24.4	80 60	94.7	5 48.4	80 60	94.4	6 12.4	80 60	94.1	6 36.4	80 60	93.8	7 00.3	80 60	93.5	3
4													5 12.4	80 60	93.6	5 36.3	80 60	93.3	6 00.3	80 60	93.0	6 24.3	80 60	92.7	4
85																5 00.3	80 60	92.5	5 24.2	80 60	92.2	5 48.2	80 60	91.9	85
6																						5 12.1	80 60	91.1	6

Digitized by Google

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	37 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	36 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	35 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	34 00.0	1.0 01	180.0	33 30.0	1.0 01	180.0	00
1	36 59.6	1.0 02	178.7	36 29.6	1.0 02	178.8	35 59.6	1.0 02	178.8	35 29.6	1.0 02	178.8	34 59.6	1.0 02	178.8	34 29.6	1.0 02	178.8	33 59.6	1.0 02	178.8	33 29.6	1.0 02	178.8	1
2	36 58.4	1.0 03	177.5	36 28.4	1.0 03	177.5	35 58.4	1.0 03	177.5	35 28.5	1.0 03	177.5	34 58.5	1.0 03	177.6	34 28.5	1.0 03	177.6	33 58.5	1.0 03	177.6	33 28.5	1.0 03	177.6	2
3	36 56.5	1.0 05	176.2	36 26.5	1.0 05	176.3	35 56.5	1.0 05	176.3	35 26.5	1.0 04	176.3	34 56.5	1.0 04	176.3	34 26.6	1.0 04	176.4	33 56.6	1.0 04	176.4	33 26.6	1.0 04	176.4	3
4	36 53.7	1.0 06	175.0	36 23.7	1.0 06	175.0	35 53.8	1.0 06	175.1	35 23.8	1.0 06	175.1	34 53.9	1.0 06	175.1	34 23.9	1.0 06	175.2	33 53.9	1.0 06	175.2	33 24.0	1.0 06	175.2	4
05	36 50.2	1.0 07	173.7	36 20.2	1.0 07	173.8	35 50.3	1.0 07	173.8	35 20.3	1.0 07	173.9	34 50.4	1.0 07	173.9	34 20.5	1.0 07	173.9	33 50.5	1.0 07	174.0	33 20.6	1.0 07	174.0	05
6	36 45.8	1.0 08	172.5	36 15.9	1.0 08	172.6	35 46.0	1.0 08	172.6	35 16.1	1.0 08	172.6	34 46.2	1.0 08	172.7	34 16.3	1.0 08	172.7	33 46.4	1.0 08	172.8	33 16.5	1.0 08	172.8	6
7	36 40.7	1.0 10	171.3	36 10.9	1.0 10	171.3	35 41.0	1.0 10	171.4	35 11.1	1.0 10	171.4	34 41.2	1.0 10	171.5	34 11.3	1.0 09	171.5	33 41.5	1.0 09	171.6	33 11.6	1.0 09	171.6	7
8	36 34.9	99 11	170.0	36 05.0	99 11	170.1	35 35.2	99 11	170.1	35 05.3	99 11	170.2	34 35.5	99 11	170.3	34 05.7	99 11	170.3	33 35.8	99 11	170.4	33 06.0	99 11	170.5	8
9	36 28.2	99 12	168.8	35 58.4	99 12	168.9	35 28.6	99 12	168.9	34 58.8	99 12	169.0	34 29.0	99 12	169.1	33 59.2	99 12	169.1	33 29.4	99 12	169.2	32 59.6	99 12	169.3	9
10	36 20.8	99 14	167.5	35 51.1	99 14	167.6	35 21.3	99 13	167.7	34 51.6	99 13	167.8	34 21.8	99 13	167.9	33 52.0	99 13	167.9	33 22.3	99 13	168.0	32 52.5	99 13	168.1	10
1	36 12.6	99 15	166.3	35 43.0	99 15	166.4	35 13.3	99 15	166.5	34 43.5	99 15	166.6	34 13.8	99 14	166.7	33 44.1	99 14	166.7	33 14.4	99 14	166.8	32 44.7	99 14	166.9	1
2	36 03.7	99 16	165.1	35 34.1	99 16	165.2	35 04.4	99 16	165.3	34 34.8	99 16	165.4	34 05.1	99 16	165.5	33 35.5	99 16	165.6	33 05.8	99 16	165.7	32 36.2	99 15	165.7	2
3	35 54.1	99 17	163.9	35 24.5	99 17	164.0	34 54.9	99 17	164.1	34 25.3	99 17	164.2	33 55.7	99 17	164.3	33 26.1	99 17	164.4	32 56.5	99 17	164.5	32 26.9	99 17	164.6	3
4	35 43.7	98 19	162.7	35 14.2	98 18	162.8	34 44.6	98 18	162.9	34 15.1	98 18	163.0	33 45.6	98 18	163.1	33 16.0	98 18	163.2	32 46.5	98 18	163.3	32 16.9	99 18	163.4	4
15	35 32.6	98 20	161.5	35 03.1	98 20	161.6	34 33.7	98 20	161.7	34 04.2	98 19	161.8	33 34.7	98 19	161.9	33 05.3	98 19	162.0	32 35.8	98 19	162.1	32 06.3	98 19	162.2	15
6	35 20.7	98 21	160.2	34 51.3	98 21	160.4	34 22.0	98 21	160.5	33 52.6	98 21	160.6	33 23.2	98 20	160.7	32 53.8	98 20	160.9	32 24.3	98 20	161.0	31 54.9	98 20	161.1	6
7	35 08.2	98 22	159.1	34 38.9	98 22	159.2	34 09.5	98 22	159.3	33 40.2	98 22	159.4	33 10.9	98 22	159.6	32 41.6	98 21	159.7	32 12.2	98 21	159.8	31 42.9	98 21	159.9	7
8	34 54.9	97 23	157.9	34 25.7	97 23	158.0	33 56.4	97 23	158.1	33 27.2	97 23	158.3	32 58.0	98 23	158.4	32 28.7	98 23	158.5	31 59.4	98 22	158.7	31 30.2	98 22	158.8	8
9	34 40.9	97 24	156.7	34 11.8	97 24	156.8	33 42.7	97 24	157.0	33 13.5	97 24	157.1	32 44.3	97 24	157.2	32 15.1	97 24	157.4	31 46.0	97 24	157.5	31 16.8	97 23	157.7	9
20	34 26.3	97 26	155.5	33 57.3	97 25	155.6	33 28.2	97 25	155.8	32 59.1	97 25	155.9	32 30.0	97 25	156.1	32 00.9	97 25	156.2	31 31.8	97 25	156.4	31 02.7	97 25	156.5	20
1	34 11.0	97 27	154.3	33 42.0	97 26	154.5	33 13.1	97 26	154.6	32 44.1	97 26	154.8	32 15.1	97 26	154.9	31 46.0	97 26	155.1	31 17.0	97 26	155.2	30 48.0	97 26	155.4	1
2	33 55.0	96 28	153.2	33 26.2	96 28	153.3	32 57.3	96 27	153.5	32 28.4	96 27	153.6	31 59.4	96 27	153.8	31 30.5	96 27	154.0	31 01.6	96 27	154.1	30 32.6	97 27	154.3	2
3	33 38.4	96 29	152.0	33 09.6	96 29	152.2	32 40.8	96 28	152.3	32 12.0	96 28	152.5	31 43.2	96 28	152.7	31 14.3	96 28	152.8	30 45.5	96 28	153.0	30 16.6	96 28	153.2	3
4	33 21.1	96 30	150.9	32 52.4	96 30	151.0	32 23.7	96 30	151.2	31 55.0	96 29	151.4	31 26.3	96 29	151.5	30 57.5	96 29	151.7	30 28.8	96 29	151.9	30 00.0	96 29	152.0	4
25	33 03.2	95 31	149.7	32 34.6	95 31	149.9	32 06.0	95 31	150.1	31 37.4	95 30	150.3	31 08.8	95 30	150.4	30 40.1	96 30	150.6	30 11.5	96 30	150.8	29 42.8	96 30	150.9	25
6	32 44.7	95 32	148.6	32 16.2	95 32	148.8	31 47.7	95 32	149.0	31 19.2	95 31	149.1	30 50.7	95 31	149.3	30 22.1	95 31	149.5	29 53.5	95 31	149.7	29 24.9	95 31	149.8	6
7	32 25.6	95 33	147.5	31 57.2	95 33	147.7	31 28.8	95 33	147.8	31 00.4	95 32	148.0	30 31.9	95 32	148.2	30 03.5	95 32	148.4	29 35.0	95 32	148.6	29 06.5	95 32	148.8	7
8	32 05.9	94 34	146.3	31 37.6	94 34	146.5	31 09.3	94 33	146.7	30 41.0	94 33	146.9	30 12.6	95 33	147.1	29 44.3	95 33	147.3	29 15.9	95 33	147.5	28 47.5	95 33	147.7	8
9	31 45.6	94 35	145.2	31 17.4	94 35	145.4	30 49.2	94 34	145.6	30 21.0	94 34	145.8	29 52.7	94 34	146.0	29 24.5	94 34	146.2	28 56.2	94 34	146.4	28 27.9	94 34	146.6	9
30	31 24.7	94 36	144.1	30 56.6	94 36	144.3	30 28.5	94 35	144.5	30 00.4	94 35	144.7	29 32.3	94 35	144.9	29 04.1	94 35	145.1	28 35.9	94 35	145.3	28 07.7	94 35	145.5	30
1	31 03.3	93 37	143.0	30 35.3	93 36	143.3	30 07.3	93 36	143.5	29 39.3	93 36	143.7	29 11.3	93 36	143.9	28 43.2	94 36	144.1	28 15.1	94 36	144.3	27 47.0	94 35	144.5	1
2	30 41.3	93 38	142.0	30 13.4	93 37	142.2	29 45.5	93 37	142.4	29 17.6	93 37	142.6	28 49.7	93 37	142.8	28 21.7	93 37	143.0	27 53.8	93 36	143.2	27 25.8	93 36	143.4	2
3	30 18.8	93 38	140.9	29 51.0	93 38	141.1	29 23.2	93 38	141.3	28 55.4	93 38	141.5	28 27.6	93 38	141.7	27 59.8	93 38	142.0	27 31.9	93 37	142.2	27 04.0	93 37	142.4	3
4	29 55.7	92 39	139.8	29 28.1	92 39	140.0	29 00.4	92 39	140.3	28 32.7	92 39	140.5	28 05.0	92 39	140.7	27 37.2	93 38	140.9	27 09.5	93 38	141.1	26 41.7	93 38	141.3	4
35	29 32.2	92 40	138.8	29 04.6	92 40	139.0	28 37.1	92 40	139.2	28 09.5	92 40	139.4	27 41.9	92 39	139.7	27 14.2	92 39	139.9	26 46.6	92 39	140.1	26 18.9	92 39	140.3	35
6	29 08.1	91 41	137.7	28 40.7	92 41	137.9	28 13.2	92 41	138.2	27 45.7	92 40	138.4	27 18.2	92 40	138.6	26 50.7	92 40	138.8	26 23.2	92 40	139.1	25 55.6	92 40	139.3	6
7	28 43.6	91 42	136.7	28 16.3	91 42	136.9	27 48.9	91 41	137.1	27 21.5	91 41	137.4	26 54.1	91 41	137.6	26 26.7	91 41	137.8	25 59.2	92 41	138.0	25 31.8	92 40	138.3	7
8	28 18.6	91 42	135.6	27 51.4	91 42	135.9	27 24.1	91 42	136.1	26 56.8	91 42	136.3	26 29.5	91 42	136.6	26 02.2	91 42	136.8	25 34.9	91 41	137.0	25 07.5	91 41	137.3	8
9	27 53.1	90 43	134.6	27 26.0	90 43	134.8	26 58.8	91 43	135.1	26 31.7	91 43	135.3	26 04.5	91 43	135.6	25 37.3	91 42	135.8	25 10.0	91 42	136.0	24 42.8	91 42	136.3	9
40	27 27.2	90 44	133.6	27 00.2	90 44	133.8	26 33.1	90 44	134.1	26 06.1	90 43	134.3	25 39.0	90 43	134.6	25 11.9	90 43	134.8	24 44.7	90 43	135.0	24 17.6	91 43	135.3	40
1	27 00.8	90 45	132.6	26 33.9	90 44	132.8	26 07.0	90 44	133.1	25 40.0	90 44	133.3	25 13.0	90 44	133.6	24 46.0	90 44	133.8	24 19.0	90 44	134.0	23 51.9	90 43	134.3	1
2	26 34.0	89 45	131.6	26 07.2	89 45	131.8	25 40.4	89 45	132.1	25 13.5	90 45	132.3	24 46.6	90 45	132.6	24 19.7	90 44	132.8	23 52.8	90 44	133.0	23 25.9	90 44	133.3	2
3	26 06.8	89 46	130.6	25 40.1	89 46	130.8	25 13.4	89 46	131.1	24 46.6	89 46	131.3	24 19.8	89 45	131.6	23 53.0	89 45	131.8	23 26.2	89 45	132.1	22 59.4	90 45	132.3	3
4	25 39.1	89 47	129.6	25 12.5	89 47	129.8	24 45.9	89 46	130.1	24 19.3	89 46	130.4	23 52.6	89 46	130.6	23 25.9	89 46	130.9	22 59.2	89 46	131.1	22 32.5	89 46	131.3	4
45	25 11.1	88 47	128.6	24 44.6	88 47	128.9	24 18.1	88 47	129.1	23 51.6	89 47	129.4	23 25.0	89 47	129.6	22 58.4	89 46	129.9	22 31.8	89 46	130.1	22 05.2	89 46	130.4	45
6	24 42.7	88 48	127.6	24 16.3	88 48	127.9	23 49.9	88 48	128.2	23 23.5	88 47	128.4	22 57.0	88 47	128.7	22 30.5	88 47	128.9	22 04.0	88 47	129.2	21 37.5	88 47	129.4	6
7	24 13.9	88 49	126.7	23 47.6	88 48	126.9	23 21.3	88 48	127.2	22 55.0	88 48	127.5	22 28.6	88 48	127.7	22 02.2	88 48	128.0	21 35.8	88 48	128.2	21 09.4	88 47	128.5	7
8	23 44.8	87 49	125.7	23 18.6	87 49	126.0	22 52.4	87 49	126.3	22 26.2	88 49	126.5	21 59.9	88 48	126.8	21 33.6	88 48	127.0	21 07.3	88 48	127.3	20 40.9	88 48	127.5	8
9	23 15.3	87 50	124.8	22 49.2	87 50	125.0	22 23.1	87 49	125.3	21 57.0	87 49	125.6	21 30.8	87 49	125.8	21 04.6	87 49	126.1	20 38.4	87 49	126.4	20 12.1	88 49	126.6	9
50	22 45.5	87 50	123.8	22 19.5	87 50	124.1	21 53.5	87 50	124.4	21 27.4	87 50	124.6	21 01.3	87 50	124.9	20 35.2	87 49	125.2	20 09.1	87 49	125.4	19 43.0	87 49	125.7	50
1	22 15.3	86 51	122.9	21 49.4	86 51	123.2	21 23.5	86 50	123.4	20 57.5	87 50	123.7	20 31.6	87 50	124.0	20 05.6	87 50	124.2	19 39.5	87 50	124.5	19 13.5	87 50	124.8	1
2	21 44.8	86 51	122.0	21 19.0	86 51	122.2	20 53.2	86 51	122.5	20 27.3	86 51	122.8	20 01.5	86 51	123.0	19 35.5	86 51	123.3	19 09.6	86 50	123.6	18 43.6	87 50	123.8	2
3	21 14.1	86 52	121.0	20 48.3	86 52	121.3	20 22.6	86 52	121.6	19 56.8	86 51	121.9	19 31.0	86 51	122.1	19 05.2	86 51	122.4	18 39.4	86 51	122.7	18 13.5	86 51	122.9	3
4	20 43.0	85 52	120.1	20 17.3	85 52	120.4	19 51.7	86 52	120.7	19 26.0	86 52	121.0	19 00.3	86 52	121.2	18 34.6	86 52	121.5	18 08.8	86 51	121.8	17 43.0	86 51	122.0	4
55	20 11.6	85 53	119.2	19 46.1	85 53	119.5	19 20.5	85 52	119.8	18 54.9	85 52	120.0	18 29.3	85 52	120.3	18 03.6	86 52	120.6	17 38.0	86 52	120.9	17 12.3	86 52	121.1	55
6	19 39.9	85 53	118.3	19 14.5	85 53	118.6	18 49.0	85 53	118.9	18 23.5	85 53	119.1	17 58.0	85 53	119.4	17 32.4	85 53	119.7	17 06.8	85 52	120.0	16 41.2	85 52	120.2	6
7	19 08.0	85 54	117.4	18 42.6	85 54	117.7	18 17.2	85 53	118.0	17 51.8	85 53	118.3	17 26.4	85 53	118.5	17 00.9	85 53	118.8	16 35.4	85 53	119.1	16 09.9	85 53	119.4	7
8	18 35.8	84 54	116.5	18 10.5	84 54	116.8	17 45.2	84 54	117.1	17 19.9	85 54	117.4	16 54.5	85 54	117.6	16 29.1	85 53	117.9	16 03.7	85 53	118.2	15 38.3	85 53	118.5	8
9	18 03.4	84 54	115.6	17 38.2	84 54	115.9	17 13.0	84 54	116.2	16 47.7	84 54	116.5	16 22.4	84 54	116.8	15 57.1	84 54	117.0	15 31.8	84 54	117.3	15 06.4	85 54	117.6	9
60	17 30.7	84 55	114.8	17 05.6	84 55	115.0	16 40.4	84 55	115.3	16 15.2	84 54	115.6	15 50.0	84 54	115.9	15 24.8	84 54	116.2	14 59.6	84 54	116.5	14 34.3	84 54	116.7	60
1	16 57.8	83 55	113.9	16 32.8	84 55	114.2	16 07.7	84 55	114.5	15 42.6	84 55	114.7	15 17.4	84 55	115.0	14 52.3	84 55	115.3	14 27.1	84 54	115.6	14 01.9	84 54	115.9	1
2	16 24.7	83 56	113.0	15 59.7	83 55	113.3	15 34.7	83 55	113.6	15 09.7	83 55	113.9	14 44.6	84 55	114.2	14 19.5	84 55	114.4	13 54.4	84 55	114.7	13 29.3	84 55	115.0	2
3	15 51.4	83 56	112.1	15 26.4	83 56	112.4	15 01.5	83 56	112.7	14 36.5	83 56	113.0	14 11.5	83 55	113.3	13 46.5	83 55	113.6	13 21.5	83 55	113.9	12 56.5	84 55	114.1	3
4	15 17.8	83 56	111.3	14 53.0	83 56	111.6	14 28.1	83 56	111.9	14 03.2	83 56	112.1	13 38.3	83 56	112.4	13 13.3	83 56	112.7	12 48.4	83 56	113.0	12 23.4	83 55	113.3	4
65	14 44.1	83 57	110.4	14 19.3	83 56	110.7	13 54.5	83 56	111.0	13 29.6	83 56	111.3	13 04.8	83 56	111.6	12 39.9	83 56	111.9	12 15.1	83 56	112.2	11 50.1	83 56	112.4	65
6	14 10.1	82 57	109.6	13 45.4	82 57	109.9	13 20.7	83 57	110.2	12 55.9	83 57	110.4	12 31.1	83 56	110.7	12 06.3	83 56	111.0	11 41.5	83 56	111.3	11 16.7	83 56	111.6	6
7	13 36.0	82 57	108.7	13 11.4	82 57	109.0	12 46.7	82 57	109.3	12 22.0	82 57	109.6	11 57.3	82 57	109.9	11 32.5	82 57	110.2	11 07.8	83 57	110.5	10 43.0	83 56	110.8	7
8	13 01.7	82 57	107.9	12 37.1	82 57	108.2	12 12.5	82 57	108.5	11 47.9	82 57	108.8	11 23.2	82 57	109.1	10 58.5	82 57	109.3	10 33.9	82 57	109.6	10 09.1	82 57	109.9	8
9	12 27.3	82 58	107.0	12 02.7	82 58	107.3	11 38.2	82 57	107.6	11 13.6	82 57	107.9	10 49.0	82 57	108.2	10 24.4	82 57	108.5	9 59.8	82 57	108.8	9 35.1	82 57	109.1	9
70	11 52.7	82 58	106.2	11 28.2	82 58	106.5	11 03.7	82 58	106.8	10 39.2	82 58	107.1	10 14.6	82 58	107.4	9 50.1	82 57	107.7	9 25.5	82 57	108.0	9 00.9	82 57	108.3	70
1	11 17.9	81 58	105.4	10 53.5	82 58	105.7	10 29.0	82 58	106.0	10 04.6	82 58	106.3	9 40.1	82 58	106.6	9 15.6	82 58	106.8	8 51.1	82 58	107.1	8 26.5	82 58	107.4	1
2	10 43.1	81 58	104.5	10 18.7	81 58	104.8	9 54.3	81 58	105.1	9 29.8	81 58	105.4	9 05.4	81 58	105.7	8 40.9	82 58	106.0	8 16.5	82 58	106.3	7 52.0	82 58	106.6	2
3	10 08.0	81 59	103.7	9 43.7	81 58	104.0	9 19.3	81 58	104.3	8 55.0	81 58	104.6	8 30.6	81 58	104.9	8 06.2	81 58	105.2	7 41.8	81 58	105.5	7 17.3	81 58	105.8	3
4	9 32.9	81 59	102.9	9 08.6	81 59	103.2	8 44.3	81 59	103.5	8 20.0	81 59	103.8	7 55.6	81 58	104.1	7 31.3	81 58	104.4	7 06.9	81 58	104.7	6 42.5	81 58	105.0	4
75	8 57.7	81 59	102.1	8 33.4	81 59	102.4	8 09.1	81 59	102.7	7 44.8	81 59	103.0	7 20.5	81 59	103.3	6 56.2	81 59	103.6	6 31.9	81 59	103.9	6 07.6	81 58	104.1	75
6	8 22.3	81 59	101.3	7 58.1	81 59	101.6	7 33.8	81 59	101.9	7 09.6	81 59	102.2	6 45.3	81 59	102.5	6 21.1	81 59	102.7	5 56.8	81 59	103.0	5 32.5	81 59	103.3	6
7	7 46.8	81 59	100.4	7 22.6	81 59	100.7	6 58.4	81 59	101.0	6 34.2	81 59	101.3	6 10.0	81 59	101.6	5 45.8	81 59	101.9	5 21.5	81 59	102.2				7
8	7 11.3	80 59	99.6	6 47.1	81 59	99.9	6 23.0	81 59	100.2	5 58.8	81 59	100.5	5 34.6	81 59	100.8	5 10.4	81 59	101.1							8
9	6 35.6	80 60	98.8	6 11.5	80 60	99.1	5 47.4	80 59	99.4	5 23.2	80 59	99.7													9
80	5 59.9	80 60	98.0	5 35.8	80 60	98.3	5 11.7	80 60	98.6																80
1	5 24.1	80 60	97.2	5 00.1	80 60	97.5																			1

Digitized by Google

Lat. 53°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	41 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	42 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	44 00.0	1.0 01	180 0	44 30.0	1.0 01	180.0	00
1	40 59.6	1.0 02	178.7	41 29.6	1.0 02	178.7	41 59.6	1.0 02	178.7	42 29.6	1.0 02	178.6	42 59.6	1.0 02	178.6	43 29.6	1.0 02	178.6	43 59.6	1.0 02	178.6	44 29.6	1.0 02	178.6	1
2	40 58.3	1.0 03	177.4	41 28.3	1.0 03	177.3	41 58.3	1.0 04	177.3	42 28.3	1.0 04	177.3	42 58.3	1.0 04	177.3	43 28.3	1.0 04	177.3	43 58.3	1.0 04	177.2	44 28.2	1.0 04	177.2	2
3	40 56.3	1.0 05	176.0	41 26.2	1.0 05	176.0	41 56.2	1.0 05	176.0	42 26.2	1.0 05	176.0	42 56.1	1.0 05	175.9	43 26.1	1.0 05	175.9	43 56.1	1.0 05	175.9	44 26.1	1.0 05	175.8	3
4	40 53.3	1.0 06	174.7	41 23.3	1.0 06	174.7	41 53.3	1.0 06	174.6	42 23.2	1.0 06	174.6	42 53.2	1.0 06	174.6	43 23.1	1.0 06	174.5	43 53.1	1.0 06	174.5	44 23.0	1.0 07	174.4	4
05	40 49.6	1.0 08	173.4	41 19.5	1.0 08	173.4	41 49.5	1.0 08	173.3	42 19.4	1.0 08	173.3	42 49.3	1.0 08	173.2	43 19.2	1.0 08	173.2	43 49.2	1.0 08	173.1	44 19.1	1.0 08	173.1	05
6	40 45.0	1.0 09	172.1	41 14.9	1.0 09	172.0	41 44.8	1.0 09	172.0	42 14.7	1.0 09	171.9	42 44.6	1.0 09	171.9	43 14.5	1.0 09	171.8	43 44.4	1.0 09	171.7	44 14.3	1.0 09	171.7	6
7	40 39.7	1.0 10	170.8	41 09.5	1.0 10	170.7	41 39.4	1.0 10	170.6	42 09.2	1.0 11	170.6	42 39.1	1.0 11	170.5	43 08.9	99 11	170.4	43 38.8	99 11	170.4	44 08.6	99 11	170.3	7
8	40 33.5	99 12	169.5	41 03.3	99 12	169.4	41 33.1	99 12	169.3	42 02.9	99 12	169.2	42 32.7	99 12	169.2	43 02.5	99 12	169.1	43 32.3	99 12	169.0	44 02.1	99 12	168.9	8
9	40 26.5	99 13	168.2	40 56.2	99 13	168.1	41 26.0	99 13	168.0	41 55.8	99 13	167.9	42 25.5	99 13	167.8	42 55.3	99 13	167.7	43 25.0	99 14	167.7	43 54.8	99 14	167.6	9
10	40 18.7	99 14	166.9	40 48.4	99 14	166.8	41 18.1	99 15	166.7	41 47.8	99 15	166.6	42 17.5	99 15	166.5	42 47.2	99 15	166.4	43 16.9	99 15	166.3	43 46.6	99 15	166.2	10
1	40 10.1	99 16	165.6	40 39.7	99 16	165.5	41 09.4	99 16	165.4	41 39.0	99 16	165.3	42 08.7	99 16	165.2	42 38.3	99 16	165.1	43 07.9	99 16	165.0	43 37.6	99 16	164.8	1
2	40 00.7	99 17	164.3	40 30.3	99 17	164.2	40 59.9	99 17	164.1	41 29.4	99 17	164.0	41 59.0	99 17	163.8	42 28.6	99 18	163.7	42 58.2	99 18	163.6	43 27.7	99 18	163.5	2
3	39 50.5	98 18	163.0	40 20.0	98 18	162.9	40 49.6	98 18	162.8	41 19.1	98 19	162.7	41 48.6	98 19	162.5	42 18.1	98 19	162.4	42 47.6	98 19	162.3	43 17.0	98 19	162.2	3
4	39 39.6	98 20	161.7	40 09.0	98 20	161.6	40 38.5	98 20	161.5	41 07.9	98 20	161.4	41 37.4	98 20	161.2	42 06.8	98 20	161.1	42 36.2	98 20	161.0	43 05.6	98 20	160.8	4
15	39 27.9	98 21	160.5	39 57.3	98 21	160.3	40 26.6	98 21	160.2	40 56.0	98 21	160.1	41 25.3	98 21	159.9	41 54.7	98 21	159.8	42 24.0	98 22	159.6	42 53.3	98 22	159.5	15
6	39 15.4	98 22	159.2	39 44.7	98 22	159.1	40 14.0	98 22	158.9	40 43.3	98 22	158.8	41 12.6	98 23	158.6	41 41.8	98 23	158.5	42 11.1	97 23	158.3	42 40.3	97 23	158.2	6
7	39 02.2	97 23	157.9	39 31.5	97 23	157.8	40 00.7	97 24	157.6	40 29.8	97 24	157.5	40 59.0	97 24	157.3	41 28.2	97 24	157.2	41 57.4	97 24	157.0	42 26.5	97 24	156.9	7
8	38 48.3	97 24	156.7	39 17.4	97 25	156.5	39 46.6	97 25	156.4	40 15.7	97 25	156.2	40 44.8	97 25	156.1	41 13.8	97 25	155.9	41 42.9	97 25	155.7	42 11.9	97 26	155.6	8
9	38 33.7	97 26	155.5	39 02.7	97 26	155.3	39 31.7	97 26	155.1	40 00.7	97 26	155.0	40 29.7	97 26	154.8	40 58.7	97 26	154.6	41 27.7	97 27	154.5	41 56.6	96 27	154.3	9
20	38 18.3	96 27	154.2	38 47.3	96 27	154.1	39 16.2	96 27	153.9	39 45.1	96 27	153.7	40 14.0	96 27	153.5	40 42.9	96 28	153.4	41 11.8	96 28	153.2	41 40.6	96 28	153.0	20
1	38 02.3	96 28	153.0	38 31.1	96 28	152.8	39 00.0	96 28	152.7	39 28.8	96 28	152.5	39 57.6	96 29	152.3	40 26.3	96 29	152.1	40 55.1	96 29	151.9	41 23.8	96 29	151.7	1
2	37 45.6	96 29	151.8	38 14.3	96 29	151.6	38 43.0	96 29	151.4	39 11.7	96 30	151.2	39 40.4	96 30	151.1	40 09.1	96 30	150.9	40 37.8	95 30	150.7	41 06.4	95 30	150.5	2
3	37 28.1	96 30	150.6	37 56.8	95 30	150.4	38 25.4	95 30	150.2	38 54.0	95 31	150.0	39 22.6	95 31	149.8	39 51.2	95 31	149.6	40 19.7	95 31	149.4	40 48.3	95 31	149.2	3
4	37 10.1	95 31	149.4	37 38.6	95 31	149.2	38 07.1	95 32	149.0	38 35.6	95 32	148.8	39 04.1	95 32	148.6	39 32.6	95 32	148.4	40 01.0	95 32	148.2	40 29.4	95 32	148.0	4
25	36 51.4	95 32	148.2	37 19.8	95 32	148.0	37 48.2	95 33	147.8	38 16.6	95 33	147.6	38 45.0	95 33	147.4	39 13.3	94 33	147.2	39 41.7	94 33	147.0	40 10.0	94 34	146.7	25
6	36 32.0	94 33	147.0	37 00.4	94 33	146.8	37 28.7	94 34	146.6	37 57.0	94 34	146.4	38 25.2	94 34	146.2	38 53.5	94 34	146.0	39 21.7	94 34	145.8	39 49.8	94 35	145.5	6
7	36 12.1	94 34	145.9	36 40.3	94 34	145.6	37 08.5	94 35	145.4	37 36.7	94 35	145.2	38 04.8	94 35	145.0	38 32.9	94 35	144.8	39 01.0	94 35	144.6	39 29.1	94 36	144.3	7
8	35 51.5	94 35	144.7	36 19.6	94 35	144.5	36 47.7	94 36	144.3	37 15.8	93 36	144.0	37 43.8	93 36	143.8	38 11.8	93 36	143.6	38 39.8	93 36	143.4	39 07.7	93 37	143.1	8
9	35 30.4	93 36	143.6	35 58.4	93 36	143.3	36 26.3	93 37	143.1	36 54.3	93 37	142.9	37 22.2	93 37	142.6	37 50.1	93 37	142.4	38 17.9	93 37	142.2	38 45.8	93 38	141.9	9
30	35 08.6	93 37	142.4	35 36.5	93 37	142.2	36 04.4	93 38	142.0	36 32.2	93 38	141.7	37 00.0	93 38	141.5	37 27.8	93 38	141.3	37 55.5	92 38	141.0	38 23.2	92 39	140.8	30
1	34 46.3	93 38	141.3	35 14.1	93 38	141.1	35 41.8	92 38	140.8	36 09.5	92 39	140.6	36 37.2	92 39	140.3	37 04.9	92 39	140.1	37 32.5	92 39	139.9	38 00.1	92 39	139.6	1
2	34 23.4	92 39	140.2	34 51.1	92 39	139.9	35 18.7	92 39	139.7	35 46.3	92 40	139.4	36 13.9	92 40	139.2	36 41.4	92 40	139.0	37 09.0	92 40	138.7	37 36.4	92 40	138.5	2
3	34 00.1	92 40	139.1	34 27.6	92 40	138.8	34 55.1	92 40	138.6	35 22.6	92 40	138.3	35 50.0	91 41	138.1	36 17.5	91 41	137.8	36 44.9	91 41	137.6	37 12.2	91 41	137.3	3
4	33 36.1	91 41	138.0	34 03.6	91 41	137.7	34 31.0	91 41	137.5	34 58.3	91 41	137.2	35 25.7	91 41	137.0	35 53.0	91 42	136.7	36 20.2	91 42	136.4	36 47.5	91 42	136.2	4
35	33 11.7	91 42	136.9	33 39.0	91 42	136.6	34 06.3	91 42	136.4	34 33.5	91 42	136.1	35 00.8	91 42	135.9	35 27.9	91 43	135.6	35 55.1	90 43	135.3	36 22.2	90 43	135.1	35
6	32 46.8	91 42	135.8	33 14.0	91 43	135.5	33 41.1	91 43	135.3	34 08.3	90 43	135.0	34 35.4	90 43	134.8	35 02.4	90 43	134.5	35 29.5	90 44	134.2	35 56.5	90 44	134.0	6
7	32 21.3	90 43	134.7	32 48.4	90 43	134.5	33 15.5	90 44	134.2	33 42.5	90 44	133.9	34 09.5	90 44	133.7	34 36.4	90 44	133.4	35 03.4	90 44	133.1	35 30.2	90 44	132.9	7
8	31 55.4	90 44	133.6	32 22.4	90 44	133.4	32 49.3	90 44	133.1	33 16.3	90 44	132.9	33 43.1	90 45	132.6	34 10.0	89 45	132.3	34 36.8	89 45	132.1	35 03.6	89 45	131.8	8
9	31 29.1	90 45	132.6	31 55.9	89 45	132.3	32 22.8	89 45	132.1	32 49.6	89 45	131.8	33 16.3	89 45	131.5	33 43.1	89 46	131.3	34 09.7	89 46	131.0	34 36.4	89 46	130.7	9
40	31 02.3	89 45	131.6	31 29.0	89 46	131.3	31 55.7	89 46	131.0	32 22.4	89 46	130.7	32 49.1	89 46	130.5	33 15.7	89 46	130.2	33 42.3	89 46	129.9	34 08.8	88 47	129.6	40
1	30 35.0	89 46	130.5	31 01.7	89 46	130.2	31 28.3	89 46	130.0	31 54.9	89 47	129.7	32 21.4	88 47	129.4	32 47.9	88 47	129.2	33 14.4	88 47	128.9	33 40.8	88 47	128.6	1
2	30 07.4	89 47	129.5	30 33.9	88 47	129.2	31 00.4	88 47	128.9	31 26.9	88 47	128.7	31 53.3	88 48	128.4	32 19.7	88 48	128.1	32 46.0	88 48	127.8	33 12.4	88 48	127.5	2
3	29 39.3	88 47	128.5	30 05.7	88 48	128.2	30 32.1	88 48	127.9	30 58.5	88 48	127.6	31 24.8	88 48	127.4	31 51.1	88 48	127.1	32 17.3	87 48	126.8	32 43.5	87 49	126.5	3
4	29 10.8	88 48	127.5	29 37.2	88 48	127.2	30 03.4	88 48	126.9	30 29.7	87 49	126.6	30 55.9	87 49	126.4	31 22.1	87 49	126.1	31 48.2	87 49	125.8	32 14.3	87 49	125.5	4
45	28 42.0	87 49	126.5	29 08.2	87 49	126.2	29 34.4	87 49	125.9	30 00.5	87 49	125.6	30 26.6	87 49	125.3	30 52.7	87 50	125.1	31 18.7	87 50	124.8	31 44.7	87 50	124.5	45
6	28 12.8	87 49	125.5	28 38.9	87 49	125.2	29 05.0	87 50	124.9	29 31.0	87 50	124.6	29 57.0	87 50	124.3	30 23.0	86 50	124.1	30 48.9	86 50	123.8	31 14.8	86 50	123.5	6
7	27 43.2	87 50	124.5	28 09.2	87 50	124.2	28 35.2	87 50	123.9	29 01.1	86 50	123.6	29 27.0	86 51	123.4	29 52.9	86 51	123.1	30 18.7	86 51	122.8	30 44.5	86 51	122.5	7
8	27 13.3	86 50	123.5	27 39.2	86 51	123.2	28 05.0	86 51	123.0	28 30.9	86 51	122.7	28 56.7	86 51	122.4	29 22.5	86 51	122.1	29 48.2	86 51	121.8	30 13.9	86 52	121.5	8
9	26 43.0	86 51	122.6	27 08.8	86 51	122.3	27 34.6	86 51	122.0	28 00.3	86 51	121.7	28 26.0	86 52	121.4	28 51.7	86 52	121.1	29 17.3	85 52	120.8	29 42.9	85 52	120.5	9
50	26 12.4	86 52	121.6	26 38.1	86 52	121.3	27 03.8	86 52	121.0	27 29.4	85 52	120.7	27 55.1	85 52	120.4	28 20.6	85 52	120.1	28 46.2	85 52	119.8	29 11.7	85 53	119.5	50
1	25 41.5	86 52	120.6	26 07.1	85 52	120.4	26 32.7	85 52	120.1	26 58.2	85 52	119.8	27 23.8	85 53	119.5	27 49.2	85 53	119.2	28 14.7	85 53	118.9	28 40.1	85 53	118.6	1
2	25 10.3	85 53	119.7	25 35.8	85 53	119.4	26 01.3	85 53	119.1	26 26.8	85 53	118.8	26 52.2	85 53	118.5	27 17.6	85 53	118.2	27 42.9	84 53	117.9	28 08.2	84 54	117.6	2
3	24 38.8	85 53	118.8	25 04.2	85 53	118.5	25 29.6	85 53	118.2	25 55.0	85 53	117.9	26 20.3	84 54	117.6	26 45.6	84 54	117.3	27 10.9	84 54	117.0	27 36.1	84 54	116.7	3
4	24 07.0	85 53	117.8	24 32.3	84 54	117.6	24 57.6	84 54	117.3	25 22.9	84 54	117.0	25 48.2	84 54	116.7	26 13.4	84 54	116.4	26 38.6	84 54	116.1	27 03.7	84 54	115.7	4
55	23 34.9	84 54	116.9	24 00.2	84 54	116.6	24 25.4	84 54	116.3	24 50.6	84 54	116.0	25 15.8	84 54	115.7	25 40.9	84 55	115.4	26 06.0	84 55	115.1	26 31.1	83 55	114.8	55
6	23 02.6	84 54	116.0	23 27.8	84 54	115.7	23 52.9	84 55	115.4	24 18.0	84 55	115.1	24 43.1	84 55	114.8	25 08.2	83 55	114.5	25 33.2	83 55	114.2	25 58.2	83 55	113.9	6
7	22 30.0	84 55	115.1	22 55.1	84 55	114.8	23 20.2	84 55	114.5	23 45.2	83 55	114.2	24 10.2	83 55	113.9	24 35.2	83 55	113.6	25 00.2	83 55	113.3	25 25.0	83 56	113.0	7
8	21 57.2	83 55	114.2	22 22.2	83 55	113.9	22 47.2	83 55	113.6	23 12.2	83 55	113.3	23 37.1	83 56	113.0	24 02.0	83 56	112.7	24 26.9	83 56	112.4	24 51.7	83 56	112.1	8
9	21 24.1	83 55	113.3	21 49.1	83 56	113.0	22 14.0	83 56	112.7	22 38.9	83 56	112.4	23 03.8	83 56	112.1	23 28.6	83 56	111.8	23 53.4	83 56	111.5	24 18.1	82 56	111.2	9
60	20 50.9	83 56	112.4	21 15.7	83 56	112.1	21 40.6	83 56	111.8	22 05.4	83 56	111.5	22 30.2	83 56	111.2	22 55.0	82 56	110.9	23 19.7	82 56	110.6	23 44.4	82 57	110.3	60
1	20 17.4	83 56	111.5	20 42.2	83 56	111.2	21 07.0	83 56	110.9	21 31.7	82 56	110.6	21 56.4	82 57	110.3	22 21.1	82 57	110.0	22 45.8	82 57	109.7	23 10.4	82 57	109.4	1
2	19 43.7	83 56	110.7	20 08.4	82 57	110.4	20 33.2	82 57	110.1	20 57.8	82 57	109.7	21 22.5	82 57	109.4	21 47.1	82 57	109.1	22 11.7	82 57	108.8	22 36.2	82 57	108.5	2
3	19 09.8	82 57	109.8	19 34.5	82 57	109.5	19 59.1	82 57	109.2	20 23.8	82 57	108.9	20 48.3	82 57	108.6	21 12.9	82 57	108.3	21 37.4	82 57	108.0	22 01.9	82 57	107.6	3
4	18 35.7	82 57	108.9	19 00.4	82 57	108.6	19 24.9	82 57	108.3	19 49.5	82 57	108.0	20 14.0	82 57	107.7	20 38.5	82 58	107.4	21 03.0	81 58	107.1	21 27.4	81 58	106.8	4
65	18 01.5	82 57	108.1	18 26.0	82 57	107.8	18 50.6	82 58	107.4	19 15.1	82 58	107.1	19 39.6	82 58	106.8	20 04.0	81 58	106.5	20 28.4	81 58	106.2	20 52.8	81 58	105.9	65
6	17 27.1	82 58	107.2	17 51.6	82 58	106.9	18 16.1	82 58	106.6	18 40.5	81 58	106.3	19 04.9	81 58	106.0	19 29.3	81 58	105.7	19 53.7	81 58	105.4	20 18.0	81 58	105.0	6
7	16 52.5	82 58	106.3	17 17.0	81 58	106.0	17 41.4	81 58	105.7	18 05.8	81 58	105.4	18 30.1	81 58	105.1	18 54.5	81 58	104.8	19 18.8	81 58	104.5	19 43.0	81 58	104.2	7
8	16 17.8	81 58	105.5	16 42.2	81 58	105.2	17 06.5	81 58	104.9	17 30.9	81 58	104.6	17 55.2	81 58	104.3	18 19.5	81 58	104.0	18 43.7	81 59	103.7	19 08.0	81 59	103.3	8
9	15 42.9	81 58	104.7	16 07.3	81 58	104.4	16 31.6	81 58	104.0	16 55.9	81 59	103.7	17 20.1	81 59	103.4	17 44.4	81 59	103.1	18 08.6	81 59	102.8	18 32.8	81 59	102.5	9
70	15 07.9	81 59	103.8	15 32.2	81 59	103.5	15 56.5	81 59	103.2	16 20.7	81 59	102.9	16 45.0	81 59	102.6	17 09.2	81 59	102.3	17 33.3	81 59	102.0	17 57.5	80 59	101.7	70
1	14 32.8	81 59	103.0	14 57.0	81 59	102.7	15 21.3	81 59	102.4	15 45.5	81 59	102.1	16 09.7	81 59	101.8	16 33.8	80 59	101.4	16 57.9	80 59	101.1	17 22.0	80 59	100.8	1
2	13 57.6	81 59	102.1	14 21.8	81 59	101.8	14 45.9	81 59	101.5	15 10.1	81 59	101.2	15 34.3	80 59	100.9	15 58.4	80 59	100.6	16 22.5	80 59	100.3	16 46.5	80 59	100.0	2
3	13 22.2	81 59	101.3	13 46.4	81 59	101.0	14 10.5	80 59	100.7	14 34.6	80 59	100.4	14 58.8	80 59	100.1	15 22.8	80 59	99.8	15 46.9	80 59	99.5	16 10.9	80 60	99.2	3
4	12 46.7	81 59	100.5	13 10.9	80 59	100.2	13 35.0	80 59	99.9	13 59.1	80 59	99.6	14 23.2	80 59	99.3	14 47.2	80 60	99.0	15 11.2	80 60	98.7	15 35.2	80 60	98.3	4
75	12 11.2	80 59	99.7	12 35.3	80 59	99.4	12 59.4	80 60	99.1	13 23.4	80 60	98.8	13 47.5	80 60	98.4	14 11.5	80 60	98.1	14 35.5	80 60	97.8	14 59.5	80 60	97.5	75
6	11 35.5	80 60	98.9	11 59.6	80 60	98.5	12 23.7	80 60	98.2	12 47.7	80 60	97.9	13 11.7	80 60	97.6	13 35.7	80 60	97.3	13 59.7	80 60	97.0	14 23.6	80 60	96.7	6
7	10 59.8	80 60	98.0	11 23.9	80 60	97.7	11 47.9	80 60	97.4	12 11.9	80 60	97.1	12 35.9	80 60	96.8	12 59.9	80 60	96.5	13 23.8	80 60	96.2	13 47.8	80 60	95.9	7
8	10 24 0	80 60	97.2	10 48.1	80 60	96.9	11 12.1	80 60	96.6	11 36.1	80 60	96.3	12 00.0	80 60	96.0	12 24.0	80 60	95.7	12 47.9	80 60	95.4	13 11.8	80 60	95.1	8
9	9 48.2	80 60	96.4	10 12.2	80 60	96.1	10 36.2	80 60	95.8	11 00.1	80 60	95.5	11 24.1	80 60	95.2	11 48.0	80 60	94.9	12 11.9	80 60	94.6	12 35.8	80 60	94.3	9
80	9 12.3	80 60	95.6	9 36.3	80 60	95.3	10 00.2	80 60	95.0	10 24.2	80 60	94.7	10 48.1	80 60	94.4	11 12.0	80 60	94.1	11 35.9	80 60	93.8	11 59.8	80 60	93.5	80
1	8 36.3	80 60	94.8	9 00.3	80 60	94.5	9 24.2	80 60	94.2	9 48.2	80 60	93.9	10 12.1	80 60	93.6	10 36.0	80 60	93.3	10 59.9	80 60	93.0	11 23.7	80 60	92.6	1
2	8 00.3	80 60	94.0	8 24.3	80 60	93.7	8 48.2	80 60	93.4	9 12.1	80 60	93.1	9 36.0	80 60	92.8	9 59.9	80 60	92.5	10 23.8	80 60	92.2	10 47.7	79 60	91.8	2
3	7 24.3	80 60	93.2	7 48.2	80 60	92.9	8 12.1	80 60	92.6	8 36.1	80 60	92.3	9 00.0	80 60	92.0	9 23.8	80 60	91.7	9 47.7	80 60	91.4	10 11.6	79 60	91.0	3
4	6 48.2	80 60	92.4	7 12.1	80 60	92.1	7 36.1	80 60	91.8	8 00.0	80 60	91.5	8 23.9	80 60	91.2	8 47.7	80 60	90.9	9 11.6	80 60	90.6	9 35.5	79 60	90.2	4
85	6 12.1	80 60	91.6	6 36.0	80 60	91.3	7 00.0	80 60	91.0	7 23.9	80 60	90.7	7 47.8	80 60	90.4	8 11.6	80 60	90.1	8 35.5	80 60	89.8	8 59.3	79 60	89.4	85
6	5 36.0	80 60	90.8	5 59.9	80 60	90.5	6 23.9	80 60	90.2	6 47.8	80 60	89.9	7 11.6	80 60	89.6	7 35.5	80 60	89.3	7 59.4	80 60	89.0	8 23.2	79 60	88.6	6
7				5 23.8	80 60	89.7	5 47.7	80 60	89.4	6 11.6	80 60	89.1	6 35.5	80 60	88.8	6 59.4	80 60	88.5	7 23.3	80 60	88.2	7 47.1	80 60	87.9	7
8							5 11.6	80 60	88.6	5 35.5	80 60	88.3	5 59.4	80 60	88.0	6 23.3	80 60	87.7	6 47.2	80 60	87.4	7 11.1	80 60	87.1	8
9													5 23.4	80 60	87.2	5 47.3	80 60	86.9	6 11.2	80 60	86.6	6 35.0	80 60	86.3	9
90																5 11.2	80 60	86.1	5 35.1	80 60	85.8	5 59.0	80 60	85.5	90

Digitized by Google

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	33 00.0	1.0 01	180.0	32 30.0	1.0 01	180.0	32 00.0	1.0 01	180.0	31 30.0	1.0 01	180.0	31 00.0	1.0 01	180.0	30 30.0	1.0 01	180.0	30 00.0	1.0 01	180.0	29 30.0	1.0 01	180.0	00
1	32 59.6	1.0 02	178.8	32 29.6	1.0 02	178.8	31 59.6	1.0 02	178.8	31 29.6	1.0 02	178.8	30 59.6	1.0 02	178.8	30 29.6	1.0 02	178.8	29 59.6	1.0 02	178.9	29 29.6	1.0 02	178.9	1
2	32 58.5	1.0 03	177.6	32 28.5	1.0 03	177.6	31 58.5	1.0 03	177.7	31 28.5	1.0 03	177.7	30 58.5	1.0 03	177.7	30 28.5	1.0 03	177.7	29 58.6	1.0 03	177.7	29 28.6	1.0 03	177.7	2
3	32 56.6	1.0 04	176.4	32 26.6	1.0 04	176.5	31 56.7	1.0 04	176.5	31 26.7	1.0 04	176.5	30 56.7	1.0 04	176.5	30 26.7	1.0 04	176.5	29 56.8	1.0 04	176.6	29 26.8	1.0 04	176.6	3
4	32 54.0	1.0 06	175.2	32 24.0	1.0 06	175.3	31 54.1	1.0 06	175.3	31 24.1	1.0 06	175.3	30 54.2	1.0 05	175.4	30 24.2	1.0 05	175.4	29 54.2	1.0 05	175.4	29 24.3	1.0 05	175.4	4
05	32 50.6	1.0 07	174.1	32 20.7	1.0 07	174.1	31 50.8	1.0 07	174.1	31 20.8	1.0 07	174.2	30 50.9	1.0 07	174.2	30 20.9	1.0 07	174.2	29 51.0	1.0 07	174.3	29 21.0	1.0 07	174.3	05
6	32 46.5	1.0 08	172.9	32 16.6	1.0 08	172.9	31 46.7	1.0 08	173.0	31 16.8	1.0 08	173.0	30 46.9	1.0 08	173.0	30 16.9	1.0 08	173.1	29 47.0	1.0 08	173.1	29 17.1	1.0 08	173.2	6
7	32 41.7	1.0 09	171.7	32 11.8	1.0 09	171.7	31 41.9	1.0 09	171.8	31 12.0	1.0 09	171.8	30 42.1	1.0 09	171.9	30 12.2	1.0 09	171.9	29 42.4	1.0 09	172.0	29 12.5	1.0 09	172.0	7
8	32 36.1	1.0 11	170.5	32 06.3	1.0 10	170.6	31 36.4	1.0 10	170.6	31 06.5	1.0 10	170.7	30 36.7	1.0 10	170.7	30 06.8	1.0 10	170.8	29 37.0	1.0 10	170.9	29 07.1	1.0 10	170.9	8
9	32 29.8	99 12	169.3	32 00.0	99 12	169.4	31 30.2	99 12	169.5	31 00.3	99 12	169.5	30 30.5	99 11	169.6	30 00.7	99 11	169.7	29 30.9	99 11	169.7	29 01.1	99 11	169.8	9
10	32 22.7	99 13	168.2	31 53.0	99 13	168.2	31 23.2	99 13	168.3	30 53.4	99 13	168.4	30 23.6	99 13	168.5	29 53.9	99 13	168.5	29 24.1	99 12	168.6	28 54.3	99 12	168.7	10
1	32 15.0	99 14	167.0	31 45.3	99 14	167.1	31 15.5	99 14	167.2	30 45.8	99 14	167.2	30 16.1	99 14	167.3	29 46.3	99 14	167.4	29 16.6	99 14	167.5	28 46.9	99 14	167.5	1
2	32 06.5	99 15	165.8	31 36.8	99 15	165.9	31 07.1	99 15	166.0	30 37.5	99 15	166.1	30 07.8	99 15	166.2	29 38.1	99 15	166.3	29 08.4	99 15	166.3	28 38.7	99 15	166.4	2
3	31 57.3	99 16	164.7	31 27.7	99 16	164.8	30 58.1	99 16	164.8	30 28.4	99 16	164.9	29 58.8	99 16	165.0	29 29.2	99 16	165.1	28 59.5	99 16	165.2	28 29.9	99 16	165.3	3
4	31 47.4	99 18	163.5	31 17.8	99 18	163.6	30 48.3	99 17	163.7	30 18.7	99 17	163.8	29 49.1	99 17	163.9	29 19.6	99 17	164.0	28 50.0	99 17	164.1	28 20.4	99 17	164.2	4
15	31 36.8	98 19	162.4	31 07.3	98 19	162.5	30 37.8	98 19	162.6	30 08.3	98 18	162.7	29 38.8	98 18	162.8	29 09.3	98 18	162.9	28 39.7	98 18	163.0	28 10.2	98 18	163.1	15
6	31 25.5	98 20	161.2	30 56.1	98 20	161.3	30 26.6	98 20	161.4	29 57.2	98 20	161.5	29 27.7	98 20	161.6	28 58.3	98 19	161.8	28 28.8	98 19	161.9	27 59.4	98 19	162.0	6
7	31 13.5	98 21	160.1	30 44.2	98 21	160.2	30 14.8	98 21	160.3	29 45.4	98 21	160.4	29 16.0	98 21	160.5	28 46.7	98 20	160.6	28 17.3	98 20	160.8	27 47.9	98 20	160.9	7
8	31 00.9	98 22	158.9	30 31.6	98 22	159.0	30 02.3	98 22	159.2	29 33.0	98 22	159.3	29 03.7	98 22	159.4	28 34.4	98 22	159.5	28 05.0	98 21	159.7	27 35.7	98 21	159.8	8
9	30 47.6	97 23	157.8	30 18.3	97 23	157.9	29 49.1	97 23	158.0	29 19.9	97 23	158.2	28 50.7	97 23	158.3	28 21.4	97 23	158.4	27 52.2	98 23	158.6	27 22.9	98 22	158.7	9
20	30 33.6	97 24	156.7	30 04.4	97 24	156.8	29 35.3	97 24	156.9	29 06.1	97 24	157.1	28 37.0	97 24	157.2	28 07.8	97 24	157.3	27 38.6	97 24	157.5	27 09.5	97 23	157.6	20
1	30 18.9	97 25	155.5	29 49.9	97 25	155.7	29 20.8	97 25	155.8	28 51.8	97 25	156.0	28 22.7	97 25	156.1	27 53.6	97 25	156.2	27 24.5	97 25	156.4	26 55.4	97 24	156.5	1
2	30 03.7	97 26	154.4	29 34.7	97 26	154.6	29 05.7	97 26	154.7	28 36.7	97 26	154.9	28 07.7	97 26	155.0	27 38.7	97 26	155.2	27 09.7	97 26	155.3	26 40.7	97 26	155.4	2
3	29 47.8	96 28	153.3	29 18.9	96 27	153.5	28 50.0	96 27	153.6	28 21.1	96 27	153.8	27 52.2	96 27	153.9	27 23.2	96 27	154.1	26 54.3	96 27	154.2	26 25.4	96 27	154.4	3
4	29 31.2	96 29	152.2	29 02.4	96 28	152.4	28 33.6	96 28	152.5	28 04.8	96 28	152.7	27 36.0	96 28	152.8	27 07.2	96 28	153.0	26 38.3	96 28	153.2	26 09.4	96 28	153.3	4
25	29 14.1	96 30	151.1	28 45.4	96 29	151.3	28 16.7	96 29	151.4	27 47.9	96 29	151.6	27 19.2	96 29	151.8	26 50.5	96 29	151.9	26 21.7	96 29	152.1	25 52.9	96 29	152.2	25
6	28 56.3	95 31	150.0	28 27.7	95 30	150.2	27 59.1	95 30	150.4	27 30.5	95 30	150.5	27 01.8	96 30	150.7	26 33.2	96 30	150.9	26 04.5	96 30	151.0	25 35.8	96 30	151.2	6
7	28 38.0	95 32	148.9	28 09.5	95 31	149.1	27 41.0	95 31	149.3	27 12.4	95 31	149.5	26 43.9	95 31	149.6	26 15.3	95 31	149.8	25 46.7	95 31	150.0	25 18.1	95 30	150.1	7
8	28 19.1	95 32	147.9	27 50.7	95 32	148.0	27 22.2	95 32	148.2	26 53.8	96 32	148.4	26 25.3	95 32	148.6	25 56.8	95 32	148.8	25 28.4	95 32	148.9	24 59.9	95 31	149.1	8
9	27 59.6	94 33	146.8	27 31.3	94 33	147.0	27 02.9	94 33	147.2	26 34.6	95 33	147.3	26 06.2	95 33	147.5	25 37.8	95 33	147.7	25 09.4	95 32	147.9	24 41.0	95 32	148.1	9
30	27 39.5	94 34	145.7	27 11.3	94 34	145.9	26 43.1	94 34	146.1	26 14.8	94 34	146.3	25 46.6	94 34	146.5	25 18.3	94 34	146.7	24 50.0	94 33	146.8	24 21.7	94 33	147.0	30
1	27 18.9	94 35	144.7	26 50.8	94 35	144.9	26 22.7	94 35	145.1	25 54.5	94 35	145.3	25 26.3	94 35	145.4	24 58.2	94 34	145.6	24 30.0	94 34	145.8	24 01.7	94 34	146.0	1
2	26 57.8	93 36	143.6	26 29.8	93 36	143.8	26 01.7	93 36	144.0	25 33.7	94 36	144.2	25 05.6	94 35	144.4	24 37.5	94 35	144.6	24 09.4	94 35	144.8	23 41.3	94 35	145.0	2
3	26 36.1	93 37	142.6	26 08.2	93 37	142.8	25 40.2	93 37	143.0	25 12.3	93 36	143.2	24 44.3	93 36	143.4	24 16.3	93 36	143.6	23 48.3	93 36	143.8	23 20.3	93 36	144.0	3
4	26 13.9	93 38	141.5	25 46.1	93 38	141.8	25 18.2	93 38	142.0	24 50.4	93 37	142.2	24 22.5	93 37	142.4	23 54.6	93 37	142.6	23 26.7	93 37	142.8	22 58.8	93 37	143.0	4
35	25 51.2	92 39	140.5	25 23.5	92 38	140.7	24 55.7	92 38	140.9	24 28.0	93 38	141.2	24 00.2	93 38	141.4	23 32.4	93 38	141.6	23 04.6	93 38	141.8	22 36.8	93 38	142.0	35
6	25 28.0	92 39	139.5	25 00.4	92 39	139.7	24 32.7	92 39	139.9	24 05.1	92 39	140.1	23 37.4	92 39	140.4	23 09.8	92 39	140.6	22 42.1	92 38	140.8	22 14.3	92 38	141.0	6
7	25 04.3	92 40	138.5	24 36.8	92 40	138.7	24 09.3	92 40	138.9	23 41.7	92 40	139.1	23 14.2	92 40	139.4	22 46.6	92 39	139.6	22 19.0	92 39	139.8	21 51.4	92 39	140.0	7
8	24 40.1	91 41	137.5	24 12.7	91 41	137.7	23 45.3	91 41	137.9	23 17.9	92 41	138.1	22 50.4	92 40	138.4	22 22.9	92 40	138.6	21 55.4	92 40	138.8	21 27.9	92 40	139.0	8
9	24 15.5	91 42	136.5	23 48.2	91 42	136.7	23 20.9	91 41	136.9	22 53.5	91 41	137.2	22 26.2	91 41	137.4	21 58.8	91 41	137.6	21 31.4	91 41	137.8	21 04.0	91 41	138.0	9
40	23 50.4	91 43	135.5	23 23.2	91 42	135.7	22 56.0	91 42	135.9	22 28.8	91 42	136.2	22 01.5	91 42	136.4	21 34.2	91 42	136.6	21 06.9	91 42	136.8	20 39.6	91 41	137.1	40
1	23 24.9	90 43	134.5	22 57.8	90 43	134.7	22 30.7	90 43	135.0	22 03.5	90 43	135.2	21 36.4	91 43	135.4	21 09.2	91 42	135.7	20 42.0	91 42	135.9	20 14.8	91 42	136.1	1
2	22 58.9	90 44	133.5	22 31.9	90 44	133.8	22 04.9	90 44	134.0	21 37.9	90 43	134.2	21 10.8	90 43	134.5	20 43.8	90 43	134.7	20 16.7	90 43	134.9	19 49.6	90 43	135.2	2
3	22 32.5	90 45	132.6	22 05.6	90 44	132.8	21 38.7	90 44	133.0	21 11.8	90 44	133.3	20 44.8	90 44	133.5	20 17.9	90 44	133.7	19 50.9	90 44	134.0	19 23.9	90 44	134.2	3
4	22 05.7	89 45	131.6	21 38.9	89 45	131.8	21 12.1	89 45	132.1	20 45.3	89 45	132.3	20 18.4	90 45	132.6	19 51.6	90 44	132.8	19 24.7	90 44	133.0	18 57.8	90 44	133.3	4
45	21 38.5	89 46	130.6	21 11.8	89 46	130.9	20 45.1	89 46	131.1	20 18.4	89 45	131.4	19 51.6	89 45	131.6	19 24.9	89 45	131.8	18 58.1	89 45	132.1	18 31.3	89 45	132.3	45
6	21 10.9	89 47	129.7	20 44.3	89 46	129.9	20 17.7	89 46	130.2	19 51.1	89 46	130.4	19 24.5	89 46	130.7	18 57.8	89 46	130.9	18 31.1	89 46	131.2	18 04.4	89 45	131.4	6
7	20 42.9	88 47	128.7	20 16.4	88 47	129.0	19 49.9	88 47	129.2	19 23.4	88 47	129.5	18 56.9	89 47	129.7	18 30.3	89 46	130.0	18 03.7	89 46	130.2	17 37.1	89 46	130.5	7
8	20 14.6	88 48	127.8	19 48.2	88 48	128.1	19 21.8	88 48	128.3	18 55.4	88 47	128.6	18 28.9	88 47	128.8	18 02.5	88 47	129.1	17 36.0	88 47	129.3	17 09.5	88 47	129.5	8
9	19 45.9	88 48	126.9	19 19.6	88 48	127.1	18 53.3	88 48	127.4	18 26.9	88 48	127.6	18 00.6	88 48	127.9	17 34.2	88 48	128.1	17 07.8	88 47	128.4	16 41.4	88 47	128.6	9
50	19 16.8	87 49	125.9	18 50.6	87 49	126.2	18 24.4	87 49	126.5	17 58.2	87 49	126.7	17 31.9	88 48	127.0	17 05.7	88 48	127.2	16 39.4	88 48	127.5	16 13.1	88 48	127.7	50
1	18 47.4	87 50	125.0	18 21.3	87 49	125.3	17 55.2	87 49	125.5	17 29.1	87 49	125.8	17 02.9	87 49	126.1	16 36.7	87 49	126.3	16 10.5	87 49	126.6	15 44.3	87 48	126.8	1
2	18 17.7	87 50	124.1	17 51.7	87 50	124.4	17 25.6	87 50	124.6	16 59.6	87 50	124.9	16 33.5	87 49	125.2	16 07.5	87 49	125.4	15 41.4	87 49	125.7	15 15.3	87 49	125.9	2
3	17 47.6	86 51	123.2	17 21.7	86 50	123.5	16 55.8	86 50	123.7	16 29.8	87 50	124.0	16 03.9	87 50	124.3	15 37.9	87 50	124.5	15 11.9	87 50	124.8	14 45.8	87 50	125.0	3
4	17 17.2	86 51	122.3	16 51.4	86 51	122.6	16 25.6	86 51	122.8	15 59.7	86 51	123.1	15 33.9	86 51	123.4	15 08.0	86 50	123.6	14 42.1	86 50	123.9	14 16.1	86 50	124.1	4
55	16 46.6	86 52	121.4	16 20.9	86 51	121.7	15 55.1	86 51	121.9	15 29.3	86 51	122.2	15 03.5	86 51	122.5	14 37.7	86 51	122.7	14 11.9	86 51	123.0	13 46.1	86 51	123.3	55
6	16 15.6	85 52	120.5	15 50.0	86 52	120.8	15 24.3	86 52	121.1	14 58.6	86 52	121.3	14 32.9	86 52	121.6	14 07.2	86 51	121.9	13 41.5	86 51	122.1	13 15.7	86 51	122.4	6
7	15 44.4	85 53	119.6	15 18.8	85 52	119.9	14 53.2	85 52	120.2	14 27.6	85 52	120.4	14 02.0	85 52	120.7	13 36.4	85 52	121.0	13 10.8	86 52	121.2	12 45.1	86 52	121.5	7
8	15 12.8	85 53	118.8	14 47.4	85 53	119.0	14 21.9	85 53	119.3	13 56.4	85 53	119.6	13 30.9	85 52	119.8	13 05.3	85 52	120.1	12 39.7	85 52	120.4	12 14.2	85 52	120.6	8
9	14 41.1	85 53	117.9	14 15.7	85 53	118.2	13 50.3	85 53	118.4	13 24.8	85 53	118.7	12 59.4	85 53	119.0	12 33.9	85 53	119.2	12 08.5	85 53	119.5	11 43.0	85 52	119.8	9
60	14 09.0	84 54	117.0	13 43.7	84 54	117.3	13 18.4	84 54	117.6	12 53.0	85 53	117.8	12 27.7	85 53	118.1	12 02.3	85 53	118.4	11 36.9	85 53	118.7	11 11.5	85 53	118.9	60
1	13 36.7	84 54	116.1	13 11.5	84 54	116.4	12 46.2	84 54	116.7	12 21.0	84 54	117.0	11 55.7	84 54	117.2	11 30.4	84 54	117.5	11 05.1	84 53	117.8	10 39.8	84 53	118.1	1
2	13 04.2	84 55	115.3	12 39.0	84 54	115.6	12 13.9	84 54	115.8	11 48.7	84 54	116.1	11 23.5	84 54	116.4	10 58.3	84 54	116.7	10 33.0	84 54	116.9	10 07.8	84 54	117.2	2
3	12 31.4	84 55	114.4	12 06.3	84 55	114.7	11 41.2	84 55	115.0	11 16.1	84 55	115.3	10 51.0	84 54	115.5	10 25.9	84 54	115.8	10 00.7	84 54	116.1	9 35.5	84 54	116.4	3
4	11 58.4	83 55	113.6	11 33.4	83 55	113.9	11 08.4	83 55	114.1	10 43.4	83 55	114.4	10 18.3	84 55	114.7	9 53.3	84 55	115.0	9 28.2	84 55	115.3	9 03.1	84 54	115.5	4
65	11 25.2	83 56	112.7	11 00.3	83 56	113.0	10 35.3	83 55	113.3	10 10.4	83 55	113.6	9 45.4	83 55	113.9	9 20.4	83 55	114.1	8 55.4	83 55	114.4	8 30.4	83 55	114.7	65
6	10 51.8	83 56	111.9	10 27.0	83 56	112.2	10 02.1	83 56	112.5	9 37.2	83 56	112.7	9 12.3	83 56	113.0	8 47.3	83 55	113.3	8 22.4	83 55	113.6	7 57.5	83 55	113.9	6
7	10 18.2	83 56	111.0	9 53.4	83 56	111.3	9 28.6	83 56	111.6	9 03.8	83 56	111.9	8 38.9	83 56	112.2	8 14.1	83 56	112.5	7 49.2	83 56	112.7	7 24.3	83 56	113.0	7
8	9 44.4	82 57	110.2	9 19.7	82 57	110.5	8 54.9	83 56	110.8	8 30.2	83 56	111.1	8 05.4	83 56	111.4	7 40.6	83 56	111.6	7 15.8	83 56	111.9	6 51.0	83 56	112.2	8
9	9 10.4	82 57	109.4	8 45.8	82 57	109.7	8 21.1	82 57	109.9	7 56.4	82 57	110.2	7 31.7	82 57	110.5	7 07.0	82 56	110.8	6 42.2	82 56	111.1	6 17.5	82 56	111.4	9
70	8 36.3	82 57	108.5	8 11.7	82 57	108.8	7 47.1	82 57	109.1	7 22.4	82 57	109.4	6 57.8	82 57	109.7	6 33.1	82 57	110.0	6 08.4	82 57	110.3	5 43.8	82 56	110.6	70
1	8 02.0	82 57	107.7	7 37.4	82 57	108.0	7 12.9	82 57	108.3	6 48.3	82 57	108.6	6 23.7	82 57	108.9	5 59.1	82 57	109.2	5 34.5	82 57	109.4	5 09.9	82 57	109.7	1
2	7 27.5	82 58	106.9	7 03.0	82 58	107.2	6 38.5	82 58	107.5	6 14.0	82 57	107.8	5 49.4	82 57	108.1	5 24.9	82 57	108.3	5 00.3	82 57	108.6				2
3	6 52.9	81 58	106.1	6 28.4	82 58	106.4	6 04.0	82 58	106.7	5 39.5	82 58	106.9	5 15.0	82 58	107.2										3
4	6 18.1	81 58	105.3	5 53.7	81 58	105.6	5 29.3	81 58	105.8	5 04.9	81 58	106.1													4
75	5 43.2	81 58	104.4	5 18.9	81 58	104.7																			75
6	5 08.2	81 59	103.6																						6

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91																						5 23.0	80 60	84.7	91

Digitized by Google

Lat. 53°

H.A.	8° 00′ Alt.	Δd Δt	Az.	8° 30′ Alt.	Δd Δt	Az.	9° 00′ Alt.	Δd Δt	Az.	9° 30′ Alt.	Δd Δt	Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	45 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	46 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0
1	44 59.6	1.0 02	178.6	45 29.6	1.0 02	178.6	45 59.6	1.0 02	178.6	46 29.5	1.0 02	178.6
2	44 58.2	1.0 04	177.2	45 28.2	1.0 04	177.2	45 58.2	1.0 04	177.2	46 28.2	1.0 04	177.1
3	44 56.0	1.0 05	175.8	45 26.0	1.0 05	175.8	45 56.0	1.0 05	175.7	46 25.9	1.0 05	175.7
4	44 52.9	1.0 07	174.4	45 22.9	1.0 07	174.4	45 52.8	1.0 07	174.3	46 22.8	1.0 07	174.3
05	44 49.0	1.0 08	173.0	45 18.9	1.0 08	173.0	45 48.8	1.0 08	172.9	46 18.7	1.0 08	172.9
6	44 44.2	1.0 10	171.6	45 14.0	1.0 10	171.6	45 43.9	1.0 10	171.5	46 13.8	1.0 10	171.4
7	44 38.5	99 11	170.2	45 08.3	99 11	170.2	45 38.1	99 11	170.1	46 08.0	99 11	170.0
8	44 31.9	99 12	168.9	45 01.7	99 12	168.8	45 31.5	99 13	168.7	46 01.3	99 13	168.6
9	44 24.5	99 14	167.5	44 54.2	99 14	167.4	45 24.0	99 14	167.3	45 53.7	99 14	167.2
10	44 16.3	99 15	166.1	44 45.9	99 15	166.0	45 15.6	99 15	165.9	45 45.3	99 15	165.8
1	44 07.2	99 17	164.7	44 36.8	99 17	164.6	45 06.4	99 17	164.5	45 36.0	99 17	164.4
2	43 57.3	98 18	163.4	44 26.8	98 18	163.3	44 56.3	98 18	163.1	45 25.8	98 18	163.0
3	43 46.5	98 19	162.0	44 16.0	98 19	161.9	44 45.4	98 20	161.8	45 14.9	98 20	161.6
4	43 35.0	98 21	160.7	44 04.4	98 21	160.5	44 33.7	98 21	160.4	45 03.1	98 21	160.3
15	43 22.6	98 22	159.4	43 51.9	98 22	159.2	44 21.2	98 22	159.1	44 50.5	98 22	158.9
6	43 09.5	97 23	158.0	43 38.7	97 23	157.9	44 07.9	97 23	157.7	44 37.1	97 24	157.5
7	42 55.6	97 24	156.7	43 24.7	97 25	156.5	43 53.8	97 25	156.4	44 22.9	97 25	156.2
8	42 41.0	97 26	155.4	43 10.0	97 26	155.2	43 39.0	97 26	155.1	44 08.0	97 26	154.9
9	42 25.6	96 27	154.1	42 54.5	96 27	153.9	43 23.4	96 27	153.7	43 52.3	96 27	153.6
20	42 09.4	96 28	152.8	42 38.2	96 28	152.6	43 07.0	96 28	152.4	43 35.8	96 29	152.2
1	41 52.6	96 29	151.5	42 21.3	96 29	151.3	42 50.0	96 30	151.1	43 18.6	96 30	150.9
2	41 35.0	95 30	150.3	42 03.6	96 31	150.1	42 32.2	95 31	149.9	43 00.7	95 31	149.7
3	41 16.8	95 32	149.0	41 45.2	95 32	148.8	42 13.7	95 32	148.6	42 42.1	95 32	148.4
4	40 57.8	95 33	147.8	41 26.2	95 33	147.5	41 54.5	94 33	147.3	42 22.9	94 33	147.1
25	40 38.2	94 34	146.5	41 06.5	94 34	146.3	41 34.7	94 34	146.1	42 02.9	94 34	145.9
6	40 18.0	94 35	145.3	40 46.1	94 35	145.1	41 14.3	94 35	144.8	41 42.3	94 35	144.6
7	39 57.1	93 36	144.1	40 25.2	93 36	143.9	40 53.1	93 36	143.6	41 21.1	93 36	143.4
8	39 35.7	93 37	142.9	40 03.6	93 37	142.7	40 31.4	93 37	142.4	40 59.3	93 37	142.2
9	39 13.6	93 38	141.7	39 41.4	93 38	141.5	40 09.1	92 38	141.2	40 36.8	92 38	141.0
30	38 50.9	92 39	140.5	39 18.6	92 39	140.3	39 46.2	92 39	140.0	40 13.8	92 39	139.8
1	38 27.7	92 40	139.4	38 55.2	92 40	139.1	39 22.7	92 40	138.8	39 50.2	91 40	138.6
2	38 03.9	91 41	138.2	38 31.3	91 41	137.9	38 58.7	91 41	137.7	39 26.0	91 41	137.4
3	37 39.5	91 41	137.1	38 06.8	91 42	136.8	38 34.1	91 42	136.5	39 01.3	91 42	136.3
4	37 14.7	91 42	135.9	37 41.9	91 42	135.7	38 09.0	90 43	135.4	38 36.1	90 43	135.1
35	36 49.3	90 43	134.8	37 16.4	90 43	134.5	37 43.4	90 44	134.3	38 10.3	90 44	134.0
6	36 23.4	90 44	133.7	36 50.4	90 44	133.4	37 17.3	90 44	133.1	37 44.1	89 44	132.9
7	35 57.1	89 45	132.6	36 23.9	89 45	132.3	36 50.7	89 45	132.0	37 17.4	89 45	131.7
8	35 30.3	89 45	131.5	35 57.0	89 46	131.2	36 23.6	89 46	130.9	36 50.2	89 46	130.7
9	35 03.0	89 46	130.4	35 29.6	89 46	130.1	35 56.1	88 47	129.9	36 22.6	88 47	129.6
40	34 35.3	88 47	129.4	35 01.8	88 47	129.1	35 28.2	88 47	128.8	35 54.6	88 47	128.5
1	34 07.2	88 48	128.3	34 33.5	88 48	128.0	34 59.8	88 48	127.7	35 26.1	87 48	127.4
2	33 38.6	88 48	127.3	34 04.9	87 48	127.0	34 31.1	87 49	126.7	34 57.2	87 49	126.4
3	33 09.7	87 49	126.2	33 35.8	87 49	125.9	34 01.9	87 49	125.6	34 28.0	87 49	125.3
4	32 40.4	87 49	125.2	33 06.4	87 50	124.9	33 32.4	87 50	124.6	33 58.3	86 50	124.3
45	32 10.7	86 50	124.2	32 36.6	86 50	123.9	33 02.5	86 50	123.6	33 28.3	86 51	123.3
6	31 40.6	86 51	123.2	32 06.5	86 51	122.9	32 32.2	86 51	122.6	32 57.9	86 51	122.3
7	31 10.2	86 51	122.2	31 36.0	86 51	121.9	32 01.6	85 52	121.6	32 27.2	85 52	121.3
8	30 39.5	85 52	121.2	31 05.1	85 52	120.9	31 30.7	85 52	120.6	31 56.2	85 52	120.3
9	30 08.5	85 52	120.2	30 34.0	85 52	119.9	30 59.4	85 53	119.6	31 24.9	85 53	119.3
50	29 37.1	85 53	119.2	30 02.5	85 53	118.9	30 27.9	84 53	118.6	30 53.2	84 53	118.3
1	29 05.5	84 53	118.3	29 30.8	84 53	118.0	29 56.1	84 54	117.7	30 21.3	84 54	117.3
2	28 33.5	84 54	117.3	28 58.7	84 54	117.0	29 23.9	84 54	116.7	29 49.1	84 54	116.4
3	28 01.3	84 54	116.4	28 26.4	84 54	116.1	28 51.5	84 54	115.8	29 16.6	83 55	115.4
4	27 28.8	84 55	115.4	27 53.9	83 55	115.1	28 18.9	83 55	114.8	28 43.9	83 55	114.5
55	26 56.1	83 55	114.5	27 21.1	83 55	114.2	27 46.0	83 55	113.9	28 10.9	83 55	113.6
6	26 23.1	83 55	113.6	26 48.0	83 55	113.3	27 12.9	83 56	113.0	27 37.7	83 56	112.6
7	25 49.9	83 56	112.7	26 14.7	83 56	112.4	26 39.5	83 56	112.0	27 04.2	82 56	111.7
8	25 16.5	83 56	111.8	25 41.2	82 56	111.5	26 05.9	82 56	111.1	26 30.6	82 56	110.8
9	24 42.8	82 56	110.9	25 07.5	82 57	110.6	25 32.2	82 57	110.2	25 56.7	82 57	109.9
60	24 09.0	82 57	110.0	24 33.6	82 57	109.7	24 58.2	82 57	109.3	25 22.7	82 57	109.0
1	23 35.0	82 57	109.1	23 59.5	82 57	108.8	24 24.0	82 57	108.5	24 48.5	81 57	108.1
2	23 00.8	82 57	108.2	23 25.2	82 57	107.9	23 49.7	81 58	107.6	24 14.1	81 58	107.3
3	22 26.4	81 58	107.3	22 50.8	81 58	107.0	23 15.2	81 58	106.7	23 39.5	81 58	106.4
4	21 51.8	81 58	106.5	22 16.2	81 58	106.1	22 40.5	81 58	105.8	23 04.8	81 58	105.5
65	21 17.1	81 58	105.6	21 41.4	81 58	105.3	22 05.7	81 58	105.0	22 29.9	81 58	104.6
6	20 42.3	81 58	104.7	21 06.5	81 58	104.4	21 30.7	81 58	104.1	21 54.9	81 59	103.8
7	20 07.3	81 59	103.9	20 31.5	81 59	103.6	20 55.7	81 59	103.2	21 19.8	80 59	102.9
8	19 32.2	81 59	103.0	19 56.3	80 59	102.7	20 20.4	80 59	102.4	20 44.5	80 59	102.1
9	18 56.9	80 59	102.2	19 21.0	80 59	101.9	19 45.1	80 59	101.6	20 09.2	80 59	101.2
70	18 21.6	80 59	101.3	18 45.6	80 59	101.0	19 09.7	80 59	100.7	19 33.7	80 59	100.4
1	17 46.1	80 59	100.5	18 10.2	80 59	100.2	18 34.2	80 59	99.9	18 58.1	80 59	99.6
2	17 10.6	80 59	99.7	17 34.6	80 59	99.4	17 58.5	80 60	99.0	18 22.5	80 60	98.7
3	16 34.9	80 60	98.9	16 58.9	80 60	98.5	17 22.8	80 60	98.2	17 46.8	80 60	97.9
4	15 59.2	80 60	98.0	16 23.2	80 60	97.7	16 47.1	80 60	97.4	17 11.0	80 60	97.1
75	15 23.4	80 60	97.2	15 47.3	80 60	96.9	16 11.2	80 60	96.6	16 35.1	80 60	96.3
6	14 47.6	80 60	96.4	15 11.5	80 60	96.1	15 35.3	80 60	95.8	15 59.2	79 60	95.4
7	14 11.7	80 60	95.6	14 35.5	80 60	95.3	14 59.4	79 60	94.9	15 23.2	79 60	94.6
8	13 35.7	80 60	94.8	13 59.6	79 60	94.4	14 23.4	79 60	94.1	14 47.2	79 60	93.8
9	12 59.7	80 60	94.0	13 23.5	79 60	93.6	13 47.4	79 60	93.3	14 11.2	79 60	93.0
80	12 23.6	79 60	93.1	12 47.5	79 60	92.8	13 11.3	79 60	92.5	13 35.1	79 60	92.2
1	11 47.6	79 60	92.3	12 11.4	79 60	92.0	12 35.2	79 60	91.7	12 59.0	79 60	91.4
2	11 11.5	79 60	91.5	11 35.3	79 60	91.2	11 59.1	79 60	90.9	12 22.9	79 60	90.6
3	10 35.4	79 60	90.7	10 59.2	79 60	90.4	11 23.0	79 60	90.1	11 46.8	79 60	89.8
4	9 59.3	79 60	89.9	10 23.1	79 60	89.6	10 46.9	79 60	89.3	11 10.7	79 60	89.0
85	9 23.2	79 60	89.1	9 47.0	79 60	88.8	10 10.8	79 60	88.5	10 34.6	79 60	88.2
6	8 47.1	79 60	88.3	9 10.9	79 60	88.0	9 34.7	79 60	87.7	9 58.5	79 60	87.4
7	8 11.0	79 60	87.5	8 34.8	79 60	87.2	8 58.6	79 60	86.9	9 22.4	79 60	86.6
8	7 34.9	79 60	86.8	7 58.8	79 60	86.4	8 22.6	79 60	86.1	8 46.4	79 60	85.8
9	6 58.9	80 60	86.0	7 22.7	79 60	85.7	7 46.6	79 60	85.3	8 10.4	79 60	85.0
90	6 22.9	80 60	85.2	6 46.8	80 60	84.9	7 10.6	80 60	84.6	7 34.5	79 60	84.2

H.A.	10° 00′ Alt.	Δd Δt	Az.	10° 30′ Alt.	Δd Δt	Az.	11° 00′ Alt.	Δd Δt	Az.	11° 30′ Alt.	Δd Δt	Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	47 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	48 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0
1	46 59.5	1.0 02	178.6	47 29.5	1.0 02	178.5	47 59.5	1.0 02	178.5	48 29.5	1.0 02	178.5
2	46 58.2	1.0 04	177.1	47 28.2	1.0 04	177.1	47 58.2	1.0 04	177.1	48 28.1	1.0 04	177.0
3	46 55.9	1.0 05	175.7	47 25.9	1.0 05	175.6	47 55.8	1.0 05	175.6	48 25.8	1.0 05	175.6
4	46 52.7	1.0 07	174.2	47 22.7	1.0 07	174.2	47 52.6	1.0 07	174.1	48 22.6	1.0 07	174.1
05	46 48.7	1.0 08	172.8	47 18.6	1.0 08	172.7	47 48.5	1.0 08	172.7	48 18.4	1.0 08	172.6
6	46 43.7	1.0 10	171.4	47 13.5	1.0 10	171.3	47 43.4	1.0 10	171.2	48 13.3	1.0 10	171.2
7	46 37.8	99 11	169.9	47 07.6	99 11	169.9	47 37.5	99 11	169.8	48 07.3	99 12	169.7
8	46 31.1	99 13	168.5	47 00.8	99 13	168.4	47 30.6	99 13	168.3	48 00.4	99 13	168.2
9	46 23.4	99 14	167.1	46 53.1	99 14	167.0	47 22.9	99 14	166.9	47 52.6	99 14	166.8
10	46 14.9	99 16	165.7	46 44.6	99 16	165.6	47 14.2	99 16	165.5	47 43.9	99 16	165.3
1	46 05.6	99 17	164.3	46 35.2	99 17	164.2	47 04.7	99 17	164.0	47 34.3	99 17	163.9
2	45 55.4	98 18	162.9	46 24.9	98 19	162.8	46 54.4	98 19	162.6	47 23.9	98 19	162.5
3	45 44.3	98 20	161.5	46 13.7	98 20	161.4	46 43.2	98 20	161.2	47 12.6	98 20	161.1
4	45 32.4	98 21	160.1	46 01.8	98 21	160.0	46 31.1	98 21	159.8	47 00.4	98 22	159.7
15	45 19.8	98 22	158.7	45 49.0	97 23	158.6	46 18.2	97 23	158.4	46 47.5	97 23	158.3
6	45 06.3	97 24	157.4	45 35.4	97 24	157.2	46 04.6	97 24	157.0	46 33.7	97 24	156.9
7	44 52.0	97 25	156.0	45 21.0	97 25	155.9	45 50.1	97 25	155.7	46 19.1	97 26	155.5
8	44 36.9	97 26	154.7	45 05.9	96 27	154.5	45 34.8	96 27	154.3	46 03.7	96 27	154.1
9	44 21.1	96 28	153.4	44 50.0	96 28	153.2	45 18.8	96 28	153.0	45 47.6	96 28	152.8
20	44 04.6	96 29	152.0	44 33.3	96 29	151.8	45 02.0	96 29	151.6	45 30.7	96 29	151.4
1	43 47.3	95 30	150.7	44 15.9	95 30	150.5	44 44.5	95 30	150.3	45 13.0	95 31	150.1
2	43 29.3	95 31	149.4	43 57.8	96 31	149.2	44 26.2	95 32	149.0	44 54.7	95 32	148.8
3	43 10.5	95 32	148.2	43 38.9	95 33	147.9	44 07.3	94 33	147.7	44 35.6	94 33	147.5
4	42 51.2	94 33	146.9	43 19.4	94 34	146.7	43 47.7	94 34	146.4	44 15.9	94 34	146.2
25	42 31.1	94 35	145.6	42 59.2	94 35	145.4	43 27.4	94 35	145.1	43 55.4	94 35	144.9
6	42 10.4	93 36	144.4	42 38.4	93 36	144.1	43 06.4	93 36	143.9	43 34.3	93 36	143.6
7	41 49.0	93 37	143.1	42 16.9	93 37	142.9	42 44.8	93 37	142.6	43 12.6	93 37	142.4
8	41 27.1	93 38	141.9	41 54.8	93 38	141.7	42 22.6	92 38	141.4	42 50.3	92 38	141.1
9	41 04.5	92 39	140.7	41 32.1	92 39	140.4	41 59.7	92 39	140.2	42 27.3	92 39	139.9
30	40 41.3	92 40	139.5	41 08.8	92 40	139.2	41 36.3	92 40	139.0	42 03.8	91 40	138.7
1	40 17.6	91 40	138.3	40 45.0	91 41	138.1	41 12.3	91 41	137.8	41 39.7	91 41	137.5
2	39 53.3	91 41	137.1	40 20.6	91 42	136.9	40 47.8	91 42	136.6	41 15.0	91 42	136.3
3	39 28.5	91 42	136.0	39 55.6	90 42	135.7	40 22.7	90 43	135.4	40 49.8	90 43	135.1
4	39 03.1	90 43	134.8	39 30.2	90 43	134.6	39 57.1	90 44	134.3	40 24.1	90 44	134.0
35	38 37.3	90 44	133.7	39 04.2	90 44	133.4	39 31.0	89 44	133.1	39 57.8	89 45	132.8
6	38 10.9	89 45	132.6	38 37.7	89 45	132.3	39 04.4	89 45	132.0	39 31.1	89 45	131.7
7	37 44.1	89 45	131.5	38 10.7	89 46	131.2	38 37.4	89 46	130.9	39 03.9	88 46	130.6
8	37 16.8	88 46	130.4	37 43.3	88 46	130.1	38 09.8	88 47	129.8	38 36.3	88 47	129.5
9	36 49.1	88 47	129.3	37 15.5	88 47	129.0	37 41.8	88 47	128.7	38 08.2	88 48	128.4
40	36 20.9	88 48	128.2	36 47.2	88 48	127.9	37 13.4	87 48	127.6	37 39.6	87 48	127.3
1	35 52.3	87 48	127.1	36 18.5	87 48	126.8	36 44.6	87 49	126.5	37 10.7	87 49	126.2
2	35 23.3	87 49	126.1	35 49.4	87 49	125.8	36 15.4	87 49	125.5	36 41.4	86 50	125.1
3	34 54.0	87 50	125.0	35 19.9	86 50	124.7	35 45.8	86 50	124.4	36 11.7	86 50	124.1
4	34 24.2	86 50	124.0	34 50.0	86 50	123.7	35 15.8	86 51	123.4	35 41.6	86 51	123.1
45	33 54.1	86 51	123.0	34 19.8	86 51	122.7	34 45.5	86 51	122.3	35 11.1	85 51	122.0
6	33 23.6	86 51	122.0	33 49.2	85 52	121.6	34 14.8	85 52	121.3	34 40.4	85 52	121.0
7	32 52.8	85 52	120.9	33 18.3	85 52	120.6	33 43.8	85 52	120.3	34 09.2	85 52	120.0
8	32 21.7	85 52	120.0	32 47.1	85 53	119.6	33 12.5	85 53	119.3	33 37.8	84 53	119.0
9	31 50.2	85 53	119.0	32 15.6	84 53	118.7	32 40.9	84 53	118.3	33 06.1	84 53	118.0
50	31 18.5	84 53	118.0	31 43.7	84 54	117.7	32 08.9	84 54	117.4	32 34.1	84 54	117.0
1	30 46.5	84 54	117.0	31 11.6	84 54	116.7	31 36.7	84 54	116.4	32 01.8	83 54	116.1
2	30 14.2	84 54	116.1	30 39.2	83 54	115.8	31 04.2	83 55	115.4	31 29.2	83 55	115.1
3	29 41.6	83 55	115.1	30 06.6	83 55	114.8	30 31.5	83 55	114.5	30 56.4	83 55	114.2
4	29 08.8	83 55	114.2	29 33.7	83 55	113.9	29 58.5	83 55	113.5	30 23.3	83 56	113.2
55	28 35.7	83 55	113.3	29 00.5	83 56	112.9	29 25.3	82 56	112.6	29 50.0	82 56	112.3
6	28 02.4	82 56	112.3	28 27.2	82 56	112.0	28 51.8	82 56	111.7	29 16.5	82 56	111.4
7	27 28.9	82 56	111.4	27 53.6	82 56	111.1	28 18.2	82 56	110.8	28 42.7	82 57	110.4
8	26 55.2	82 57	110.5	27 19.8	82 57	110.2	27 44.3	82 57	109.9	28 08.8	82 57	109.5
9	26 21.3	82 57	109.6	26 45.8	82 57	109.3	27 10.3	81 57	109.0	27 34.7	81 57	108.6
60	25 47.2	82 57	108.7	26 11.6	81 57	108.4	26 36.0	81 57	108.1	27 00.4	81 57	107.7
1	25 12.9	81 57	107.8	25 37.3	81 58	107.5	26 01.6	81 58	107.2	26 25.9	81 58	106.8
2	24 38.4	81 58	106.9	25 02.8	81 58	106.6	25 27.0	81 58	106.3	25 51.3	81 58	106.0
3	24 03.8	81 58	106.1	24 28.1	81 58	105.7	24 52.3	81 58	105.4	25 16.5	81 58	105.1
4	23 29.0	81 58	105.2	23 53.2	81 58	104.9	24 17.4	80 58	104.5	24 41.5	80 58	104.2
65	22 54.1	81 58	104.3	23 18.3	80 58	104.0	23 42.4	80 59	103.7	24 06.5	80 59	103.3
6	22 19.1	80 59	103.5	22 43.2	80 59	103.1	23 07.2	80 59	102.8	23 31.3	80 59	102.5
7	21 43.9	80 59	102.6	22 08.0	80 59	102.3	22 32.0	80 59	102.0	22 56.0	80 59	101.6
8	21 08.6	80 59	101.8	21 32.6	80 59	101.4	21 56.6	80 59	101.1	22 20.5	80 59	100.8
9	20 33.2	80 59	100.9	20 57.2	80 59	100.6	21 21.1	80 59	100.3	21 45.0	80 59	99.9
70	19 57.7	80 59	100.1	20 21.6	80 59	99.8	20 45.5	80 59	99.4	21 09.4	80 60	99.1
1	19 22.1	80 59	99.2	19 46.0	80 60	98.9	20 09.9	80 60	98.6	20 33.7	79 60	98.3
2	18 46.4	80 60	98.4	19 10.3	80 60	98.1	19 34.1	79 60	97.8	19 58.0	79 60	97.4
3	18 10.7	80 60	97.6	18 34.5	79 60	97.3	18 58.3	79 60	96.9	19 22.1	79 60	96.6
4	17 34.8	79 60	96.8	17 58.7	79 60	96.4	18 22.5	79 60	96.1	18 46.2	79 60	95.8
75	16 58.9	79 60	95.9	17 22.7	79 60	95.6	17 46.5	79 60	95.3	18 10.3	79 60	95.0
6	16 23.0	79 60	95.1	16 46.8	79 60	94.8	17 10.5	79 60	94.5	17 34.3	79 60	94.2
7	15 47.0	79 60	94.3	16 10.8	79 60	94.0	16 34.5	79 60	93.7	16 58.2	79 60	93.4
8	15 11.0	79 60	93.5	15 34.7	79 60	93.2	15 58.5	79 60	92.9	16 22.2	79 60	92.6
9	14 34.9	79 60	92.7	14 58.7	79 60	92.4	15 22.4	79 60	92.1	15 46.1	79 60	91.7
80	13 58.9	79 60	91.9	14 22.6	79 60	91.6	14 46.3	79 60	91.3	15 10.0	79 60	90.9
1	13 22.8	79 60	91.1	13 46.5	79 60	90.8	14 10.2	79 60	90.5	14 33.9	79 60	90.1
2	12 46.6	79 60	90.3	13 10.4	79 60	90.0	13 34.1	79 60	89.7	13 57.8	79 60	89.3
3	12 10.5	79 60	89.5	12 34.3	79 60	89.2	12 58.0	79 60	88.9	13 21.7	79 60	88.6
4	11 34.4	79 60	88.7	11 58.2	79 60	88.4	12 21.9	79 60	88.1	12 45.6	79 60	87.8
85	10 58.3	79 60	87.9	11 22.1	79 60	87.6	11 45.8	79 60	87.3	12 09.5	79 60	87.0
6	10 22.3	79 60	87.1	10 46.0	79 60	86.8	11 09.8	79 60	86.5	11 33.5	79 60	86.2
7	9 46.2	79 60	86.3	10 10.0	79 60	86.0	10 33.7	79 60	85.7	10 57.5	79 60	85.4
8	9 10.2	79 60	85.5	9 34.0	79 60	85.2	9 57.8	79 60	84.9	10 21.5	79 60	84.6
9	8 34.2	79 60	84.7	8 58.0	79 60	84.4	9 21.8	79 60	84.1	9 45.6	79 60	83.8
90	7 58.3	79 60	83.9	8 22.1	79 60	83.6	8 45.9	79 60	83.3	9 09.7	79 60	83.0

Digitized by Google

10—15036

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	29 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	28 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	27 00.0	1.0 01	180.0	26 30.0	1.0 01	180.0	26 00.0	1.0 01	180.0	25 30.0	1.0 01	180.0	00
1	28 59.6	1.0 02	178.9	28 29.6	1.0 02	178.9	27 59.6	1.0 02	178.9	27 29.6	1.0 02	178.9	26 59.7	1.0 02	178.9	26 29.7	1.0 02	178.9	25 59.7	1.0 02	178.9	25 29.7	1.0 02	178.9	1
2	28 58.6	1.0 03	177.7	28 28.6	1.0 03	177.7	27 58.6	1.0 03	177.8	27 28.6	1.0 03	177.8	26 58.6	1.0 03	177.8	26 28.6	1.0 03	177.8	25 58.6	1.0 03	177.8	25 28.6	1.0 03	177.8	2
3	28 56.8	1.0 04	176.6	28 26.8	1.0 04	176.6	27 56.8	1.0 04	176.6	27 26.8	1.0 04	176.7	26 56.9	1.0 04	176.7	26 26.9	1.0 04	176.7	25 56.9	1.0 04	176.7	25 26.9	1.0 04	176.7	3
4	28 54.3	1.0 05	175.5	28 24.3	1.0 05	175.5	27 54.4	1.0 05	175.5	27 24.4	1.0 05	175.6	26 54.4	1.0 05	175.6	26 24.5	1.0 05	175.6	25 54.5	1.0 05	175.6	25 24.5	1.0 05	175.7	4
05	28 51.1	1.0 07	174.3	28 21.1	1.0 06	174.4	27 51.2	1.0 06	174.4	27 21.3	1.0 06	174.4	26 51.3	1.0 06	174.5	26 21.4	1.0 06	174.5	25 51.4	1.0 06	174.5	25 21.5	1.0 06	174.6	05
6	28 47.2	1.0 08	173.2	28 17.3	1.0 08	173.3	27 47.3	1.0 08	173.3	27 17.4	1.0 08	173.3	26 47.5	1.0 08	173.4	26 17.6	1.0 07	173.4	25 47.6	1.0 07	173.5	25 17.7	1.0 07	173.5	6
7	28 42.6	1.0 09	172.1	28 12.7	1.0 09	172.1	27 42.8	1.0 09	172.2	27 12.9	1.0 09	172.2	26 43.0	1.0 09	172.3	26 13.1	1.0 09	172.3	25 43.2	1.0 09	172.4	25 13.3	1.0 09	172.4	7
8	28 37.2	1.0 10	171.0	28 07.4	1.0 10	171.0	27 37.5	1.0 10	171.1	27 07.6	1.0 10	171.1	26 37.8	1.0 10	171.2	26 07.9	1.0 10	171.2	25 38.0	1.0 10	171.3	25 08.2	1.0 10	171.3	8
9	28 31.2	99 11	169.8	28 01.4	99 11	169.9	27 31.6	99 11	170.0	27 01.7	99 11	170.0	26 31.9	99 11	170.1	26 02.1	99 11	170.1	25 32.2	99 11	170.2	25 02.4	99 11	170.3	9
10	28 24.5	99 12	168.7	27 54.7	99 12	168.8	27 24.9	99 12	168.9	26 55.1	99 12	168.9	26 25.3	99 12	169.0	25 55.6	99 12	169.1	25 25.8	99 12	169.1	24 56.0	99 12	169.2	10
1	28 17.1	99 14	167.6	27 47.4	99 13	167.7	27 17.6	99 13	167.8	26 47.9	99 13	167.8	26 18.1	99 13	167.9	25 48.4	99 13	168.0	25 18.6	99 13	168.0	24 48.8	99 13	168.1	1
2	28 09.0	99 15	166.5	27 39.3	99 15	166.6	27 09.6	99 14	166.7	26 39.9	99 14	166.7	26 10.2	99 14	166.8	25 40.5	99 14	166.9	25 10.8	99 14	167.0	24 41.1	99 14	167.0	2
3	28 00.2	99 16	165.4	27 30.6	99 16	165.5	27 01.0	99 16	165.6	26 31.3	99 15	165.6	26 01.6	99 15	165.7	25 32.0	99 15	165.8	25 02.3	99 15	165.9	24 32.7	99 15	166.0	3
4	27 50.8	99 17	164.3	27 21.2	99 17	164.4	26 51.6	99 17	164.5	26 22.0	99 17	164.6	25 52.4	99 16	164.6	25 22.8	99 16	164.7	24 53.2	99 16	164.8	24 23.6	99 16	164.9	4
15	27 40.7	98 18	163.2	27 11.1	98 18	163.3	26 41.6	98 18	163.4	26 12.1	98 18	163.5	25 42.5	98 18	163.6	25 13.0	99 17	163.7	24 43.4	99 17	163.8	24 13.9	99 17	163.9	15
6	27 29.9	98 19	162.1	27 00.4	98 19	162.2	26 31.0	98 19	162.3	26 01.5	98 19	162.4	25 32.0	98 19	162.5	25 02.5	98 19	162.6	24 33.0	98 18	162.7	24 03.5	98 18	162.8	6
7	27 18.5	98 20	161.0	26 49.1	98 20	161.1	26 19.6	98 20	161.2	25 50.2	98 20	161.3	25 20.8	98 20	161.4	24 51.4	98 20	161.5	24 21.9	98 19	161.6	23 52.5	98 19	161.7	7
8	27 06.4	98 21	159.9	26 37.0	98 21	160.0	26 07.7	98 21	160.1	25 38.3	98 21	160.2	25 09.0	98 21	160.4	24 39.6	98 21	160.5	24 10.2	98 21	160.6	23 40.9	98 20	160.7	8
9	26 53.6	98 22	158.8	26 24.4	98 22	158.9	25 55.1	98 22	159.1	25 25.8	98 22	159.2	24 56.5	98 22	159.3	24 27.2	98 22	159.4	23 57.9	98 22	159.5	23 28.6	98 21	159.6	9
20	26 40.3	97 23	157.7	26 11.1	97 23	157.9	25 41.9	97 23	158.0	25 12.7	97 23	158.1	24 43.4	97 23	158.2	24 14.2	97 23	158.4	23 45.0	97 23	158.5	23 15.8	97 22	158.6	20
1	26 26.3	97 24	156.7	25 57.1	97 24	156.8	25 28.0	97 24	156.9	24 58.9	97 24	157.0	24 29.7	97 24	157.2	24 00.6	97 24	157.3	23 31.4	97 24	157.4	23 02.3	97 23	157.6	1
2	26 11.6	97 25	155.6	25 42.6	97 25	155.7	25 13.6	97 25	155.9	24 44.5	97 25	156.0	24 15.4	97 25	156.1	23 46.4	97 25	156.3	23 17.3	97 25	156.4	22 48.2	97 24	156.5	2
3	25 56.4	97 26	154.5	25 27.5	97 26	154.7	24 58.5	97 26	154.8	24 29.5	97 26	154.9	24 00.5	97 26	155.1	23 31.5	97 26	155.2	23 02.5	97 26	155.4	22 33.5	97 25	155.5	3
4	25 40.6	96 27	153.5	25 11.7	96 27	153.6	24 42.8	96 27	153.8	24 13.9	96 27	153.9	23 45.0	96 27	154.0	23 16.1	96 27	154.2	22 47.2	96 27	154.3	22 18.3	96 26	154.5	4
25	25 24.1	96 28	152.4	24 55.4	96 28	152.6	24 26.6	96 28	152.7	23 57.7	96 28	152.9	23 28.9	96 28	153.0	23 00.1	96 28	153.2	22 31.3	96 28	153.3	22 02.4	96 27	153.5	25
6	25 07.1	96 29	151.4	24 38.4	96 29	151.5	24 09.7	96 29	151.7	23 41.0	96 29	151.8	23 12.2	96 29	152.0	22 43.5	96 29	152.1	22 14.8	96 28	152.3	21 46.0	96 28	152.4	6
7	24 49.5	95 30	150.3	24 20.9	95 30	150.5	23 52.3	95 30	150.6	23 23.6	95 30	150.8	22 55.0	95 30	151.0	22 26.3	96 30	151.1	21 57.7	96 29	151.3	21 29.0	96 29	151.4	7
8	24 31.4	95 31	149.3	24 02.8	95 31	149.4	23 34.3	95 31	149.6	23 05.8	95 31	149.8	22 37.2	95 31	149.9	22 08.6	95 30	150.1	21 40.1	95 30	150.3	21 11.5	95 30	150.4	8
9	24 12.6	95 32	148.2	23 44.2	95 32	148.4	23 15.8	95 32	148.6	22 47.3	95 32	148.8	22 18.8	95 32	148.9	21 50.4	95 31	149.1	21 21.9	95 31	149.3	20 53.4	95 31	149.4	9
30	23 53.3	94 33	147.2	23 25.0	94 33	147.4	22 56.7	95 33	147.6	22 28.3	95 33	147.7	21 59.9	95 32	147.9	21 31.5	95 32	148.1	21 03.2	95 32	148.3	20 34.8	95 32	148.4	30
1	23 33.5	94 34	146.2	23 05.3	94 34	146.4	22 37.0	94 34	146.6	22 08.8	94 33	146.7	21 40.5	94 33	146.9	21 12.2	94 33	147.1	20 43.9	94 33	147.3	20 15.6	94 33	147.5	1
2	23 13.2	94 35	145.2	22 45.0	94 35	145.4	22 16.9	94 34	145.6	21 48.7	94 34	145.7	21 20.5	94 34	145.9	20 52.3	94 34	146.1	20 24.1	94 34	146.3	19 55.9	94 34	146.5	2
3	22 52.3	93 36	144.2	22 24.2	94 35	144.4	21 56.2	94 35	144.6	21 28.1	94 35	144.7	21 00.0	94 35	144.9	20 31.9	94 35	145.1	20 03.8	94 35	145.3	19 35.7	94 34	145.5	3
4	22 30.9	93 36	143.2	22 02.9	93 36	143.4	21 35.0	93 36	143.6	21 07.0	93 36	143.8	20 39.0	93 36	143.9	20 11.0	93 36	144.1	19 43.0	93 36	144.3	19 15.0	93 35	144.5	4
35	22 09.0	93 37	142.2	21 41.2	93 37	142.4	21 13.3	93 37	142.6	20 45.4	93 37	142.8	20 17.5	93 37	143.0	19 49.6	93 36	143.2	19 21.7	93 36	143.4	18 53.8	93 36	143.6	35
6	21 46.6	92 38	141.2	21 18.9	93 38	141.4	20 51.1	93 38	141.6	20 23.3	93 38	141.8	19 55.5	93 37	142.0	19 27.7	93 37	142.2	18 59.9	93 37	142.4	18 32.1	93 37	142.6	6
7	21 23.7	92 39	140.2	20 56.1	92 39	140.4	20 28.4	92 39	140.6	20 00.8	92 38	140.8	19 33.1	92 38	141.0	19 05.4	92 38	141.2	18 37.6	92 38	141.4	18 09.9	92 38	141.6	7
8	21 00.4	92 40	139.2	20 32.8	92 40	139.4	20 05.3	92 39	139.6	19 37.7	92 39	139.9	19 10.1	92 39	140.1	18 42.5	92 39	140.3	18 14.9	92 39	140.5	17 47.3	92 38	140.7	8
9	20 36.6	91 40	138.3	20 09.1	92 40	138.5	19 41.7	92 40	138.7	19 14.2	92 40	138.9	18 46.7	92 40	139.1	18 19.2	92 40	139.3	17 51.7	92 39	139.5	17 24.2	92 39	139.7	9
40	20 12.3	91 41	137.3	19 45.0	91 41	137.5	19 17.6	91 41	137.7	18 50.2	91 41	137.9	18 22.8	91 40	138.2	17 55.4	91 40	138.4	17 28.0	91 40	138.6	17 00.6	91 40	138.8	40
1	19 47.6	91 42	136.3	19 20.4	91 42	136.6	18 53.1	91 42	136.8	18 25.8	91 41	137.0	17 58.5	91 41	137.2	17 31.2	91 41	137.4	17 03.9	91 41	137.6	16 36.6	91 41	137.9	1
2	19 22.4	90 43	135.4	18 55.3	90 42	135.6	18 28.2	91 42	135.8	18 01.0	91 42	136.1	17 33.8	91 42	136.3	17 06.6	91 42	136.5	16 39.4	91 42	136.7	16 12.2	91 41	136.9	2
3	18 56.9	90 43	134.4	18 29.8	90 43	134.7	18 02.8	90 43	134.9	17 35.7	90 43	135.1	17 08.6	90 43	135.3	16 41.5	90 42	135.6	16 14.4	90 42	135.8	15 47.3	90 42	136.0	3
4	18 30.9	90 44	133.5	18 03.9	90 44	133.7	17 37.0	90 44	134.0	17 10.0	90 44	134.2	16 43.0	90 43	134.4	16 16.0	90 43	134.6	15 49.0	90 43	134.9	15 22.0	90 43	135.1	4
45	18 04.5	89 45	132.6	17 37.6	89 44	132.8	17 10.8	90 44	133.0	16 43.9	90 44	133.3	16 17.0	90 44	133.5	15 50.1	90 44	133.7	15 23.2	90 44	134.0	14 56.3	90 44	134.2	45
6	17 37.7	89 45	131.6	17 11.0	89 45	131.9	16 44.2	89 45	132.1	16 17.4	89 45	132.3	15 50.7	89 45	132.6	15 23.9	89 44	132.8	14 57.0	89 44	133.0	14 30.2	89 44	133.3	6
7	17 10.5	89 46	130.7	16 43.9	89 46	130.9	16 17.2	89 46	131.2	15 50.6	89 45	131.4	15 23.9	89 45	131.7	14 57.2	89 45	131.9	14 30.5	89 45	132.1	14 03.7	89 45	132.4	7
8	16 43.0	88 47	129.8	16 16.4	88 46	130.0	15 49.9	89 46	130.3	15 23.3	89 46	130.5	14 56.7	89 46	130.8	14 30.1	89 46	131.0	14 03.5	89 46	131.2	13 36.9	89 45	131.5	8
9	16 15.0	88 47	128.9	15 48.6	88 47	129.1	15 22.1	88 47	129.4	14 55.7	88 47	129.6	14 29.2	88 46	129.9	14 02.7	88 46	130.1	13 36.2	88 46	130.3	13 09.6	88 46	130.6	9
50	15 46.7	88 48	128.0	15 20.4	88 48	128.2	14 54.0	88 47	128.5	14 27.7	88 47	128.7	14 01.3	88 47	129.0	13 34.9	88 47	129.2	13 08.4	88 47	129.4	12 42.0	88 47	129.7	50
1	15 18.1	87 48	127.1	14 51.8	88 48	127.3	14 25.6	88 48	127.6	13 59.3	88 48	127.8	13 33.0	88 48	128.1	13 06.7	88 48	128.3	12 40.4	88 47	128.6	12 14.1	88 47	128.8	1
2	14 49.1	87 49	126.2	14 23.0	87 49	126.4	13 56.8	87 49	126.7	13 30.6	87 48	126.9	13 04.4	87 48	127.2	12 38.2	87 48	127.4	12 12.0	87 48	127.7	11 45.7	87 48	127.9	2
3	14 19.8	87 49	125.3	13 53.7	87 49	125.5	13 27.7	87 49	125.8	13 01.6	87 49	126.1	12 35.5	87 49	126.3	12 09.4	87 49	126.6	11 43.2	87 48	126.8	11 17.1	87 48	127.1	3
4	13 50.2	87 50	124.4	13 24.2	87 50	124.7	12 58.2	87 50	124.9	12 32.2	87 49	125.2	12 06.2	87 49	125.4	11 40.2	87 49	125.7	11 14.2	87 49	125.9	10 48.1	87 49	126.2	4
55	13 20.2	86 50	123.5	12 54.4	86 50	123.8	12 28.5	86 50	124.0	12 02.6	86 50	124.3	11 36.6	86 50	124.6	11 10.7	86 50	124.8	10 44.8	86 50	125.1	10 18.8	87 49	125.3	55
6	12 50.0	86 51	122.6	12 24.2	86 51	122.9	11 58.4	86 51	123.2	11 32.6	86 50	123.4	11 06.8	86 50	123.7	10 40.9	86 50	124.0	10 15.1	86 50	124.2	9 49.2	86 50	124.5	6
7	12 19.4	86 51	121.8	11 53.7	86 51	122.0	11 28.0	86 51	122.3	11 02.3	86 51	122.6	10 36.6	86 51	122.8	10 10.8	86 51	123.1	9 45.0	86 51	123.4	9 19.3	86 50	123.6	7
8	11 48.6	85 52	120.9	11 23.0	85 52	121.2	10 57.4	85 52	121.4	10 31.7	85 51	121.7	10 06.1	86 51	122.0	9 40.4	86 51	122.2	9 14.7	86 51	122.5	8 49.1	86 51	122.8	8
9	11 17.5	85 52	120.1	10 51.9	85 52	120.3	10 26.4	85 52	120.6	10 00.9	85 52	120.9	9 35.3	85 52	121.1	9 09.7	85 52	121.4	8 44.1	85 51	121.6	8 18.5	85 51	121.9	9
60	10 46.1	85 53	119.2	10 20.6	85 53	119.5	9 55.2	85 52	119.7	9 29.7	85 52	120.0	9 04.2	86 52	120.3	8 38.8	85 52	120.5	8 13.3	85 52	120.8	7 47.8	85 52	121.1	60
1	10 14.4	84 53	118.3	9 49.1	85 53	118.6	9 23.7	85 53	118.9	8 58.3	85 53	119.2	8 32.9	85 53	119.4	8 07.5	85 52	119.7	7 42.1	85 52	120.0	7 16.7	85 52	120.2	1
2	9 42.5	84 54	117.5	9 17.2	84 53	117.8	8 52.0	84 53	118.0	8 26.7	84 53	118.3	8 01.3	84 53	118.6	7 36.0	84 53	118.9	7 10.7	84 53	119.1	6 45.4	84 53	119.4	2
3	9 10.4	84 54	116.6	8 45.2	84 54	116.9	8 20.0	84 54	117.2	7 54.7	84 54	117.5	7 29.5	84 53	117.7	7 04.3	84 53	118.0	6 39.0	84 53	118.3	6 13.8	84 53	118.6	3
4	8 38.0	84 54	115.8	8 12.9	84 54	116.1	7 47.7	84 54	116.4	7 22.6	84 54	116.6	6 57.4	84 54	116.9	6 32.3	84 54	117.2	6 07.1	84 54	117.5	5 41.9	84 53	117.7	4
65	8 05.4	83 55	115.0	7 40.3	83 55	115.3	7 15.3	84 54	115.5	6 50.2	84 54	115.8	6 25.1	84 54	116.1	6 00.0	84 54	116.4	5 34.9	84 54	116.6	5 09.9	84 54	116.9	65
6	7 32.5	83 55	114.1	7 07.5	83 55	114.4	6 42.6	83 55	114.7	6 17.6	83 55	115.0	5 52.6	83 55	115.3	5 27.6	83 54	115.5	5 02.6	83 54	115.8				6
7	6 59.5	83 55	113.3	6 34.6	83 55	113.6	6 09.6	83 55	113.9	5 44.7	83 55	114.2	5 19.8	83 55	114.4										7
8	6 26.2	83 56	112.5	6 01.4	83 56	112.8	5 36.5	83 56	113.0	5 11.7	83 55	113.3													8
9	5 52.7	83 56	111.7	5 28.0	83 56	111.9	5 03.2	83 56	112.2																9
70	5 19.1	82 56	110.8																						70

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	5 46.9	80 60	84.4	6 10.8	80 60	84.1	6 34.7	80 60	83.8	6 58.6	80 60	83.5	7 22.4	79 60	83.2	7 46.3	79 60	82.8	8 10.1	79 60	82.5	8 33.9	79 60	82.2	91
2	5 11.0	80 60	83.6	5 34.9	80 60	83.3	5 58.8	80 60	83.0	6 22.7	80 60	82.7	6 46.6	80 60	82.4	7 10.5	80 60	82.1	7 34.3	79 60	81.8	7 58.2	79 59	81.4	2
3							5 23.0	80 60	82.2	5 46.9	80 60	81.9	6 10.8	80 59	81.6	6 34.7	80 59	81.3	6 58.6	80 59	81.0	7 22.5	80 59	80.7	3
4										5 11.2	80 59	81.1	5 35.2	80 59	80.8	5 59.1	80 59	80.5	6 23.0	80 59	80.2	6 46.9	80 59	79.9	4
95																5 23.5	80 59	79.7	5 47.5	80 59	79.4	6 11.4	80 59	79.1	95
6																			5 12.0	80 59	78.6	5 36.0	80 59	78.3	6
7																						5 00.7	80 59	77.5	7

Digitized by Google

Lat. 53°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	49 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0
1	48 59.5	1.0 02	178.5	49 29.5	1.0 02	178.5	49 59.5	1.0 02	178.5	50 29.5	1.0 02	178.5
2	48 58.1	1.0 04	177.0	49 28.1	1.0 04	177.0	49 58.1	1.0 04	177.0	50 28.1	1.0 04	176.9
3	48 55.8	1.0 05	175.5	49 25.7	1.0 06	175.5	49 55.7	1.0 06	175.5	50 25.7	1.0 06	175.4
4	48 52.5	1.0 07	174.0	49 22.4	1.0 07	174.0	49 52.4	1.0 07	173.9	50 22.3	1.0 07	173.9
05	48 48.3	1.0 09	172.6	49 18.2	1.0 09	172.5	49 48.1	1.0 09	172.4	50 18.0	1.0 09	172.4
6	48 43.1	1.0 10	171.1	49 13.0	1.0 10	171.0	49 42.9	1.0 10	170.9	50 12.7	1.0 10	170.9
7	48 37.1	99 12	169.6	49 06.9	99 12	169.5	49 36.7	99 12	169.4	50 06.5	99 12	169.4
8	48 30.1	99 13	168.1	48 59.9	99 13	168.0	49 29.6	99 13	167.9	49 59.4	99 13	167.8
9	48 22.3	99 15	166.7	48 52.0	99 15	166.6	49 21.6	99 15	166.5	49 51.3	99 15	166.4
10	48 13.5	99 16	165.2	48 43.1	99 16	165.1	49 12.7	99 16	165.0	49 42.4	99 16	164.9
1	48 03.9	99 18	163.8	48 33.4	98 18	163.7	49 02.9	98 18	163.5	49 32.5	98 18	163.4
2	47 53.3	98 19	162.3	48 22.8	98 19	162.2	48 52.3	98 19	162.1	49 21.7	98 19	161.9
3	47 42.0	98 20	160.9	48 11.3	98 21	160.8	48 40.7	98 21	160.6	49 10.1	98 21	160.5
4	47 29.7	98 22	159.5	47 59.0	98 22	159.3	48 28.3	98 22	159.2	48 57.6	98 22	159.0
15	47 16.7	97 23	158.1	47 45.9	97 23	157.9	48 15.0	97 23	157.7	48 44.2	97 24	157.6
6	47 02.8	97 24	156.7	47 31.9	97 25	156.5	48 00.9	97 25	156.3	48 30.0	97 25	156.1
7	46 48.1	97 26	155.3	47 17.1	97 26	155.1	47 46.0	97 26	154.9	48 15.0	96 26	154.7
8	46 32.6	96 27	153.9	47 01.5	96 27	153.7	47 30.3	96 27	153.5	47 59.2	96 28	153.3
9	46 16.4	96 28	152.6	46 45.1	96 29	152.4	47 13.9	96 29	152.1	47 42.6	96 29	151.9
20	45 59.4	96 30	151.2	46 28.0	95 30	151.0	46 56.6	95 30	150.8	47 25.2	95 30	150.6
1	45 41.6	95 31	149.9	46 10.1	95 31	149.7	46 38.6	95 31	149.4	47 07.1	95 31	149.2
2	45 23.1	95 32	148.6	45 51.5	95 32	148.3	46 19.9	95 32	148.1	46 48.2	94 33	147.8
3	45 03.9	94 33	147.2	45 32.2	94 33	147.0	46 00.4	94 34	146.8	46 28.7	94 34	146.5
4	44 44.0	94 34	145.9	45 12.2	94 34	145.7	45 40.3	94 35	145.4	46 08.4	94 35	145.2
25	44 23.5	93 35	144.7	44 51.5	93 36	144.4	45 19.5	93 36	144.1	45 47.4	93 36	143.9
6	44 02.3	93 36	143.4	44 30.2	93 37	143.1	44 58.0	93 37	142.9	45 25.8	93 37	142.6
7	43 40.4	93 37	142.1	44 08.2	92 38	141.9	44 35.9	92 38	141.6	45 03.6	92 38	141.3
8	43 17.9	92 38	140.9	43 45.6	92 39	140.6	44 13.2	92 39	140.3	44 40.7	92 39	140.1
9	42 54.9	92 39	139.6	43 22.4	92 40	139.4	43 49.8	91 40	139.1	44 17.2	91 40	138.8
30	42 31.2	91 40	138.4	42 58.5	91 41	138.1	43 25.9	91 41	137.9	43 53.2	91 41	137.6
1	42 06.9	91 41	137.2	42 34.2	91 42	136.9	43 01.4	91 42	136.7	43 28.5	90 42	136.4
2	41 42.1	90 42	136.0	42 09.2	90 42	135.7	42 36.3	90 43	135.5	43 03.3	90 43	135.2
3	41 16.8	90 43	134.9	41 43.8	90 43	134.6	42 10.7	90 44	134.3	42 37.6	90 44	134.0
4	40 51.0	90 44	133.7	41 17.8	89 44	133.4	41 44.6	89 44	133.1	42 11.3	89 45	132.8
35	40 24.6	89 45	132.5	40 51.3	89 45	132.2	41 18.0	89 45	131.9	41 44.6	89 45	131.6
6	39 57.7	89 46	131.4	40 24.3	89 46	131.1	40 50.9	88 46	130.8	41 17.4	88 46	130.5
7	39 30.4	88 46	130.3	39 56.9	88 46	130.0	40 23.3	88 47	129.7	40 49.7	88 47	129.3
8	39 02.6	88 47	129.2	39 29.0	88 47	128.9	39 55.3	88 47	128.5	40 21.5	87 48	128.2
9	38 34.4	87 48	128.1	39 00.7	87 48	127.7	39 26.8	87 48	127.4	39 52.9	87 48	127.1
40	38 05.8	87 48	127.0	38 31.9	87 49	126.7	38 57.9	87 49	126.3	39 23.9	87 49	126.0
1	37 36.7	87 49	125.9	38 02.7	87 49	125.6	38 28.7	86 49	125.3	38 54.5	86 50	124.9
2	37 07.3	86 50	124.8	37 33.2	86 50	124.5	37 59.0	86 50	124.2	38 24.7	86 50	123.9
3	36 37.5	86 50	123.8	37 03.2	86 50	123.5	37 28.9	86 51	123.1	37 54.6	85 51	122.8
4	36 07.3	86 51	122.7	36 32.9	85 51	122.4	36 58.5	85 51	122.1	37 24.0	85 51	121.8
45	35 36.7	85 51	121.7	36 02.3	85 52	121.4	36 27.7	85 52	121.1	36 53.2	85 52	120.7
6	35 05.8	85 52	120.7	35 31.3	85 52	120.4	35 56.6	85 52	120.0	36 22.0	84 53	119.7
7	34 34.6	85 53	119.7	34 59.9	84 53	119.3	35 25.2	84 53	119.0	35 50.4	84 53	118.7
8	34 03.1	84 53	118.7	34 28.3	84 53	118.3	34 53.5	84 53	118.0	35 18.6	84 54	117.7
9	33 31.3	84 54	117.7	33 56.4	84 54	117.4	34 21.5	84 54	117.0	34 46.5	83 54	116.7
50	32 59.1	84 54	116.7	33 24.2	83 54	116.4	33 49.2	83 54	116.0	34 14.1	83 54	115.7
1	32 26.8	83 54	115.7	32 51.7	83 55	115.4	33 16.6	83 55	115.1	33 41.4	83 55	114.7
2	31 54.1	83 55	114.8	32 19.0	83 55	114.4	32 43.8	83 55	114.1	33 08.5	82 55	113.8
3	31 21.2	83 55	113.8	31 46.0	82 55	113.5	32 10.7	82 56	113.2	32 35.4	82 56	112.8
4	30 48.0	82 56	112.9	31 12.7	82 56	112.6	31 37.4	82 56	112.2	32 02.0	82 56	111.9
55	30 14.7	82 56	112.0	30 39.3	82 56	111.6	31 03.8	82 56	111.3	31 28.3	82 56	110.9
6	29 41.1	82 56	111.0	30 05.6	82 56	110.7	30 30.1	82 57	110.4	30 54.5	81 57	110.0
7	29 07.3	82 57	110.1	29 31.7	81 57	109.8	29 56.1	81 57	109.4	30 20.5	81 57	109.1
8	28 33.3	81 57	109.2	28 57.6	81 57	108.9	29 22.0	81 57	108.5	29 46.3	81 57	108.2
9	27 59.1	81 57	108.3	28 23.4	81 57	108.0	28 47.7	81 58	107.6	29 11.9	81 58	107.3
60	27 24.7	81 58	107.4	27 48.9	81 58	107.1	28 13.2	81 58	106.7	28 37.3	80 58	106.4
1	26 50.1	81 58	106.5	27 14.4	81 58	106.2	27 38.5	80 58	105.8	28 02.6	80 58	105.5
2	26 15.5	81 58	105.6	26 39.6	80 58	105.3	27 03.7	80 58	105.0	27 27.7	80 58	104.6
3	25 40.6	80 58	104.8	26 04.7	80 58	104.4	26 28.7	80 58	104.1	26 52.7	80 59	103.8
4	25 05.6	80 59	103.9	25 29.7	80 59	103.6	25 53.7	80 59	103.2	26 17.6	80 59	102.9
65	24 30.5	80 59	103.0	24 54.5	80 59	102.7	25 18.4	80 59	102.4	25 42.3	80 59	102.0
6	23 55.3	80 59	102.2	24 19.2	80 59	101.8	24 43.1	80 59	101.5	25 07.0	79 59	101.2
7	23 19.9	80 59	101.3	23 43.8	80 59	101.0	24 07.7	79 59	100.7	24 31.5	79 59	100.3
8	22 44.4	80 59	100.5	23 08.3	79 59	100.1	23 32.1	79 59	99.8	23 55.9	79 59	99.5
9	22 08.9	80 59	99.6	22 32.7	79 59	99.3	22 56.5	79 60	99.0	23 20.3	79 60	98.6
70	21 33.2	79 60	98.8	21 57.0	79 60	98.5	22 20.8	79 60	98.1	22 44.5	79 60	97.8
1	20 57.5	79 60	98.0	21 21.3	79 60	97.6	21 45.0	79 60	97.3	22 08.7	79 60	97.0
2	20 21.7	79 60	97.1	20 45.5	79 60	96.8	21 09.2	79 60	96.5	21 32.8	79 60	96.1
3	19 45.9	79 60	96.3	20 09.6	79 60	96.0	20 33.3	79 60	95.6	20 56.9	79 60	95.3
4	19 09.9	79 60	95.5	19 33.6	79 60	95.2	19 57.3	79 60	94.8	20 20.9	79 60	94.5
75	18 34.0	79 60	94.7	18 57.7	79 60	94.3	19 21.3	79 60	94.0	19 44.9	79 60	93.7
6	17 58.0	79 60	93.8	18 21.6	79 60	93.5	18 45.3	79 60	93.2	19 08.9	79 60	92.9
7	17 21.9	79 60	93.0	17 45.6	79 60	92.7	18 09.2	79 60	92.4	18 32.8	79 60	92.1
8	16 45.9	79 60	92.2	17 09.5	79 60	91.9	17 33.1	79 60	91.6	17 56.7	79 60	91.3
9	16 09.8	79 60	91.4	16 33.4	79 60	91.1	16 57.0	79 60	90.8	17 20.6	79 60	90.5
80	15 33.7	79 60	90.6	15 57.3	79 60	90.3	16 20.9	79 60	90.0	16 44.5	79 60	89.7
1	14 57.6	79 60	89.8	15 21.2	79 60	89.5	15 44.8	79 60	89.2	16 08.4	79 60	88.9
2	14 21.5	79 60	89.0	14 45.1	79 60	88.7	15 08.7	79 60	88.4	15 32.3	79 60	88.1
3	13 45.4	79 60	88.2	14 09.0	79 60	87.9	14 32.6	79 60	87.6	14 56.2	79 60	87.3
4	13 09.3	79 60	87.4	13 32.9	79 60	87.1	13 56.6	79 60	86.8	14 20.2	79 60	86.5
85	12 33.2	79 60	86.7	12 56.9	79 60	86.3	13 20.5	79 60	86.0	13 44.1	79 60	85.7
6	11 57.2	79 60	85.9	12 20.9	79 60	85.5	12 44.5	79 60	85.2	13 08.1	79 60	84.9
7	11 21.2	79 60	85.1	11 44.9	79 60	84.8	12 08.5	79 60	84.4	12 32.2	79 60	84.1
8	10 45.2	79 60	84.3	11 08.9	79 60	84.0	11 32.6	79 60	83.7	11 56.3	79 60	83.3
9	10 09.3	79 60	83.5	10 33.1	79 60	83.2	10 56.8	79 60	82.9	11 20.5	79 60	82.6
90	9 33.5	79 60	82.7	9 57.2	79 60	82.4	10 21.0	79 60	82.1	10 44.7	79 60	81.8

14° 00′			14° 30′			15° 00′			15° 30′			H.A.
Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
51 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	00
50 59.5	1.0 02	178.5	51 29.5	1.0 02	178.4	51 59.5	1.0 02	178.4	52 29.5	1.0 02	178.4	1
50 58.1	1.0 04	176.9	51 28.0	1.0 04	176.9	51 58.0	1.0 04	176.9	52 28.0	1.0 04	176.8	2
50 55.6	1.0 06	175.4	51 25.6	1.0 06	175.3	51 55.6	1.0 06	175.3	52 25.5	1.0 06	175.3	3
50 52.2	1.0 07	173.8	51 22.2	1.0 07	173.8	51 52.1	1.0 07	173.7	52 22.0	1.0 07	173.7	4
50 47.9	1.0 09	172.3	51 17.8	1.0 09	172.2	51 47.7	1.0 09	172.2	52 17.6	1.0 09	172.1	05
50 42.6	1.0 10	170.8	51 12.4	99 11	170.7	51 42.3	99 11	170.6	52 12.1	99 11	170.5	6
50 36.3	99 12	169.3	51 06.1	99 12	169.2	51 35.9	99 12	169.1	52 05.7	99 12	169.0	7
50 29.1	99 14	167.7	50 58.9	99 14	167.6	51 28.6	99 14	167.5	51 58.3	99 14	167.4	8
50 21.0	99 15	166.2	50 50.7	99 15	166.1	51 20.3	99 15	166.0	51 50.0	99 15	165.9	9
50 12.0	99 17	164.7	50 41.5	99 17	164.6	51 11.1	99 17	164.5	51 40.7	99 17	164.3	10
50 02.0	98 18	163.2	50 31.5	98 18	163.1	51 01.0	98 18	163.0	51 30.5	98 19	162.8	1
49 51.1	98 20	161.8	50 20.6	98 20	161.6	50 50.0	98 20	161.5	51 19.4	98 20	161.3	2
49 39.4	98 21	160.3	50 08.7	98 21	160.1	50 38.0	98 21	160.0	51 07.3	98 22	159.8	3
49 26.8	97 22	158.8	49 56.0	97 23	158.7	50 25.2	97 23	158.5	50 54.4	97 23	158.3	4
49 13.3	97 24	157.4	49 42.5	97 24	157.2	50 11.6	97 24	157.0	50 40.7	97 24	156.8	15
48 59.0	97 25	156.0	49 28.0	97 25	155.8	49 57.0	97 26	155.6	50 26.0	97 26	155.4	6
48 43.9	96 27	154.5	49 12.8	96 27	154.3	49 41.7	96 27	154.1	50 10.5	96 27	153.9	7
48 28.0	96 28	153.1	48 56.8	96 28	152.9	49 25.5	96 28	152.7	49 54.3	96 28	152.5	8
48 11.3	96 29	151.7	48 39.9	95 29	151.5	49 08.6	95 30	151.3	49 37.2	95 30	151.0	9
47 53.8	95 30	150.3	48 22.3	95 31	150.1	48 50.8	95 31	149.9	49 19.3	95 31	149.6	20
47 35.5	95 32	149.0	48 03.9	95 32	148.7	48 32.3	95 32	148.5	49 00.7	94 32	148.2	1
47 16.5	94 33	147.6	47 44.8	94 33	147.4	48 13.1	94 33	147.1	48 41.3	94 34	146.9	2
46 56.8	94 34	146.3	47 25.0	94 34	146.0	47 53.1	94 34	145.8	48 21.2	94 35	145.5	3
46 36.4	93 35	144.9	47 04.4	93 35	144.7	47 32.4	93 36	144.4	48 00.4	93 36	144.1	4
46 15.4	93 36	143.6	46 43.2	93 36	143.4	47 11.1	93 37	143.1	47 38.9	93 37	142.8	25
45 53.6	93 37	142.3	46 21.4	92 38	142.1	46 49.1	92 38	141.8	47 16.7	92 38	141.5	6
45 31.2	92 38	141.0	45 58.8	92 39	140.8	46 26.4	92 39	140.5	46 53.9	92 39	140.2	7
45 08.2	92 39	139.8	45 35.7	91 40	139.5	46 03.1	91 40	139.2	46 30.5	91 40	138.9	8
44 44.6	91 40	138.5	45 11.9	91 41	138.2	45 39.2	91 41	137.9	46 06.5	91 41	137.6	9
44 20.4	91 41	137.3	44 47.6	91 42	137.0	45 14.7	90 42	136.7	45 41.8	90 42	136.4	30
43 55.6	90 42	136.1	44 22.7	90 42	135.8	44 49.7	90 43	135.5	45 16.6	90 43	135.1	1
43 30.3	90 43	134.9	43 57.2	90 43	134.5	44 24.1	89 44	134.2	44 50.9	89 44	133.9	2
43 04.4	89 44	133.7	43 31.2	89 44	133.4	43 57.9	89 44	133.0	44 24.6	89 45	132.7	3
42 38.0	89 45	132.5	43 04.7	89 45	132.2	43 31.3	89 45	131.8	43 57.8	88 45	131.5	4
42 11.2	88 46	131.3	42 37.7	88 46	131.0	43 04.2	88 46	130.7	43 30.6	88 46	130.4	35
41 43.8	88 46	130.2	42 10.2	88 47	129.8	42 36.5	88 47	129.5	43 02.8	88 47	129.2	6
41 16.0	88 47	129.0	41 42.2	87 47	128.7	42 08.5	87 48	128.4	42 34.6	87 48	128.0	7
40 47.7	87 48	127.9	41 13.8	87 48	127.6	41 39.9	87 48	127.2	42 05.9	87 48	126.9	8
40 19.0	87 49	126.8	40 45.0	87 49	126.5	41 11.0	86 49	126.1	41 36.9	86 49	125.8	9
39 49.9	86 49	125.7	40 15.8	86 49	125.4	40 41.6	86 50	125.0	41 07.4	86 50	124.7	40
39 20.4	86 50	124.6	39 46.1	86 50	124.3	40 11.8	86 50	123.9	40 37.5	85 50	123.6	1
38 50.4	86 50	123.5	39 16.1	85 51	123.2	39 41.7	85 51	122.9	40 07.2	85 51	122.5	2
38 20.2	85 51	122.5	38 45.7	85 51	122.1	39 11.2	85 51	121.8	39 36.6	85 52	121.5	3
37 49.5	85 52	121.4	38 15.0	85 52	121.1	38 40.3	84 52	120.7	39 05.6	84 52	120.4	4
37 18.5	84 52	120.4	37 43.9	84 52	120.1	38 09.1	84 53	119.7	38 34.3	84 53	119.4	45
36 47.2	84 53	119.4	37 12.4	84 53	119.0	37 37.6	84 53	118.7	38 02.7	84 53	118.3	6
36 15.6	84 53	118.4	36 40.7	84 53	118.0	37 05.8	83 54	117.7	37 30.8	83 54	117.3	7
35 43.7	83 54	117.3	36 08.7	83 54	117.0	36 33.6	83 54	116.7	36 58.5	83 54	116.3	8
35 11.5	83 54	116.4	35 36.4	83 54	116.0	36 01.2	83 54	115.7	36 26.0	83 55	115.3	9
34 39.0	83 55	115.4	35 03.8	83 55	115.0	35 28.6	82 55	114.7	35 53.3	82 55	114.3	50
34 06.2	83 55	114.4	34 30.9	82 55	114.1	34 55.6	82 55	113.7	35 20.2	82 55	113.4	1
33 33.2	82 55	113.4	33 57.9	82 56	113.1	34 22.4	82 56	112.7	34 47.0	82 56	112.4	2
33 00.0	82 56	112.5	33 24.5	82 56	112.1	33 49.0	82 56	111.8	34 13.5	81 56	111.4	3
32 26.5	82 56	111.5	32 51.0	81 56	111.2	33 15.4	81 56	110.9	33 39.7	81 57	110.5	4
31 52.8	81 56	110.6	32 17.2	81 57	110.3	32 41.5	81 57	109.9	33 05.8	81 57	109.6	55
31 18.9	81 57	109.7	31 43.2	81 57	109.3	32 07.5	81 57	109.0	32 31.7	81 57	108.6	6
30 44.8	81 57	108.8	31 09.1	81 57	108.4	31 33.3	81 57	108.1	31 57.4	80 57	107.7	7
30 10.5	81 57	107.9	30 34.7	81 58	107.5	30 58.8	80 58	107.2	31 22.9	80 58	106.8	8
29 36.1	80 58	107.0	30 00.2	80 58	106.6	30 24.3	80 58	106.3	30 48.3	80 58	105.9	9
29 01.4	80 58	106.1	29 25.5	80 58	105.7	29 49.5	80 58	105.4	30 13.5	80 58	105.0	60
28 26.7	80 58	105.2	28 50.7	80 58	104.8	29 14.6	80 58	104.5	29 38.5	80 58	104.1	1
27 51.7	80 58	104.3	28 15.7	80 59	103.9	28 39.6	80 59	103.6	29 03.4	79 59	103.3	2
27 16.7	80 59	103.4	27 40.6	80 59	103.1	28 04.4	79 59	102.7	28 28.2	79 59	102.4	3
26 41.5	80 59	102.5	27 05.4	79 59	102.2	27 29.2	79 59	101.9	27 52.9	79 59	101.5	4
26 06.2	79 59	101.7	26 30.0	79 59	101.3	26 53.8	79 59	101.0	27 17.5	79 59	100.7	65
25 30.8	79 59	100.8	25 54.6	79 59	100.5	26 18.3	79 59	100.2	26 41.9	79 59	99.8	6
24 55.3	79 59	100.0	25 19.0	79 59	99.6	25 42.7	79 59	99.3	26 06.3	79 60	99.0	7
24 19.7	79 60	99.1	24 43.4	79 60	98.8	25 07.0	79 60	98.5	25 30.6	79 60	98.1	8
23 44.0	79 60	98.3	24 07.6	79 60	98.0	24 31.3	79 60	97.6	24 54.8	79 60	97.3	9
23 08.2	79 60	97.5	23 31.8	79 60	97.1	23 55.4	79 60	96.8	24 19.0	78 60	96.5	70
22 32.4	79 60	96.6	22 56.0	79 60	96.3	23 19.5	78 60	96.0	23 43.1	78 60	95.6	1
21 56.5	79 60	95.8	22 20.1	79 60	95.5	22 43.6	78 60	95.1	23 07.1	78 60	94.8	2
21 20.5	79 60	95.0	21 44.1	78 60	94.7	22 07.6	78 60	94.3	22 31.1	78 60	94.0	3
20 44.5	79 60	94.2	21 08.1	78 60	93.8	21 31.6	78 60	93.5	21 55.1	78 60	93.2	4
20 08.5	79 60	93.4	20 32.0	78 60	93.0	20 55.5	78 60	92.7	21 19.0	78 60	92.4	75
19 32.4	78 60	92.5	19 56.0	78 60	92.2	20 19.5	78 60	91.9	20 42.9	78 60	91.6	6
18 56.4	78 60	91.7	19 19.9	78 60	91.4	19 43.4	78 60	91.1	20 06.8	78 60	90.7	7
18 20.3	78 60	90.9	18 43.8	78 60	90.6	19 07.3	78 60	90.3	19 30.7	78 60	90.0	8
17 44.1	78 60	90.1	18 07.7	78 60	89.8	18 31.1	78 60	89.5	18 54.6	78 60	89.2	9
17 08.0	78 60	89.3	17 31.6	78 60	89.0	17 55.0	78 60	88.7	18 18.5	78 60	88.4	80
16 31.9	78 60	88.5	16 55.5	78 60	88.2	17 19.0	78 60	87.9	17 42.4	78 60	87.6	1
15 55.8	78 60	87.8	16 19.4	78 60	87.4	16 42.9	78 60	87.1	17 06.3	78 60	86.8	2
15 19.8	79 60	87.0	15 43.3	78 60	86.6	16 06.8	78 60	86.3	16 30.3	78 60	86.0	3
14 43.7	79 60	86.2	15 07.3	78 60	85.8	15 30.8	78 60	85.5	15 54.3	78 60	85.2	4
14 07.7	79 60	85.4	14 31.3	79 60	85.1	14 54.8	78 60	84.7	15 18.3	78 60	84.4	85
13 31.8	79 60	84.6	13 55.3	79 60	84.3	14 18.9	78 60	84.0	14 42.4	78 60	83.6	6
12 55.8	79 60	83.8	13 19.4	79 60	83.5	13 43.0	79 60	83.2	14 06.6	78 60	82.9	7
12 20.0	79 60	83.0	12 43.6	79 60	82.7	13 07.2	79 60	82.4	13 30.8	79 60	82.1	8
11 44.1	79 60	82.2	12 07.8	79 60	81.9	12 31.4	79 59	81.6	12 55.0	79 59	81.3	9
11 08.4	79 59	81.5	11 32.1	79 59	81.2	11 55.7	79 59	80.8	12 19.4	79 59	80.5	90

Digitized by Google

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	°
00	25 00.0	1.0 01	180.0	24 30.0	1.0 01	180.0	24 00.0	1.0 01	180.0	23 30.0	1.0 01	180.0	23 00.0	1.0 01	180.0	22 30.0	1.0 01	180.0	22 00.0	1.0 01	180.0	21 30.0	1.0 01	180.0	00
1	24 59.7	1.0 02	178.9	24 29.7	1.0 02	178.9	23 59.7	1.0 02	178.9	23 29.7	1.0 02	178.9	22 59.7	1.0 02	178.9	22 29.7	1.0 02	179.0	21 59.7	1.0 02	179.0	21 29.7	1.0 02	179.0	1
2	24 58.6	1.0 03	177.8	24 28.6	1.0 03	177.9	23 58.7	1.0 03	177.9	23 28.7	1.0 03	177.9	22 58.7	1.0 03	177.9	22 28.7	1.0 03	177.9	21 58.7	1.0 03	177.9	21 28.7	1.0 03	177.9	2
3	24 56.9	1.0 04	176.8	24 27.0	1.0 04	176.8	23 57.0	1.0 04	176.8	23 27.0	1.0 04	176.8	22 57.0	1.0 04	176.8	22 27.0	1.0 04	176.9	21 57.0	1.0 04	176.9	21 27.1	1.0 04	176.9	3
4	24 54.6	1.0 05	175.7	24 24.6	1.0 05	175.7	23 54.6	1.0 05	175.7	23 24.7	1.0 05	175.8	22 54.7	1.0 05	175.8	22 24.7	1.0 05	175.8	21 54.8	1.0 05	175.8	21 24.8	1.0 05	175.9	4
05	24 51.5	1.0 06	174.6	24 21.6	1.0 06	174.6	23 51.6	1.0 06	174.7	23 21.7	1.0 06	174.7	22 51.7	1.0 06	174.7	22 21.8	1.0 06	174.8	21 51.8	1.0 06	174.8	21 21.8	1.0 06	174.8	05
6	24 47.8	1.0 07	173.5	24 17.8	1.0 07	173.6	23 47.9	1.0 07	173.6	23 18.0	1.0 07	173.6	22 48.1	1.0 07	173.7	22 18.1	1.0 07	173.7	21 48.2	1.0 07	173.8	21 18.3	1.0 07	173.8	6
7	24 43.4	1.0 08	172.5	24 13.5	1.0 08	172.5	23 43.6	1.0 08	172.5	23 13.7	1.0 08	172.6	22 43.8	1.0 08	172.6	22 13.9	1.0 08	172.7	21 44.0	1.0 08	172.7	21 14.0	1.0 08	172.8	7
8	24 38.3	1.0 10	171.4	24 08.4	1.0 10	171.4	23 38.6	1.0 09	171.5	23 08.7	1.0 09	171.5	22 38.8	1.0 09	171.6	22 08.9	1.0 09	171.6	21 39.1	1.0 09	171.7	21 09.2	1.0 09	171.7	8
9	24 32.6	99 11	170.3	24 02.7	99 11	170.4	23 32.9	99 11	170.4	23 03.0	99 10	170.5	22 33.2	99 10	170.5	22 03.4	99 10	170.6	21 33.5	99 10	170.6	21 03.7	99 10	170.7	9
10	24 26.2	99 12	169.2	23 56.4	99 12	169.3	23 26.5	99 12	169.4	22 56.7	99 12	169.4	22 26.9	99 12	169.5	21 57.1	99 11	169.6	21 27.3	99 11	169.6	20 57.5	99 11	169.7	10
1	24 19.1	99 13	168.2	23 49.3	99 13	168.3	23 19.6	99 13	168.3	22 49.8	99 13	168.4	22 20.0	99 13	168.5	21 50.3	99 13	168.5	21 20.5	99 12	168.6	20 50.7	99 12	168.7	1
2	24 11.4	99 14	167.1	23 41.6	99 14	167.2	23 11.9	99 14	167.3	22 42.2	99 14	167.3	22 12.5	99 14	167.4	21 42.8	99 14	167.5	21 13.0	99 14	167.6	20 43.3	99 13	167.6	2
3	24 03.0	99 15	166.1	23 33.3	99 15	166.1	23 03.6	99 15	166.2	22 34.0	99 15	166.3	22 04.3	99 15	166.4	21 34.6	99 15	166.5	21 04.9	99 15	166.5	20 35.3	99 14	166.6	3
4	23 54.0	99 16	165.0	23 24.3	99 16	165.1	22 54.7	99 16	165.2	22 25.1	99 16	165.3	21 55.5	99 16	165.3	21 25.8	99 16	165.4	20 56.2	99 16	165.5	20 26.6	99 16	165.6	4
15	23 44.3	99 17	163.9	23 14.7	99 17	164.0	22 45.2	99 17	164.1	22 15.6	99 17	164.2	21 46.0	99 17	164.3	21 16.4	99 17	164.4	20 46.9	99 17	164.5	20 17.3	99 16	164.6	15
6	23 34.0	98 18	162.9	23 04.5	98 18	163.0	22 35.0	98 18	163.1	22 05.5	98 18	163.2	21 35.9	98 18	163.3	21 06.4	98 18	163.4	20 36.9	98 18	163.5	20 07.4	98 18	163.6	6
7	23 23.1	98 19	161.8	22 53.6	98 19	162.0	22 24.2	98 19	162.1	21 54.7	98 19	162.2	21 25.3	98 19	162.3	20 55.8	98 19	162.4	20 26.3	98 19	162.5	19 56.9	98 19	162.6	7
8	23 11.5	98 20	160.8	22 42.1	98 20	160.9	22 12.7	98 20	161.0	21 43.3	98 20	161.1	21 13.9	98 20	161.2	20 44.5	98 20	161.3	20 15.1	98 20	161.4	19 45.7	98 20	161.6	8
9	22 59.3	98 21	159.8	22 30.0	98 21	159.9	22 00.7	98 21	160.0	21 31.4	98 21	160.1	21 02.0	98 21	160.2	20 32.7	98 21	160.3	20 03.4	98 21	160.4	19 34.0	98 21	160.6	9
20	22 46.5	97 22	158.7	22 17.3	97 22	158.8	21 48.0	98 22	159.0	21 18.8	98 22	159.1	20 49.5	98 22	159.2	20 20.2	98 22	159.3	19 51.0	98 22	159.4	19 21.7	98 22	159.6	20
1	22 33.1	97 23	157.7	22 03.9	97 23	157.8	21 34.8	97 23	157.9	21 05.6	97 23	158.1	20 36.4	97 23	158.2	20 07.2	97 23	158.3	19 38.0	97 23	158.4	19 08.8	97 22	158.6	1
2	22 19.1	97 24	156.7	21 50.0	97 24	156.8	21 20.9	97 24	156.9	20 51.8	97 24	157.1	20 22.7	97 24	157.2	19 53.6	97 24	157.3	19 24.4	97 24	157.4	18 55.3	97 23	157.6	2
3	22 04.5	97 25	155.6	21 35.5	97 25	155.8	21 06.5	97 25	155.9	20 37.4	97 25	156.0	20 08.4	97 25	156.2	19 39.3	97 25	156.3	19 10.3	97 25	156.4	18 41.2	97 24	156.6	3
4	21 49.3	96 26	154.6	21 20.4	96 26	154.8	20 51.4	97 26	154.9	20 22.5	97 26	155.0	19 53.5	97 26	155.2	19 24.5	97 26	155.3	18 55.6	97 25	155.5	18 26.6	97 25	155.6	4
25	21 33.6	96 27	153.6	21 04.7	96 27	153.8	20 35.8	96 27	153.9	20 07.0	96 27	154.0	19 38.1	96 27	154.2	19 09.2	96 27	154.3	18 40.3	96 26	154.5	18 11.4	96 26	154.6	25
6	21 17.2	96 28	152.6	20 48.5	96 28	152.8	20 19.7	96 28	152.9	19 50.9	96 28	153.1	19 22.1	96 28	153.2	18 53.3	96 27	153.3	18 24.5	96 27	153.5	17 55.6	96 27	153.6	6
7	21 00.3	96 29	151.6	20 31.6	96 29	151.8	20 02.9	96 29	151.9	19 34.2	96 29	152.1	19 05.5	96 28	152.2	18 36.8	96 28	152.4	18 08.1	96 28	152.5	17 39.3	96 28	152.7	7
8	20 42.9	95 30	150.6	20 14.3	95 30	150.8	19 45.7	95 30	150.9	19 17.0	95 30	151.1	18 48.4	95 29	151.2	18 19.8	95 29	151.4	17 51.1	95 29	151.5	17 22.5	96 29	151.7	8
9	20 24.9	95 31	149.6	19 56.4	95 31	149.8	19 27.8	95 31	149.9	18 59.3	95 30	150.1	18 30.8	95 30	150.3	18 02.2	95 30	150.4	17 33.7	95 30	150.6	17 05.1	95 30	150.7	9
30	20 06.3	95 32	148.6	19 37.9	95 32	148.8	19 09.5	95 31	149.0	18 41.0	95 31	149.1	18 12.6	95 31	149.3	17 44.1	95 31	149.5	17 15.7	95 31	149.6	16 47.2	95 31	149.8	30
1	19 47.3	94 33	147.6	19 18.9	94 32	147.8	18 50.6	94 32	148.0	18 22.2	95 32	148.1	17 53.9	95 32	148.3	17 25.5	95 32	148.5	16 57.1	95 32	148.7	16 28.8	95 32	148.8	1
2	19 27.7	94 34	146.7	18 59.4	94 33	146.8	18 31.2	94 33	147.0	18 02.9	94 33	147.2	17 34.7	94 33	147.4	17 06.4	94 33	147.5	16 38.1	94 33	147.7	16 09.8	94 32	147.9	2
3	19 07.6	94 34	145.7	18 39.4	94 34	145.9	18 11.3	94 34	146.0	17 43.1	94 34	146.2	17 14.9	94 34	146.4	16 46.8	94 34	146.6	16 18.6	94 33	146.8	15 50.4	94 33	146.9	3
4	18 47.0	93 35	144.7	18 18.9	94 35	144.9	17 50.9	94 35	145.1	17 22.8	94 35	145.3	16 54.7	94 35	145.5	16 26.6	94 34	145.6	15 58.5	94 34	145.8	15 30.4	94 34	146.0	4
35	18 25.8	93 36	143.7	17 57.9	93 36	143.9	17 29.9	93 36	144.1	17 02.0	93 36	144.3	16 34.0	93 35	144.5	16 06.0	93 35	144.7	15 38.0	93 35	144.9	15 10.0	93 35	145.1	35
6	18 04.3	93 37	142.8	17 36.4	93 37	143.0	17 08.5	93 36	143.2	16 40.7	93 36	143.4	16 12.8	93 36	143.6	15 44.9	93 36	143.8	15 17.0	93 36	143.9	14 49.1	93 36	144.1	6
7	17 42.2	92 38	141.8	17 14.4	93 37	142.0	16 46.7	93 37	142.2	16 18.9	93 37	142.4	15 51.1	93 37	142.6	15 23.3	93 37	142.8	14 55.5	93 37	143.0	14 27.7	93 36	143.2	7
8	17 19.6	92 38	140.9	16 52.0	92 38	141.1	16 24.3	92 38	141.3	15 56.6	92 38	141.5	15 28.9	92 38	141.7	15 01.2	92 38	141.9	14 33.5	92 37	142.1	14 05.8	92 37	142.3	8
9	16 56.6	92 39	139.9	16 29.1	92 39	140.2	16 01.5	92 39	140.4	15 33.9	92 39	140.6	15 06.3	92 38	140.8	14 38.7	92 38	141.0	14 11.1	92 38	141.2	13 43.5	92 38	141.4	9
40	16 33.2	91 40	139.0	16 05.7	92 40	139.2	15 38.2	92 40	139.4	15 10.8	92 39	139.6	14 43.3	92 39	139.8	14 15.8	92 39	140.1	13 48.3	92 39	140.3	13 20.7	92 39	140.5	40
1	16 09.3	91 41	138.1	15 41.9	91 40	138.3	15 14.5	91 40	138.5	14 47.2	91 40	138.7	14 19.8	91 40	138.9	13 52.4	91 40	139.1	13 25.0	91 40	139.3	12 57.5	91 39	139.6	1
2	15 44.9	91 41	137.2	15 17.7	91 41	137.4	14 50.4	91 41	137.6	14 23.1	91 41	137.8	13 55.8	91 41	138.0	13 28.5	91 40	138.2	13 01.2	91 40	138.4	12 33.9	91 40	138.7	2
3	15 20.1	90 42	136.2	14 53.0	91 42	136.5	14 25.8	91 42	136.7	13 58.7	91 41	136.9	13 31.5	91 41	137.1	13 04.3	91 41	137.3	12 37.0	91 41	137.5	12 09.8	91 41	137.8	3
4	14 55.0	90 43	135.3	14 27.9	90 42	135.5	14 00.8	90 42	135.8	13 33.8	90 42	136.0	13 06.7	90 42	136.2	12 39.6	90 42	136.4	12 12.5	90 42	136.6	11 45.3	90 41	136.9	4
45	14 29.4	90 43	134.4	14 02.4	90 43	134.6	13 35.5	90 43	134.9	13 08.5	90 43	135.1	12 41.5	90 43	135.3	12 14.5	90 42	135.5	11 47.5	90 42	135.8	11 20.4	90 42	136.0	45
6	14 03.4	89 44	133.5	13 36.5	90 44	133.7	13 09.7	90 44	134.0	12 42.8	90 43	134.2	12 15.9	90 43	134.4	11 49.0	90 43	134.6	11 22.1	90 43	134.9	10 55.2	90 43	135.1	6
7	13 37.0	89 45	132.6	13 10.2	89 44	132.8	12 43.5	89 44	133.1	12 16.7	89 44	133.3	11 49.9	89 44	133.5	11 23.1	89 44	133.8	10 56.3	89 44	134.0	10 29.5	89 43	134.2	7
8	13 10.2	89 45	131.7	12 43.6	89 45	131.9	12 16.9	89 45	132.2	11 50.2	89 45	132.4	11 23.5	89 45	132.6	10 56.8	89 44	132.9	10 30.1	89 44	133.1	10 03.4	89 44	133.3	8
9	12 43.1	88 46	130.8	12 16.5	89 46	131.1	11 50.0	89 46	131.3	11 23.4	89 45	131.5	10 56.8	89 45	131.8	10 30.2	89 45	132.0	10 03.6	89 45	132.2	9 36.9	89 45	132.5	9
50	12 15.6	88 46	129.9	11 49.1	88 46	130.2	11 22.6	88 46	130.4	10 56.2	88 46	130.7	10 29.7	88 46	130.9	10 03.2	88 46	131.1	9 36.7	88 45	131.4	9 10.1	88 45	131.6	50
1	11 47.7	88 47	129.1	11 21.3	88 47	129.3	10 55.0	88 47	129.5	10 28.6	88 47	129.8	10 02.2	88 46	130.0	9 35.8	88 46	130.3	9 09.4	88 46	130.5	8 42.9	88 46	130.7	1
2	11 19.5	88 48	128.2	10 53.2	88 47	128.4	10 27.0	88 47	128.7	10 00.7	88 47	128.9	9 34.4	88 47	129.2	9 08.1	88 47	129.4	8 41.7	88 47	129.6	8 15.4	88 46	129.9	2
3	10 50.9	87 48	127.3	10 24.8	87 48	127.6	9 58.6	87 48	127.8	9 32.4	87 48	128.1	9 06.2	87 48	128.3	8 40.0	87 47	128.5	8 13.8	87 47	128.8	7 47.5	87 47	129.0	3
4	10 22.1	87 49	126.4	9 56.0	87 49	126.7	9 29.9	87 48	126.9	9 03.8	87 48	127.2	8 37.7	87 48	127.4	8 11.6	87 48	127.7	7 45.5	87 48	127.9	7 19.3	87 48	128.2	4
55	9 52.8	87 49	125.6	9 26.9	87 49	125.8	9 00.9	87 49	126.1	8 34.9	87 49	126.3	8 08.9	87 49	126.6	7 42.8	87 48	126.8	7 16.8	87 48	127.1	6 50.8	87 48	127.3	55
6	9 23.3	86 50	124.7	8 57.4	86 50	125.0	8 31.5	86 49	125.2	8 05.6	86 49	125.5	7 39.7	86 49	125.7	7 13.8	86 49	126.0	6 47.9	86 49	126.2	6 21.9	86 49	126.5	6
7	8 53.5	86 50	123.9	8 27.7	86 50	124.1	8 01.9	86 50	124.4	7 36.1	86 50	124.6	7 10.3	86 50	124.9	6 44.4	86 49	125.2	6 18.6	86 49	125.4	5 52.7	86 49	125.7	7
8	8 23.4	86 51	123.0	7 57.7	86 51	123.3	7 31.9	86 50	123.5	7 06.2	86 50	123.8	6 40.5	86 50	124.1	6 14.7	86 50	124.3	5 49.0	86 50	124.6	5 23.2	86 50	124.8	8
9	7 52.9	85 51	122.2	7 27.3	85 51	122.4	7 01.7	85 51	122.7	6 36.1	85 51	123.0	6 10.4	85 51	123.2	5 44.8	86 50	123.5	5 19.1	86 50	123.7				9
60	7 22.2	85 52	121.3	6 56.7	85 51	121.6	6 31.2	85 51	121.9	6 05.6	85 51	122.1	5 40.1	85 51	122.4	5 14.5	85 51	122.7							60
1	6 51.3	85 52	120.5	6 25.8	85 52	120.8	6 00.4	85 52	121.0	5 34.9	85 52	121.3	5 09.4	85 51	121.6										1
2	6 20.0	85 53	119.7	5 54.7	85 52	119.9	5 29.3	85 52	120.2	5 03.9	85 52	120.5													2
3	5 48.5	84 53	118.8	5 23.2	84 53	119.1																			3
4	5 16.7	84 53	118.0																						4

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	°
91	8 57.7	79 60	81.9	9 21.5	79 59	81.6	9 45.2	79 59	81.3	10 09.0	79 59	81.0	10 32.7	79 59	80.7	10 56.4	79 59	80.4	11 20.1	79 59	80.1	11 43.8	79 59	79.7	91
2	8 22.0	79 59	81.1	8 45.8	79 59	80.8	9 09.6	79 59	80.5	9 33.4	79 59	80.2	9 57.1	79 59	79.9	10 20.9	79 59	79.6	10 44.6	79 59	79.3	11 08.3	79 59	79.0	2
3	7 46.3	80 59	80.4	8 10.2	79 59	80.0	8 34.0	79 59	79.7	8 57.8	79 59	79.4	9 21.6	79 59	79.1	9 45.4	79 59	78.8	10 09.2	79 59	78.5	10 32.9	79 59	78.2	3
4	7 10.8	80 59	79.6	7 34.7	80 59	79.3	7 58.5	80 59	79.0	8 22.4	79 59	78.7	8 46.2	79 59	78.3	9 10.0	79 59	78.0	9 33.8	79 59	77.7	9 57.6	79 59	77.4	4
95	6 35.3	80 59	78.8	6 59.2	80 59	78.5	7 23.1	80 59	78.2	7 47.0	80 59	77.9	8 10.9	80 59	77.6	8 34.8	80 59	77.3	8 58.6	79 59	77.0	9 22.5	79 58	76.6	95
6	5 59.9	80 59	78.0	6 23.9	80 59	77.7	6 47.8	80 59	77.4	7 11.8	80 59	77.1	7 35.7	80 58	76.8	7 59.6	80 58	76.5	8 23.5	80 58	76.2	8 47.4	80 58	75.9	6
7	5 24.7	80 59	77.2	5 48.7	80 59	76.9	6 12.7	80 58	76.6	6 36.6	80 58	76.3	7 00.6	80 58	76.0	7 24.6	80 58	75.7	7 48.5	80 58	75.4	8 12.4	80 58	75.1	7
8				5 13.6	80 58	76.1	5 37.6	80 58	75.8	6 01.6	80 58	75.5	6 25.6	80 58	75.2	6 49.6	80 58	74.9	7 13.6	80 58	74.6	7 37.6	80 58	74.3	8
9							5 02.6	80 58	75.0	5 26.7	80 58	74.7	5 50.8	80 58	74.4	6 14.8	80 58	74.1	6 38.9	80 58	73.8	7 02.9	80 58	73.5	9
100													5 16.1	80 58	73.7	5 40.2	80 58	73.4	6 04.3	80 57	73.1	6 28.3	80 57	72.8	100
1																5 05.6	81 57	72.6	5 29.8	80 57	72.3	5 53.9	80 57	72.0	1
2																						5 19.7	81 57	71.2	2

Digitized by Google

Lat. 53°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	53 00.0	1.0	01	180.0	53 30.0	1.0	01	180.0	54 00.0	1.0	01	180.0	54 30.0	1.0	01	180.0
1	52 59.5	1.0	03	178.4	53 29.5	1.0	03	178.4	53 59.5	1.0	03	178.4	54 29.5	1.0	03	178.4
2	52 58.0	1.0	04	176.8	53 28.0	1.0	04	176.8	53 58.0	1.0	04	176.7	54 27.9	1.0	04	176.7
3	52 55.5	1.0	06	175.2	53 25.4	1.0	06	175.2	53 55.4	1.0	06	175.1	54 25.3	1.0	06	175.1
4	52 52.0	1.0	08	173.6	53 21.9	1.0	08	173.6	53 51.8	1.0	08	173.5	54 21.7	1.0	08	173.4
05	52 47.5	1.0	09	172.0	53 17.3	1.0	09	172.0	53 47.2	1.0	09	171.9	54 17.1	1.0	09	171.8
6	52 42.0	99	11	170.5	53 11.8	99	11	170.4	53 41.6	99	11	170.3	54 11.5	99	11	170.2
7	52 35.5	99	12	168.9	53 05.3	99	13	168.8	53 35.0	99	13	168.7	54 04.8	99	13	168.6
8	52 28.0	99	14	167.3	52 57.7	99	14	167.2	53 27.5	99	14	167.1	53 57.2	99	14	167.0
9	52 19.6	99	16	165.8	52 49.3	99	16	165.6	53 18.9	99	16	165.5	53 48.5	99	16	165.4
10	52 10.3	99	17	164.2	52 39.8	99	17	164.1	53 09.4	98	17	163.9	53 38.9	98	18	163.8
1	52 00.0	98	19	162.7	52 29.4	98	19	162.5	52 58.9	98	19	162.4	53 28.3	98	19	162.2
2	51 48.8	98	20	161.1	52 18.1	98	20	161.0	52 47.5	98	21	160.8	53 16.8	98	21	160.6
3	51 36.6	98	22	159.6	52 05.9	98	22	159.4	52 35.2	97	22	159.3	53 04.4	97	22	159.1
4	51 23.6	97	23	158.1	51 52.8	97	23	157.9	52 21.9	97	24	157.7	52 51.1	97	24	157.5
15	51 09.7	97	25	156.6	51 38.8	97	25	156.4	52 07.8	97	25	156.2	52 36.8	97	25	156.0
6	50 55.0	96	26	155.1	51 23.9	96	26	154.9	51 52.8	96	26	154.7	52 21.7	96	27	154.5
7	50 39.4	96	27	153.7	51 08.2	96	28	153.5	51 37.0	96	28	153.2	52 05.7	96	28	153.0
8	50 23.0	96	29	152.2	50 51.6	95	29	152.0	51 20.3	95	29	151.8	51 48.9	95	29	151.5
9	50 05.7	95	30	150.8	50 34.3	95	30	150.6	51 02.8	95	30	150.3	51 31.3	95	31	150.1
20	49 47.7	95	31	149.4	50 16.2	95	32	149.1	50 44.5	95	32	148.9	51 12.9	94	32	148.6
1	49 29.0	94	33	148.0	49 57.3	94	33	147.7	50 25.5	94	33	147.5	50 53.7	94	33	147.2
2	49 09.5	94	34	146.6	49 37.6	94	34	146.3	50 05.7	94	34	146.1	50 33.8	93	34	145.8
3	48 49.2	93	35	145.2	49 17.2	93	35	144.9	49 45.2	93	35	144.7	50 13.1	93	36	144.4
4	48 28.3	93	36	143.9	48 56.1	93	36	143.6	49 23.9	93	37	143.3	49 51.7	93	37	143.0
25	48 06.6	92	37	142.5	48 34.3	92	37	142.2	49 02.0	92	38	141.9	49 29.6	92	38	141.6
6	47 44.3	92	38	141.2	48 11.9	92	38	140.9	48 39.4	92	39	140.6	49 06.9	92	39	140.3
7	47 21.4	92	39	139.9	47 48.8	91	40	139.6	48 16.2	91	40	139.3	48 43.5	91	40	139.0
8	46 57.8	91	40	138.6	47 25.1	91	41	138.3	47 52.3	91	41	138.0	48 19.5	91	41	137.7
9	46 33.6	91	41	137.3	47 00.8	90	42	137.0	47 27.9	90	42	136.7	47 54.9	90	42	136.4
30	46 08.9	90	42	136.1	46 35.9	90	42	135.8	47 02.8	90	43	135.4	47 29.7	90	43	135.1
1	45 43.5	90	43	134.8	46 10.4	89	43	134.5	46 37.2	89	44	134.2	47 03.9	89	44	133.9
2	45 17.7	89	44	133.6	45 44.4	89	44	133.3	46 11.0	89	44	132.9	46 37.6	89	45	132.6
3	44 51.3	89	45	132.4	45 17.8	88	45	132.1	45 44.3	88	45	131.7	46 10.8	88	46	131.4
4	44 24.3	88	46	131.2	44 50.8	88	46	130.9	45 17.1	88	46	130.5	45 43.5	88	46	130.2
35	43 56.9	88	46	130.0	44 23.2	88	47	129.7	44 49.5	87	47	129.3	45 15.6	87	47	129.0
6	43 29.0	87	47	128.9	43 55.2	87	47	128.5	44 21.3	87	48	128.2	44 47.3	87	48	127.8
7	43 00.7	87	48	127.7	43 26.7	87	48	127.4	43 52.7	86	48	127.0	44 18.6	86	49	126.7
8	42 31.9	86	49	126.6	42 57.8	86	49	126.2	43 23.6	86	49	125.9	43 49.4	86	49	125.5
9	42 02.7	86	49	125.5	42 28.5	86	50	125.1	42 54.2	86	50	124.8	43 19.8	85	50	124.4
40	41 33.1	86	50	124.3	41 58.7	85	50	124.0	42 24.3	85	50	123.6	42 49.8	85	51	123.3
1	41 03.1	85	51	123.3	41 28.6	85	51	122.9	41 54.1	85	51	122.5	42 19.5	85	51	122.2
2	40 32.7	85	51	122.2	40 58.1	85	51	121.8	41 23.5	84	52	121.5	41 48.7	84	52	121.1
3	40 02.0	84	52	121.1	40 27.2	84	52	120.8	40 52.5	84	52	120.4	41 17.6	84	52	120.0
4	39 30.9	84	52	120.1	39 56.0	84	53	119.7	40 21.2	84	53	119.3	40 46.2	83	53	119.0
45	38 59.5	84	53	119.0	39 24.5	83	53	118.7	39 49.5	83	53	118.3	40 14.5	83	53	117.9
6	38 27.7	83	53	118.0	38 52.7	83	54	117.6	39 17.6	83	54	117.3	39 42.4	83	54	116.9
7	37 55.7	83	54	117.0	38 20.5	83	54	116.6	38 45.3	83	54	116.3	39 10.1	82	54	115.9
8	37 23.4	83	54	116.0	37 48.1	82	54	115.6	38 12.8	82	55	115.2	38 37.5	82	55	114.9
9	36 50.8	82	55	115.0	37 15.4	82	55	114.6	37 40.0	82	55	114.2	38 04.6	82	55	113.9
50	36 17.9	82	55	114.0	36 42.5	82	55	113.6	37 07.0	82	56	113.3	37 31.4	81	56	112.9
1	35 44.8	82	56	113.0	36 09.3	82	56	112.7	36 33.7	81	56	112.3	36 58.0	81	56	111.9
2	35 11.4	81	56	112.0	35 35.8	81	56	111.7	36 00.2	81	56	111.3	36 24.4	81	56	111.0
3	34 37.8	81	56	111.1	35 02.2	81	56	110.7	35 26.4	81	57	110.4	35 50.6	81	57	110.0
4	34 04.0	81	57	110.2	34 28.3	81	57	109.8	34 52.5	80	57	109.4	35 16.6	80	57	109.1
55	33 30.0	81	57	109.2	33 54.2	80	57	108.9	34 18.3	80	57	108.5	34 42.4	80	57	108.1
6	32 55.9	80	57	108.3	33 20.0	80	57	107.9	33 44.0	80	58	107.6	34 08.0	80	58	107.2
7	32 21.5	80	58	107.4	32 45.5	80	58	107.0	33 09.5	80	58	106.7	33 33.4	80	58	106.3
8	31 46.9	80	58	106.5	32 10.9	80	58	106.1	32 34.8	80	58	105.8	32 58.6	79	58	105.4
9	31 12.2	80	58	105.6	31 36.1	80	58	105.2	32 00.0	79	58	104.9	32 23.8	79	58	104.5
60	30 37.4	80	58	104.7	31 01.2	79	58	104.3	31 25.0	79	59	104.0	31 48.7	79	59	103.6
1	30 02.4	79	59	103.8	30 26.2	79	59	103.4	30 49.9	79	59	103.1	31 13.6	79	59	102.7
2	29 27.2	79	59	102.9	29 51.0	79	59	102.6	30 14.7	79	59	102.2	30 38.3	79	59	101.8
3	28 52.0	79	59	102.0	29 15.7	79	59	101.7	29 39.3	79	59	101.3	30 02.9	79	59	101.0
4	28 16.6	79	59	101.2	28 40.3	79	59	100.8	29 03.9	79	59	100.5	29 27.4	78	59	100.1
65	27 41.1	79	59	100.3	28 04.7	79	59	100.0	28 28.3	78	59	99.6	28 51.8	78	59	99.3
6	27 05.6	79	59	99.5	27 29.1	78	60	99.1	27 52.7	78	60	98.8	28 16.1	78	60	98.4
7	26 29.9	79	60	98.6	26 53.4	78	60	98.3	27 16.9	78	60	97.9	27 40.4	78	60	97.6
8	25 54.2	78	60	97.8	26 17.7	78	60	97.4	26 41.1	78	60	97.1	27 04.5	78	60	96.7
9	25 18.4	78	60	96.9	25 41.8	78	60	96.6	26 05.3	78	60	96.2	26 28.6	78	60	95.9
70	24 42.5	78	60	96.1	25 05.9	78	60	95.8	25 29.3	78	60	95.4	25 52.7	78	60	95.1
1	24 06.5	78	60	95.3	24 30.0	78	60	94.9	24 53.4	78	60	94.6	25 16.7	78	60	94.2
2	23 30.6	78	60	94.5	23 54.0	78	60	94.1	24 17.4	78	60	93.8	24 40.7	78	60	93.4
3	22 54.5	78	60	93.6	23 18.0	78	60	93.3	23 41.3	78	60	93.0	24 04.6	78	60	92.6
4	22 18.5	78	60	92.8	22 41.9	78	60	92.5	23 05.2	78	60	92.2	23 28.5	78	60	91.8
75	21 42.4	78	60	92.0	22 05.8	78	60	91.7	22 29.1	78	60	91.3	22 52.4	78	60	91.0
6	21 06.3	78	60	91.2	21 29.7	78	60	90.9	21 53.0	78	60	90.5	22 16.3	78	60	90.2
7	20 30.2	78	60	90.4	20 53.6	78	60	90.1	21 16.9	78	60	89.7	21 40.2	78	60	89.4
8	19 54.1	78	60	89.6	20 17.5	78	60	89.3	20 40.8	78	60	88.9	21 04.1	78	60	88.6
9	19 18.0	78	60	88.8	19 41.4	78	60	88.5	20 04.7	78	60	88.2	20 28.0	78	60	87.8
80	18 41.9	78	60	88.0	19 05.3	78	60	87.7	19 28.6	78	60	87.4	19 52.0	78	60	87.0
1	18 05.8	78	60	87.2	18 29.2	78	60	86.9	18 52.6	78	60	86.6	19 15.9	78	60	86.2
2	17 29.8	78	60	86.5	17 53.2	78	60	86.1	18 16.6	78	60	85.8	18 39.9	78	60	85.5
3	16 53.8	78	60	85.7	17 17.2	78	60	85.3	17 40.6	78	60	85.0	18 03.9	78	60	84.7
4	16 17.8	78	60	84.9	16 41.2	78	60	84.6	17 04.6	78	60	84.2	17 28.0	78	60	83.9
85	15 41.8	78	60	84.1	16 05.3	78	60	83.8	16 28.7	78	60	83.5	16 52.1	78	60	83.1
6	15 05.9	78	60	83.3	15 29.4	78	60	83.0	15 52.9	78	60	82.7	16 16.3	78	60	32.3
7	14 30.1	78	60	82.5	14 53.6	78	60	82.2	15 17.1	78	60	81.9	15 40.5	78	59	81.6
8	13 54.3	78	60	81.8	14 17.9	78	59	81.4	14 41.4	78	59	81.1	15 04.9	78	59	80.8
9	13 18.6	79	59	81.0	13 42.2	79	59	80.7	14 05.7	78	59	80.3	14 29.3	78	59	80.0
90	12 43.0	79	59	80.2	13 06.6	79	59	79.9	13 30.2	79	59	79.6	13 53.7	78	59	79.3

18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
° ′			°	° ′			°	° ′			°	° ′			°	°
55 00.0	1.0	01	180.0	55 30.0	1.0	01	180.0	56 00.0	1.0	01	180.0	56 30.0	1.0	01	180.0	00
54 59.5	1.0	03	178.3	55 29.5	1.0	03	178.3	55 59.5	1.0	03	178.3	56 29.5	1.0	03	178.3	1
54 57.9	1.0	04	176.7	55 27.9	1.0	04	176.7	55 57.9	1.0	04	176.6	56 27.8	1.0	04	176.6	2
54 55.3	1.0	06	175.0	55 25.3	1.0	06	175.0	55 55.2	1.0	06	174.9	56 25.2	1.0	06	174.9	3
54 51.7	1.0	08	173.4	55 21.6	1.0	08	173.3	55 51.5	1.0	08	173.3	56 21.4	1.0	08	173.2	4
54 47.0	1.0	10	171.7	55 16.9	1.0	10	171.7	55 46.7	1.0	10	171.6	56 16.6	1.0	10	171.5	05
54 41.3	99	11	170.1	55 11.1	99	11	170.0	55 40.9	99	11	169.9	56 10.7	99	12	169.8	6
54 34.6	99	13	168.5	55 04.3	99	13	168.4	55 34.1	99	13	168.2	56 03.8	99	13	168.1	7
54 26.8	99	15	166.8	54 56.5	99	15	166.7	55 26.2	99	15	166.6	55 55.9	99	15	166.5	8
54 18.1	99	16	165.2	54 47.7	99	16	165.1	55 17.3	99	16	164.9	55 46.9	99	17	164.8	9
54 08.4	98	18	163.6	54 37.9	98	18	163.5	55 07.4	98	18	163.3	55 36.9	98	18	163.2	10
53 57.8	98	19	162.0	54 27.2	98	20	161.9	54 56.6	98	20	161.7	55 26.0	98	20	161.5	1
53 46.2	98	21	160.5	54 15.5	98	21	160.3	54 44.8	98	21	160.1	55 14.0	98	21	159.9	2
53 33.6	97	22	158.9	54 02.8	97	23	158.7	54 32.0	97	23	158.5	55 01.2	97	23	158.3	3
53 20.2	97	24	157.3	53 49.2	97	24	157.1	54 18.3	97	24	156.9	54 47.3	97	25	156.7	4
53 05.8	97	25	155.8	53 34.8	96	26	155.6	54 03.7	96	26	155.4	54 32.6	96	26	155.1	15
52 50.6	96	27	154.3	53 19.4	96	27	154.0	53 48.2	96	27	153.8	54 17.0	96	28	153.6	6
52 34.5	96	28	152.8	53 03.2	96	28	152.5	53 31.8	96	29	152.3	54 00.5	95	29	152.0	7
52 17.5	95	30	151.3	52 46.1	95	30	151.0	53 14.6	95	30	150.8	53 43.1	95	30	150.5	8
51 59.8	95	31	149.8	52 28.2	95	31	149.5	52 56.6	95	31	149.3	53 24.9	94	32	149.0	9
51 41.2	94	32	148.4	52 09.5	94	32	148.1	52 37.7	94	33	147.8	53 05.9	94	33	147.5	20
51 21.9	94	33	146.9	51 50.0	94	34	146.6	52 18.1	94	34	146.3	52 46.2	93	34	146.1	1
51 01.8	93	35	145.5	51 29.8	93	35	145.2	51 57.7	93	35	144.9	52 25.6	93	35	144.6	2
50 41.0	93	36	144.1	51 08.8	93	36	143.8	51 36.6	93	36	143.5	52 04.3	92	37	143.2	3
50 19.4	92	37	142.7	50 47.1	92	37	142.4	51 14.8	92	38	142.1	51 42.4	92	38	141.8	4
49 57.2	92	38	141.3	50 24.8	92	38	141.0	50 52.2	92	39	140.7	51 19.7	91	39	140.4	25
49 34.3	91	39	140.0	50 01.7	91	39	139.7	50 29.0	91	40	139.4	50 56.3	91	40	139.0	6
49 10.8	91	40	138.7	49 38.0	91	41	138.3	50 05.2	90	41	138.0	50 32.3	90	41	137.7	7
48 46.6	90	41	137.3	49 13.7	90	42	137.0	49 40.7	90	42	136.7	50 07.7	90	42	136.3	8
48 21.9	90	42	136.1	48 48.8	90	42	135.7	49 15.7	89	43	135.4	49 42.5	89	43	135.0	9
47 56.5	89	43	134.8	48 23.3	89	43	134.4	48 50.0	89	44	134.1	49 16.7	89	44	133.7	30
47 30.6	89	44	133.5	47 57.2	89	44	133.2	48 23.8	88	45	132.8	48 50.3	88	45	132.5	1
47 04.2	88	45	132.3	47 30.6	88	45	131.9	47 57.1	88	45	131.6	48 23.4	88	46	131.2	2
46 37.2	88	46	131.0	47 03.5	88	46	130.7	47 29.8	87	46	130.3	47 56.0	87	47	130.0	3
46 09.7	87	47	129.8	46 35.9	87	47	129.5	47 02.0	87	47	129.1	47 28.1	87	47	128.8	4
45 41.7	87	47	128.6	46 07.8	87	48	128.3	46 33.8	86	48	127.9	46 59.7	86	48	127.6	35
45 13.3	86	48	127.5	45 39.2	86	48	127.1	46 05.1	86	49	126.7	46 30.8	86	49	126.4	6
44 44.4	86	49	126.3	45 10.2	86	49	126.0	45 35.9	86	49	125.6	46 01.5	85	50	125.2	7
44 15.1	86	50	125.2	44 40.8	85	50	124.8	45 06.3	85	50	124.4	45 31.8	85	50	124.1	8
43 45.4	85	50	124.0	44 10.9	85	50	123.7	44 36.4	85	51	123.3	45 01.7	84	51	122.9	9
43 15.3	85	51	122.9	43 40.7	84	51	122.6	44 06.0	84	51	122.2	44 31.2	84	51	121.8	40
42 44.8	84	51	121.8	43 10.1	84	52	121.5	43 35.2	84	52	121.1	44 00.4	84	52	120.7	1
42 13.9	84	52	120.7	42 39.1	84	52	120.4	43 04.1	83	52	120.0	43 29.1	83	53	119.6	2
41 42.7	84	53	119.7	42 07.8	83	53	119.3	42 32.7	83	53	118.9	42 57.6	83	53	118.5	3
41 11.2	83	53	118.6	41 36.1	83	53	118.2	42 00.9	83	53	117.9	42 25.7	82	54	117.5	4
40 39.3	83	54	117.6	41 04.1	83	54	117.2	41 28.9	82	54	116.8	41 53.5	82	54	116.4	45
40 07.2	82	54	116.5	40 31.9	82	54	116.2	40 56.5	82	54	115.8	41 21.0	82	55	115.4	6
39 34.7	82	55	115.5	39 59.3	82	55	115.1	40 23.8	82	55	114.8	40 48.3	81	55	114.4	7
39 02.0	82	55	114.5	39 26.5	82	55	114.1	39 50.9	81	55	113.8	40 15.3	81	55	113.4	8
38 29.0	81	55	113.5	38 53.4	81	56	113.1	39 17.8	81	56	112.8	39 42.0	81	56	112.4	9
37 55.8	81	56	112.5	38 20.1	81	56	112.2	38 44.3	81	56	111.8	39 08.5	80	56	111.4	50
37 22.3	81	56	111.6	37 46.5	81	56	111.2	38 10.7	80	56	110.8	38 34.8	80	57	110.4	1
36 48.6	81	56	110.6	37 12.8	80	57	110.2	37 36.8	80	57	109.8	38 00.8	80	57	109.5	2
36 14.7	80	57	109.6	36 38.8	80	57	109.3	37 02.8	80	57	108.9	37 26.7	80	57	108.5	3
35 40.6	80	57	108.7	36 04.6	80	57	108.3	36 28.5	80	57	108.0	36 52.4	79	58	107.6	4
35 06.3	80	57	107.8	35 30.2	80	58	107.4	35 54.1	79	58	107.0	36 17.8	79	58	106.6	55
34 31.9	80	58	106.8	34 55.7	79	58	106.5	35 19.5	79	58	106.1	35 43.2	79	58	105.7	6
33 57.2	79	58	105.9	34 21.0	79	58	105.6	34 44.7	79	58	105.2	35 08.3	79	58	104.8	7
33 22.4	79	58	105.0	33 46.1	79	58	104.7	34 09.8	79	58	104.3	34 33.4	78	58	103.9	8
32 47.5	79	58	104.1	33 11.1	79	59	103.8	33 34.7	79	59	103.4	33 58.2	78	59	103.0	9
32 12.4	79	59	103.2	32 36.0	79	59	102.9	32 59.5	78	59	102.5	33 23.0	78	59	102.1	60
31 37.2	79	59	102.4	32 00.7	78	59	102.0	32 24.2	78	59	101.6	32 47.6	78	59	101.3	1
31 01.8	78	59	101.5	31 25.4	78	59	101.1	31 48.8	78	59	100.8	32 12.2	78	59	100.4	2
30 26.4	78	59	100.6	30 49.9	78	59	100.3	31 13.3	78	59	99.9	31 36.6	78	59	99.5	3
29 50.9	78	59	99.8	30 14.3	78	59	99.4	30 37.7	78	60	99.0	31 01.0	78	60	98.7	4
29 15.2	78	60	98.9	29 38.6	78	60	98.5	30 02.0	78	60	98.2	30 25.2	77	60	97.8	65
28 39.5	78	60	98.1	29 02.9	78	60	97.7	29 26.2	78	60	97.3	29 49.4	77	60	97.0	6
28 03.7	78	60	97.2	28 27.1	78	60	96.9	28 50.3	77	60	96.5	29 13.5	77	60	96.1	7
27 27.9	78	60	96.4	27 51.2	78	60	96.0	28 14.4	77	60	95.7	28 37.6	77	60	95.3	8
26 52.0	78	60	95.5	27 15.2	77	60	95.2	27 38.5	77	60	94.8	28 01.6	77	60	94.5	9
26 16.0	78	60	94.7	26 39.3	77	60	94.4	27 02.5	77	60	94.0	27 25.6	77	60	93.7	70
25 40.0	78	60	93.9	26 03.2	77	60	93.5	26 26.4	77	60	93.2	26 49.6	77	60	92.8	1
25 04.0	78	60	93.1	25 27.2	77	60	92.7	25 50.4	77	60	92.4	26 13.5	77	60	92.0	2
24 27.9	77	60	92.3	24 51.1	77	60	91.9	25 14.3	77	60	91.6	25 37.4	77	60	91.2	3
23 51.8	77	60	91.5	24 15.0	77	60	91.1	24 38.2	77	60	90.8	25 01.3	77	60	90.4	4
23 15.7	77	60	90.7	23 38.9	77	60	90.3	24 02.1	77	60	90.0	24 25.2	77	60	89.6	75
22 39.6	77	60	89.9	23 02.8	77	60	89.5	23 26.0	77	60	89.2	23 49.1	77	60	88.8	6
22 03.5	77	60	89.1	22 26.7	77	60	88.7	22 49.9	77	60	88.4	23 13.0	77	60	88.0	7
21 27.4	77	60	88.3	21 50.6	77	60	87.9	22 13.8	77	60	87.6	22 36.9	77	60	87.2	8
20 51.3	77	60	87.5	21 14.5	77	60	87.1	21 37.7	77	60	86.8	22 00.8	77	60	86.5	9
20 15.2	78	60	86.7	20 38.5	77	60	86.4	21 01.7	77	60	86.0	21 24.8	77	60	85.7	80
19 39.2	78	60	85.9	20 02.5	77	60	85.6	20 25.7	77	60	85.2	20 48.8	77	60	84.9	1
19 03.2	78	60	85.1	19 26.5	77	60	84.8	19 49.7	77	60	84.5	20 12.9	77	60	84.1	2
18 27.2	78	60	84.3	18 50.5	78	60	84.0	19 13.8	77	60	83.7	19 37.0	77	60	83.3	3
17 51.3	78	60	83.6	18 14.6	78	60	83.2	18 37.9	78	60	82.9	19 01.2	77	60	82.6	4
17 15.5	78	60	82.8	17 38.8	78	60	82.5	18 02.1	78	60	82.1	18 25.4	78	60	81.8	85
16 39.7	78	60	82.0	17 03.1	78	59	81.7	17 26.4	78	59	81.4	17 49.7	78	59	81.0	6
16 04.0	78	59	81.2	16 27.4	78	59	80.9	16 50.7	78	59	80.6	17 14.1	78	59	80.3	7
15 28.3	78	59	80.5	15 51.7	78	59	80.2	16 15.1	78	59	79.8	16 38.5	78	59	79.5	8
14 52.7	78	59	79.7	15 16.2	78	59	79.4	15 39.6	78	59	79.1	16 03.1	78	59	78.7	9
14 17.3	78	59	78.9	14 40.8	78	59	78.6	15 04.2	78	59	78.3	15 27.7	78	59	78.0	90

Digitized by Google

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	21 00.0	1.0 01	180.0	20 30.0	1.0 01	180.0	20 00.0	1.0 01	180.0	19 30.0	1.0 01	180.0	19 00.0	1.0 01	180.0	18 30.0	1.0 01	180.0	18 00.0	1.0 01	180.0	17 30.0	1.0 01	180.0	00
1	20 59.7	1.0 02	179.0	20 29.7	1.0 02	179.0	19 59.7	1.0 02	179.0	19 29.7	1.0 02	179.0	18 59.7	1.0 02	179.0	18 29.7	1.0 02	179.0	17 59.7	1.0 02	179.0	17 29.7	1.0 02	179.0	1
2	20 58.7	1.0 03	177.9	20 28.7	1.0 03	178.0	19 58.7	1.0 03	178.0	19 28.7	1.0 03	178.0	18 58.7	1.0 03	178.0	18 28.7	1.0 03	178.0	17 58.7	1.0 03	178.0	17 28.8	1.0 03	178.0	2
3	20 57.1	1.0 04	176.9	20 27.1	1.0 04	176.9	19 57.1	1.0 04	176.9	19 27.1	1.0 04	177.0	18 57.1	1.0 04	177.0	18 27.2	1.0 04	177.0	17 57.2	1.0 04	177.0	17 27.2	1.0 04	177.0	3
4	20 54.8	1.0 05	175.9	20 24.8	1.0 05	175.9	19 54.9	1.0 05	175.9	19 24.9	1.0 05	176.0	18 54.9	1.0 05	176.0	18 25.0	1.0 05	176.0	17 55.0	1.0 06	176.0	17 25.0	1.0 05	176.0	4
05	20 51.9	1.0 06	174.9	20 21.9	1.0 06	174.9	19 52.0	1.0 06	174.9	19 22.0	1.0 06	174.9	18 52.1	1.0 06	175.0	18 22.1	1.0 06	175.0	17 52.2	1.0 06	175.0	17 22.2	1.0 06	175.1	05
6	20 48.3	1.0 07	173.8	20 18.4	1.0 07	173.9	19 48.5	1.0 07	173.9	19 18.5	1.0 07	173.9	18 48.6	1.0 07	174.0	18 18.7	1.0 07	174.0	17 48.7	1.0 07	174.0	17 18.8	1.0 07	174.1	6
7	20 44.1	1.0 08	172.8	20 14.2	1.0 08	172.8	19 44.3	1.0 08	172.9	19 14.4	1.0 08	172.9	18 44.5	1.0 08	173.0	18 14.6	1.0 08	173.0	17 44.7	1.0 08	173.1	17 14.8	1.0 08	173.1	7
8	20 39.3	1.0 09	171.8	20 09.4	1.0 09	171.8	19 39.5	1.0 09	171.9	19 09.7	1.0 09	171.9	18 39.8	1.0 09	172.0	18 09.9	1.0 09	172.0	17 40.0	1.0 09	172.1	17 10.1	1.0 09	172.1	8
9	20 33.8	99 10	170.8	20 04.0	99 10	170.8	19 34.1	99 10	170.9	19 04.3	1.0 10	170.9	18 34.4	1.0 10	171.0	18 04.6	1.0 10	171.0	17 34.7	1.0 10	171.1	17 04.9	1.0 10	171.1	9
10	20 27.7	99 11	169.7	19 57.9	99 11	169.8	19 28.1	99 11	169.9	18 58.3	99 11	169.9	18 28.4	99 11	170.0	17 58.6	99 11	170.0	17 28.8	99 11	170.1	16 59.0	99 11	170.1	10
1	20 20.9	99 12	168.7	19 51.2	99 12	168.8	19 21.4	99 12	168.8	18 51.6	99 12	168.9	18 21.8	99 12	169.0	17 52.1	99 12	169.0	17 22.3	99 12	169.1	16 52.5	99 12	169.2	1
2	20 13.6	99 13	167.7	19 43.8	99 13	167.8	19 14.1	99 13	167.8	18 44.4	99 13	167.9	18 14.6	99 13	168.0	17 44.9	99 13	168.1	17 15.1	99 13	168.1	16 45.4	99 13	168.2	2
3	20 05.6	99 14	166.7	19 35.9	99 14	166.8	19 06.2	99 14	166.8	18 36.5	99 14	166.9	18 06.8	99 14	167.0	17 37.1	99 14	167.1	17 07.4	99 14	167.1	16 37.7	99 14	167.2	3
4	19 56.9	99 15	165.7	19 27.3	99 15	165.8	18 57.7	99 15	165.8	18 28.0	99 15	165.9	17 58.4	99 15	166.0	17 28.7	99 15	166.1	16 59.1	99 15	166.2	16 29.4	99 15	166.2	4
15	19 47.7	99 16	164.7	19 18.1	99 16	164.8	18 48.5	99 16	164.8	18 18.9	99 16	164.9	17 49.3	99 16	165.0	17 19.7	99 16	165.1	16 50.1	99 16	165.2	16 20.5	99 16	165.3	15
6	19 37.8	98 17	163.7	19 08.3	98 17	163.8	18 38.8	98 17	163.8	18 09.2	98 17	163.9	17 39.7	98 17	164.0	17 10.2	98 17	164.1	16 40.6	98 17	164.2	16 11.1	98 17	164.3	6
7	19 27.4	98 18	162.7	18 57.9	98 18	162.8	18 28.4	98 18	162.9	17 59.0	98 18	163.0	17 29.5	98 18	163.0	17 00.0	98 18	163.1	16 30.5	98 18	163.2	16 01.0	98 18	163.3	7
8	19 16.3	98 19	161.7	18 46.9	98 19	161.8	18 17.5	98 19	161.9	17 48.1	98 19	162.0	17 18.6	98 19	162.1	16 49.2	98 19	162.2	16 19.8	98 19	162.3	15 50.4	98 19	162.4	8
9	19 04.7	98 20	160.7	18 35.3	98 20	160.8	18 06.0	98 20	160.9	17 36.6	98 20	161.0	17 07.2	98 20	161.1	16 37.9	98 20	161.2	16 08.5	98 20	161.3	15 39.1	98 20	161.4	9
20	18 52.4	98 21	159.7	18 23.1	98 21	159.8	17 53.8	98 21	159.9	17 24.5	98 21	160.0	16 55.3	98 21	160.1	16 26.0	98 21	160.2	15 56.7	98 21	160.3	15 27.3	98 21	160.5	20
1	18 39.6	97 22	158.7	18 10.4	97 22	158.8	17 41.1	97 22	158.9	17 11.9	97 22	159.0	16 42.7	97 22	159.2	16 13.5	97 22	159.3	15 44.2	97 22	159.4	15 15.0	97 22	159.5	1
2	18 26.2	97 23	157.7	17 57.0	97 23	157.8	17 27.9	97 23	157.9	16 58.7	97 23	158.1	16 29.6	97 23	158.2	16 00.4	97 23	158.3	15 31.2	97 23	158.4	15 02.1	97 22	158.6	2
3	18 12.2	97 24	156.7	17 43.1	97 24	156.8	17 14.0	97 24	157.0	16 44.9	97 24	157.1	16 15.9	97 24	157.2	15 46.8	97 24	157.4	15 17.7	97 24	157.5	14 48.6	97 23	157.6	3
4	17 57.6	97 25	155.7	17 28.6	97 25	155.9	16 59.6	97 25	156.0	16 30.6	97 25	156.1	16 01.6	97 25	156.3	15 32.6	97 25	156.4	15 03.6	97 24	156.5	14 34.5	97 24	156.7	4
25	17 42.5	96 26	154.8	17 13.6	96 26	154.9	16 44.6	96 26	155.0	16 15.7	96 26	155.2	15 46.8	96 26	155.3	15 17.9	96 25	155.4	14 48.9	96 25	155.6	14 20.0	96 25	155.7	25
6	17 26.8	96 27	153.8	16 58.0	96 27	153.9	16 29.1	96 27	154.1	16 00.3	96 27	154.2	15 31.4	96 26	154.4	15 02.6	96 26	154.5	14 33.7	96 26	154.6	14 04.9	96 26	154.8	6
7	17 10.6	96 28	152.8	16 41.8	96 28	153.0	16 13.1	96 28	153.1	15 44.3	96 28	153.3	15 15.5	96 27	153.4	14 46.8	96 27	153.6	14 18.0	96 27	153.7	13 49.2	96 27	153.9	7
8	16 53.8	96 29	151.9	16 25.2	96 29	152.0	15 56.5	96 29	152.2	15 27.8	96 28	152.3	14 59.1	96 28	152.5	14 30.4	96 28	152.6	14 01.7	96 28	152.8	13 33.0	96 28	152.9	8
9	16 36.5	95 30	150.9	16 07.9	95 30	151.1	15 39.4	95 29	151.2	15 10.8	95 29	151.4	14 42.2	95 29	151.5	14 13.6	95 29	151.7	13 45.0	95 29	151.8	13 16.3	95 29	152.0	9
30	16 18.7	95 31	149.9	15 50.2	95 30	150.1	15 21.7	95 30	150.3	14 53.2	95 30	150.4	14 24.7	95 30	150.6	13 56.2	95 30	150.8	13 27.7	95 30	150.9	12 59.1	95 30	151.1	30
1	16 00.4	95 31	149.0	15 32.0	95 31	149.2	15 03.6	95 31	149.3	14 35.1	95 31	149.5	14 06.7	95 31	149.7	13 38.3	95 31	149.8	13 09.8	95 31	150.0	12 41.4	95 30	150.2	1
2	15 41.5	94 32	148.1	15 13.2	94 32	148.2	14 44.9	94 32	148.4	14 16.6	94 32	148.6	13 48.2	94 32	148.7	13 19.9	94 32	148.9	12 51.5	94 31	149.1	12 23.2	95 31	149.2	2
3	15 22.2	94 33	147.1	14 53.9	94 33	147.3	14 25.7	94 33	147.5	13 57.5	94 33	147.6	13 29.2	94 32	147.8	13 01.0	94 32	148.0	12 32.7	94 32	148.2	12 04.5	94 32	148.3	3
4	15 02.3	94 34	146.2	14 34.2	94 34	146.4	14 06.0	94 34	146.5	13 37.9	94 33	146.7	13 09.8	94 33	146.9	12 41.6	94 33	147.1	12 13.4	94 33	147.2	11 45.3	94 33	147.4	4
35	14 42.0	93 35	145.2	14 13.9	93 35	145.4	13 45.9	93 34	145.6	13 17.8	93 34	145.8	12 49.8	94 34	146.0	12 21.7	94 34	146.2	11 53.7	94 34	146.3	11 25.6	94 34	146.5	35
6	14 21.1	93 35	144.3	13 53.2	93 35	144.5	13 25.3	93 35	144.7	12 57.3	93 35	144.9	12 29.4	93 35	145.1	12 01.4	93 35	145.3	11 33.4	93 35	145.4	11 05.4	93 34	145.6	6
7	13 59.8	93 36	143.4	13 32.0	93 36	143.6	13 04.2	93 36	143.8	12 36.3	93 36	144.0	12 08.4	93 36	144.2	11 40.6	93 35	144.4	11 12.7	93 35	144.5	10 44.8	93 35	144.7	7
8	13 38.1	92 37	142.5	13 10.3	92 37	142.7	12 42.6	93 37	142.9	12 14.8	93 37	143.1	11 47.1	93 36	143.3	11 19.3	93 36	143.5	10 51.5	93 36	143.6	10 23.7	93 36	143.8	8
9	13 15.9	92 38	141.6	12 48.2	92 38	141.8	12 20.6	92 37	142.0	11 52.9	92 37	142.2	11 25.3	92 37	142.4	10 57.6	92 37	142.6	10 29.9	92 37	142.8	10 02.2	92 37	143.0	9
40	12 53.2	92 38	140.7	12 25.7	92 38	140.9	11 58.1	92 38	141.1	11 30.6	92 38	141.3	11 03.0	92 38	141.5	10 35.4	92 38	141.7	10 07.8	92 38	141.9	9 40.2	92 37	142.1	40
1	12 30.1	91 39	139.8	12 02.7	91 39	140.0	11 35.2	92 39	140.2	11 07.7	92 39	140.4	10 40.3	92 39	140.6	10 12.8	92 38	140.8	9 45.3	92 38	141.0	9 17.8	92 38	141.2	1
2	12 06.6	91 40	138.9	11 39.2	91 40	139.1	11 11.9	91 40	139.3	10 44.5	91 39	139.5	10 17.1	91 39	139.7	9 49.8	91 39	139.9	9 22.4	91 39	140.1	8 55.0	91 39	140.3	2
3	11 42.6	91 41	138.0	11 15.3	91 40	138.2	10 48.1	91 40	138.4	10 20.8	91 40	138.6	9 53.6	91 40	138.8	9 26.3	91 40	139.0	8 59.0	91 40	139.2	8 31.7	91 39	139.5	3
4	11 18.2	90 41	137.1	10 51.1	90 41	137.3	10 23.9	91 41	137.5	9 56.8	91 41	137.7	9 29.6	91 41	137.9	9 02.4	91 40	138.2	8 35.2	91 40	138.4	8 08.0	91 40	138.6	4
45	10 53.4	90 42	136.2	10 26.4	90 42	136.4	9 59.3	90 42	136.6	9 32.3	90 42	136.9	9 05.2	90 41	137.1	8 38.1	90 41	137.3	8 11.0	90 41	137.5	7 44.0	90 41	137.7	45
6	10 28.2	90 43	135.3	10 01.3	90 42	135.5	9 34.3	90 42	135.8	9 07.4	90 42	136.0	8 40.4	90 42	136.2	8 13.4	90 42	136.4	7 46.5	90 42	136.6	7 19.5	90 41	136.9	6
7	10 02.6	89 43	134.4	9 35.8	89 43	134.7	9 08.9	90 43	134.9	8 42.1	90 43	135.1	8 15.2	90 43	135.3	7 48.3	90 42	135.6	7 21.5	90 42	135.8	6 54.6	90 42	136.0	7
8	9 36.7	89 44	133.6	9 09.9	89 44	133.8	8 43.2	89 44	134.0	8 16.4	89 43	134.3	7 49.7	89 43	134.5	7 22.9	89 43	134.7	6 56.1	89 43	134.9	6 29.3	89 43	135.2	8
9	9 10.3	89 45	132.7	8 43.7	89 44	132.9	8 17.0	89 44	133.2	7 50.4	89 44	133.4	7 23.7	89 44	133.6	6 57.0	89 44	133.9	6 30.4	89 44	134.1	6 03.7	89 43	134.3	9
50	8 43.6	88 45	131.8	8 17.1	88 45	132.1	7 50.5	89 45	132.3	7 23.9	89 45	132.5	6 57.4	89 44	132.8	6 30.8	89 44	133.0	6 04.2	89 44	133.2	5 37.7	89 44	133.5	50
1	8 16.5	88 46	131.0	7 50.1	88 46	131.2	7 23.6	88 45	131.5	6 57.2	88 45	131.7	6 30.7	88 45	131.9	6 04.2	88 45	132.2	5 37.8	88 45	132.4	5 11.3	88 45	132.6	1
2	7 49.1	88 46	130.1	7 22.7	88 46	130.4	6 56.4	88 46	130.6	6 30.0	88 46	130.9	6 03.7	88 46	131.1	5 37.3	88 45	131.3	5 10.9	88 45	131.6				2
3	7 21.3	87 47	129.3	6 55.1	87 47	129.5	6 28.8	88 47	129.8	6 02.5	88 46	130.0	5 36.3	88 46	130.3	5 10.0	88 46	130.5							3
4	6 53.2	87 47	128.4	6 27.0	87 47	128.7	6 00.9	87 47	128.9	5 34.7	87 47	129.2	5 08.5	87 47	129.4										4
55	6 24.7	87 48	127.6	5 58.7	87 48	127.8	5 32.6	87 48	128.1	5 06.6	87 47	128.3													55
6	5 56.0	87 48	126.8	5 30.0	87 48	127.0	5 04.0	87 48	127.3																6
7	5 26.9	86 49	125.9	5 01.0	86 49	126.2																			7

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	12 07.5	79 59	79.4	12 31.1	79 59	79.1	12 54.7	79 59	78.8	13 18.3	79 59	78.5	13 41.9	79 59	78.2	14 05.4	78 59	77.8	14 28.9	78 59	77.5	14 52.4	78 59	77.2	91
2	11 32.0	79 59	78.7	11 55.7	79 59	78.3	12 19.3	79 59	78.0	12 43.0	79 59	77.7	13 06.6	79 59	77.4	13 30.2	79 59	77.1	13 53.7	78 58	76.8	14 17.3	78 58	76.4	2
3	10 56.7	79 59	77.9	11 20.4	79 59	77.6	11 44.1	79 59	77.3	12 07.7	79 59	76.9	12 31.4	79 58	76.6	12 55.0	79 58	76.3	13 18.6	79 58	76.0	13 42.2	79 58	75.7	3
4	10 21.4	79 59	77.1	10 45.2	79 58	76.8	11 08.9	79 58	76.5	11 32.6	79 58	76.2	11 56.3	79 58	75.9	12 20.0	79 58	75.5	12 43.7	79 58	75.2	13 07.3	79 58	74.9	4
95	9 46.3	79 58	76.3	10 10.1	79 58	76.0	10 33.9	79 58	75.7	10 57.6	79 58	75.4	11 21.4	79 58	75.1	11 45.1	79 58	74.8	12 08.8	79 58	74.5	12 32.5	79 58	74.2	95
6	9 11.2	80 58	75.6	9 35.1	79 58	75.3	9 58.9	79 58	74.9	10 22.7	79 58	74.6	10 46.5	79 58	74.3	11 10.3	79 58	74.0	11 34.1	79 58	73.7	11 57.8	79 58	73.4	6
7	8 36.3	80 58	74.8	9 00.2	80 58	74.5	9 24.1	80 58	74.2	9 48.0	80 58	73.9	10 11.8	79 58	73.6	10 35.7	79 58	73.3	10 59.5	79 57	72.9	11 23.3	79 57	72.6	7
8	8 01.6	80 58	74.0	8 25.5	80 58	73.7	8 49.4	80 58	73.4	9 13.4	80 57	73.1	9 37.3	80 57	72.8	10 01.2	80 57	72.5	10 25.0	80 57	72.2	10 48.9	79 57	71.9	8
9	7 26.9	80 58	73.2	7 50.9	80 57	72.9	8 14.9	80 57	72.6	8 38.9	80 57	72.3	9 02.9	80 57	72.0	9 26.8	80 57	71.7	9 50.7	80 57	71.4	10 14.7	80 57	71.1	9
100	6 52.4	80 57	72.5	7 16.5	80 57	72.2	7 40.5	80 57	71.9	8 04.6	80 57	71.6	8 28.6	80 57	71.3	8 52.6	80 57	71.0	9 16.6	80 57	70.6	9 40.6	80 57	70.3	100
1	6 18.1	80 57	71.7	6 42.2	80 57	71.4	7 06.3	80 57	71.1	7 30.4	80 57	70.8	7 54.5	80 57	70.5	8 18.5	80 56	70.2	8 42.6	80 56	69.9	9 06.7	80 56	69.6	1
2	5 43.9	81 57	70.9	6 08.0	81 57	70.6	6 32.2	81 56	70.3	6 56.4	81 56	70.0	7 20.5	80 56	69.7	7 44.7	80 56	69.4	8 08.8	80 56	69.1	8 32.9	80 56	68.8	2
3	5 09.8	81 56	70.1	5 34.1	81 56	69.8	5 58.3	81 56	69.5	6 22.5	81 56	69.2	6 46.7	81 56	68.9	7 10.9	81 56	68.6	7 35.1	81 56	68.3	7 59.3	81 56	68.0	3
4				5 00.2	81 56	69.1	5 24.6	81 56	68.8	5 48.8	81 56	68.5	6 13.1	81 56	68.2	6 37.4	81 56	67.9	7 01.7	81 55	67.6	7 25.9	81 55	67.3	4
105										5 15.3	81 56	67.7	5 39.7	81 55	67.4	6 04.0	81 55	67.1	6 28.4	81 55	66.8	6 52.7	81 55	66.5	105
6													5 06.5	81 55	66.6	5 30.9	81 55	66.3	5 55.3	81 55	66.0	6 19.7	81 55	65.7	6
7																			5 22.4	82 54	65.3	5 46.9	82 54	65.0	7
8																						5 14.3	82 54	64.2	8

Digitized by Google

Lat. 53°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	57 00.0	1.0 01	180.0	57 30.0	1.0 01	180.0	58 00.0	1.0 01	180.0	58 30.0	1.0 01	180.0
1	56 59.5	1.0 03	178.3	57 29.5	1.0 03	178.3	57 59.4	1.0 03	178.2	58 29.4	1.0 03	178.2
2	56 57.8	1.0 05	176.6	57 27.8	1.0 05	176.5	57 57.8	1.0 05	176.5	58 27.8	1.0 05	176.4
3	56 55.1	1.0 06	174.8	57 25.1	1.0 06	174.8	57 55.0	1.0 06	174.7	58 25.0	1.0 06	174.7
4	56 51.3	1.0 08	173.1	57 21.2	1.0 08	173.0	57 51.1	1.0 08	173.0	58 21.0	1.0 08	172.9
05	56 46.5	1.0 10	171.4	57 16.3	1.0 10	171.3	57 46.2	1.0 10	171.2	58 16.0	1.0 10	171.1
6	56 40.5	99 12	169.7	57 10.3	99 12	169.6	57 40.1	99 12	169.5	58 09.9	99 12	169.4
7	56 33.6	99 13	168.0	57 03.3	99 14	167.9	57 33.0	99 14	167.8	58 02.7	99 14	167.6
8	56 25.5	99 15	166.3	56 55.2	99 15	166.2	57 24.8	99 15	166.0	57 54.4	99 16	165.9
9	56 16.5	99 17	164.6	56 46.0	99 17	164.5	57 15.6	98 17	164.3	57 45.1	98 17	164.2
10	56 06.4	98 18	163.0	56 35.9	98 19	162.8	57 05.3	98 19	162.6	57 34.8	98 19	162.5
1	55 55.3	98 20	161.3	56 24.7	98 20	161.2	56 54.0	98 20	161.0	57 23.4	98 21	160.8
2	55 43.3	98 22	159.7	56 12.5	97 22	159.5	56 41.8	97 22	159.3	57 11.0	97 22	159.1
3	55 30.3	97 23	158.1	55 59.4	97 23	157.9	56 28.5	97 24	157.7	56 57.6	97 24	157.4
4	55 16.4	97 25	156.5	55 45.4	97 25	156.3	56 14.3	97 25	156.0	56 43.3	96 25	155.8
15	55 01.5	96 26	154.9	55 30.3	96 26	154.7	55 59.2	96 27	154.4	56 28.0	96 27	154.2
6	54 45.7	96 28	153.3	55 14.4	96 28	153.1	55 43.1	96 28	152.8	56 11.8	95 28	152.6
7	54 29.1	95 29	151.8	54 57.7	95 29	151.5	55 26.2	95 30	151.2	55 54.7	95 30	151.0
8	54 11.6	95 31	150.2	54 40.0	95 31	150.0	55 08.4	95 31	149.7	55 36.7	94 31	149.4
9	53 53.2	94 32	148.7	54 21.5	94 32	148.4	54 49.8	94 32	148.2	55 17.9	94 33	147.9
20	53 34.1	94 33	147.2	54 02.2	94 33	146.9	54 30.3	94 34	146.6	54 58.3	93 34	146.3
1	53 14.2	93 34	145.8	53 42.1	93 35	145.5	54 10.0	93 35	145.1	54 37.9	93 35	144.8
2	52 53.5	93 36	144.3	53 21.3	93 36	144.0	53 49.0	92 36	143.7	54 16.7	92 37	143.3
3	52 32.0	92 37	142.9	52 59.7	92 37	142.6	53 27.3	92 37	142.2	53 54.8	92 38	141.9
4	52 09.9	92 38	141.5	52 37.4	92 38	141.1	53 04.8	91 39	140.8	53 32.2	91 39	140.4
25	51 47.0	91 39	140.1	52 14.4	91 39	139.7	52 41.6	91 40	139.4	53 08.8	91 40	139.0
6	51 23.5	91 40	138.7	51 50.7	90 41	138.3	52 17.8	90 41	138.0	52 44.8	90 41	137.6
7	50 59.4	90 41	137.3	51 26.4	90 42	137.0	51 53.3	90 42	136.6	52 20.2	89 42	136.3
8	50 34.6	90 42	136.0	51 01.4	89 43	135.6	51 28.2	89 43	135.3	51 54.9	89 43	134.9
9	50 09.2	89 43	134.7	50 35.9	89 44	134.3	51 02.5	89 44	134.0	51 29.0	88 44	133.6
30	49 43.3	89 44	133.4	50 09.8	88 44	133.0	50 36.2	88 45	132.7	51 02.6	88 45	132.3
1	49 16.7	88 45	132.1	49 43.1	88 45	131.7	50 09.4	88 46	131.4	50 35.6	87 46	131.0
2	48 49.7	87 46	130.9	49 15.9	87 46	130.5	49 42.0	87 46	130.1	50 08.1	87 47	129.7
3	48 22.1	87 47	129.6	48 48.2	87 47	129.2	49 14.2	86 47	128.9	49 40.1	86 48	128.5
4	47 54.1	86 48	128.4	48 20.0	86 48	128.0	48 45.8	86 48	127.6	49 11.6	86 48	127.2
35	47 25.5	86 48	127.2	47 51.3	86 49	126.8	48 17.0	85 49	126.4	48 42.6	85 49	126.0
6	46 56.5	86 49	126.0	47 22.2	85 49	125.6	47 47.7	85 50	125.2	48 13.2	85 50	124.8
7	46 27.1	85 50	124.8	46 52.6	85 50	124.4	47 18.0	85 50	124.1	47 43.3	84 50	123.7
8	45 57.3	85 50	123.7	46 22.6	84 51	123.3	46 47.9	84 51	122.9	47 13.1	84 51	122.5
9	45 27.0	84 51	122.5	45 52.2	84 51	122.2	46 17.4	84 51	121.8	46 42.4	83 52	121.4
40	44 56.4	84 52	121.4	45 21.5	83 52	121.0	45 46.5	83 52	120.6	46 11.4	83 52	120.2
1	44 25.4	83 52	120.3	44 50.4	83 52	119.9	45 15.2	83 53	119.5	45 40.0	83 53	119.1
2	43 54.1	83 53	119.2	44 18.9	83 53	118.8	44 43.7	82 53	118.4	45 08.3	82 53	118.0
3	43 22.4	83 53	118.2	43 47.1	82 54	117.8	44 11.7	82 54	117.4	44 36.3	82 54	117.0
4	42 50.4	82 54	117.1	43 15.0	82 54	116.7	43 39.5	82 54	116.3	44 04.0	81 54	115.9
45	42 18.1	82 54	116.1	42 42.6	82 54	115.7	43 07.0	81 55	115.3	43 31.3	81 55	114.9
6	41 45.5	81 55	115.0	42 09.9	81 55	114.6	42 34.2	81 55	114.2	42 58.4	81 55	113.8
7	41 12.7	81 55	114.0	41 37.0	81 55	113.6	42 01.2	81 56	113.2	42 25.3	80 56	112.8
8	40 39.5	81 56	113.0	41 03.7	81 56	112.6	41 27.9	80 56	112.2	41 51.9	80 56	111.8
9	40 06.2	80 56	112.0	40 30.3	80 56	111.6	40 54.3	80 56	111.2	41 18.2	80 56	110.8
50	39 32.6	80 56	111.0	39 56.6	80 56	110.6	40 20.5	80 57	110.2	40 44.4	79 57	109.8
1	38 58.8	80 57	110.0	39 22.7	80 57	109.7	39 46.5	79 57	109.3	40 10.3	79 57	108.9
2	38 24.8	80 57	109.1	38 48.6	79 57	108.7	39 12.4	79 57	108.3	39 36.0	79 57	107.9
3	37 50.5	79 57	108.1	38 14.3	79 57	107.7	38 38.0	79 58	107.4	39 01.6	79 58	107.0
4	37 16.1	79 58	107.2	37 39.8	79 58	106.8	38 03.4	79 58	106.4	38 27.0	78 58	106.0
55	36 41.5	79 58	106.3	37 05.2	79 58	105.9	37 28.7	78 58	105.5	37 52.2	78 58	105.1
6	36 06.8	79 58	105.3	36 30.4	78 58	105.0	36 53.8	78 58	104.6	37 17.3	78 58	104.2
7	35 31.9	78 58	104.4	35 55.4	78 58	104.1	36 18.8	78 59	103.7	36 42.2	78 59	103.3
8	34 56.9	78 59	108.5	35 20.3	78 59	103.2	35 43.7	78 59	102.8	36 07.0	78 59	102.4
9	34 21.7	78 59	102.6	34 45.1	78 59	102.3	35 08.4	78 59	101.9	35 31.6	77 59	101.5
60	33 46.4	78 59	101.8	34 09.7	78 59	101.4	34 33.0	77 59	101.0	34 56.2	77 59	100.6
1	33 11.0	78 59	100.9	33 34.3	78 59	100.5	33 57.5	77 59	100.1	34 20.7	77 59	99.7
2	32 35.5	78 59	100.0	32 58.7	77 59	99.6	33 21.9	77 59	99.3	33 45.0	77 60	98.9
3	31 59.9	77 59	99.2	32 23.1	77 60	98.8	32 46.2	77 60	98.4	33 09.3	77 60	98.0
4	31 24.2	77 60	98.3	31 47.4	77 60	97.9	32 10.5	77 60	97.5	32 33.5	77 60	97.2
65	30 48.4	77 60	97.4	31 11.6	77 60	97.1	31 34.6	77 60	96.7	31 57.7	77 60	96.3
6	30 12.6	77 60	96.6	30 35.7	77 60	96.2	30 58.8	77 60	95.9	31 21.7	77 60	95.5
7	29 36.7	77 60	95.8	29 59.8	77 60	95.4	30 22.8	77 60	95.0	30 45.8	76 60	94.7
8	29 00.7	77 60	94.9	29 23.8	77 60	94.6	29 46.8	77 60	94.2	30 09.8	76 60	93.8
9	28 24.7	77 60	94.1	28 47.8	77 60	93.8	29 10.8	77 60	93.4	29 33.7	76 60	93.0
70	27 48.7	77 60	93.3	28 11.7	77 60	92.9	28 34.7	77 60	92.6	28 57.6	76 60	92.2
1	27 12.6	77 60	92.5	27 35.7	77 60	92.1	27 58.6	76 60	91.8	28 21.6	76 60	91.4
2	26 36.6	77 60	91.7	26 59.6	77 60	91.3	27 22.5	76 60	91.0	27 45.5	76 60	90.6
3	26 00.5	77 60	90.9	26 23.5	77 60	90.5	26 46.4	76 60	90.1	27 09.3	76 60	89.8
4	25 24.4	77 60	90.1	25 47.4	77 60	89.7	26 10.3	76 60	89.4	26 33.2	76 60	89.0
75	24 48.2	77 60	89.3	25 11.3	77 60	88.9	25 34.2	76 60	88.6	25 57.1	76 60	88.2
6	24 12.1	77 60	88.5	24 35.2	77 60	88.1	24 58.1	76 60	87.8	25 21.1	76 60	87.4
7	23 36.1	77 60	87.7	23 59.1	77 60	87.3	24 22.1	77 60	87.0	24 45.0	76 60	86.6
8	23 00.0	77 60	86.9	23 23.0	77 60	86.5	23 46.0	77 60	86.2	24 09.0	76 60	85.8
9	22 23.9	77 60	86.1	22 47.0	77 60	85.8	23 10.0	77 60	85.4	23 33.0	76 60	85.1
80	21 47.9	77 60	85.3	22 11.0	77 60	85.0	22 34.0	77 60	84.6	22 57.0	77 60	84.3
1	21 12.0	77 60	84.6	21 35.1	77 60	84.2	21 58.1	77 60	83.9	22 21.1	77 60	83.5
2	20 36.0	77 60	83.8	20 59.2	77 60	83.4	21 22.2	77 60	83.1	21 45.3	77 60	82.8
3	20 00.2	77 60	83.0	20 23.3	77 60	82.7	20 46.4	77 60	82.3	21 09.5	77 60	82.0
4	19 24.4	77 60	82.2	19 47.5	77 60	81.9	20 10.7	77 59	81.6	20 33.8	77 59	81.2
85	18 48.6	77 59	81.5	19 11.8	77 59	81.1	19 35.0	77 59	80.8	19 58.1	77 59	80.5
6	18 13.0	77 59	80.7	18 36.2	77 59	80.4	18 59.4	77 59	80.0	19 22.5	77 59	79.7
7	17 37.4	78 59	79.9	18 00.6	78 59	79.6	18 23.9	77 59	79.3	18 47.1	77 59	78.9
8	17 01.8	78 59	79.2	17 25.2	78 59	78.8	17 48.4	78 59	78.5	18 11.7	77 59	78.2
9	16 26.4	78 59	78.4	16 49.8	78 59	78.1	17 13.1	78 59	77.8	17 36.4	78 59	77.4
90	15 51.1	78 59	77.6	16 14.5	78 59	77.3	16 37.9	78 59	77.0	17 01.2	78 58	76.7

22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
59 00.0	1.0 01	180.0	59 30.0	1.0 01	180.0	60 00.0	1.0 01	180.0	60 30.0	1.0 01	180.0	00
58 59.4	1.0 03	178.2	59 29.4	1.0 03	178.2	59 59.4	1.0 03	178.2	60 29.4	1.0 03	178.1	1
58 57.7	1.0 05	176.4	59 27.7	1.0 05	176.4	59 57.7	1.0 05	176.3	60 27.7	1.0 05	176.3	2
58 54.9	1.0 07	174.6	59 24.8	1.0 07	174.5	59 54.8	1.0 07	174.5	60 24.7	1.0 07	174.4	3
58 50.9	1.0 08	172.8	59 20.8	1.0 09	172.7	59 50.7	1.0 09	172.7	60 20.6	1.0 09	172.6	4
58 45.9	99 10	171.0	59 15.7	99 10	170.9	59 45.6	99 11	170.8	60 15.4	99 11	170.7	05
58 39.7	99 12	169.3	59 09.5	99 12	169.1	59 39.2	99 12	169.0	60 09.0	99 13	168.9	6
58 32.4	99 14	167.5	59 02.1	99 14	167.4	59 31.8	99 14	167.2	60 01.5	99 14	167.1	7
58 24.1	99 16	165.7	58 53.7	99 16	165.6	59 23.3	99 16	165.4	59 52.9	99 16	165.3	8
58 14.6	98 17	164.0	58 44.2	98 18	163.8	59 13.6	98 18	163.7	59 43.1	98 18	163.5	9
58 04.2	98 19	162.3	58 33.6	98 19	162.1	59 03.0	98 20	161.9	59 32.3	98 20	161.7	10
57 52.7	98 21	160.6	58 21.9	98 21	160.4	58 51.2	98 21	160.1	59 20.4	97 22	159.9	1
57 40.1	97 23	158.9	58 09.3	97 23	158.7	58 38.4	97 23	158.4	59 07.5	97 23	158.2	2
57 26.6	97 24	157.2	57 55.7	97 24	157.0	58 24.7	97 25	156.7	58 53.6	97 25	156.5	3
57 12.2	96 26	155.5	57 41.0	96 26	155.3	58 09.9	96 26	155.0	58 38.7	96 26	154.8	4
56 56.7	96 27	153.9	57 25.5	96 28	153.6	57 54.2	96 28	153.4	58 22.8	95 28	153.1	15
56 40.4	95 29	152.3	57 09.0	95 29	152.0	57 37.5	95 29	151.7	58 06.0	95 30	151.4	6
56 23.2	95 30	150.7	56 51.6	95 30	150.4	57 20.0	95 31	150.1	57 48.3	94 31	149.8	7
56 05.0	94 32	149.1	56 33.3	94 32	148.8	57 01.5	94 32	148.5	57 29.7	94 32	148.2	8
55 46.1	94 33	147.5	56 14.2	94 33	147.2	56 42.2	93 34	146.9	57 10.2	93 34	146.6	9
55 26.3	93 34	146.0	55 54.2	93 35	145.7	56 22.1	93 35	145.4	56 49.9	93 35	145.0	20
55 05.7	93 36	144.5	55 33.5	92 36	144.2	56 01.2	92 36	143.8	56 28.8	92 36	143.5	1
54 44.4	92 37	143.0	55 12.0	92 37	142.7	55 39.5	92 37	142.3	56 07.0	91 38	142.0	2
54 22.3	91 38	141.5	54 49.7	91 38	141.2	55 17.1	91 39	140.8	55 44.3	91 39	140.5	3
53 59.5	91 39	140.1	54 26.7	91 39	139.7	54 53.9	90 40	139.4	55 21.0	90 40	139.0	4
53 36.0	90 40	138.7	54 03.0	90 41	138.3	54 30.0	90 41	137.9	54 57.0	90 41	137.6	25
53 11.8	90 41	137.3	53 38.7	90 42	136.9	54 05.5	89 42	136.5	54 32.3	89 42	136.1	6
52 47.0	89 42	135.9	53 13.7	89 43	135.5	53 40.4	89 43	135.1	54 06.9	88 43	134.7	7
52 21.5	89 43	134.5	52 48.1	88 44	134.2	53 14.6	88 44	133.8	53 41.0	88 44	133.4	8
51 55.5	88 44	133.2	52 21.9	88 45	132.8	52 48.2	88 45	132.4	53 14.5	87 45	132.0	9
51 28.9	88 45	131.9	51 55.1	87 46	131.5	52 21.3	87 46	131.1	52 47.3	87 46	130.7	30
51 01.8	87 46	130.6	51 27.8	87 46	130.2	51 53.8	86 47	129.8	52 19.7	86 47	129.4	1
50 34.1	86 47	129.3	51 00.0	86 47	128.9	51 25.8	86 47	128.5	51 51.5	86 48	128.1	2
50 05.9	86 48	128.1	50 31.6	86 48	127.7	50 57.3	85 48	127.3	51 22.9	85 49	126.8	3
49 37.2	85 49	126.8	50 02.8	85 49	126.4	50 28.3	85 49	126.0	50 53.8	85 49	125.6	4
49 08.1	85 49	125.6	49 33.6	85 50	125.2	49 58.9	84 50	124.8	50 24.2	84 50	124.4	35
48 38.5	84 50	124.4	49 03.8	84 50	124.0	49 29.0	84 50	123.6	49 54.2	84 51	123.2	6
48 08.6	84 51	123.3	48 33.7	84 51	122.8	48 58.8	83 51	122.4	49 23.7	83 51	122.0	7
47 38.2	84 51	122.1	48 03.2	83 52	121.7	48 28.1	83 52	121.3	48 52.9	83 52	120.8	8
47 07.4	83 52	121.0	47 32.3	83 52	120.5	47 57.0	82 52	120.1	48 21.7	82 53	119.7	9
46 36.2	83 52	119.8	47 01.0	82 53	119.4	47 25.6	82 53	119.0	47 50.2	82 53	118.6	40
46 04.7	82 53	118.7	46 29.4	82 53	118.3	46 53.9	82 53	117.9	47 18.3	81 54	117.5	1
45 32.9	82 54	117.6	45 57.4	82 54	117.2	46 21.8	81 54	116.8	46 46.1	81 54	116.4	2
45 00.8	81 54	116.6	45 25.1	81 54	116.1	45 49.4	81 54	115.7	46 13.6	80 55	115.3	3
44 28.3	81 55	115.5	44 52.6	81 55	115.1	45 16.8	80 55	114.7	45 40.8	80 55	114.2	4
43 55.6	81 55	114.5	44 19.7	80 55	114.0	44 43.8	80 55	113.6	45 07.8	80 56	113.2	45
43 22.6	80 55	113.4	43 46.6	80 56	113.0	44 10.6	80 56	112.6	44 34.5	79 56	112.2	6
42 49.3	80 56	112.4	43 13.3	80 56	112.0	43 37.1	79 56	111.6	44 00.9	79 56	111.2	7
42 15.8	80 56	111.4	42 39.7	79 56	111.0	43 03.5	79 57	110.6	43 27.1	79 57	110.2	8
41 42.1	79 57	110.4	42 05.9	79 57	110.0	42 29.5	79 57	109.6	42 53.1	78 57	109.2	9
41 08.1	79 57	109.4	41 31.8	79 57	109.0	41 55.4	78 57	108.6	42 18.9	78 57	108.2	50
40 34.0	79 57	108.5	40 57.6	79 57	108.1	41 21.1	78 58	107.6	41 44.5	78 58	107.2	1
39 59.6	79 58	107.5	40 23.2	78 58	107.1	40 46.6	78 58	106.7	41 09.9	78 58	106.3	2
39 25.1	78 58	106.6	39 48.6	78 58	106.2	40 11.9	78 58	105.7	40 35.2	77 58	105.3	3
38 50.4	78 58	105.6	39 13.8	78 58	105.2	39 37.1	77 58	104.8	40 00.3	77 58	104.4	4
38 15.6	78 58	104.7	38 38.9	78 58	104.3	39 02.1	77 59	103.9	39 25.3	77 59	103.5	55
37 40.6	78 59	103.8	38 03.8	77 59	103.4	38 27.0	77 59	103.0	38 50.1	77 59	102.6	6
37 05.4	77 59	102.9	37 28.6	77 59	102.5	37 51.7	77 59	102.1	38 14.8	77 59	101.7	7
36 30.2	77 59	102.0	36 53.3	77 59	101.6	37 16.4	77 59	101.2	37 39.4	76 59	100.8	8
35 54.8	77 59	101.1	36 17.9	77 59	100.7	36 40.9	77 59	100.3	37 03.8	76 59	99.9	9
35 19.3	77 59	100.2	35 42.4	77 59	99.8	36 05.3	76 59	99.4	36 28.2	76 60	99.0	60
34 43.7	77 59	99.4	35 06.7	77 60	99.0	35 29.7	76 60	98.6	35 52.5	76 60	98.2	1
34 08.1	77 60	98.5	34 31.0	76 60	98.1	34 53.9	76 60	97.7	35 16.7	76 60	97.3	2
33 32.3	77 60	97.6	33 55.2	76 60	97.2	34 18.1	76 60	96.9	34 40.9	76 60	96.5	3
32 56.5	76 60	96.8	33 19.4	76 60	96.4	33 42.2	76 60	96.0	34 05.0	76 60	95.6	4
32 20.6	76 60	95.9	32 43.5	76 60	95.6	33 06.3	76 60	95.2	33 29.0	76 60	94.8	65
31 44.7	76 60	95.1	32 07.5	76 60	94.7	32 30.3	76 60	94.3	32 53.0	76 60	94.0	6
31 08.7	76 60	94.3	31 31.5	76 60	93.9	31 54.3	76 60	93.5	32 17.0	76 60	93.1	7
30 32.6	76 60	93.5	30 55.5	76 60	93.1	31 18.2	76 60	92.7	31 40.9	76 60	92.3	8
29 56.6	76 60	92.6	30 19.4	76 60	92.3	30 42.1	76 60	91.9	31 04.8	75 60	91.5	9
29 20.5	76 60	91.8	29 43.3	76 60	91.5	30 06.0	76 60	91.1	30 28.7	75 60	90.7	70
28 44.4	76 60	91.0	29 07.2	76 60	90.6	29 29.9	76 60	90.3	29 52.6	75 60	89.9	1
28 08.3	76 60	90.2	28 31.1	76 60	89.8	28 53.8	76 60	89.5	29 16.5	75 60	89.1	2
27 32.2	76 60	89.4	27 55.0	76 60	89.1	28 17.7	76 60	88.7	28 40.4	75 60	88.3	3
26 56.1	76 60	88.6	27 18.9	76 60	88.3	27 41.6	76 60	87.9	28 04.3	75 60	87.5	4
26 20.0	76 60	87.8	26 42.8	76 60	87.5	27 05.6	76 60	87.1	27 28.3	76 60	86.7	75
25 43.9	76 60	87.1	26 06.7	76 60	86.7	26 29.5	76 60	86.3	26 52.2	76 60	86.0	6
25 07.9	76 60	86.3	25 30.7	76 60	85.9	25 53.5	76 60	85.6	26 16.2	76 60	85.2	7
24 31.9	76 60	85.5	24 54.7	76 60	85.1	25 17.5	76 60	84.8	25 40.3	76 60	84.4	8
23 55.9	76 60	84.7	24 18.8	76 60	84.4	24 41.6	76 60	84.0	25 04.3	76 60	83.6	9
23 20.0	76 60	83.9	23 42.8	76 60	83.6	24 05.7	76 60	83.2	24 28.5	76 60	82.9	80
22 44.1	76 60	83.2	23 07.0	76 60	82.8	23 29.9	76 60	82.5	23 52.7	76 60	82.1	1
22 08.3	77 60	82.4	22 31.2	76 60	82.1	22 54.1	76 60	81.7	23 16.9	76 59	81.4	2
21 32.5	77 60	81.6	21 55.5	77 59	81.3	22 18.4	76 59	80.9	22 41.3	76 59	80.6	3
20 56.8	77 59	80.9	21 19.8	77 59	80.5	21 42.8	76 59	80.2	22 05.7	76 59	79.8	4
20 21.2	77 59	80.1	20 44.2	77 59	79.8	21 07.2	77 59	79.4	21 30.2	76 59	79.1	85
19 45.7	77 59	79.4	20 08.7	77 59	79.0	20 31.8	77 59	78.7	20 54.8	77 59	78.3	6
19 10.2	77 59	78.6	19 33.3	77 59	78.3	19 56.4	77 59	77.9	20 19.5	77 59	77.6	7
18 34.9	77 59	77.8	18 58.0	77 59	77.5	19 21.2	77 59	77.2	19 44.3	77 58	76.8	8
17 59.6	77 59	77.1	18 22.8	77 58	76.8	18 46.0	77 58	76.4	19 09.2	77 58	76.1	9
17 24.5	78 58	76.3	17 47.7	77 58	76.0	18 11.0	77 58	75.7	18 34.2	77 58	75.3	90

Digitized by Google

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	17 00.0	1.0 01	180.0	16 30.0	1.0 00	180.0	16 00.0	1.0 00	180.0	15 30.0	1.0 00	180.0	15 00.0	1.0 00	180.0	14 30.0	1.0 00	180.0	14 00.0	1.0 00	180.0	13 30.0	1.0 00	180.0	00
1	16 59.7	1.0 02	179.0	16 29.7	1.0 02	179.0	15 59.7	1.0 02	179.0	15 29.7	1.0 02	179.0	14 59.7	1.0 02	179.0	14 29.7	1.0 02	179.0	13 59.7	1.0 02	179.1	13 29.7	1.0 01	179.1	1
2	16 58.8	1.0 03	178.0	16 28.8	1.0 03	178.0	15 58.8	1.0 03	178.1	15 28.8	1.0 03	178.1	14 58.8	1.0 02	178.1	14 28.8	1.0 02	178.1	13 58.8	1.0 02	178.1	13 28.8	1.0 02	178.1	2
3	16 57.2	1.0 04	177.1	16 27.2	1.0 04	177.1	15 57.2	1.0 04	177.1	15 27.3	1.0 04	177.1	14 57.3	1.0 04	177.1	14 27.3	1.0 04	177.1	13 57.3	1.0 04	177.2	13 27.3	1.0 03	177.2	3
4	16 55.0	1.0 05	176.1	16 25.1	1.0 05	176.1	15 55.1	1.0 05	176.1	15 25.1	1.0 05	176.1	14 55.2	1.0 05	176.2	14 25.2	1.0 05	176.2	13 55.2	1.0 04	176.2	13 25.2	1.0 04	176.2	4
05	16 52.3	1.0 06	175.1	16 22.3	1.0 06	175.1	15 52.4	1.0 06	175.1	15 22.4	1.0 06	175.2	14 52.4	1.0 06	175.2	14 22.5	1.0 06	175.2	13 52.5	1.0 05	175.3	13 22.6	1.0 05	175.3	05
6	16 48.9	1.0 07	174.1	16 18.9	1.0 07	174.1	15 49.0	1.0 07	174.2	15 19.1	1.0 07	174.2	14 49.1	1.0 07	174.2	14 19.2	1.0 06	174.3	13 49.3	1.0 06	174.3	13 19.3	1.0 06	174.3	6
7	16 44.9	1.0 08	173.1	16 14.9	1.0 08	173.2	15 45.0	1.0 08	173.2	15 15.1	1.0 08	173.3	14 45.2	1.0 08	173.3	14 15.3	1.0 08	173.3	13 45.4	1.0 07	173.4	13 15.5	1.0 07	173.4	7
8	16 40.2	1.0 09	172.2	16 10.3	1.0 09	172.2	15 40.5	1.0 09	172.2	15 10.6	1.0 09	172.3	14 40.7	1.0 09	172.3	14 10.8	1.0 08	172.4	13 40.9	1.0 08	172.4	13 11.0	1.0 08	172.5	8
9	16 35.0	1.0 10	171.2	16 05.1	1.0 10	171.2	15 35.3	1.0 10	171.3	15 05.4	1.0 10	171.3	14 35.6	1.0 10	171.4	14 05.7	1.0 09	171.4	13 35.9	1.0 09	171.5	13 06.0	1.0 09	171.5	9
10	16 29.2	99 11	170.2	15 59.3	99 11	170.3	15 29.5	99 11	170.3	14 59.7	99 11	170.4	14 29.9	99 10	170.4	14 00.0	99 10	170.5	13 30.2	99 10	170.5	13 00.4	99 10	170.6	10
1	16 22.7	99 12	169.2	15 52.9	99 12	169.3	15 23.1	99 12	169.4	14 53.4	99 12	169.4	14 23.6	99 11	169.5	13 53.8	99 11	169.5	13 24.0	99 11	169.6	12 54.2	99 11	169.7	1
2	16 15.7	99 13	168.3	15 45.9	99 13	168.3	15 16.2	99 13	168.4	14 46.4	99 13	168.5	14 16.7	99 12	168.5	13 46.9	99 12	168.6	13 17.2	99 12	168.7	12 47.4	99 12	168.7	2
3	16 08.0	99 14	167.3	15 38.3	99 14	167.4	15 08.6	99 14	167.4	14 38.9	99 14	167.5	14 09.2	99 13	167.6	13 39.5	99 13	167.7	13 09.8	99 13	167.7	12 40.1	99 13	167.8	3
4	15 59.8	99 15	166.3	15 30.1	99 15	166.4	15 00.5	99 15	166.5	14 30.8	99 14	166.6	14 01.1	99 14	166.6	13 31.5	99 14	166.7	13 01.8	99 14	166.8	12 32.2	99 14	166.9	4
15	15 50.9	99 16	165.4	15 21.3	99 16	165.4	14 51.7	99 16	165.5	14 22.1	99 15	165.6	13 52.5	99 15	165.7	13 22.9	99 15	165.8	12 53.3	99 15	165.9	12 23.7	99 15	165.9	15
6	15 41.5	99 17	164.4	15 12.0	99 17	164.5	14 42.4	99 16	164.6	14 12.9	99 16	164.7	13 43.3	99 16	164.7	13 13.7	99 16	164.8	12 44.2	99 16	164.9	12 14.6	99 16	165.0	6
7	15 31.5	98 18	163.4	15 02.0	98 18	163.5	14 32.5	98 17	163.6	14 03.0	98 17	163.7	13 33.5	98 17	163.8	13 04.0	98 17	163.9	12 34.5	98 17	164.0	12 05.0	98 17	164.1	7
8	15 20.9	98 19	162.5	14 51.5	98 18	162.6	14 22.0	98 18	162.7	13 52.6	98 18	162.8	13 23.2	98 18	162.9	12 53.7	98 18	163.0	12 24.3	98 18	163.1	11 54.8	98 18	163.2	8
9	15 09.8	98 20	161.5	14 40.4	98 19	161.6	14 11.0	98 19	161.7	13 41.6	98 19	161.8	13 12.2	98 19	161.9	12 42.9	98 19	162.0	12 13.5	98 19	162.1	11 44.1	98 19	162.2	9
20	14 58.0	98 20	160.6	14 28.7	98 20	160.7	13 59.4	98 20	160.8	13 30.1	98 20	160.9	13 00.8	98 20	161.0	12 31.4	98 20	161.1	12 02.1	98 20	161.2	11 32.8	98 20	161.3	20
1	14 45.7	97 21	159.6	14 16.5	97 21	159.7	13 47.2	98 21	159.8	13 18.0	98 21	160.0	12 48.7	98 21	160.1	12 19.5	98 21	160.2	11 50.2	98 21	160.3	11 21.0	98 21	160.4	1
2	14 32.9	97 22	158.7	14 03.7	97 22	158.8	13 34.5	97 22	158.9	13 05.3	97 22	159.0	12 36.2	97 22	159.2	12 07.0	97 22	159.3	11 37.8	97 22	159.4	11 08.6	97 22	159.5	2
3	14 19.5	97 23	157.7	13 50.4	97 23	157.9	13 21.3	97 23	158.0	12 52.2	97 23	158.1	12 23.0	97 23	158.2	11 53.9	97 23	158.4	11 24.8	97 23	158.5	10 55.7	97 22	158.6	3
4	14 05.5	97 24	156.8	13 36.5	97 24	156.9	13 07.5	97 24	157.1	12 38.4	97 24	157.2	12 09.4	97 24	157.3	11 40.3	97 24	157.4	11 11.3	97 23	157.6	10 42.2	97 23	157.7	4
25	13 51.0	97 25	155.9	13 22.1	97 25	156.0	12 53.1	97 25	156.1	12 24.1	97 25	156.3	11 55.2	97 25	156.4	11 26.2	97 24	156.5	10 57.2	97 24	156.7	10 28.3	97 24	156.8	25
6	13 36.0	96 26	154.9	13 07.1	96 26	155.1	12 38.2	96 26	155.2	12 09.3	96 26	155.3	11 40.5	96 25	155.5	11 11.6	96 25	155.6	10 42.7	96 25	155.8	10 13.8	96 25	155.9	6
7	13 20.4	96 27	154.0	12 51.6	96 27	154.1	12 22.8	96 27	154.3	11 54.0	96 26	154.4	11 25.2	96 26	154.6	10 56.4	96 26	154.7	10 27.6	96 26	154.9	9 58.8	96 26	155.0	7
8	13 04.3	96 28	153.1	12 35.6	96 28	153.2	12 06.9	96 27	153.4	11 38.2	96 27	153.5	11 09.4	96 27	153.7	10 40.7	96 27	153.8	10 12.0	96 27	154.0	9 43.2	96 27	154.1	8
9	12 47.7	95 29	152.1	12 19.1	95 28	152.3	11 50.4	95 28	152.5	11 21.8	95 28	152.6	10 53.2	95 28	152.8	10 24.5	95 28	152.9	9 55.9	96 28	153.1	9 27.2	96 28	153.2	9
30	12 30.6	95 29	151.2	12 02.0	95 29	151.4	11 33.5	95 29	151.5	11 04.9	95 29	151.7	10 36.4	95 29	151.9	10 07.8	95 29	152.0	9 39.3	95 29	152.2	9 10.7	95 28	152.3	30
1	12 13.0	95 30	150.3	11 44.5	95 30	150.5	11 16.0	95 30	150.6	10 47.6	95 30	150.8	10 19.1	95 30	151.0	9 50.6	95 29	151.1	9 22.2	95 29	151.3	8 53.7	95 29	151.4	1
2	11 54.8	95 31	149.4	11 26.5	95 31	149.6	10 58.1	95 31	149.7	10 29.7	95 31	149.9	10 01.3	95 30	150.1	9 33.0	95 30	150.2	9 04.6	95 30	150.4	8 36.2	95 30	150.6	2
3	11 36.2	94 32	148.5	11 07.9	94 32	148.7	10 39.7	94 32	148.8	10 11.4	94 31	149.0	9 43.1	94 31	149.2	9 14.8	94 31	149.4	8 46.5	94 31	149.5	8 18.2	94 31	149.7	3
4	11 17.1	94 33	147.6	10 48.9	94 32	147.8	10 20.7	94 32	147.9	9 52.5	94 32	148.1	9 24.3	94 32	148.3	8 56.1	94 32	148.5	8 27.9	94 32	148.6	7 59.7	94 32	148.8	4
35	10 57.5	94 33	146.7	10 29.4	94 33	146.9	10 01.3	94 33	147.1	9 33.2	94 33	147.2	9 05.1	94 33	147.4	8 37.0	94 33	147.6	8 08.9	94 32	147.8	7 40.8	94 32	147.9	35
6	10 37.5	93 34	145.8	10 09.5	93 34	146.0	9 41.5	93 34	146.2	9 13.5	93 34	146.4	8 45.4	93 34	146.5	8 17.4	93 33	146.7	7 49.4	93 33	146.9	7 21.4	93 33	147.1	6
7	10 16.9	93 35	144.9	9 49.0	93 35	145.1	9 21.1	93 35	145.3	8 53.2	93 34	145.5	8 25.3	93 34	145.7	7 57.4	93 34	145.8	7 29.5	93 34	146.0	7 01.5	93 34	146.2	7
8	9 55.9	93 36	144.0	9 28.1	93 36	144.2	9 00.3	93 35	144.4	8 32.5	93 35	144.6	8 04.7	93 35	144.8	7 36.9	93 35	145.0	7 09.1	93 35	145.2	6 41.2	93 35	145.4	8
9	9 34.5	92 36	143.2	9 06.8	92 36	143.3	8 39.1	92 36	143.5	8 11.4	92 36	143.7	7 43.7	92 36	143.9	7 15.9	92 36	144.1	6 48.2	92 35	144.3	6 20.5	92 35	144.5	9
40	9 12.6	92 37	142.3	8 45.0	92 37	142.5	8 17.4	92 37	142.7	7 49.8	92 37	142.9	7 22.2	92 36	143.1	6 54.6	92 36	143.3	6 26.9	92 36	143.5	5 59.3	92 36	143.6	40
1	8 50.3	92 38	141.4	8 22.8	92 38	141.6	7 55.3	92 38	141.8	7 27.8	92 37	142.0	7 00.3	92 37	142.2	6 32.7	92 37	142.4	6 05.2	92 37	142.6	5 37.7	92 37	142.8	1
2	8 27.6	91 39	140.5	8 00.2	91 38	140.7	7 32.8	91 38	140.9	7 05.4	91 38	141.1	6 37.9	91 38	141.3	6 10.5	91 38	141.6	5 43.1	91 38	141.8	5 15.6	91 37	142.0	2
3	8 04.4	91 39	139.7	7 37.1	91 39	139.9	7 09.8	91 39	140.1	6 42.5	91 39	140.3	6 15.2	91 39	140.5	5 47.8	91 38	140.7	5 20.5	91 38	140.9				3
4	7 40.8	91 40	138.8	7 13.6	91 40	139.0	6 46.4	91 40	139.2	6 19.2	91 39	139.4	5 52.0	91 39	139.6	5 24.8	91 39	139.9							4
45	7 16.9	90 41	137.9	6 49.8	90 40	138.2	6 22.6	90 40	138.4	5 55.5	90 40	138.6	5 28.4	90 40	138.8	5 01.3	90 40	139.0							45
6	6 52.5	90 41	137.1	6 25.5	90 41	137.3	5 58.5	90 41	137.5	5 31.5	90 41	137.7	5 04.4	90 41	138.0										6
7	6 27.7	90 42	136.2	6 00.8	90 42	136.5	5 33.9	90 42	136.7	5 07.0	90 42	136.9													7
8	6 02.5	89 43	135.4	5 35.7	89 42	135.6	5 08.9	89 42	135.8																8
9	5 37.0	89 43	134.6	5 10.3	89 43	134.8																			9
50	5 11.1	89 44	133.7																						50

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	15 15.9	78 59	76.9	15 39.3	78 58	76.6	16 02.7	78 58	76.2	16 26.1	78 58	75.9	16 49.5	78 58	75.6	17 12.8	78 58	75.3	17 36.0	78 58	74.9	17 59.3	77 58	74.6	91
2	14 40.8	78 58	76.1	15 04.3	78 58	75.8	15 27.7	78 58	75.5	15 51.1	78 58	75.2	16 14.5	78 58	74.8	16 37.9	78 58	74.5	17 01.2	78 58	74.2	17 24.6	78 58	73.8	2
3	14 05.8	78 58	75.4	14 29.3	78 58	75.0	14 52.8	78 58	74.7	15 16.3	78 58	74.4	15 39.8	78 58	74.1	16 03.2	78 58	73.7	16 26.6	78 58	73.4	16 49.9	78 57	73.1	3
4	13 30.9	79 58	74.6	13 54.5	79 58	74.3	14 18.1	78 58	74.0	14 41.6	78 58	73.6	15 05.1	78 58	73.3	15 28.6	78 57	73.0	15 52.0	78 57	72.7	16 15.5	78 57	72.4	4
95	12 56.2	79 58	73.8	13 19.8	79 58	73.5	13 43.4	79 58	73.2	14 07.0	79 57	72.9	14 30.6	79 57	72.6	14 54.1	78 57	72.2	15 17.6	78 57	71.9	15 41.1	78 57	71.6	95
6	12 21.5	79 57	73.1	12 45.2	79 57	72.8	13 08.9	79 57	72.5	13 32.6	79 57	72.1	13 56.2	79 57	71.8	14 19.8	79 57	71.5	14 43.4	79 57	71.2	15 06.9	78 57	70.9	6
7	11 47.1	79 57	72.3	12 10.8	79 57	72.0	12 34.6	79 57	71.7	12 58.3	79 57	71.4	13 22.0	79 57	71.1	13 45.6	79 57	70.8	14 09.3	79 57	70.4	14 32.9	79 56	70.1	7
8	11 12.7	79 57	71.6	11 36.6	79 57	71.2	12 00.4	79 57	70.9	12 24.1	79 57	70.6	12 47.9	79 57	70.3	13 11.6	79 56	70.0	13 35.3	79 56	69.7	13 59.0	79 56	69.4	8
9	10 38.6	80 57	70.8	11 02.4	80 57	70.5	11 26.3	80 56	70.2	11 50.1	79 56	69.9	12 14.0	79 56	69.6	12 37.8	79 56	69.2	13 01.6	79 56	68.9	13 25.3	79 56	68.6	9
100	10 04.5	80 56	70.0	10 28.5	80 56	69.7	10 52.4	80 56	69.4	11 16.3	80 56	69.1	11 40.2	80 56	68.8	12 04.1	80 56	68.5	12 27.9	79 56	68.2	12 51.8	79 56	67.9	100
1	9 30.7	80 56	69.3	9 54.7	80 56	69.0	10 18.7	80 56	68.7	10 42.7	80 56	68.4	11 06.6	80 56	68.1	11 30.6	80 56	67.7	11 54.5	80 55	67.4	12 18.4	80 55	67.1	1
2	8 57.0	80 56	68.5	9 21.1	80 56	68.2	9 45.1	80 56	67.9	10 09.2	80 56	67.6	10 33.2	80 55	67.3	10 57.3	80 55	67.0	11 21.3	80 55	66.7	11 45.2	80 55	66.4	2
3	8 23.5	81 56	67.7	8 47.6	80 55	67.4	9 11.8	80 55	67.1	9 35.9	80 55	66.8	10 00.0	80 55	66.5	10 24.1	80 55	66.2	10 48.2	80 55	65.9	11 12.2	80 55	65.6	3
4	7 50.2	81 55	67.0	8 14.4	81 55	66.7	8 38.6	81 55	66.4	9 02.8	81 55	66.1	9 27.0	81 55	65.8	9 51.2	81 55	65.5	10 15.3	80 54	65.2	10 39.5	80 54	64.9	4
105	7 17.0	81 55	66.2	7 41.3	81 55	65.9	8 05.6	81 55	65.6	8 29.9	81 54	65.3	8 54.2	81 54	65.0	9 18.4	81 54	64.7	9 42.6	81 54	64.4	10 06.9	81 54	64.1	105
6	6 44.1	81 55	65.4	7 08.5	81 54	65.2	7 32.8	81 54	64.9	7 57.2	81 54	64.6	8 21.5	81 54	64.3	8 45.9	81 54	64.0	9 10.2	81 54	63.7	9 34.5	81 54	63.4	6
7	6 11.3	82 54	64.7	6 35.8	82 54	64.4	7 00.2	81 54	64.1	7 24.7	81 54	63.8	7 49.1	81 54	63.5	8 13.5	81 54	63.2	8 37.9	81 53	62.9	9 02.3	81 53	62.6	7
8	5 38.8	82 54	63.9	6 03.3	82 54	63.6	6 27.9	82 54	63.3	6 52.4	82 53	63.0	7 16.9	82 53	62.7	7 41.4	82 53	62.5	8 05.9	82 53	62.2	8 30.3	82 53	61.9	8
9	5 06.5	82 54	63.1	5 31.1	82 53	62.8	5 55.7	82 53	62.6	6 20.3	82 53	62.3	6 44.9	82 53	62.0	7 09.5	82 53	61.7	7 34.1	82 53	61.4	7 58.6	82 52	61.1	9
110							5 23.8	82 53	61.8	5 48.5	82 53	61.5	6 13.1	82 53	61.2	6 37.8	82 52	60.9	7 02.5	82 52	60.6	7 27.1	82 52	60.4	110
1										5 16.8	83 52	60.7	5 41.6	83 52	60 4	6 06.4	83 52	60.2	6 31.1	82 52	59.9	6 55.9	82 52	59.6	1
2													5 10.3	83 52	59.7	5 35.2	83 52	59.4	6 00.0	83 51	59.1	6 24.8	83 51	58.8	2
3																5 04.2	83 51	58.6	5 29.1	83 51	58.3	5 54.1	83 51	58.1	3
4																						5 23.5	83 50	57.3	4

Digitized by Google

Lat. 53°

H.A.	24° 00′ Alt.	Δd Δt	Az.	24° 30′ Alt.	Δd Δt	Az.	25° 00′ Alt.	Δd Δt	Az.	25° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	61 00.0	1.0 01	180.0	61 30.0	1.0 01	180.0	62 00.0	1.0 01	180.0	62 30.0	1.0 01	180.0
1	60 59.4	1.0 03	178.1	61 29.4	1.0 03	178.1	61 59.4	1.0 03	178.1	62 29.4	1.0 03	178.0
2	60 57.6	1.0 05	176.2	61 27.6	1.0 05	176.2	61 57.6	1.0 05	176.1	62 27.5	1.0 05	176.1
3	60 54.7	1.0 07	174.4	61 24.6	1.0 07	174.3	61 54.5	1.0 07	174.2	62 24.5	1.0 07	174.1
4	60 50.5	1.0 09	172.5	61 20.4	1.0 09	172.4	61 50.3	1.0 09	172.3	62 20.2	1.0 09	172.2
05	60 45.2	99 11	170.6	61 15.0	99 11	170.5	61 44.9	99 11	170.4	62 14.7	99 11	170.3
6	60 38.8	99 13	168.8	61 08.5	99 13	168.6	61 38.2	99 13	168.5	62 08.0	99 13	168.4
7	60 31.2	99 15	166.9	61 00.8	99 15	166.8	61 30.5	99 15	166.6	62 00.1	99 15	166.4
8	60 22.4	99 16	165.1	60 52.0	99 17	164.9	61 21.5	98 17	164.7	61 51.1	98 17	164.6
9	60 12.6	98 18	163.3	60 42.0	98 18	163.1	61 11.5	98 19	162.9	61 40.9	98 19	162.7
10	60 01.7	98 20	161.5	60 31.0	98 20	161.3	61 00.3	98 20	161.1	61 29.6	98 21	160.8
1	59 49.7	97 22	159.7	60 18.9	97 22	159.5	60 48.0	97 22	159.2	61 17.2	97 22	159.0
2	59 36.6	97 23	157.9	60 05.7	97 24	157.7	60 34.7	97 24	157.4	61 03.7	97 24	157.2
3	59 22.6	96 25	156.2	59 51.5	96 25	155.9	60 20.3	96 26	155.7	60 49.2	96 26	155.4
4	59 07.5	96 27	154.5	59 36.2	96 27	154.2	60 05.0	96 27	153.9	60 33.6	96 28	153.6
15	58 51.5	95 28	152.8	59 20.1	96 29	152.5	59 48.6	95 29	152.2	60 17.1	95 29	151.9
6	58 34.5	95 30	151.1	59 02.9	95 30	150.8	59 31.3	95 30	150.5	59 59.6	94 31	150.2
7	58 16.6	94 31	149.5	58 44.8	94 32	149.1	59 13.0	94 32	148.8	59 41.2	94 32	148.5
8	57 57.8	94 33	147.8	58 25.9	93 33	147.5	58 53.9	93 33	147.2	59 21.9	93 34	146.8
9	57 38.2	93 34	146.2	58 06.1	93 34	145.9	58 33.9	93 35	145.5	59 01.7	92 35	145.2
20	57 17.7	92 35	144.7	57 45.4	92 36	144.3	58 13.1	92 36	143.9	58 40.6	92 36	143.6
1	56 56.4	92 37	143.1	57 23.9	92 37	142.8	57 51.4	91 37	142.4	58 18.8	91 38	142.0
2	56 34.4	91 38	141.6	57 01.7	91 38	141.2	57 29.0	91 39	140.8	57 56.2	91 39	140.4
3	56 11.6	91 39	140.1	56 38.7	90 40	139.7	57 05.8	90 40	139.3	57 32.8	90 40	138.9
4	55 48.0	90 40	138.6	56 15.0	90 41	138.2	56 41.9	90 41	137.8	57 08.7	89 41	137.4
25	55 23.8	89 41	137.2	55 50.6	89 42	136.8	56 17.3	89 42	136.4	56 43.9	89 42	135.9
6	54 59.0	89 42	135.7	55 25.6	89 43	135.3	55 52.1	88 43	134.9	56 18.5	88 43	134.5
7	54 33.4	88 44	134.3	54 59.9	88 44	133.9	55 26.2	88 44	133.5	55 52.4	87 44	133.1
8	54 07.3	88 45	133.0	54 33.6	87 45	132.5	54 59.7	87 45	132.1	55 25.8	87 45	131.7
9	53 40.6	87 45	131.6	54 06.7	87 46	131.2	54 32.6	86 46	130.8	54 58.5	86 46	130.3
30	53 13.3	86 46	130.3	53 39.2	86 47	129.9	54 05.0	86 47	129.4	54 30.7	86 47	129.0
1	52 45.5	86 47	129.0	53 11.2	86 48	128.5	53 36.9	85 48	128.1	54 02.4	85 48	127.7
2	52 17.2	85 48	127.7	52 42.7	85 48	127.3	53 08.2	85 49	126.8	53 33.6	84 49	126.4
3	51 48.4	85 49	126.4	52 13.8	84 49	126.0	52 39.1	84 49	125.5	53 04.2	84 50	125.1
4	51 19.1	84 50	125.2	51 44.3	84 50	124.7	52 09.4	84 50	124.3	52 34.5	83 50	123.8
35	50 49.3	84 50	124.0	51 14.4	83 50	123.5	51 39.4	83 51	123.1	52 04.3	83 51	122.6
6	50 19.2	83 51	122.8	50 44.1	83 51	122.3	51 08.9	83 51	121.9	51 33.7	82 52	121.4
7	49 48.6	83 52	121.6	50 13.4	82 52	121.1	50 38.1	82 52	120.7	51 02.7	82 52	120.2
8	49 17.7	82 52	120.4	49 42.3	82 52	120.0	50 06.8	82 53	119.5	50 31.3	81 53	119.1
9	48 46.3	82 53	119.3	49 10.8	82 53	118.8	49 35.2	81 53	118.4	49 59.5	81 53	117.9
40	48 14.7	81 53	118.1	48 39.0	81 54	117.7	49 03.3	81 54	117.3	49 27.5	80 54	116.8
1	47 42.7	81 54	117.0	48 06.9	81 54	116.6	48 31.1	80 54	116.2	48 55.1	80 54	115.7
2	47 10.4	81 54	115.9	47 34.5	80 55	115.5	47 58.5	80 55	115.1	48 22.4	80 55	114.6
3	46 37.7	80 55	114.9	47 01.7	80 55	114.4	47 25.6	79 55	114.0	47 49.4	79 55	113.5
4	46 04.8	80 55	113.8	46 28.7	79 55	113.4	46 52.5	79 56	112.9	47 16.2	79 56	112.5
45	45 31.7	79 56	112.8	45 55.5	79 56	112.3	46 19.1	79 56	111.9	46 42.7	78 56	111.4
6	44 58.3	79 56	111.7	45 21.9	79 56	111.3	45 45.5	78 56	110.9	46 09.0	78 57	110.4
7	44 24.6	79 56	110.7	44 48.2	78 57	110.3	45 11.7	78 57	109.9	45 35.0	78 57	109.4
8	43 50.7	78 57	109.7	44 14.2	78 57	109.3	44 37.6	78 57	108.9	45 00.9	77 57	108.4
9	43 16.6	78 57	108.7	43 40.0	78 57	108.3	44 03.3	77 57	107.9	44 26.5	77 58	107.4
50	42 42.3	78 57	107.8	43 05.6	78 58	107.3	43 28.9	77 58	106.9	43 52.0	77 58	106.5
1	42 07.8	78 58	106.8	42 31.1	77 58	106.4	42 54.2	77 58	105.9	43 17.3	77 58	105.5
2	41 33.2	77 58	105.9	41 56.4	77 58	105.4	42 19.4	77 58	105.0	42 42.4	76 58	104.6
3	40 58.4	77 58	104.9	41 21.5	77 58	104.5	41 44.5	76 58	104.1	42 07.4	76 59	103.6
4	40 23.4	77 59	104.0	40 46.4	77 59	103.6	41 09.4	76 59	103.1	41 32.2	76 59	102.7
55	39 48.3	77 59	103.1	40 11.3	76 59	102.6	40 34.1	76 59	102.2	40 56.9	76 59	101.8
6	39 13.1	77 59	102.2	39 36.0	76 59	101.7	39 58.8	76 59	101.3	40 21.5	76 59	100.9
7	38 37.7	76 59	101.3	39 00.6	76 59	100.8	39 23.3	76 59	100.4	39 46.0	75 59	100.0
8	38 02.2	76 59	100.4	38 25.1	76 59	100.0	38 47.8	76 59	99.5	39 10.4	75 60	99.1
9	37 26.7	76 59	99.5	37 49.4	76 59	99.1	38 12.1	75 60	98.7	38 34.7	75 60	98.2
60	36 51.0	76 60	98.6	37 13.7	76 60	98.2	37 36.4	75 60	97.8	37 58.9	75 60	97.4
1	36 15.3	76 60	97.8	36 38.0	75 60	97.4	37 00.6	75 60	96.9	37 23.1	75 60	96.5
2	35 39.5	76 60	96.9	36 02.1	75 60	96.5	36 24.7	75 60	96.1	36 47.2	75 60	95.7
3	35 03.6	76 60	96.1	35 26.2	75 60	95.7	35 48.8	75 60	95.3	36 11.2	75 60	94.8
4	34 27.7	75 60	95.2	34 50.3	75 60	94.8	35 12.8	75 60	94.4	35 35.2	75 60	94.0
65	33 51.7	75 60	94.4	34 14.3	75 60	94.0	34 36.8	75 60	93.6	34 59.2	75 60	93.2
6	33 15.7	75 60	93.6	33 38.2	75 60	93.2	34 00.7	75 60	92.8	34 23.1	75 60	92.4
7	32 39.6	75 60	92.7	33 02.2	75 60	92.4	33 24.6	75 60	92.0	33 47.0	75 60	91.6
8	32 03.5	75 60	91.9	32 26.1	75 60	91.5	32 48.5	75 60	91.1	33 10.9	75 60	90.7
9	31 27.4	75 60	91.1	31 50.0	75 60	90.7	32 12.4	75 60	90.3	32 34.8	75 60	89.9
70	30 51.3	75 60	90.3	31 13.9	75 60	89.9	31 36.3	75 60	89.5	31 58.7	75 60	89.2
1	30 15.2	75 60	89.5	30 37.7	75 60	89.1	31 00.2	75 60	88.8	31 22.6	75 60	88.4
2	29 39.1	75 60	88.7	30 01.6	75 60	88.3	30 24.1	75 60	88.0	30 46.5	75 60	87.6
3	29 03.0	75 60	87.9	29 25.6	75 60	87.6	29 48.0	75 60	87.2	30 10.5	75 60	86.8
4	28 26.9	75 60	87.2	28 49.5	75 60	86.8	29 12.0	75 60	86.4	29 34.4	75 60	86.0
75	27 50.9	75 60	86.4	28 13.5	75 60	86.0	28 36.0	75 60	85.6	28 58.4	75 60	85.2
6	27 14.9	75 60	85.6	27 37.5	75 60	85.2	28 00.0	75 60	84.9	28 22.5	75 60	84.5
7	26 38.9	75 60	84.8	27 01.5	75 60	84.5	27 24.1	75 60	84.1	27 46.5	75 60	83.7
8	26 02.9	76 60	84.1	26 25.6	75 60	83.7	26 48.2	75 60	83.3	27 10.7	75 60	82.9
9	25 27.1	76 60	83.3	25 49.7	75 60	82.9	26 12.3	75 60	82.6	26 34.9	75 60	82.2
80	24 51.2	76 60	82.5	25 13.9	76 60	82.2	25 36.6	75 60	81.8	25 59.1	75 59	81.4
1	24 15.5	76 60	81.8	24 38.2	76 59	81.4	25 00.8	75 59	81.0	25 23.5	75 59	80.7
2	23 39.8	76 59	81.0	24 02.5	76 59	80.6	24 25.2	76 59	80.3	24 47.9	75 59	79.9
3	23 04.1	76 59	80.2	23 26.9	76 59	79.9	23 49.7	76 59	79.5	24 12.4	76 59	79.2
4	22 28.6	76 59	79.5	22 51.4	76 59	79.1	23 14.2	76 59	78.8	23 36.9	76 59	78.4
85	21 53.1	76 59	78.7	22 16.0	76 59	78.4	22 38.8	76 59	78.0	23 01.6	76 59	77.7
6	21 17.8	76 59	78.0	21 40.7	76 59	77.6	22 03.6	76 59	77.3	22 26.4	76 59	76.9
7	20 42.5	77 59	77.2	21 05.5	76 58	76.9	21 28.4	76 58	76.6	21 51.3	76 58	76.2
8	20 07.3	77 58	76.5	20 30.3	77 58	76.2	20 53.3	77 58	75.8	21 16.3	76 58	75.5
9	19 32.3	77 58	75.7	19 55.3	77 58	75.4	20 18.4	77 58	75.1	20 41.4	77 58	74.7
90	18 57.3	77 58	75.0	19 20.5	77 58	74.7	19 43.5	77 58	74.3	20 06.6	77 58	74.0

26° 00′ Alt.	Δd Δt	Az.	26° 30′ Alt.	Δd Δt	Az.	27° 00′ Alt.	Δd Δt	Az.	27° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
63 00.0	1.0 01	180.0	63 30.0	1.0 01	180.0	64 00.0	1.0 01	180.0	64 30.0	1.0 01	180.0	00
62 59.4	1.0 03	178.0	63 29.4	1.0 03	178.0	63 59.4	1.0 03	178.0	64 29.4	1.0 03	177.9	1
62 57.5	1.0 05	176.0	63 27.5	1.0 05	176.0	63 57.4	1.0 05	175.9	64 27.4	1.0 05	175.9	2
62 54.4	1.0 07	174.1	63 24.3	1.0 07	174.0	63 54.2	1.0 07	173.9	64 24.2	1.0 08	173.8	3
62 50.1	1.0 09	172.1	63 19.9	1.0 09	172.0	63 49.8	1.0 10	171.9	64 19.6	1.0 10	171.8	4
62 44.5	99 11	170.2	63 14.3	99 11	170.0	63 44.1	99 12	169.9	64 13.9	99 12	169.8	05
62 37.7	99 13	168.2	63 07.4	99 13	168.1	63 37.1	99 14	167.9	64 06.8	99 14	167.7	6
62 29.7	99 15	166.3	62 59.3	99 15	166.1	63 28.9	99 16	165.9	63 58.5	99 16	165.7	7
62 20.6	98 17	164.4	62 50.1	98 17	164.2	63 19.6	98 18	164.0	63 49.0	98 18	163.8	8
62 10.3	98 19	162.5	62 39.6	98 19	162.3	63 09.0	98 20	162.0	63 38.3	98 20	161.8	9
61 58.8	97 21	160.6	62 28.1	97 21	160.4	62 57.3	97 21	160.1	63 26.5	97 22	159.8	10
61 46.3	97 23	158.7	62 15.4	97 23	158.5	62 44.4	97 23	158.2	63 13.5	97 24	157.9	1
61 32.7	96 24	156.9	62 01.6	96 25	156.6	62 30.5	96 25	156.3	62 59.3	96 25	156.0	2
61 18.0	95 26	155.1	61 46.7	96 26	154.8	62 15.5	96 27	154.5	62 44.1	96 27	154.2	3
61 02.3	95 28	153.3	61 30.9	95 28	153.0	61 59.4	95 28	152.7	62 27.9	95 29	152.3	4
60 45.6	95 29	151.6	61 14.0	95 30	151.2	61 42.3	94 30	150.9	62 10.6	94 30	150.5	15
60 27.9	94 31	149.8	60 56.1	94 31	149.5	61 24.3	94 32	149.1	61 52.4	94 32	148.8	6
60 09.3	94 33	148.1	60 37.3	93 33	147.8	61 05.3	93 33	147.4	61 33.2	93 34	147.0	7
59 49.8	93 34	146.5	60 17.6	93 34	146.1	60 45.4	92 35	145.7	61 13.1	92 35	145.3	8
59 29.4	92 35	144.8	59 57.0	92 36	144.4	60 24.6	92 36	144.0	60 52.1	92 36	143.6	9
59 08.1	92 37	143.2	59 35.6	91 37	142.8	60 03.0	91 37	142.4	60 30.3	91 38	142.0	20
58 46.1	91 38	141.6	59 13.4	91 38	141.2	59 40.5	90 39	140.8	60 07.6	90 39	140.3	1
58 23.3	90 39	140.0	58 50.3	90 40	139.6	59 17.3	90 40	139.2	59 44.2	89 40	138.8	2
57 59.7	90 40	138.5	58 26.6	89 41	138.1	58 53.3	89 41	137.6	59 20.0	89 41	137.2	3
57 35.5	89 42	137.0	58 02.1	89 42	136.6	58 28.7	88 42	136.1	58 55.1	88 43	135.7	4
57 10.5	88 43	135.5	57 36.9	88 43	135.1	58 03.3	88 43	134.6	58 29.5	87 44	134.2	25
56 44.9	88 44	134.1	57 11.1	87 44	133.6	57 37.3	87 44	133.2	58 03.3	87 45	132.7	6
56 18.6	87 45	132.6	56 44.7	87 45	132.2	57 10.6	86 45	131.7	57 36.5	86 46	131.3	7
55 51.7	86 46	131.2	56 17.6	86 46	130.8	56 43.4	86 46	130.3	57 09.0	85 47	129.9	8
55 24.3	86 47	129.9	55 50.0	85 47	129.4	56 15.6	85 47	128.9	56 41.0	85 48	128.5	9
54 56.3	85 48	128.5	55 21.8	85 48	128.1	55 47.2	84 48	127.6	56 12.5	84 48	127.1	30
54 27.8	85 48	127.2	54 53.1	84 49	126.7	55 18.4	84 49	126.3	55 43.5	83 49	125.8	1
53 58.8	84 49	125.9	54 24.0	84 49	125.4	54 49.0	83 50	125.0	55 13.9	83 50	124.5	2
53 29.3	83 50	124.6	53 54.3	83 50	124.2	54 19.2	83 50	123.7	54 43.9	82 51	123.2	3
52 59.4	83 51	123.4	53 24.2	83 51	122.9	53 48.9	82 51	122.4	54 13.5	82 51	122.0	4
52 29.0	82 51	122.2	52 53.7	82 52	121.7	53 18.3	82 52	121.2	53 42.7	81 52	120.7	35
51 58.3	82 52	121.0	52 22.8	81 52	120.5	52 47.2	81 52	120.0	53 11.4	81 53	119.5	6
51 27.1	81 53	119.8	51 51.5	81 53	119.3	52 15.7	81 53	118.8	52 39.8	80 53	118.3	7
50 55.6	81 53	118.6	51 19.8	81 53	118.1	51 43.9	80 54	117.7	52 07.9	80 54	117.2	8
50 23.7	80 54	117.5	50 47.8	80 54	117.0	51 11.8	80 54	116.5	51 35.6	79 54	116.0	9
49 51.5	80 54	116.3	50 15.5	80 54	115.9	50 39.3	79 55	115.4	51 03.0	79 55	114.9	40
49 19.0	80 55	115.2	49 42.8	79 55	114.8	50 06.5	79 55	114.3	50 30.1	78 55	113.8	1
48 46.2	79 55	114.1	49 09.9	79 55	113.7	49 33.5	78 56	113.2	49 56.9	78 56	112.7	2
48 13.1	79 56	113.1	48 36.7	78 56	112.6	49 00.2	78 56	112.1	49 23.5	78 56	111.7	3
47 39.8	78 56	112.0	48 03.2	78 56	111.6	48 26.6	78 56	111.1	48 49.8	77 56	110.6	4
47 06.2	78 56	111.0	47 29.5	78 57	110.5	47 52.8	77 57	110.1	48 15.9	77 57	109.6	45
46 32.4	78 57	110.0	46 55.6	77 57	109.5	47 18.8	77 57	109.0	47 41.8	77 57	108.6	6
45 58.3	77 57	109.0	46 21.5	77 57	108.5	46 44.5	77 57	108.0	47 07.5	76 58	107.6	7
45 24.1	77 57	108.0	45 47.1	77 58	107.5	46 10.1	76 58	107.0	46 32.9	76 58	106.6	8
44 49.6	77 58	107.0	45 12.6	76 58	106.5	45 35.5	76 58	106.1	45 58.2	76 58	105.6	9
44 15.0	77 58	106.0	44 37.9	76 58	105.6	45 00.7	76 58	105.1	45 23.4	75 58	104.6	50
43 40.2	76 58	105.1	44 03.0	76 58	104.6	44 25.8	76 58	104.2	44 48.4	75 59	103.7	1
43 05.3	76 58	104.1	43 28.0	76 59	103.7	43 50.7	75 59	103.2	44 13.2	75 59	102.8	2
42 30.2	76 59	103.2	42 52.9	75 59	102.7	43 15.5	75 59	102.3	43 37.9	75 59	101.8	3
41 54.9	76 59	102.3	42 17.6	75 59	101.8	42 40.1	75 59	101.4	43 02.5	75 59	100.9	4
41 19.6	75 59	101.4	41 42.2	75 59	100.9	42 04.7	75 59	100.5	42 27.0	74 59	100.0	55
40 44.1	75 59	100.5	41 06.7	75 59	100.0	41 29.1	75 59	99.6	41 51.4	74 60	99.1	6
40 08.6	75 59	99.6	40 31.1	75 60	99.1	40 53.4	74 60	98.7	41 15.7	74 60	98.3	7
39 32.9	75 60	98.7	39 55.4	75 60	98.3	40 17.7	74 60	97.8	40 40.0	74 60	97.4	8
38 57.2	75 60	97.8	39 19.6	75 60	97.4	39 41.9	74 60	97.0	40 04.1	74 60	96.5	9
38 21.4	75 60	97.0	38 43.8	74 60	96.5	39 06.0	74 60	96.1	39 28.2	74 60	95.7	60
37 45.5	75 60	96.1	38 07.9	74 60	95.7	38 30.1	74 60	95.3	38 52.3	74 60	94.8	1
37 09.6	75 60	95.3	37 31.9	74 60	94.8	37 54.1	74 60	94.4	38 16.3	74 60	94.0	2
36 33.6	74 60	94.4	36 55.9	74 60	94.0	37 18.1	74 60	93.6	37 40.2	74 60	93.2	3
35 57.6	74 60	93.6	36 19.9	74 60	93.2	36 42.1	74 60	92.8	37 04.2	74 60	92.3	4
35 21.5	74 60	92.8	35 43.8	74 60	92.4	36 06.0	74 60	92.0	36 28.1	73 60	91.5	65
34 45.5	74 60	92.0	35 07.7	74 60	91.6	35 29.9	74 60	91.1	35 52.0	73 60	90.7	6
34 09.4	74 60	91.2	34 31.6	74 60	90.7	34 53.8	74 60	90.3	35 15.9	73 60	89.9	7
33 33.3	74 60	90.3	33 55.5	74 60	89.9	34 17.7	74 60	89.5	34 39.7	73 60	89.1	8
32 57.1	74 60	89.6	33 19.4	74 60	89.2	33 41.6	74 60	88.7	34 03.6	73 60	88.3	9
32 21.0	74 60	88.8	32 43.3	74 60	88.4	33 05.5	74 60	88.0	33 27.6	74 60	87.6	70
31 44.9	74 60	88.0	32 07.2	74 60	87.6	32 29.4	74 60	87.2	32 51.5	74 60	86.8	1
31 08.9	74 60	87.2	31 31.1	74 60	86.8	31 53.3	74 60	86.4	32 15.5	74 60	86.0	2
30 32.8	74 60	86.4	30 55.1	74 60	86.0	31 17.3	74 60	85.6	31 39.5	74 60	85.2	3
29 56.8	74 60	85.6	30 19.1	74 60	85.2	30 41.3	74 60	84.9	31 03.5	74 60	84.5	4
29 20.8	75 60	84.9	29 43.1	74 60	84.5	30 05.4	74 60	84.1	30 27.6	74 60	83.7	75
28 44.9	75 60	84.1	29 07.2	74 60	83.7	29 29.5	74 60	83.3	29 51.7	74 60	82.9	6
28 09.0	75 60	83.3	28 31.4	74 60	83.0	28 53.7	74 60	82.6	29 15.9	74 60	82.2	7
27 33.1	75 60	82.6	27 55.5	75 60	82.2	28 17.9	74 60	81.8	28 40.2	74 59	81.4	8
26 57.4	75 60	81.8	27 19.8	75 59	81.4	27 42.2	74 59	81.1	28 04.5	74 59	80.7	9
26 21.7	75 59	81.1	26 44.1	75 59	80.7	27 06.5	75 59	80.3	27 28.9	74 59	79.9	80
25 46.0	75 59	80.3	26 08.5	75 59	79.9	26 31.0	75 59	79.6	26 53.4	75 59	79.2	1
25 10.5	75 59	79.6	25 33.0	75 59	79.2	25 55.5	75 59	78.8	26 18.0	75 59	78.5	2
24 35.0	75 59	78.8	24 57.6	75 59	78.5	25 20.1	75 59	78.1	25 42.6	75 59	77.7	3
23 59.6	76 59	78.1	24 22.3	75 59	77.7	24 44.9	75 59	77.4	25 07.4	75 59	77.0	4
23 24.4	76 59	77.3	23 47.0	76 59	77.0	24 09.7	75 58	76.6	24 32.3	75 58	76.3	85
22 49.2	76 58	76.6	23 11.9	76 58	76.2	23 34.6	76 58	75.9	23 57.3	75 58	75.5	6
22 14.1	76 58	75.9	22 36.9	76 58	75.5	22 59.6	76 58	75.1	23 22.3	76 58	74.8	7
21 39.1	76 58	75.1	22 02.0	76 58	74.8	22 24.8	76 58	74.4	22 47.6	76 58	74.1	8
21 04.3	76 58	74.4	21 27.2	76 58	74.0	21 50.1	76 58	73.7	22 12.9	76 58	73.3	9
20 29.6	77 58	73.6	20 52.6	76 58	73.3	21 15.5	76 57	73.0	21 38.4	76 57	72.6	90

Digitized by Google

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	°
00	13 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	00
1	12 59.7	1.0 02	179.1	12 29.7	1.0 01	179.1	11 59.7	1.0 01	179.1	11 29.7	1.0 01	179.1	10 59.7	1.0 02	179.1	10 29.7	1.0 01	179.1	9 59.7	1.0 01	179.1	9 29.7	1.0 01	179.1	1
2	12 58.8	1.0 02	178.1	12 28.8	1.0 02	178.1	11 58.8	1.0 02	178.1	11 28.8	1.0 02	178.2	10 58.8	1.0 02	178.2	10 28.9	1.0 02	178.2	9 58.9	1.0 02	178.2	9 28.9	1.0 02	178.2	2
3	12 57.3	1.0 03	177.2	12 27.4	1.0 03	177.2	11 57.4	1.0 03	177.2	11 27.4	1.0 03	177.2	10 57.4	1.0 03	177.3	10 27.4	1.0 03	177.3	9 57.4	1.0 03	177.3	9 27.5	1.0 03	177.3	3
4	12 55.3	1.0 04	176.3	12 25.3	1.0 04	176.3	11 55.3	1.0 04	176.3	11 25.4	1.0 04	176.3	10 55.4	1.0 04	176.3	10 25.4	1.0 04	176.4	9 55.4	1.0 04	176.4	9 25.5	1.0 04	176.4	4
05	12 52.6	1.0 05	175.3	12 22.7	1.0 05	175.3	11 52.7	1.0 05	175.4	11 22.7	1.0 05	175.4	10 52.8	1.0 05	175.4	10 22.8	1.0 05	175.5	9 52.9	1.0 05	175.5	9 22.9	1.0 05	175.5	05
6	12 49.4	1.0 06	174.4	12 19.4	1.0 06	174.4	11 49.5	1.0 06	174.4	11 19.6	1.0 06	174.5	10 49.6	1.0 06	174.5	10 19.7	1.0 06	174.5	9 49.7	1.0 06	174.6	9 19.8	1.0 06	174.6	6
7	12 45.5	1.0 07	173.4	12 15.6	1.0 07	173.5	11 45.7	1.0 07	173.5	11 15.8	1.0 07	173.6	10 45.9	1.0 07	173.6	10 16.0	1.0 07	173.6	9 46.1	1.0 07	173.7	9 16.1	1.0 07	173.7	7
8	12 41.1	1.0 08	172.5	12 11.2	1.0 08	172.6	11 41.4	1.0 08	172.6	11 11.5	1.0 08	172.6	10 41.6	1.0 08	172.7	10 11.7	1.0 08	172.7	9 41.8	1.0 08	172.8	9 11.9	1.0 08	172.8	8
9	12 36.1	1.0 09	171.6	12 06.3	1.0 09	171.6	11 36.4	1.0 09	171.7	11 06.6	1.0 09	171.7	10 36.7	1.0 09	171.8	10 06.8	1.0 09	171.8	9 37.0	1.0 09	171.9	9 07.1	1.0 09	171.9	9
10	12 30.6	99 10	170.6	12 00.7	99 10	170.7	11 30.9	99 10	170.8	11 01.1	99 10	170.8	10 31.2	99 10	170.9	10 01.4	99 10	170.9	9 31.6	99 10	171.0	9 01.8	99 10	171.0	10
1	12 24.4	99 11	169.7	11 54.6	99 11	169.8	11 24.8	99 11	169.8	10 55.0	99 11	169.9	10 25.2	99 11	170.0	9 55.4	99 11	170.0	9 25.6	99 11	170.1	8 55.8	99 11	170.1	1
2	12 17.7	99 12	168.8	11 47.9	99 12	168.9	11 18.2	99 12	168.9	10 48.4	99 12	169.0	10 18.7	99 12	169.1	9 48.9	99 12	169.1	9 19.1	99 12	169.2	8 49.4	99 12	169.2	2
3	12 10.4	99 13	167.9	11 40.7	99 13	167.9	11 10.9	99 13	168.0	10 41.2	99 13	168.1	10 11.5	99 13	168.1	9 41.8	99 13	168.2	9 12.1	99 13	168.3	8 42.4	99 13	168.4	3
4	12 02.5	99 14	166.9	11 32.8	99 14	167.0	11 03.2	99 14	167.1	10 33.5	99 14	167.2	10 03.8	99 14	167.2	9 34.1	99 14	167.3	9 04.5	99 14	167.4	8 34.8	99 14	167.5	4
15	11 54.0	99 15	166.0	11 24.4	99 15	166.1	10 54.8	99 15	166.2	10 25.2	99 15	166.3	9 55.6	99 15	166.3	9 25.9	99 15	166.4	8 56.3	99 14	166.5	8 26.7	99 14	166.6	15
6	11 45.0	99 16	165.1	11 15.5	99 16	165.2	10 45.9	99 16	165.3	10 16.3	99 16	165.4	9 46.8	99 16	165.4	9 17.2	99 15	165.5	8 47.6	99 15	165.6	8 18.0	99 15	165.7	6
7	11 35.5	98 17	164.2	11 06.0	98 17	164.3	10 36.4	98 17	164.4	10 06.9	98 17	164.5	9 37.4	98 16	164.5	9 07.9	98 16	164.6	8 38.4	98 16	164.7	8 08.9	98 16	164.8	7
8	11 25.4	98 18	163.3	10 55.9	98 18	163.4	10 26.4	98 18	163.5	9 57.0	98 18	163.6	9 27.5	98 17	163.6	8 58.1	98 17	163.7	8 28.6	98 17	163.8	7 59.1	98 17	163.9	8
9	11 14.7	98 19	162.3	10 45.3	98 19	162.4	10 15.9	98 18	162.6	9 46.5	98 18	162.7	9 17.1	98 18	162.8	8 47.7	98 18	162.9	8 18.3	98 18	163.0	7 48.9	98 18	163.1	9
20	11 03.5	98 20	161.4	10 34.1	98 20	161.5	10 04.8	98 19	161.6	9 35.4	98 19	161.8	9 06.1	98 19	161.9	8 36.8	98 19	162.0	8 07.4	98 19	162.1	7 38.1	98 19	162.2	20
1	10 51.7	98 20	160.5	10 22.4	98 20	160.6	9 53.1	98 20	160.8	9 23.9	98 20	160.9	8 54.6	98 20	161.0	8 25.3	98 20	161.1	7 56.0	98 20	161.2	7 26.8	98 20	161.3	1
2	10 39.4	97 21	159.6	10 10.2	97 21	159.7	9 41.0	97 21	159.9	9 11.8	97 21	160.0	8 42.6	97 21	160.1	8 13.4	97 21	160.2	7 44.1	97 21	160.3	7 14.9	97 21	160.4	2
3	10 26.5	97 22	158.7	9 57.4	97 22	158.8	9 28.3	97 22	159.0	8 59.1	97 22	159.1	8 30.0	97 22	159.2	8 00.9	97 22	159.3	7 31.7	97 22	159.4	7 02.6	97 21	159.6	3
4	10 13.2	97 23	157.8	9 44.1	97 23	157.9	9 15.0	97 23	158.1	8 46.0	97 23	158.2	8 16.9	97 23	158.3	7 47.9	97 23	158.4	7 18.8	97 22	158.6	6 49.7	97 22	158.7	4
25	9 59.3	97 24	156.9	9 30.3	97 24	157.0	9 01.3	97 24	157.2	8 32.3	97 24	157.3	8 03.3	97 24	157.4	7 34.3	97 23	157.6	7 05.3	97 23	157.7	6 36.3	97 23	157.8	25
6	9 44.9	96 25	156.0	9 16.0	96 25	156.2	8 47.0	96 25	156.3	8 18.1	96 24	156.4	7 49.2	96 24	156.6	7 20.3	96 24	156.7	6 51.4	96 24	156.8	6 22.5	96 24	157.0	6
7	9 29.9	96 26	155.1	9 01.1	96 26	155.3	8 32.3	96 25	155.4	8 03.4	96 25	155.6	7 34.6	96 25	155.7	7 05.8	96 25	155.8	6 36.9	96 25	156.0	6 08.1	96 25	156.1	7
8	9 14.5	96 27	154.2	8 45.7	96 26	154.4	8 17.0	96 26	154.5	7 48.2	96 26	154.7	7 19.5	96 26	154.8	6 50.7	96 26	155.0	6 22.0	96 26	155.1	5 53.2	96 26	155.3	8
9	8 58.6	96 27	153.4	8 29.9	96 27	153.5	8 01.2	96 27	153.7	7 32.6	96 27	153.8	7 03.9	96 27	154.0	6 35.2	96 27	154.1	6 06.5	96 27	154.3	5 37.8	96 26	154.4	9
30	8 42.1	95 28	152.5	8 13.5	95 28	152.6	7 45.0	95 28	152.8	7 16.4	95 28	152.9	6 47.8	95 28	153.1	6 19.2	95 27	153.2	5 50.6	95 27	153.4	5 22.0	95 27	153.5	30
1	8 25.2	95 29	151.6	7 56.7	95 29	151.8	7 28.2	95 29	151.9	6 59.7	95 29	152.1	6 31.2	95 28	152.2	6 02.7	95 28	152.4	5 34.2	95 28	152.5	5 05.7	95 28	152.7	1
2	8 07.8	95 30	150.7	7 39.4	95 30	150.9	7 11.0	95 30	151.0	6 42.5	95 29	151.2	6 14.1	95 29	151.4	5 45.7	95 29	151.5	5 17.3	95 29	151.7				2
3	7 49.9	94 31	149.9	7 21.6	94 30	150.0	6 53.2	94 30	150.2	6 24.9	94 30	150.4	5 56.6	94 30	150.5	5 28.3	94 30	150.7							3
4	7 31.5	94 31	149.0	7 03.3	94 31	149.2	6 35.1	94 31	149.3	6 06.8	94 31	149.5	5 38.6	94 31	149.7	5 10.4	94 31	149.8							4
35	7 12.7	94 32	148.1	6 44.5	94 32	148.3	6 16.4	94 32	148.5	5 48.3	94 32	148.6	5 20.1	94 32	148.8										35
6	6 53.4	93 33	147.3	6 25.3	93 33	147.4	5 57.3	93 33	147.6	5 29.2	93 32	147.8	5 01.2	93 32	148.0										6
7	6 33.6	93 34	146.4	6 05.7	93 34	146.6	5 37.7	93 33	146.8	5 09.8	93 33	146.9													7
8	6 13.4	93 34	145.5	5 45.6	93 34	145.7	5 17.7	93 34	145.9																8
9	5 52.7	92 35	144.7	5 25.0	92 35	144.9																			9
40	5 31.7	92 36	143.8	5 04.0	92 35	144.0																			40
1	5 10.1	92 36	143.0																						1

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	°
91	18 22.5	77 58	74.3	18 45.7	77 58	73.9	19 08.8	77 58	73.6	19 32.0	77 58	73.2	19 55.0	77 57	72.9	20 18.1	77 57	72.6	20 41.0	77 57	72.2	21 04.0	76 57	71.9	91
2	17 47.8	78 58	73.5	18 11.1	77 58	73.2	18 34.3	77 57	72.8	18 57.4	77 57	72.5	19 20.6	77 57	72.2	19 43.7	77 57	71.8	20 06.7	77 57	71.5	20 29.7	77 57	71.2	2
3	17 13.3	78 57	72.8	17 36.6	78 57	72.4	17 59.8	78 57	72.1	18 23.1	77 57	71.8	18 46.3	77 57	71.4	19 09.4	77 57	71.1	19 32.6	77 57	70.8	19 55.6	77 57	70.4	3
4	16 38.9	78 57	72.0	17 02.2	78 57	71.7	17 25.5	78 57	71.4	17 48.8	78 57	71.0	18 12.1	77 57	70.7	18 35.3	77 57	70.4	18 58.5	77 56	70.0	19 21.7	77 56	69.7	4
95	16 04.6	78 57	71.3	16 28.0	78 57	71.0	16 51.4	78 57	70.6	17 14.8	78 57	70.3	17 38.1	78 56	70.0	18 01.4	78 56	69.6	18 24.7	78 56	69.3	18 47.9	77 56	69.0	95
6	15 30.5	78 57	70.5	15 54.0	78 56	70.2	16 17.4	78 56	69.9	16 40.9	78 56	69.6	17 04.3	78 56	69.2	17 27.6	78 56	68.9	17 51.0	78 56	68.6	18 14.3	78 56	68.3	6
7	14 56.5	79 56	69.8	15 20.1	79 56	69.5	15 43.6	78 56	69.2	16 07.1	78 56	68.8	16 30.6	78 56	68.5	16 54.0	78 56	68.2	17 17.5	78 56	67.9	17 40.8	78 55	67.5	7
8	14 22.7	79 56	69.1	14 46.3	79 56	68.7	15 09.9	79 56	68.4	15 33.5	79 56	68.1	15 57.1	78 56	67.8	16 20.6	78 55	67.4	16 44.1	78 55	67.1	17 07.6	78 55	66.8	8
9	13 49.0	79 56	68.3	14 12.8	79 56	68.0	14 36.4	79 56	67.7	15 00.1	79 55	67.4	15 23.7	79 55	67.0	15 47.3	79 55	66.7	16 10.9	79 55	66.4	16 34.5	78 55	66.1	9
100	13 15.6	79 55	67.6	13 39.4	79 55	67.3	14 03.1	79 55	66.9	14 26.9	79 55	66.6	14 50.6	79 55	66.3	15 14.3	79 55	66.0	15 37.9	79 55	65.7	16 01.6	79 55	65.3	100
1	12 42.3	80 55	66.8	13 06.2	80 55	66.5	13 30.0	79 55	66.2	13 53.8	79 55	65.9	14 17.6	79 55	65.6	14 41.4	79 54	65.3	15 05.1	79 54	64.9	15 28.8	79 54	64.6	1
2	12 09.2	80 55	66.1	12 33.1	80 55	65.8	12 57.1	80 55	65.5	13 21.0	80 54	65.1	13 44.8	80 54	64.8	14 08.7	79 54	64.5	14 32.5	79 54	64.2	14 56.3	79 54	63.9	2
3	11 36.3	80 55	65.3	12 00.3	80 54	65.0	12 24.3	80 54	64.7	12 48.3	80 54	64.4	13 12.2	80 54	64.1	13 36.2	80 54	63.8	14 00.1	80 54	63.5	14 24.0	80 54	63.2	3
4	11 03.6	80 54	64.6	11 27.7	80 54	64.3	11 51.8	80 54	64.0	12 15.8	80 54	63.7	12 39.9	80 54	63.4	13 03.9	80 53	63.1	13 27.9	80 53	62.7	13 51.9	80 53	62.4	4
105	10 31.1	81 54	63.8	10 55.2	81 54	63.5	11 19.4	81 54	63.2	11 43.6	80 53	62.9	12 07.7	80 53	62.6	12 31.8	80 53	62.3	12 55.9	80 53	62.0	13 20.0	80 53	61.7	105
6	9 58.8	81 54	63.1	10 23.0	81 53	62.8	10 47.3	81 53	62.5	11 11.5	81 53	62.2	11 35.7	81 53	61.9	11 59.9	81 53	61.6	12 24.1	81 53	61.3	12 48.3	81 52	61.0	6
7	9 26.7	81 53	62.3	9 51.0	81 53	62.0	10 15.4	81 53	61.7	10 39.7	81 53	61.4	11 04.0	81 52	61.1	11 28.3	81 52	60.8	11 52.6	81 52	60.5	12 16.8	81 52	60.2	7
8	8 54.8	82 53	61.6	9 19.2	81 53	61.3	9 43.7	81 52	61.0	10 08.1	81 52	60.7	10 32.5	81 52	60.4	10 56.9	81 52	60.1	11 21.2	81 52	59.8	11 45.6	81 52	59.5	8
9	8 23.2	82 52	60.8	8 47.7	82 52	60.5	9 12.2	82 52	60.2	9 36.7	82 52	59.9	10 01.2	82 52	59.7	10 25.7	82 52	59.4	10 50.2	82 51	59.1	11 14.6	81 51	58.8	9
110	7 51.8	82 52	60.1	8 16.4	82 52	59.8	8 41.0	82 52	59.5	9 05.6	82 51	59.2	9 30.2	82 51	58.9	9 54.7	82 51	58.6	10 19.3	82 51	58.3	10 43.8	82 51	58.0	110
1	7 20.6	82 52	59.3	7 45.3	82 51	59.0	8 10.0	82 51	58.7	8 34.7	82 51	58.4	8 59.4	82 51	58.2	9 24.0	82 51	57.9	9 48.7	82 51	57.6	10 13.3	82 50	57.3	1
2	6 49.7	83 51	58.5	7 14.5	83 51	58.3	7 39.3	83 51	58.0	8 04.0	83 51	57.7	8 28.8	83 50	57.4	8 53.6	83 50	57.1	9 18.3	82 50	56.8	9 43.1	82 50	56.6	2
3	6 19.0	83 51	57.8	6 43.9	83 51	57.5	7 08.8	83 50	57.2	7 33.7	83 50	56.9	7 58.5	83 50	56.7	8 23.4	83 50	56.4	8 48.2	83 50	56.1	9 13.1	83 50	55.8	3
4	5 48.6	83 50	57.0	6 13.6	83 50	56.7	6 38.5	83 50	56.5	7 03.5	83 50	56.2	7 28.5	83 50	55.9	7 53.5	83 49	55.6	8 18.4	83 49	55.3	8 43.3	83 49	55.1	4
115	5 18.4	84 50	56.3	5 43.5	84 50	56.0	6 08.6	84 50	55.7	6 33.7	84 49	55.4	6 58.7	84 49	55.2	7 23.8	84 49	54.9	7 48.8	83 49	54.6	8 13.9	83 49	54.3	115
6				5 13.7	84 49	55.2	5 38.9	84 49	54.9	6 04.1	84 49	54.7	6 29.2	84 49	54.4	6 54.4	84 49	54.1	7 19.5	84 48	53.8	7 44.7	84 48	53.6	6
7							5 09.5	84 49	54.2	5 34.7	84 48	53.9	6 00.0	84 48	53.6	6 25.3	84 48	53.4	6 50.5	84 48	53.1	7 15.8	84 48	52.8	7
8										5 05.7	85 48	53.1	5 31.1	85 48	52.9	5 56.4	85 48	52.6	6 21.8	85 47	52.3	6 47.1	84 47	52.1	8
9													5 02.4	85 47	52.1	5 27.9	85 47	51.8	5 53.4	85 47	51.6	6 18.8	85 47	51.3	9
120																			5 25.2	85 46	50.8	5 50.8	85 46	50.6	120
1																						5 23.0	86 46	49.8	1

Digitized by Google

Lat. 53°

H.A.	28° 00′		28° 30′		29° 00′		30° 00′		32° 00′		34° 00′		34° 30′		35° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		°
00	65 00.0 1.0 01	180.0	65 30.0 1.0 01	180.0	66 00.0 1.0 01	180.0	67 00.0 1.0 01	180.0	69 00.0 1.0 01	180.0	71 00.0 1.0 01	180.0	71 30.0 1.0 01	180.0	72 30.0 1.0 01	180.0	00
1	64 59.3 1.0 03	177.9	65 29.3 1.0 03	177.9	65 59.3 1.0 03	177.9	66 59.3 1.0 04	177.8	68 59.3 1.0 04	177.6	70 59.2 1.0 04	177.5	71 29.2 1.0 04	177.4	72 29.1 1.0 04	177.3	1
2	64 57.4 1.0 05	175.8	65 27.3 1.0 06	175.8	65 57.3 1.0 06	175.7	66 57.2 1.0 06	175.6	68 57.0 1.0 06	175.3	70 56.8 1.0 07	174.9	71 26.7 1.0 07	174.8	72 26.6 1.0 07	174.6	2
3	64 54.1 1.0 08	173.7	65 24.0 1.0 08	173.7	65 53.9 1.0 08	173.6	66 53.7 1.0 08	173.4	68 53.3 1.0 09	172.9	70 52.8 1.0 09	172.4	71 22.7 1.0 09	172.2	72 22.4 99 10	171.9	3
4	64 49.5 1.0 10	171.7	65 19.4 99 10	171.6	65 49.2 99 10	171.4	66 48.9 99 10	171.2	68 48.1 99 11	170.6	70 47.2 99 12	169.9	71 17.0 99 12	169.7	72 16.4 99 13	169.3	4
05	64 43.6 99 12	169.6	65 13.4 99 12	169.5	65 43.2 99 12	169.3	66 42.7 99 13	169.0	68 41.5 99 13	168.3	70 40.1 99 14	167.4	71 09.7 99 15	167.1	72 08.9 99 15	166.6	05
6	64 36.5 99 14	167.6	65 06.2 99 14	167.4	65 35.8 99 14	167.2	66 35.1 99 15	166.8	68 33.4 99 16	166.0	70 31.5 98 17	164.9	71 00.9 98 17	164.6	71 59.7 98 18	164.0	6
7	64 28.1 99 16	165.5	64 57.7 98 16	165.3	65 27.2 98 16	165.1	66 26.2 98 17	164.7	68 24.0 98 18	163.7	70 21.4 98 19	162.5	70 50.6 97 20	162.2	71 49.0 97 20	161.5	7
8	64 18.5 98 18	163.5	64 47.9 98 18	163.3	65 17.3 98 19	163.1	66 16.0 98 19	162.6	68 13.2 97 20	161.5	70 09.8 97 22	160.1	70 38.8 97 22	159.8	71 36.8 96 23	158.9	8
9	64 07.6 98 20	161.5	64 36.9 98 20	161.3	65 06.2 97 21	161.0	66 04.6 97 21	160.5	68 01.0 97 22	159.2	69 56.8 96 24	157.8	70 25.6 96 24	157.4	71 23.1 96 25	156.5	9
10	63 55.6 97 22	159.6	64 24.7 97 22	159.3	64 53.8 97 22	159.0	65 51.9 97 23	158.4	67 47.6 96 24	157.1	69 42.5 95 26	155.5	70 11.1 95 26	155.0	71 08.0 95 27	154.1	10
1	63 42.5 97 24	157.6	64 11.4 96 24	157.3	64 40.3 96 25	157.0	65 38.0 96 25	156.4	67 32.9 95 26	154.9	69 26.9 94 28	153.2	69 55.2 94 29	152.7	70 51.5 94 30	151.7	1
2	63 28.2 96 26	155.7	63 56.9 96 26	155.4	64 25.7 96 26	155.1	65 23.0 96 27	154.4	67 17.0 95 28	152.8	69 10.0 94 30	151.0	69 38.0 93 31	150.5	70 33.8 93 32	149.4	2
3	63 12.8 95 27	153.9	63 41.4 95 28	153.5	64 09.9 95 28	153.2	65 06.8 95 29	152.4	67 00.0 94 30	150.8	68 51.9 93 32	148.9	69 19.6 92 33	148.3	70 14.8 92 34	147.2	3
4	62 56.3 95 29	152.0	63 24.7 95 29	151.6	63 53.1 94 30	151.3	64 49.6 94 30	150.5	66 41.8 93 32	148.8	68 32.6 92 34	146.7	69 00.1 91 34	146.2	69 54.7 91 35	145.0	4
15	62 38.9 94 31	150.2	63 07.1 94 31	149.8	63 35.2 94 31	149.4	64 31.3 93 32	148.6	66 22.5 92 34	146.8	68 12.3 91 36	144.7	68 39.5 90 36	144.1	69 33.4 90 37	142.9	15
6	62 20.4 93 32	148.4	62 48.4 93 33	148.0	63 16.3 93 33	147.6	64 12.0 92 34	146.7	66 02.2 91 35	144.9	67 50.9 90 37	142.7	68 17.8 89 38	142.1	69 11.1 88 39	140.8	6
7	62 01.0 93 34	146.6	62 28.8 92 34	146.2	62 56.5 92 35	145.8	63 51.7 92 35	144.9	65 41.0 90 37	143.0	67 28.5 89 39	140.7	67 55.1 88 39	140.1	68 47.9 87 40	138.8	7
8	61 40.7 92 35	144.9	62 08.3 92 36	144.5	62 35.8 91 36	144.0	63 30.5 91 37	143.1	65 18.8 90 38	141.1	67 05.2 88 40	138.9	67 31.5 87 41	138.2	68 23.6 86 42	136.9	8
9	61 19.5 91 37	143.2	61 46.9 91 37	142.8	62 14.1 91 37	142.3	63 08.4 90 38	141.4	64 55.7 89 40	139.3	66 41.0 87 42	137.0	67 07.0 86 42	136.4	67 58.5 85 43	135.0	9
20	60 57.5 91 38	141.5	61 24.6 90 38	141.1	61 51.6 90 39	140.6	62 45.4 89 40	139.7	64 31.7 88 41	137.6	66 16.0 86 43	135.2	66 41.7 85 44	134.6	67 32.6 84 44	133.2	20
1	60 34.6 90 39	139.9	61 01.5 90 40	139.4	61 28.3 89 40	139.0	62 21.7 89 41	138.0	64 07.0 87 43	135.9	65 50.2 85 44	133.5	66 15.6 84 45	132.8	67 05.9 83 46	131.4	1
2	60 11.0 89 41	138.3	60 37.7 89 41	137.8	61 04.2 88 41	137.4	61 57.1 88 42	136.4	63 41.5 86 44	134.2	65 23.6 84 45	131.8	65 48.7 84 46	131.1	66 38.5 82 47	129.7	2
3	59 46.6 88 42	136.7	60 13.1 88 42	136.3	60 39.4 88 43	135.8	61 31.8 87 43	134.8	63 15.2 85 45	132.6	64 56.3 83 47	130.1	65 21.2 83 47	129.5	66 10.4 81 48	128.1	3
4	59 21.5 88 43	135.2	59 47.7 87 43	134.7	60 13.9 87 44	134.2	61 05.9 86 44	133.2	62 48.3 84 46	131.0	64 28.4 82 48	128.5	64 53.0 82 48	127.8	65 41.6 80 49	126.4	4
25	58 55.7 87 44	133.7	59 21.8 87 44	133.2	59 47.7 86 45	132.7	60 39.2 85 45	131.7	62 20.7 84 47	129.4	63 59.8 81 49	126.9	64 24.2 81 49	126.3	65 12.3 80 50	124.9	25
6	58 29.3 86 45	132.2	58 55.1 86 45	131.7	59 20.8 86 46	131.2	60 11.9 85 46	130.2	61 52.6 83 48	127.9	63 30.7 81 49	125.4	63 54.8 80 50	124.8	64 42.4 79 51	123.4	6
7	58 02.2 86 46	130.8	58 27.9 85 46	130.3	58 53.4 85 47	129.8	59 44.1 84 47	128.7	61 23.8 82 49	126.5	63 01.0 80 50	124.0	63 24.9 79 51	123.3	64 12.0 78 52	121.9	7
8	57 34.6 85 47	129.4	58 00.0 85 47	128.9	58 25.4 84 48	128.4	59 15.6 83 48	127.3	60 54.5 81 50	125.0	62 30.8 79 51	122.5	62 54.4 78 52	121.8	63 41.1 77 52	120.4	8
9	57 06.4 84 48	128.0	57 31.7 84 48	127.5	57 56.8 84 48	127.0	58 46.6 83 49	125.9	60 24.7 81 50	123.6	62 00.1 78 52	121.1	62 23.5 78 52	120.4	63 09.7 76 53	119.0	9
30	56 37.7 84 49	126.6	57 02.7 83 49	126.1	57 27.7 83 49	125.6	58 17.1 82 50	124.5	59 54.4 80 51	122.3	61 29.0 78 53	119.7	61 52.2 77 53	119.1	62 38.0 76 54	117.7	30
1	56 08.5 83 50	125.3	56 33.3 83 50	124.8	56 58.1 82 50	124.3	57 47.2 81 51	123.2	59 23.6 79 52	120.9	60 57.4 77 53	118.4	61 20.4 76 54	117.7	62 05.8 75 54	116.4	1
2	55 38.7 82 50	124.0	56 03.4 82 51	123.5	56 28.0 82 51	123.0	57 16.7 81 51	121.9	58 52.4 79 53	119.6	60 25.5 76 54	117.1	60 48.3 76 54	116.5	61 33.3 74 55	115.1	2
3	55 08.6 82 51	122.7	55 33.1 82 51	122.2	55 57.5 81 52	121.7	56 45.9 80 52	120.6	58 20.8 78 53	118.3	59 53.1 76 54	115.8	60 15.8 75 55	115.2	61 00.4 74 55	113.8	3
4	54 38.0 81 52	121.5	55 02.3 81 52	121.0	55 26.6 80 52	120.4	56 14.6 80 53	119.4	57 48.9 78 54	117.1	59 20.5 75 55	114.6	59 42.9 74 55	114.0	60 27.2 73 56	112.6	4
35	54 07.0 81 52	120.2	54 31.2 80 53	119.7	54 55.2 80 53	119.2	55 42.9 79 53	118.1	57 16.5 77 54	115.9	58 47.5 75 55	113.4	59 09.8 74 56	112.8	59 53.7 73 56	111.4	35
6	53 35.6 80 53	119.0	53 59.6 80 53	118.5	54 23.5 79 53	118.0	55 10.9 78 54	116.9	56 43.9 76 55	114.7	58 14.2 74 56	112.2	58 36.3 73 56	111.6	59 20.0 72 57	110.2	6
7	53 03.8 80 54	117.8	53 27.7 79 54	117.3	53 51.5 79 54	116.8	54 38.5 78 54	115.8	56 10.9 76 55	113.5	57 40.7 74 56	111.1	58 02.6 73 57	110.4	58 46.0 72 57	109.1	7
8	52 31.7 79 54	116.7	52 55.5 79 54	116.2	53 19.1 78 54	115.7	54 05.9 78 55	114.6	55 37.7 75 56	112.4	57 06.8 73 57	109.9	57 28.7 72 57	109.3	58 11.7 71 57	108.0	8
9	51 59.3 79 55	115.5	52 22.9 78 55	115.0	52 46.4 78 55	114.5	53 32.9 77 55	113.5	55 04.1 75 56	111.2	56 32.8 73 57	108.8	56 54.5 72 57	108.2	57 37.3 71 58	106.9	9
40	51 26.6 78 55	114.4	51 50.0 78 55	113.9	52 13.4 78 55	113.4	52 59.6 77 56	112.4	54 30.4 75 57	110.1	55 58.5 72 57	107.8	56 20.1 72 58	107.1	57 02.7 70 58	105.9	40
1	50 53.6 78 55	113.3	51 16.9 78 56	112.8	51 40.1 77 56	112.3	52 26.1 76 56	111.3	53 56.3 74 57	109.1	55 24.0 72 58	106.7	55 45.5 71 58	106.1	56 27.8 70 58	104.8	1
2	50 20.3 78 56	112.2	50 43.5 77 56	111.7	51 06.6 77 56	111.2	51 52.3 76 57	110.2	53 22.1 74 57	108.0	54 49.3 72 58	105.7	55 10.7 71 58	105.0	55 52.8 70 59	103.8	2
3	49 46.7 77 56	111.2	50 09.8 77 56	110.7	50 32.8 76 57	110.2	51 18.3 75 57	109.1	52 47.7 73 58	107.0	54 14.5 71 58	104.6	54 35.7 71 58	104.0	55 17.7 69 59	102.8	3
4	49 12.9 77 57	110.1	49 35.9 76 57	109.6	49 58.8 76 57	109.1	50 44.1 75 57	108.1	52 13.0 73 58	105.9	53 39.5 71 59	103.6	54 00.6 70 59	103.0	54 42.4 69 59	101.8	4
45	48 38.9 76 57	109.1	49 01.8 76 57	108.6	49 24.6 76 57	108.1	50 09.7 75 58	107.1	51 38.2 73 58	104.9	53 04.3 71 59	102.7	53 25.4 70 59	102.1	54 07.0 69 59	100.8	45
6	48 04.7 76 57	108.1	48 27.5 76 58	107.6	48 50.1 75 58	107.1	49 35.1 74 58	106.1	51 03.3 73 59	104.0	52 29.0 70 59	101.7	52 50.0 70 59	101.1	53 31.5 69 59	99.9	6
7	47 30.3 76 58	107.1	47 53.0 75 58	106.6	48 15.5 75 58	106.1	49 00.3 74 58	105.1	50 28.2 72 59	103.0	51 53.6 70 59	100.7	52 14.5 70 59	100.2	52 55.9 68 60	99.0	7
8	46 55.7 76 58	106.1	47 18.3 75 58	105.6	47 40.8 75 58	105.1	48 25.4 74 58	104.1	49 52.9 72 59	102.0	51 18.0 70 59	99.8	51 38.9 69 60	99.2	52 20.2 68 60	98.1	8
9	46 20.9 75 58	105.1	46 43.4 75 58	104.6	47 05.8 74 58	104.2	47 50.3 74 59	103.2	49 17.5 72 59	101.1	50 42.4 70 60	98.9	51 03.2 69 60	98.3	51 44.4 68 60	97.2	9
50	45 46.0 75 58	104.2	46 08.4 75 59	103.7	46 30.7 74 59	103.2	47 15.0 73 59	102.2	48 42.0 72 59	100.2	50 06.7 70 60	98.0	50 27.5 69 60	97.4	51 08.5 68 60	96.3	50
1	45 10.9 75 59	103.2	45 33.3 74 59	102.7	45 55.5 74 59	102.3	46 39.7 73 59	101.3	48 06.4 71 59	99.2	49 30.9 69 60	97.1	49 51.6 69 60	96.5	50 32.6 68 60	95.4	1
2	44 35.7 75 59	102.3	44 58.0 74 59	101.8	45 20.2 74 59	101.3	46 04.2 73 59	100.4	47 30.8 71 60	98.3	48 55.0 69 60	96.2	49 15.7 69 60	95.7	49 56.6 68 60	94.5	2
3	44 00.3 74 59	101.4	44 22.6 74 59	100.9	44 44.7 74 59	100.4	45 28.7 73 59	99.5	46 55.0 71 60	97.5	48 19.1 69 60	95.3	48 39.8 69 60	94.8	49 20.6 68 60	93.7	3
4	43 24.9 74 59	100.5	43 47.1 74 59	100.0	44 09.2 73 59	99.5	44 53.0 73 60	98.6	46 19.2 71 60	96.6	47 43.1 69 60	94.5	48 03.8 69 60	93.9	48 44.6 67 60	92.8	4
55	42 49.3 74 59	99.6	43 11.5 74 59	99.1	43 33.5 73 60	98.6	44 17.2 73 60	97.7	45 43.3 71 60	95.7	47 07.1 69 60	93.6	47 27.7 68 60	93.1	48 08.5 67 60	92.0	55
6	42 13.6 74 60	98.7	42 35.8 74 60	98.2	42 57.8 73 60	97.8	43 41.4 72 60	96.8	45 07.3 71 60	94.9	46 31.1 69 60	92.8	46 51.7 68 60	92.3	47 32.4 67 60	91.2	6
7	41 37.9 74 60	97.8	42 00.0 73 60	97.4	42 22.0 73 60	96.9	43 05.5 72 60	96.0	44 31.3 71 60	94.0	45 55.0 69 60	92.0	46 15.6 68 60	91.5	46 56.3 67 60	90.4	7
8	41 02.1 74 60	96.9	41 24.1 73 60	96.5	41 46.1 73 60	96.0	42 29.6 72 60	95.1	43 55.3 71 60	93.2	45 18.9 69 60	91.2	45 39.5 68 60	90.6	46 20.2 67 60	89.6	8
9	40 26.2 74 60	96.1	40 48.2 73 60	95.6	41 10.1 73 60	95.2	41 53.6 72 60	94.3	43 19.2 71 60	92.4	44 42.8 69 60	90.4	45 03.4 68 60	89.8	45 44.1 67 60	88.8	9
60	39 50.3 73 60	95.2	40 12.3 73 60	94.8	40 34.2 73 60	94.3	41 17.6 72 60	93.4	42 43.1 70 60	91.5	44 06.7 69 60	89.6	44 27.2 68 60	89.1	45 08.0 67 60	88.0	60
1	39 14.3 73 60	94.4	39 36.3 73 60	94.0	39 58.1 73 60	93.5	40 41.5 72 60	92.6	42 07.0 70 60	90.7	43 30.6 69 60	88.8	43 51.1 68 60	88.3	44 31.9 67 60	87.2	1
2	38 38.3 73 60	93.6	39 00.2 73 60	93.1	39 22.1 73 60	92.7	40 05.4 72 60	91.8	41 30.9 70 60	89.9	42 54.5 69 60	88.0	43 15.1 68 60	87.5	43 55.8 67 60	86.5	2
3	38 02.2 73 60	92.7	38 24.2 73 60	92.3	38 46.0 73 60	91.9	39 29.3 72 60	91.0	40 54.8 70 60	89.1	42 18.4 69 60	87.2	42 39.0 68 60	86.7	43 19.8 68 60	85.7	3
4	37 26.2 73 60	91.9	37 48.1 73 60	91.5	38 09.9 73 60	91.1	38 53.2 72 60	90.2	40 18.7 70 60	88.3	41 42.4 69 60	86.4	42 03.0 69 60	86.0	42 43.8 68 60	85.0	4
65	36 50.1 73 60	91.1	37 12.0 73 60	90.7	37 33.8 73 60	90.2	38 17.1 72 60	89.4	39 42.6 71 60	87.6	41 06.3 69 60	85.7	41 27.0 69 60	85.2	42 07.9 68 60	84.2	65
6	36 14.0 73 60	90.3	36 35.9 73 60	89.9	36 57.7 73 60	89.5	37 41.0 72 60	88.6	39 06.5 71 60	86.8	40 30.3 69 60	84.9	40 51.0 69 60	84.4	41 32.0 68 60	83.5	6
7	35 37.8 73 60	89.5	35 59.8 73 60	89.1	36 21.6 73 60	88.7	37 04.9 72 60	87.8	38 30.5 71 60	86.0	39 54.4 69 60	84.2	40 15.1 69 60	83.7	40 56.1 68 60	82.7	7
8	35 01.7 73 60	88.7	35 23.7 73 60	88.3	35 45.5 73 60	87.9	36 28.9 72 60	87.0	37 54.5 71 60	85.3	39 18.5 69 60	83.4	39 39.2 69 60	83.0	40 20.3 68 60	82.0	8
9	34 25.6 73 60	87.9	34 47.6 73 60	87.5	35 09.4 73 60	87.1	35 52.8 72 60	86.2	37 18.5 71 60	84.5	38 42.7 69 60	82.7	39 03.4 69 60	82.2	39 44.6 68 59	81.3	9
70	33 49.6 73 60	87.1	34 11.5 73 60	86.7	34 33.4 73 60	86.3	35 16.8 72 60	85.5	36 42.6 71 60	83.8	38 06.9 70 60	82.0	38 27.7 69 59	81.5	39 09.0 68 59	80.6	70
1	33 13.5 73 60	86.4	33 35.5 73 60	86.0	33 57.3 73 60	85.5	34 40.8 72 60	84.7	36 06.7 71 60	83.0	37 31.1 70 59	81.2	37 52.0 69 59	80.8	38 33.4 69 59	79.9	1
2	32 37.5 73 60	85.6	32 59.5 73 60	85.2	33 21.4 73 60	84.8	34 04.9 72 60	84.0	35 30.9 71 60	82.3	36 55.5 70 59	80.5	37 16.4 69 59	80.1	37 57.9 69 59	79.1	2
3	32 01.5 73 60	84.8	32 23.5 73 60	84.4	32 45.4 73 60	84.0	33 29.0 72 60	83.2	34 55.2 71 59	81.5	36 19.9 70 59	79.8	36 40.9 70 59	79.3	37 22.4 69 59	78.4	3
4	31 25.6 74 60	84.1	31 47.6 73 60	83.7	32 09.5 73 60	83.3	32 53.2 72 60	82.5	34 19.5 71 59	80.8	35 44.4 70 59	79.1	36 05.4 70 59	78.6	36 47.1 69 59	77.7	4
75	30 49.7 74 60	83.3	31 11.7 73 60	82.9	31 33.7 73 60	82.5	32 17.4 73 59	81.7	33 43.9 72 59	80.1	35 09.0 70 59	78.3	35 30.1 70 59	77.9	36 11.9 69 59	77.0	75
6	30 13.9 74 60	82.6	30 35.9 73 60	82.2	30 57.9 73 60	81.8	31 41.7 73 59	81.0	33 08.4 72 59	79.3	34 33.7 71 59	77.6	34 54.8 70 59	77.2	35 36.7 70 58	76.3	6
7	29 38.1 74 60	81.8	30 00.2 74 59	81.4	30 22.2 73 59	81.0	31 06.1 73 59	80.2	32 32.9 72 59	78.6	33 58.5 71 59	76.9	34 19.6 70 58	76.5	35 01.7 70 58	75.6	7
8	29 02.4 74 59	81.1	29 24.5 74 59	80.7	29 46.6 73 59	80.3	30 30.6 73 59	79.5	31 57.6 72 59	77.9	33 23.4 71 58	76.2	33 44.6 71 58	75.8	34 26.8 70 58	74.9	8
9	28 26.7 74 59	80.3	28 48.9 74 59	79.9	29 11.1 74 59	79.5	29 55.1 73 59	78.8	31 22.3 72 59	77.2	32 48.3 71 58	75.5	33 09.6 71 58	75.1	33 52.0 70 58	74.2	9
80	27 51.2 74 59	79.6	28 13.4 74 59	79.2	28 35.6 74 59	78.8	29 19.7 73 59	78.0	30 47.2 72 58	76.4	32 13.4 71 58	74.8	32 34.8 71 58	74.4	33 17.3 71 58	73.6	80
1	27 15.7 74 59	78.8	27 38.0 74 59	78.5	28 00.2 74 59	78.1	28 44.5 74 59	77.3	30 12.1 73 58	75.7	31 38.6 72 58	74.1	32 00.1 71 58	73.7	32 42.7 71 57	72.9	1
2	26 40.3 75 59	78.1	27 02.7 74 59	77.7	27 24.9 74 59	77.3	28 09.3 74 58	76.6	29 37.2 73 58	75.0	31 04.0 72 58	73.4	31 25.5 72 57	73.0	32 08.3 71 57	72.2	2
3	26 05.1 75 59	77.4	26 27.4 74 59	77.0	26 49.8 74 58	76.6	27 34.2 74 58	75.9	29 02.4 73 58	74.3	30 29.4 72 57	72.7	30 51.0 72 57	72.3	31 34.0 71 57	71.5	3
4	25 29.9 75 58	76.6	25 52.3 75 58	76.3	26 14.7 74 58	75.9	26 59.3 74 58	75.1	28 27.7 73 58	73.6	29 55.0 72 57	72.0	30 16.7 72 57	71.6	30 59.8 72 57	70.8	4
85	24 54.8 75 58	75.9	25 17.3 75 58	75.5	25 39.7 75 58	75.2	26 24.4 74 58	74.4	27 53.1 73 57	72.9	29 20.7 73 57	71.3	29 42.5 72 57	70.9	30 25.7 72 56	70.1	85
6	24 19.8 75 58	75.2	24 42.4 75 58	74.8	25 04.9 75 58	74.4	25 49.7 75 58	73.7	27 18.6 74 57	72.2	28 46.6 73 57	70.7	29 08.4 73 57	70.3	29 51.9 72 56	69.5	6
7	23 45.0 75 58	74.4	24 07.6 75 58	74.1	24 30.2 75 58	73.7	25 15.1 75 57	73.0	26 44.3 74 57	71.5	28 12.6 73 56	70.0	28 34.5 73 56	69.6	29 18.1 72 56	68.8	7
8	23 10.3 76 58	73.7	23 32.9 75 58	73.3	23 55.6 75 57	73.0	24 40.6 75 57	72.3	26 10.2 74 57	70.8	27 38.7 73 56	69.3	28 00.7 73 56	68.9	28 44.5 73 56	68.1	8
9	22 35.7 76 57	73.0	22 58.4 76 57	72.6	23 21.1 76 57	72.3	24 06.3 75 57	71.6	25 36.1 74 56	70.1	27 05.0 74 56	68.6	27 27.1 73 56	68.2	28 11.3 73 55	67.4	9
90	22 01.2 76 57	72.3	22 24.0 76 57	71.9	22 46.8 76 57	71.6	23 32.1 75 57	70.8	25 02.3 75 56	69.4	26 31.5 74 56	67.9	26 53.7 74 55	67.5	27 37.8 73 55	66.8	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0	8 00.0	1.0 00	180.0	7 00.0	1.0 00	180.0	5 00.0	1.0 00	180.0										00
1	8 59.7	1.0 01	179.1	8 29.7	1.0 01	179.1	7 59.7	1.0 01	179.1	6 59.7	1.0 01	179.1													1
2	8 58.9	1.0 02	178.2	8 28.9	1.0 02	178.2	7 58.9	1.0 02	178.2	6 58.9	1.0 02	178.3													2
3	8 57.5	1.0 03	177.3	8 27.5	1.0 03	177.3	7 57.5	1.0 03	177.4	6 57.5	1.0 03	177.4													3
4	8 55.5	1.0 04	176.4	8 25.5	1.0 04	176.4	7 55.5	1.0 04	176.5	6 55.6	1.0 04	176.5													4
05	8 53.0	1.0 05	175.5	8 23.0	1.0 05	175.6	7 53.0	1.0 05	175.6	6 53.1	1.0 05	175.6													05
6	8 49.9	1.0 06	174.6	8 19.9	1.0 06	174.7	7 50.0	1.0 06	174.7	6 50.1	1.0 06	174.8													6
7	8 46.2	1.0 07	173.7	8 16.3	1.0 07	173.8	7 46.4	1.0 07	173.8	6 46.5	1.0 07	173.9													7
8	8 42.0	1.0 08	172.9	8 12.1	1.0 08	172.9	7 42.2	1.0 08	172.9	6 42.4	1.0 08	173.0													8
9	8 37.2	1.0 09	172.0	8 07.4	1.0 09	172.0	7 37.5	1.0 09	172.1	6 37.8	1.0 09	172.2													9
10	8 31.9	99 10	171.1	8 02.1	99 10	171.1	7 32.3	99 10	171.2	6 32.6	99 10	171.3													10
1	8 26.0	99 11	170.2	7 56.2	99 11	170.3	7 26.5	99 11	170.3	6 26.9	99 10	170.4													1
2	8 19.6	99 12	169.3	7 49.9	99 12	169.4	7 20.1	99 11	169.4	6 20.6	99 11	169.6													2
3	8 12.6	99 13	168.4	7 42.9	99 12	168.5	7 13.2	99 12	168.6	6 13.8	99 12	168.7													3
4	8 05.1	99 13	167.5	7 35.5	99 13	167.6	7 05.8	99 13	167.7	6 06.4	99 13	167.8													4
15	7 57.1	99 14	166.7	7 27.4	99 14	166.7	6 57.8	99 14	166.8	5 58.6	99 14	167.0													15
6	7 48.5	99 15	165.8	7 18.9	99 15	165.9	6 49.3	99 15	165.9	5 50.2	99 15	166.1													6
7	7 39.3	98 16	164.9	7 09.8	98 16	165.0	6 40.3	98 16	165.1	5 41.2	98 16	165.3													7
8	7 29.7	98 17	164.0	7 00.2	98 17	164.1	6 30.7	98 17	164.2	5 31.8	98 17	164.4													8
9	7 19.5	98 18	163.2	6 50.0	98 18	163.3	6 20.6	98 18	163.4	5 21.8	98 17	163.5													9
20	7 08.7	98 19	162.3	6 39.4	98 19	162.4	6 10.0	98 19	162.5	5 11.3	98 18	162.7													20
1	6 57.5	98 20	161.4	6 28.2	98 20	161.5	5 58.9	98 19	161.6	5 00.3	98 19	161.8													1
2	6 45.7	97 20	160.5	6 16.5	97 20	160.7	5 47.3	97 20	160.8																2
3	6 33.4	97 21	159.7	6 04.3	97 21	159.8	5 35.1	97 21	159.9																3
4	6 20.6	97 22	158.8	5 51.6	97 22	158.9	5 22.5	97 22	159.1																4
25	6 07.3	97 23	158.0	5 38.3	97 23	158.1	5 09.3	97 23	158.2																25
6	5 53.5	96 24	157.1	5 24.6	96 24	157.2																			6
7	5 39.2	96 25	156.2	5 10.4	96 24	156.4																			7
8	5 24.4	96 25	155.4																						8
9	5 09.2	96 26	154.5																						9

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	21 26.9	76 57	71.5	21 49.8	76 57	71.2	22 12.6	76 57	70.8	22 58.1	76 56	70.1	24 28.5	75 56	68.7	25 58.1	74 55	67.2	26 20.4	74 55	66.8	27 04.7	74 55	66.1	91
2	20 52.7	77 57	70.8	21 15.7	76 57	70.5	21 38.6	76 56	70.1	22 24.2	76 56	69.4	23 55.0	75 56	68.0	25 24.9	75 55	66.5	25 47.3	74 55	66.2	26 31.8	74 55	65.4	2
3	20 18.7	77 56	70.1	20 41.7	77 56	69.7	21 04.7	76 56	69.4	21 50.5	76 56	68.7	23 21.6	76 55	67.3	24 51.9	75 55	65.9	25 14.3	75 55	65.5	25 59.1	74 54	64.7	3
4	19 44.8	77 56	69.4	20 07.9	77 56	69.0	20 31.0	77 56	68.7	21 16.9	76 56	68.0	22 48.4	76 55	66.6	24 19.0	75 54	65.2	24 41.6	75 54	64.8	25 26.5	75 54	64.1	4
95	19 11.1	77 56	68.6	19 34.3	77 56	68.3	19 57.4	77 56	68.0	20 43.5	77 55	67.3	22 15.3	76 55	65.9	23 46.4	76 54	64.5	24 09.0	75 54	64.1	24 54.1	75 54	63.4	95
6	18 37.6	78 56	67.9	19 00.8	77 56	67.6	19 24.0	77 55	67.2	20 10.3	77 55	66.6	21 42.4	76 54	65.2	23 13.9	76 54	63.8	23 36.6	76 54	63.4	24 21.9	75 53	62.7	6
7	18 04.2	78 55	67.2	18 27.5	78 55	66.9	18 50.8	78 55	66.5	19 37.3	77 55	65.9	21 09.7	77 54	64.5	22 41.6	76 54	63.1	23 04.4	76 53	62.8	23 49.9	76 53	62.1	7
8	17 31.0	78 55	66.5	17 54.4	78 55	66.1	18 17.8	78 55	65.8	19 04.4	78 54	65.2	20 37.3	77 54	63.8	22 09.5	77 53	62.4	22 32.4	76 53	62.1	23 18.1	76 53	61.4	8
9	16 58.0	78 55	65.8	17 21.5	78 55	65.4	17 44.9	78 54	65.1	18 31.7	78 54	64.4	20 05.0	77 54	63.1	21 37.5	77 53	61.7	22 00.6	77 53	61.4	22 46.5	76 52	60.7	9
100	16 25.2	79 54	65.0	16 48.7	79 54	64.7	17 12.3	78 54	64.4	17 59.3	78 54	63.7	19 32.8	78 53	62.4	21 05.8	77 52	61.1	21 29.0	77 52	60.7	22 15.2	77 52	60.0	100
1	15 52.5	79 54	64.3	16 16.2	79 54	64.0	16 39.8	79 54	63.7	17 27.0	79 53	63.0	19 01.0	78 53	61.7	20 34.3	78 52	60.4	20 57.6	77 52	60.0	21 44.0	77 52	59.4	1
2	15 20.1	79 54	63.6	15 43.8	79 54	63.3	16 07.6	79 53	62.9	16 54.9	79 53	62.3	18 29.3	78 52	61.0	20 03.1	78 52	59.7	20 26.4	78 52	59.3	21 13.0	78 51	58.7	2
3	14 47.9	80 53	62.9	15 11.7	79 53	62.5	15 35.5	79 53	62.2	16 23.0	79 53	61.6	17 57.8	79 52	60.3	19 32.0	78 51	59.0	19 55.5	78 51	58.7	20 42.3	78 51	58.0	3
4	14 15.8	80 53	62.1	14 39.8	80 53	61.8	15 03.7	80 53	61.5	15 51.4	79 52	60.9	17 26.5	79 52	59.6	19 01.2	79 51	58.3	19 24.7	79 51	58.0	20 11.8	78 50	57.3	4
105	13 44.0	80 53	61.4	14 08.0	80 52	61.1	14 32.0	80 52	60.8	15 20.0	80 52	60.2	16 55.5	79 51	58.9	18 30.6	79 51	57.6	18 54.2	79 50	57.3	19 41.5	79 50	56.6	105
6	13 12.4	80 52	60.7	13 36.5	80 52	60.4	14 00.6	80 52	60.1	14 48.8	80 52	59.4	16 24.7	80 51	58.2	18 00.2	79 50	56.9	18 24.0	79 50	56.6	19 11.5	79 50	56.0	6
7	12 41.1	81 52	59.9	13 05.3	81 52	59.6	13 29.5	81 52	59.3	14 17.8	80 51	58.7	15 54.1	80 51	57.5	17 30.0	80 50	56.2	17 54.0	80 50	55.9	18 41.7	79 49	55.3	7
8	12 09.9	81 52	59.2	12 34.2	81 51	58.9	12 58.5	81 51	58.6	13 47.0	81 51	58.0	15 23.8	80 50	56.8	17 00.2	80 49	55.5	17 24.2	80 49	55.2	18 12.1	80 49	54.6	8
9	11 39.0	81 51	58.5	12 03.4	81 51	58.2	12 27.8	81 51	57.9	13 16.5	81 50	57.3	14 53.7	81 50	56.1	16 30.5	80 49	54.8	16 54.6	80 49	54.5	17 42.8	80 48	53.9	9
110	11 08.4	82 51	57.7	11 32.9	82 50	57.4	11 57.4	82 50	57.2	12 46.3	81 50	56.6	14 23.9	81 49	55.4	16 01.1	81 49	54.1	16 25.4	81 48	53.8	17 13.8	81 48	53.2	110
1	10 38.0	82 50	57.0	11 02.6	82 50	56.7	11 27.2	82 50	56.4	12 16.3	82 50	55.8	13 54.3	82 49	54.6	15 32.0	81 48	53.4	15 56.3	81 48	53.1	16 45.0	81 48	52.5	1
2	10 07.8	82 50	56.3	10 32.5	82 50	56.0	10 57.2	82 50	55.7	11 46.5	82 49	55.1	13 25.0	82 48	53.9	15 03.1	82 48	52.7	15 27.6	82 47	52.4	16 16.4	81 47	51.8	2
3	9 37.9	83 49	55.5	10 02.7	83 49	55.2	10 27.5	83 49	55.0	11 17.0	83 49	54.4	12 55.9	82 48	53.2	14 34.5	82 47	52.0	14 59.1	82 47	51.8	15 48.2	82 47	51.2	3
4	9 08.3	83 49	54.8	9 33.2	83 49	54.5	9 58.1	83 49	54.2	10 47.8	83 48	53.7	12 27.1	83 48	52.5	14 06.2	82 47	51.3	14 30.9	82 47	51.1	15 20.2	82 46	50.5	4
115	8 38.9	83 48	54.0	9 03.9	83 48	53.8	9 28.9	83 48	53.5	10 18.9	83 48	52.9	11 58.6	83 47	51.8	13 38.1	83 46	50.6	14 02.9	83 46	50.3	14 52.5	83 46	49.8	115
6	8 09.8	84 48	53.3	8 34.9	84 48	53.0	9 00.0	84 48	52.7	9 50.2	84 47	52.2	11 30.4	83 47	51.1	13 10.3	83 46	49.9	13 35.3	83 46	49.6	14 25.1	83 45	49.1	6
7	7 41.0	84 48	52.5	8 06.2	84 47	52.3	8 31.4	84 47	52.0	9 21.8	84 47	51.4	11 02.5	84 46	50.3	12 42.8	84 45	49.2	13 07.9	83 45	48.9	13 57.9	83 45	48.4	7
8	7 12.5	84 47	51.8	7 37.8	84 47	51.5	8 03.1	84 47	51.3	8 53.7	84 46	50.7	10 34.8	84 46	49.6	12 15.6	84 45	48.5	12 40.8	84 45	48.2	13 31.1	84 44	47.7	8
9	6 44.3	85 47	51.0	7 09.7	85 46	50.8	7 35.1	85 46	50.5	8 25.9	85 46	50.0	10 07.4	85 45	48.9	11 48.7	84 44	47.8	12 14.0	84 44	47.5	13 04.5	84 44	47.0	9
120	6 16.3	85 46	50.3	6 41.9	85 46	50.0	7 07.4	85 46	49.8	7 58.4	85 45	49.2	9 40.4	85 45	48.2	11 22.1	85 44	47.1	11 47.5	85 44	46.8	12 38.3	85 43	46.3	120
1	5 48.7	86 46	49.5	6 14.4	85 45	49.3	6 40.0	85 45	49.0	7 31.2	85 45	48.5	9 13.6	85 44	47.4	10 55.9	85 43	46.4	11 21.4	85 43	46.1	12 12.4	85 43	45.6	1
2	5 21.4	86 45	48.8	5 47.1	86 45	48.5	6 12.9	86 45	48.3	7 04.4	86 44	47.7	8 47.2	86 44	46.7	10 29.9	85 43	45.6	10 55.5	85 43	45.4	11 46.7	85 42	44.9	2
3				5 20.3	86 44	47.8	5 46.1	86 44	47.5	6 37.8	86 44	47.0	8 21.1	86 43	46.0	10 04.2	86 42	44.9	10 30.0	86 42	44.7	11 21.4	86 42	44.1	3
4							5 19.7	87 44	46.7	6 11.6	86 43	46.2	7 55.3	86 42	45.2	9 38.9	86 42	44.2	10 04.7	86 42	43.9	10 56.4	86 41	43.4	4
125										5 45.7	87 43	45.5	7 29.8	87 42	44.5	9 13.9	87 41	43.5	9 39.9	87 41	43.2	10 31.8	87 41	42.7	125
6										5 20.1	87 42	44.7	7 04.7	87 41	43.7	8 49.2	87 41	42.7	9 15.3	87 40	42.5	10 07.5	87 40	42.0	6
7													6 39.9	88 41	43.0	8 24.9	87 40	42.0	8 51.1	87 40	41.8	9 43.5	87 39	41.3	7
8													6 15.5	88 40	42.2	8 00.9	88 39	41.3	8 27.2	88 39	41.0	9 19.8	88 39	40.6	8
9													5 51.4	88 40	41.5	7 37.2	88 39	40.5	8 03.7	88 39	40.3	8 56.5	88 38	39.8	9
130													5 27.6	89 39	40.7	7 13.9	89 38	39.8	7 40.5	89 38	39.6	8 33.6	88 38	39.1	130
1													5 04.2	89 38	40.0	6 51.0	89 38	39.1	7 17.7	89 37	38.8	8 11.0	89 37	38.4	1
2																6 28.4	89 37	38.3	6 55.2	89 37	38.1	7 48.7	89 36	37.6	2
3																6 06.2	90 36	37.6	6 33.1	90 36	37.4	7 26.9	90 36	36.9	3
4																5 44.4	90 36	36.8	6 11.4	90 36	36.6	7 05.4	90 35	36.2	4
135																5 22.9	90 35	36.1	5 50.0	90 35	35.9	6 44.3	90 35	35.4	135
6																5 01.9	91 35	35.3	5 29.1	91 34	35.1	6 23.5	91 34	34.7	6
7																			5 08.5	91 34	34.4	6 03.2	91 33	33.9	7
8																						5 43.2	91 33	33.2	8
9																						5 23.6	92 32	32.4	9
140																						5 04.5	92 31	31.7	140

Digitized by Google

Lat. 53°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	73 00.0	1.0 01	180.0	74 00.0	1.0 02	180.0	75 30.0	1.0 02	180.0	77 00.0	1.0 02	180.0
1	72 59.1	1.0 04	177.2	73 59.1	1.0 05	177.1	75 29.0	1.0 05	176.9	76 58.9	1.0 06	176.6
2	72 56.5	1.0 07	174.5	73 56.4	1.0 08	174.2	75 26.1	1.0 08	173.8	76 55.7	1.0 09	173.2
3	72 52.2	99 10	171.7	73 51.8	99 11	171.4	75 21.2	99 11	170.7	76 50.4	99 12	169.9
4	72 46.1	99 13	169.0	73 45.5	99 13	168.5	75 14.4	99 14	167.6	76 43.0	98 16	166.6
05	72 38.4	98 16	166.3	73 37.4	98 16	165.7	75 05.7	98 17	164.6	76 33.6	97 19	163.3
6	72 29.1	98 18	163.7	73 27.7	98 19	162.9	74 55.3	97 20	161.7	76 22.3	96 22	160.1
7	72 18.2	97 21	161.1	73 16.3	97 22	160.2	74 43.0	96 23	158.8	76 09.1	95 25	157.0
8	72 05.7	96 23	158.5	73 03.3	96 24	157.6	74 29.1	95 26	156.0	75 54.2	94 28	154.0
9	71 51.7	95 26	156.0	72 48.8	95 27	155.0	74 13.7	94 28	153.2	75 37.5	93 30	151.1
10	71 36.3	94 28	153.6	72 32.8	94 29	152.5	73 56.6	93 31	150.6	75 19.3	91 33	148.3
1	71 19.6	93 30	151.2	72 15.4	93 31	150.0	73 38.2	91 33	148.0	74 59.7	90 35	145.6
2	71 01.6	92 32	148.8	71 56.7	91 33	147.6	73 18.4	90 35	145.5	74 38.6	88 37	143.0
3	70 42.3	91 34	146.6	71 36.7	90 35	145.3	72 57.3	89 37	143.1	74 16.3	87 39	140.5
4	70 21.8	90 36	144.4	71 15.6	89 37	143.0	72 35.0	87 39	140.8	73 52.7	85 41	138.1
15	70 00.2	89 38	142.2	70 53.3	88 39	140.9	72 11.7	86 41	138.5	73 28.1	84 43	135.8
6	69 37.6	88 39	140.2	70 30.0	87 40	138.7	71 47.2	85 42	136.4	73 02.4	82 44	133.6
7	69 14.0	87 41	138.2	70 05.7	86 42	136.7	71 21.8	83 44	134.3	72 35.8	81 46	131.5
8	68 49.4	86 42	136.2	69 40.5	84 43	134.7	70 55.5	82 45	132.3	72 08.4	80 47	129.5
9	68 24.0	85 44	134.3	69 14.4	83 45	132.8	70 28.4	81 46	130.3	71 40.1	78 48	127.5
20	67 57.8	84 45	132.5	68 47.5	82 46	131.0	70 00.5	80 48	128.5	71 11.1	77 49	125.7
1	67 30.8	83 46	130.7	68 19.9	81 47	129.2	69 31.9	79 49	126.7	70 41.5	76 50	123.9
2	67 03.1	82 47	129.0	67 51.6	80 48	127.5	69 02.6	78 50	124.9	70 11.2	75 51	122.2
3	66 34.7	81 48	127.3	67 22.6	79 49	125.8	68 32.7	77 51	123.3	69 40.3	74 52	120.5
4	66 05.6	80 49	125.7	66 53.0	78 50	124.2	68 02.2	76 52	121.7	69 09.0	73 53	118.9
25	65 36.0	79 50	124.1	66 22.9	77 51	122.6	67 31.3	75 52	120.1	68 37.1	72 54	117.4
6	65 05.9	78 51	122.6	65 52.2	76 52	121.1	66 59.8	74 53	118.6	68 04.9	71 54	115.9
7	64 35.2	77 52	121.1	65 21.0	76 53	119.6	66 27.9	73 54	117.2	67 32.2	70 55	114.5
8	64 04.1	76 53	119.7	64 49.4	75 53	118.2	65 55.5	72 55	115.8	66 59.1	69 56	113.1
9	63 32.5	76 53	118.3	64 17.4	74 54	116.8	65 22.8	71 55	114.4	66 25.8	68 56	111.8
30	63 00.5	75 54	117.0	63 45.0	73 55	115.5	64 49.8	71 56	113.1	65 52.1	68 57	110.5
1	62 28.2	74 55	115.6	63 12.2	73 55	114.2	64 16.4	70 56	111.8	65 18.1	67 57	109.2
2	61 55.4	74 55	114.4	62 39.1	72 56	112.9	63 42.7	69 57	110.5	64 43.9	66 57	108.0
3	61 22.4	73 56	113.1	62 05.7	71 56	111.7	63 08.8	69 57	109.3	64 09.4	66 58	106.8
4	60 49.0	72 56	111.9	61 32.0	71 57	110.5	62 34.6	68 57	108.2	63 34.8	65 58	105.7
35	60 15.4	72 56	110.7	60 58.0	70 57	109.3	62 00.2	68 58	107.0	62 59.9	65 58	104.6
6	59 41.5	71 57	109.6	60 23.8	70 57	108.1	61 25.5	67 58	105.9	62 24.9	65 59	103.5
7	59 07.3	71 57	108.4	59 49.4	69 58	107.0	60 50.7	67 58	104.8	61 49.7	64 59	102.4
8	58 33.0	70 58	107.3	59 14.8	69 58	105.9	60 15.7	66 59	103.7	61 14.4	64 59	101.4
9	57 58.4	70 58	106.2	58 40.0	69 58	104.9	59 40.6	66 59	102.7	60 38.9	63 59	100.4
40	57 23.6	70 58	105.2	58 05.0	68 59	103.8	59 05.3	66 59	101.7	60 03.4	63 59	99.4
1	56 48.7	69 58	104.2	57 29.8	68 59	102.8	58 29.9	66 59	100.7	59 27.7	63 60	98.5
2	56 13.6	69 59	103.1	56 54.6	68 59	101.8	57 54.3	65 59	99.7	58 51.9	63 60	97.5
3	55 38.4	69 59	102.2	56 19.2	67 59	100.8	57 18.7	65 60	98.8	58 16.1	63 60	96.6
4	55 03.0	68 59	101.2	55 43.6	67 59	99.9	56 43.0	65 60	97.9	57 40.2	62 60	95.7
45	54 27.5	68 59	100.2	55 08.0	67 60	98.9	56 07.2	65 60	96.9	57 04.2	62 60	94.8
6	53 52.0	68 59	99.3	54 32.3	67 60	98.0	55 31.3	64 60	96.0	56 28.2	62 60	94.0
7	53 16.3	68 60	98.4	53 56.5	66 60	97.1	54 55.3	64 60	95.2	55 52.2	62 60	93.1
8	52 40.5	68 60	97.4	53 20.6	66 60	96.2	54 19.4	64 60	94.3	55 16.1	62 60	92.3
9	52 04.7	67 60	96.6	52 44.7	66 60	95.3	53 43.3	64 60	93.4	54 40.0	62 60	91.4
50	51 28.8	67 60	95.7	52 08.7	66 60	94.5	53 07.3	64 60	92.6	54 03.9	62 60	90.6
1	50 52.8	67 60	94.8	51 32.7	66 60	93.6	52 31.2	64 60	91.8	53 27.8	62 60	89.8
2	50 16.8	67 60	94.0	50 56.7	66 60	92.8	51 55.1	64 60	90.9	52 51.7	62 60	89.0
3	49 40.8	67 60	93.1	50 20.6	66 60	91.9	51 19.0	64 60	90.1	52 15.6	62 60	88.3
4	49 04.7	67 60	92.3	49 44.5	66 60	91.1	50 42.9	64 60	89.3	51 39.5	62 60	87.5
55	48 28.6	67 60	91.5	49 08.4	66 60	90.3	50 06.8	64 60	88.6	51 03.5	62 60	86.7
6	47 52.5	67 60	90.6	48 32.3	66 60	89.5	49 30.7	64 60	87.8	50 27.4	62 60	86.0
7	47 16.4	67 60	89.8	47 56.2	66 60	88.7	48 54.6	64 60	87.0	49 51.4	62 60	85.2
8	46 40.3	67 60	89.1	47 20.1	66 60	88.0	48 18.6	64 60	86.3	49 15.5	62 60	84.5
9	46 04.2	67 60	88.3	46 44.0	66 60	87.2	47 42.5	64 60	85.5	48 39.6	62 60	83.8
60	45 28.1	67 60	87.5	46 08.0	66 60	86.4	47 06.6	64 60	84.8	48 03.7	63 60	83.0
1	44 52.0	67 60	86.7	45 31.9	66 60	85.7	46 30.6	64 60	84.0	47 27.9	63 60	82.3
2	44 16.0	67 60	86.0	44 56.0	66 60	84.9	45 54.7	65 60	83.3	46 52.1	63 60	81.6
3	43 40.0	67 60	85.2	44 20.0	66 60	84.2	45 18.9	65 60	82.6	46 16.4	63 59	80.9
4	43 04.1	67 60	84.5	43 44.1	66 60	83.4	44 43.1	65 60	81.9	45 40.8	63 59	80.2
65	42 28.1	67 60	83.7	43 08.3	66 60	82.7	44 07.4	65 59	81.1	45 05.3	63 59	79.5
6	41 52.3	67 60	83.0	42 32.5	67 60	82.0	43 31.8	65 59	80.4	44 29.8	64 59	78.8
7	41 16.5	68 60	82.3	41 56.8	67 59	81.3	42 56.2	65 59	79.7	43 54.4	64 59	78.2
8	40 40.7	68 59	81.5	41 21.1	67 59	80.5	42 20.7	66 59	79.0	43 19.1	64 59	77.5
9	40 05.0	68 59	80.8	40 45.5	67 59	79.8	41 45.3	66 59	78.3	42 43.9	64 58	76.8
70	39 29.4	68 59	80.1	40 10.0	67 59	79.1	41 10.0	66 59	77.7	42 08.8	65 58	76.1
1	38 53.9	68 59	79.4	39 34.6	67 59	78.4	40 34.8	66 59	77.0	41 33.8	65 58	75.5
2	38 18.4	68 59	78.7	38 59.3	68 59	77.7	39 59.6	66 58	76.3	40 58.9	65 58	74.8
3	37 43.1	69 59	78.0	38 24.0	68 59	77.0	39 24.6	67 58	75.6	40 24.1	65 58	74.2
4	37 07.8	69 59	77.3	37 48.9	68 58	76.4	38 49.7	67 58	74.9	39 49.4	66 58	73.5
75	36 32.6	69 58	76.6	37 13.8	68 58	75.7	38 14.9	67 58	74.3	39 14.9	66 57	72.8
6	35 57.6	69 58	75.9	36 38.9	69 58	75.0	37 40.2	68 58	73.6	38 40.4	66 57	72.2
7	35 22.6	69 58	75.2	36 04.1	69 58	74.3	37 05.6	68 57	72.9	38 06.1	67 57	71.5
8	34 47.8	70 58	74.5	35 29.4	69 58	73.6	36 31.1	68 57	72.3	37 31.9	67 57	70.9
9	34 13.0	70 58	73.8	34 54.8	69 57	72.9	35 56.8	68 57	71.6	36 57.9	67 57	70.2
80	33 38.4	70 58	73.1	34 20.4	70 57	72.3	35 22.6	69 57	71.0	36 24.0	68 56	69.6
1	33 03.9	70 57	72.5	33 46.0	70 57	71.6	34 48.5	69 57	70.3	35 50.2	68 56	69.0
2	32 29.5	71 57	71.8	33 11.8	70 57	70.9	34 14.6	69 56	69.6	35 16.6	68 56	68.3
3	31 55.3	71 57	71.1	32 37.8	70 57	70.3	33 40.8	70 56	69.0	34 43.1	69 56	67.7
4	31 21.2	71 57	70.4	32 03.9	71 56	69.6	33 07.2	70 56	68.3	34 09.8	69 55	67.0
85	30 47.3	72 56	69.7	31 30.1	71 56	68.9	32 33.7	70 56	67.7	33 36.6	69 55	66.4
6	30 13.5	72 56	69.1	30 56.5	71 56	68.3	32 00.4	71 55	67.0	33 03.6	70 55	65.8
7	29 39.8	72 56	68.4	30 23.0	72 56	67.6	31 27.2	71 55	66.4	32 30.7	70 54	65.1
8	29 06.3	73 56	67.7	29 49.7	72 55	66.9	30 54.2	71 55	65.7	31 58.1	71 54	64.5
9	28 33.0	73 55	67.1	29 16.6	72 55	66.3	30 21.4	72 54	65.1	31 25.6	71 54	63.8
90	27 59.8	73 55	66.4	28 43.6	73 55	65.6	29 48.7	72 54	64.4	30 53.2	71 54	63.2

H.A.	42° 00′			42° 30′			43° 00′			45° 00′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	79 00.0	1.0 02	180.0	79 30.0	1.0 02	180.0	80 00.0	1.0 02	180.0	82 00.0	1.0 03	180.0
1	78 58.8	1.0 06	176.1	79 28.7	1.0 06	176.0	79 58.7	1.0 07	175.8	81 58.4	1.0 08	174.9
2	78 55.1	99 10	172.2	79 24.9	99 10	171.9	79 54.7	99 11	171.6	81 53.6	99 13	169.9
3	78 49.0	99 14	168.4	79 18.6	99 14	168.0	79 48.2	98 15	167.5	81 45.8	98 18	165.0
4	78 40.6	98 18	164.7	79 09.9	97 18	164.1	79 39.1	97 19	163.5	81 35.0	96 23	160.3
05	78 30.0	96 21	161.0	78 58.9	96 22	160.4	79 27.7	96 23	159.6	81 21.5	94 27	155.8
6	78 17.2	95 25	157.5	78 45.7	95 25	156.7	79 14.0	94 26	155.8	81 05.5	91 31	151.5
7	78 02.4	94 28	154.1	78 30.4	93 29	153.2	78 58.2	92 30	152.2	80 47.1	89 34	147.4
8	77 45.7	92 31	150.8	78 13.2	91 32	149.8	78 40.4	90 33	148.8	80 26.7	86 37	143.6
9	77 27.2	90 34	147.6	77 54.2	89 34	146.6	78 20.8	88 35	145.5	80 04.4	84 40	140.1
10	77 07.1	88 36	144.6	77 33.5	87 37	143.5	77 59.6	86 38	142.4	79 40.4	81 42	136.8
1	76 45.5	87 38	141.8	77 11.3	86 39	140.6	77 36.8	84 40	139.4	79 15.0	79 45	133.7
2	76 22.4	85 40	139.0	76 47.7	84 41	137.9	77 12.6	82 42	136.6	78 48.2	76 46	130.8
3	75 58.1	83 42	136.4	76 22.9	82 43	135.2	76 47.2	81 44	134.0	78 20.4	74 48	128.1
4	75 32.7	81 44	133.9	75 56.9	80 45	132.7	76 20.7	79 46	131.5	77 51.4	72 50	125.6
15	75 06.2	80 46	131.6	75 29.8	78 47	130.4	75 53.1	77 47	129.1	77 21.7	70 51	123.2
6	74 38.7	78 47	129.3	75 01.9	77 48	128.1	75 24.7	75 49	126.8	76 51.1	68 52	121.0
7	74 10.3	76 49	127.2	74 33.0	75 49	126.0	74 55.4	74 50	124.7	76 19.8	67 53	119.0
8	73 41.2	75 50	125.2	74 03.5	74 50	124.0	74 25.3	72 51	122.7	75 47.9	65 54	117.0
9	73 11.3	74 51	123.2	73 33.2	72 52	122.0	73 54.6	71 52	120.8	75 15.5	64 55	115.2
20	72 40.8	72 52	121.4	73 02.3	71 52	120.2	73 23.3	69 53	119.0	74 42.6	63 56	113.5
1	72 09.7	71 53	119.6	72 30.8	70 53	118.4	72 51.4	68 54	117.2	74 09.3	61 56	111.9
2	71 38.0	70 54	117.9	71 58.8	68 54	116.8	72 19.1	67 55	115.6	73 35.6	60 57	110.3
3	71 05.9	69 54	116.3	71 26.3	67 55	115.2	71 46.3	66 55	114.0	73 01.6	59 57	108.8
4	70 33.3	68 55	114.8	70 53.4	66 55	113.7	71 13.1	65 56	112.5	72 27.3	58 58	107.4
25	70 00.3	67 56	113.3	70 20.2	65 56	112.2	70 39.6	64 56	111.0	71 52.7	58 58	106.1
6	69 27.0	66 56	111.9	69 46.6	65 56	110.8	70 05.7	63 57	109.7	71 17.9	57 58	104.8
7	68 53.3	65 57	110.5	69 12.7	64 57	109.4	69 31.6	62 57	108.3	70 42.9	56 59	103.6
8	68 19.4	64 57	109.2	68 38.5	63 57	108.1	68 57.2	62 58	107.0	70 07.7	56 59	102.4
9	67 45.1	64 57	107.9	68 04.0	62 58	106.9	68 22.6	61 58	105.8	69 32.4	55 59	101.3
30	67 10.6	63 58	106.7	67 29.4	62 58	105.7	67 47.7	60 58	104.6	68 56.9	55 59	100.2
1	66 35.9	63 58	105.5	66 54.5	61 58	104.5	67 12.7	60 59	103.5	68 21.3	54 60	99.1
2	66 01.0	62 58	104.3	66 19.5	61 59	103.4	66 37.5	59 59	102.4	67 45.6	54 60	98.1
3	65 26.0	62 59	103.2	65 44.2	60 59	102.3	66 02.2	59 59	101.3	67 09.8	54 60	97.1
4	64 50.7	61 59	102.1	65 08.9	60 59	101.2	65 26.7	59 59	100.2	66 33.9	53 60	96.2
35	64 15.4	61 59	101.1	64 33.4	60 59	100.2	64 51.1	58 59	99.2	65 58.0	53 60	95.2
6	63 39.9	60 59	100.1	63 57.8	59 60	99.1	64 15.4	58 60	98.2	65 22.0	53 60	94.3
7	63 04.3	60 60	99.1	63 22.1	59 60	98.2	63 39.6	58 60	97.3	64 46.0	53 60	93.4
8	62 28.6	60 60	98.1	62 46.3	59 60	97.2	63 03.8	58 60	96.3	64 09.9	53 60	92.6
9	61 52.8	60 60	97.1	62 10.5	58 60	96.3	62 27.8	57 60	95.4	63 33.8	53 60	91.7
40	61 16.9	59 60	96.2	61 34.5	58 60	95.4	61 51.9	57 60	94.5	62 57.7	53 60	90.9
1	60 41.0	59 60	95.3	60 58.6	58 60	94.5	61 15.8	57 60	93.6	62 21.6	53 60	90.1
2	60 05.0	59 60	94.4	60 22.6	58 60	93.6	60 39.8	57 60	92.8	61 45.5	53 60	89.3
3	59 29.0	59 60	93.5	59 46.5	58 60	92.7	60 03.7	57 60	91.9	61 09.4	53 60	88.5
4	58 52.9	59 60	92.7	59 10.4	58 60	91.9	59 27.6	57 60	91.1	60 33.3	53 60	87.7
45	58 16.8	59 60	91.9	58 34.3	58 60	91.1	58 51.5	57 60	90.3	59 57.3	53 60	87.0
6	57 40.8	59 60	91.0	57 58.2	58 60	90.3	58 15.4	57 60	89.5	59 21.2	53 60	86.3
7	57 04.6	59 60	90.2	57 22.1	58 60	89.5	57 39.3	57 60	88.7	58 45.2	53 60	85.5
8	56 28.5	59 60	89.4	56 46.0	58 60	88.7	57 03.2	57 60	87.9	58 09.2	53 60	84.8
9	55 52.4	59 60	88.6	56 09.9	58 60	87.9	56 27.1	57 60	87.2	57 33.3	53 60	84.1
50	55 16.3	59 60	87.9	55 33.8	58 60	87.2	55 51.1	57 60	86.4	56 57.4	53 60	83.4
1	54 40.3	59 60	87.1	54 57.8	58 60	86.4	55 15.1	57 60	85.7	56 21.5	54 60	82.7
2	54 04.2	59 60	86.4	54 21.8	58 60	85.7	54 39.1	57 60	85.0	55 45.8	54 60	82.0
3	53 28.2	59 60	85.6	53 45.8	58 60	84.9	54 03.1	57 60	84.2	55 10.0	54 59	81.4
4	52 52.2	59 60	84.9	53 09.8	58 60	84.2	53 27.2	58 60	83.5	54 34.4	54 59	80.7
55	52 16.3	59 60	84.2	52 33.9	59 60	83.5	52 51.4	58 60	82.8	53 58.8	55 59	80.0
6	51 40.4	59 60	83.4	51 58.1	59 60	82.8	52 15.6	58 60	82.1	53 23.2	55 59	79.4
7	51 04.5	60 60	82.7	51 22.3	59 60	82.1	51 39.8	58 59	81.4	52 47.8	55 59	78.7
8	50 28.7	60 60	82.0	50 46.6	59 59	81.4	51 04.2	58 59	80.8	52 12.4	55 59	78.1
9	49 53.0	60 59	81.3	50 10.9	59 59	80.7	50 28.6	59 59	80.1	51 37.1	56 59	77.5
60	49 17.3	60 59	80.7	49 35.3	59 59	80.0	49 53.0	59 59	79.4	51 01.9	56 59	76.8
1	48 41.7	60 59	80.0	48 59.8	60 59	79.4	49 17.6	59 59	78.7	50 26.8	56 58	76.2
2	48 06.2	61 59	79.3	48 24.3	60 59	78.7	48 42.2	59 59	78.1	49 51.8	57 58	75.6
3	47 30.8	61 59	78.6	47 48.9	60 59	78.0	48 06.9	60 59	77.4	49 16.8	57 58	75.0
4	46 55.4	61 59	78.0	47 13.7	60 59	77.4	47 31.7	60 58	76.8	48 42.0	57 58	74.4
65	46 20.2	61 59	77.3	46 38.5	61 58	76.7	46 56.6	60 58	76.1	48 07.3	58 58	73.7
6	45 45.0	62 58	76.6	46 03.4	61 58	76.1	46 21.6	60 58	75.5	47 32.7	58 58	73.1
7	45 09.9	62 58	76.0	45 28.4	61 58	75.4	45 46.7	61 58	74.9	46 58.2	58 57	72.5
8	44 34.9	62 58	75.3	44 53.5	62 58	74.8	45 11.9	61 58	74.2	46 23.8	59 57	71.9
9	44 00.0	62 58	74.7	44 18.7	62 58	74.1	44 37.2	61 58	73.6	45 49.5	59 57	71.3
70	43 25.3	63 58	74.0	43 44.0	62 58	73.5	44 02.6	62 57	73.0	45 15.4	60 57	70.7
1	42 50.6	63 58	73.4	43 09.5	63 57	72.9	43 28.1	62 57	72.3	44 41.4	60 56	70.1
2	42 16.1	63 57	72.8	42 35.0	63 57	72.2	42 53.8	62 57	71.7	44 07.5	60 56	69.5
3	41 41.6	64 57	72.1	42 00.7	63 57	71.6	42 19.6	63 57	71.1	43 33.7	61 56	68.9
4	41 07.3	64 57	71.5	41 26.5	64 57	71.0	41 45.5	63 57	70.5	43 00.1	61 56	68.3
75	40 33.2	64 57	70.9	40 52.4	64 57	70.4	41 11.5	64 56	69.8	42 26.6	62 56	67.8
6	39 59.1	65 57	70.2	40 18.5	64 56	69.7	40 37.7	64 56	69.2	41 53.2	62 55	67.2
7	39 25.2	65 56	69.6	39 44.7	65 56	69.1	40 04.0	64 56	68.6	41 20.0	62 55	66.6
8	38 51.4	65 56	69.0	39 11.0	65 56	68.5	39 30.4	65 56	68.0	40 47.0	63 55	66.0
9	38 17.8	66 56	68.4	38 37.5	65 56	67.9	38 57.0	65 55	67.4	40 14.1	63 55	65.4
80	37 44.3	66 56	67.7	38 04.1	66 55	67.3	38 23.8	65 55	66.8	39 41.3	64 54	64.8
1	37 10.9	67 55	67.1	37 30.9	66 55	66.6	37 50.7	66 55	66.2	39 08.7	64 54	64.2
2	36 37.8	67 55	66.5	36 57.8	67 55	66.0	37 17.7	66 55	65.6	38 36.3	65 54	63.6
3	36 04.7	67 55	65.9	36 24.9	67 55	65.4	36 44.9	67 54	65.0	38 04.0	65 54	63.1
4	35 31.8	68 55	65.3	35 52.1	67 54	64.8	36 12.3	67 54	64.3	37 31.9	66 53	62.5
85	34 59.1	68 54	64.6	35 19.5	68 54	64.2	35 39.8	67 54	63.7	37 00.0	66 53	61.9
6	34 26.6	69 54	64.0	34 47.1	68 54	63.6	35 07.5	68 54	63.1	36 28.2	67 53	61.3
7	33 54.2	69 54	63.4	34 14.9	69 53	63.0	34 35.4	68 53	62.5	35 56.6	67 52	60.7
8	33 22.0	69 53	62.8	33 42.8	69 53	62.3	34 03.5	69 53	61.9	35 25.2	67 52	60.1
9	32 50.0	70 53	62.2	33 10.9	70 53	61.7	33 31.7	69 53	61.3	34 54.0	68 52	59.5
90	32 18.2	70 53	61.5	32 39.2	70 53	61.1	33 00.1	70 52	60.7	34 23.0	68 51	59.0

Digitized by Google

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	27 26.8	74 55	65.7	28 10.8	73 54	64.9	29 16.3	72 54	63.8	30 21.1	72 53	62.6	31 46.5	71 52	60.9	32 07.7	70 52	60.5	32 28.7	70 52	60.1	33 52.1	69 51	58.4	91
2	26 54.0	74 54	65.0	27 38.2	73 54	64.3	28 44.0	73 54	63.1	29 49.1	72 53	61.9	31 15.0	71 52	60.3	31 36.3	71 52	59.9	31 57.5	71 52	59.5	33 21.5	69 51	57.8	2
3	26 21.4	74 54	64.4	27 05.7	74 54	63.6	28 11.9	73 53	62.5	29 17.4	72 53	61.3	30 43.8	71 52	59.7	31 05.2	71 52	59.3	31 26.5	71 51	58.9	32 51.0	70 50	57.2	3
4	25 48.9	75 54	63.7	26 33.5	74 53	63.0	27 39.9	74 53	61.8	28 45.8	73 52	60.7	30 12.7	72 51	59.1	30 34.2	72 51	58.7	30 55.7	71 51	58.3	32 20.8	70 50	56.6	4
95	25 16.6	75 54	63.0	26 01.4	74 53	62.3	27 08.2	74 53	61.2	28 14.4	73 52	60.0	29 41.8	72 51	58.5	30 03.5	72 51	58.1	30 25.1	72 51	57.7	31 50.7	71 50	56.0	95
6	24 44.5	75 53	62.4	25 29.5	75 53	61.6	26 36.7	74 52	60.5	27 43.2	74 52	59.4	29 11.1	73 51	57.8	29 33.0	73 51	57.4	29 54.7	72 50	57.0	31 20.9	71 49	55.4	6
7	24 12.6	76 53	61.7	24 57.9	75 52	61.0	26 05.3	75 52	59.9	27 12.3	74 51	58.7	28 40.7	73 50	57.2	29 02.6	73 50	56.8	29 24.5	73 50	56.4	30 51.3	72 49	54.8	7
8	23 40.9	76 52	61.0	24 26.4	76 52	60.3	25 34.2	75 52	59.2	26 41.5	75 51	58.1	28 10.4	74 50	56.6	28 32.5	73 50	56.2	28 54.5	73 50	55.8	30 21.9	72 49	54.2	8
9	23 09.5	76 52	60.4	23 55.1	76 52	59.6	25 03.3	75 51	58.6	26 11.0	75 51	57.5	27 40.4	74 50	56.0	28 02.6	74 49	55.6	28 24.7	74 49	55.2	29 52.7	73 48	53.7	9
100	22 38.2	77 52	59.7	23 24.1	76 51	59.0	24 32.6	76 51	57.9	25 40.6	75 50	56.8	27 10.6	75 49	55.4	27 32.9	74 49	55.0	27 55.2	74 49	54.6	29 23.7	73 48	53.1	100
1	22 07.1	77 51	59.0	22 53.2	77 51	58.3	24 02.1	76 50	57.3	25 10.5	76 50	56.2	26 41.0	75 49	54.7	27 03.5	75 49	54.4	27 25.9	75 48	54.0	28 54.9	74 48	52.5	1
2	21 36.3	77 51	58.3	22 22.6	77 51	57.6	23 31.8	77 50	56.6	24 40.6	76 49	55.5	26 11.6	75 49	54.1	26 34.2	75 48	53.7	26 56.8	75 48	53.4	28 26.4	74 47	51.9	2
3	21 05.7	78 51	57.7	21 52.2	78 50	57.0	23 01.8	77 50	56.0	24 11.0	77 49	54.9	25 42.5	76 48	53.5	26 05.2	76 48	53.1	26 27.9	76 48	52.8	27 58.1	75 47	51.3	3
4	20 35.3	78 50	57.0	21 22.1	78 50	56.3	22 32.0	77 49	55.3	23 41.5	77 49	54.3	25 13.6	76 48	52.9	25 36.5	76 48	52.5	25 59.3	76 47	52.1	27 30.1	75 46	50.7	4
105	20 05.1	79 50	56.3	20 52.1	78 50	55.6	22 02.4	78 49	54.6	23 12.3	77 48	53.6	24 44.9	77 47	52.2	25 07.9	77 47	51.9	25 30.9	76 47	51.5	27 02.3	76 46	50.1	105
6	19 35.2	79 49	55.6	20 22.5	79 49	55.0	21 33.1	78 48	54.0	22 43.4	78 48	53.0	24 16.5	77 47	51.6	24 39.7	77 47	51.2	25 02.8	77 46	50.9	26 34.7	76 46	49.6	6
7	19 05.5	79 49	55.0	19 53.0	79 49	54.3	21 04.0	79 48	53.3	22 14.7	78 47	52.3	23 48.3	78 47	51.0	24 11.6	78 46	50.6	24 34.9	77 46	50.3	26 07.4	77 45	48.9	7
8	18 36.0	80 49	54.3	19 23.8	79 48	53.6	20 35.2	79 48	52.7	21 46.2	79 47	51.7	23 20.4	78 46	50.3	23 43.8	78 46	50.0	24 07.2	78 46	49.6	25 40.3	77 45	48.3	8
9	18 06.9	80 48	53.6	18 54.9	80 48	53.0	20 06.6	80 47	52.0	21 18.0	79 47	51.0	22 52.7	79 46	49.7	23 16.3	79 45	49.4	23 39.8	78 45	49.0	25 13.5	78 44	47.7	9
110	17 37.9	80 48	52.9	18 26.2	80 47	52.3	19 38.3	80 47	51.3	20 50.1	80 46	50.4	22 25.3	79 45	49.1	22 49.0	79 45	48.7	23 12.7	79 45	48.4	24 46.9	78 44	47.0	110
1	17 09.3	81 47	52.2	17 57.7	81 47	51.6	19 10.2	80 46	50.7	20 22.4	80 46	49.7	21 58.2	80 45	48.4	22 22.0	79 45	48.1	22 45.8	79 44	47.8	24 20.7	79 43	46.4	1
2	16 40.8	81 47	51.5	17 29.6	81 46	50.9	18 42.4	81 46	50.0	19 55.0	80 45	49.1	21 31.3	80 44	47.8	21 55.3	80 44	47.5	22 19.2	80 44	47.1	23 54.6	79 43	45.8	2
3	16 12.7	82 46	50.9	17 01.7	82 46	50.2	18 14.9	81 45	49.3	19 27.9	81 45	48.4	21 04.7	80 44	47.1	21 28.8	80 44	46.8	21 52.9	80 43	46.5	23 28.9	80 42	45.2	3
4	15 44.8	82 46	50.2	16 34.0	82 46	49.6	17 47.6	82 45	48.7	19 01.0	81 44	47.8	20 38.4	81 43	46.5	21 02.6	81 43	46.2	21 26.8	81 43	45.9	23 03.4	80 42	44.6	4
115	15 17.2	82 46	49.5	16 06.7	82 45	48.9	17 20.7	82 44	48.0	18 34.4	82 44	47.1	20 12.3	81 43	45.9	20 36.7	81 43	45.6	21 01.1	81 42	45.2	22 38.2	81 42	44.0	115
6	14 49.9	83 45	48.8	15 39.6	83 45	48.2	16 54.0	82 44	47.3	18 08.1	82 43	46.4	19 46.5	82 42	45.2	20 11.1	82 42	44.9	20 35.6	82 42	44.6	22 13.2	81 41	43.4	6
7	14 22.9	83 45	48.1	15 12.9	83 44	47.5	16 27.6	83 44	46.6	17 42.1	83 43	45.8	19 21.0	82 42	44.6	19 45.7	82 42	44.3	20 10.4	82 42	44.0	21 48.6	82 41	42.7	7
8	13 56.2	84 44	47.4	14 46.4	84 44	46.8	16 01.5	83 43	46.0	17 16.4	83 42	45.1	18 55.9	83 42	43.9	19 20.7	83 41	43.6	19 45.4	83 41	43.3	21 24.2	82 40	42.1	8
9	13 29.8	84 44	46.7	14 20.2	84 43	46.1	15 35.7	84 42	45.3	16 50.9	84 42	44.4	18 31.0	83 41	43.3	18 55.9	83 41	43.0	19 20.8	83 41	42.7	21 00.2	83 40	41.5	9
120	13 03.7	84 43	46.0	13 54.3	84 43	45.4	15 10.1	84 42	44.6	16 25.8	84 41	43.8	18 06.4	84 40	42.6	18 31.4	84 40	42.3	18 56.5	83 40	42.0	20 36.4	83 39	40.9	120
1	12 37.8	85 42	45.3	13 28.7	85 42	44.7	14 44.9	85 42	43.9	16 01.0	84 41	43.1	17 42.1	84 40	42.0	18 07.3	84 40	41.7	18 32.4	84 40	41.4	20 12.9	84 39	40.2	1
2	12 12.3	85 42	44.6	13 03.5	85 42	44.0	14 20.1	85 41	43.2	15 36.5	85 40	42.4	17 18.1	85 39	41.3	17 43.4	84 39	41.0	18 08.7	84 39	40.7	19 49.7	84 38	39.6	2
3	11 47.1	86 41	43.9	12 38.5	86 41	43.3	13 55.5	85 40	42.5	15 12.3	85 40	41.7	16 54.4	85 39	40.6	17 19.9	85 39	40.4	17 45.3	85 38	40.1	19 26.9	84 38	39.0	3
4	11 22.3	86 41	43.2	12 13.9	86 40	42.6	13 31.2	86 40	41.9	14 48.4	86 39	41.1	16 31.0	85 38	40.0	16 56.6	85 38	39.7	17 22.2	85 38	39.4	19 04.3	85 37	38.3	4
125	10 57.7	86 40	42.5	11 49.6	86 40	41.9	13 07.3	86 39	41.2	14 24.8	86 39	40.4	16 08.0	86 38	39.3	16 33.7	86 38	39.1	16 59.4	86 37	38.8	18 42.1	85 37	37.7	125
6	10 33.5	87 40	41.7	11 25.6	87 39	41.2	12 43.7	87 39	40.5	14 01.6	86 38	39.7	15 45.3	86 37	38.7	16 11.1	86 37	38.4	16 37.0	86 37	38.1	18 20.2	86 36	37.1	6
7	10 09.7	87 39	41.0	11 02.0	87 39	40.5	12 20.4	87 38	39.8	13 38.7	87 38	39.0	15 22.9	87 37	38.0	15 48.9	87 37	37.7	16 14.8	87 36	37.5	17 58.6	86 35	36.4	7
8	9 46.1	88 39	40.3	10 38.7	88 38	39.8	11 57.5	87 38	39.1	13 16.1	87 37	38.3	15 00.8	87 36	37.3	15 26.9	87 36	37.1	15 53.0	87 36	36.8	17 37.3	87 35	35.8	8
9	9 22.9	88 38	39.6	10 15.8	88 38	39.1	11 34.9	88 37	38.4	12 53.9	88 36	37.6	14 39.1	88 36	36.7	15 05.3	87 35	36.4	15 31.6	87 35	36.1	17 16.3	87 34	35.1	9
130	9 00.1	88 37	38.9	9 53.2	88 37	38.4	11 12.6	88 36	37.7	12 32.0	88 36	37.0	14 17.7	88 35	36.0	14 44.1	88 35	35.7	15 10.4	88 35	35.5	16 55.7	88 34	34.5	130
1	8 37.6	89 37	38.1	9 30.9	89 36	37.7	10 50.8	89 36	37.0	12 10.5	89 35	36.3	13 56.7	88 34	35.3	14 23.2	88 34	35.1	14 49.7	88 34	34.8	16 35.5	88 33	33.8	1
2	8 15.5	89 36	37.4	9 09.0	89 36	37.0	10 29.2	89 35	36.3	11 49.3	89 35	35.6	13 36.0	89 34	34.6	14 02.6	89 34	34.4	14 29.2	89 33	34.1	16 15.5	88 33	33.2	2
3	7 53.8	90 36	36.7	8 47.5	90 35	36.2	10 08.0	89 35	35.6	11 28.5	89 34	34.9	13 15.6	89 33	33.9	13 42.4	89 33	33.7	14 09.1	89 33	33.5	15 55.9	89 32	32.5	3
4	7 32.4	90 35	35.9	8 26.3	90 35	35.5	9 47.2	90 34	34.8	11 08.0	90 33	34.2	12 55.6	90 33	33.3	13 22.5	90 32	33.0	13 49.4	90 32	32.8	15 36.7	89 32	31.9	4
135	7 11.4	90 34	35.2	8 05.6	90 34	34.8	9 26.8	90 33	34.1	10 47.9	90 33	33.5	12 36.0	90 32	32.6	13 03.0	90 32	32.4	13 30.0	90 32	32.1	15 17.8	90 31	31.2	135
6	6 50.7	91 34	34.5	7 45.1	91 33	34.0	9 06.7	91 33	33.4	10 28.2	91 32	32.8	12 16.8	90 31	31.9	12 43.9	90 31	31.7	13 11.0	90 31	31.5	14 59.2	90 30	30.6	6
7	6 30.5	91 33	33.7	7 25.1	91 33	33.3	8 47.0	91 32	32.7	10 08.9	91 32	32.1	11 57.9	91 31	31.2	12 25.1	91 31	31.0	12 52.3	91 30	30.8	14 41.1	91 30	29.9	7
8	6 10.6	91 32	33.0	7 05.5	91 32	32.6	8 27.7	91 32	32.0	9 49.9	91 31	31.3	11 39.3	91 30	30.5	12 06.7	91 30	30.3	12 34.0	91 30	30.1	14 23.2	91 29	29.2	8
9	5 51.2	92 32	32.2	6 46.2	92 31	31.8	8 08.8	92 31	31.2	9 31.3	92 30	30.6	11 21.2	92 30	29.8	11 48.7	92 29	29.6	12 16.1	91 29	29.4	14 05.8	91 28	28.6	9
140	5 32.1	92 31	31.5	6 27.4	92 31	31.1	7 50.3	92 30	30.5	9 13.1	92 30	29.9	11 03.4	92 29	29.1	11 31.0	92 29	28.9	11 58.6	92 29	28.7	13 48.7	92 28	27.9	140
1	5 13.4	92 30	30.7	6 08.9	92 30	30.4	7 32.1	92 30	29.8	8 55.3	92 29	29.2	10 46.0	92 28	28.4	11 13.7	92 28	28.2	11 41.4	92 28	28.0	13 32.0	92 27	27.2	1
2				5 50.9	93 29	29.6	7 14.4	93 29	29.1	8 37.8	93 28	28.5	10 29.1	93 28	27.7	10 56.8	93 28	27.5	11 24.6	93 27	27.3	13 15.6	92 27	26.6	2
3				5 33.2	93 29	28.9	6 57.0	93 28	28.3	8 20.8	93 28	27.8	10 12.4	93 27	27.0	10 40.3	93 27	26.8	11 08.2	93 27	26.7	12 59.7	93 26	25.9	3
4				5 16.0	93 28	28.1	6 40.1	93 28	27.6	8 04.2	93 27	27.1	9 56.2	93 26	26.3	10 24.2	93 26	26.1	10 52.2	93 26	26.0	12 44.1	93 25	25.2	4
145							6 23.6	94 27	26.9	7 48.0	94 26	26.3	9 40.4	94 26	25.6	10 08.5	94 26	25.4	10 36.6	94 25	25.3	12 28.9	94 25	24.5	145
6							6 07.5	94 26	26.1	7 32.2	94 26	25.6	9 25.0	94 25	24.9	9 53.2	94 25	24.7	10 21.4	94 25	24.6	12 14.1	94 24	23.9	6
7							5 51.8	94 25	25.4	7 16.8	94 25	24.9	9 10.0	94 24	24.2	9 38.3	94 24	24.0	10 06.6	94 24	23.9	11 59.7	94 23	23.2	7
8							5 36.6	95 25	24.6	7 01.8	95 24	24.1	8 55.4	95 24	23.5	9 23.8	95 24	23.3	9 52.2	95 23	23.2	11 45.7	95 23	22.5	8
9							5 21.7	95 24	23.9	6 47.2	95 24	23.4	8 41.2	95 23	22.8	9 09.7	95 23	22.6	9 38.2	95 23	22.5	11 32.1	95 22	21.8	9
150							5 07.3	95 23	23.1	6 33.1	95 23	22.7	8 27.4	95 22	22.1	8 56.0	95 22	21.9	9 24.6	95 22	21.8	11 18.8	95 21	21.1	150
1										6 19.4	96 22	21.9	8 14.1	96 22	21.3	8 42.8	96 21	21.2	9 11.4	96 21	21.0	11 06.0	95 21	20.4	1
2										6 06.1	96 21	21.2	8 01.2	96 21	20.6	8 29.9	96 21	20.5	8 58.7	96 21	20.3	10 53.6	96 20	19.8	2
3										5 53.3	96 21	20.5	7 48.6	96 20	19.9	8 17.5	96 20	19.8	8 46.3	96 20	19.6	10 41.6	96 19	19.1	3
4										5 40.9	96 20	19.7	7 36.6	96 19	19.2	8 05.5	96 19	19.1	8 34.4	96 19	18.9	10 30.0	96 19	18.4	4
155										5 28.9	97 19	19.0	7 24.9	97 19	18.5	7 53.9	97 19	18.3	8 22.9	97 18	18.2	10 18.8	97 18	17.7	155
6										5 17.4	97 18	18.2	7 13.7	97 18	17.7	7 42.8	97 18	17.6	8 11.8	97 18	17.5	10 08.1	97 17	17.0	6
7										5 06.3	97 18	17.5	7 02.9	97 17	17.0	7 32.1	97 17	16.9	8 01.2	97 17	16.8	9 57.7	97 17	16.3	7
8													6 52.6	97 16	16.3	7 21.8	97 16	16.2	7 51.0	97 16	16.1	9 47.8	97 16	15.6	8
9													6 42.7	98 16	15.6	7 11.9	98 16	15.4	7 41.2	98 16	15.3	9 38.3	98 15	14.9	9
160													6 33.2	98 15	14.8	7 02.5	98 15	14.7	7 31.9	98 15	14.6	9 29.3	98 14	14.2	160
1													6 24.2	98 14	14.1	6 53.6	98 14	14.0	7 23.0	98 14	13.9	9 20.6	98 14	13.5	1
2													6 15.6	98 14	13.4	6 45.1	98 13	13.3	7 14.6	98 13	13.2	9 12.4	98 13	12.8	2
3													6 07.5	98 13	12.6	6 37.0	98 13	12.5	7 06.6	98 13	12.4	9 04.6	98 12	12.1	3
4													5 59.8	99 12	11.9	6 29.4	99 12	11.8	6 59.0	99 12	11.7	8 57.3	99 12	11.4	4
165													5 52.6	99 11	11.1	6 22.3	99 11	11.1	6 51.9	99 11	11.0	8 50.4	99 11	10.7	165
6													5 45.9	99 10	10.4	6 15.5	99 10	10.3	6 45.2	99 10	10.3	8 43.9	99 10	10.0	6
7													5 39.6	99 10	09.7	6 09.3	99 10	09.6	6 39.0	99 10	09.5	8 37.9	99 09	09.3	7
8													5 33.7	99 09	08.9	6 03.5	99 09	08.9	6 33.3	99 09	08.8	8 32.3	99 09	08.5	8
9													5 28.4	99 08	08.2	5 58.2	99 08	08.1	6 28.0	99 08	08.1	8 27.2	99 08	07.8	9
170													5 23.5	99 07	07.4	5 53.3	99 07	07.4	6 23.1	99 07	07.3	8 22.5	99 07	07.1	170
1													5 19.0	1.0 07	06.7	5 48.9	1.0 07	06.7	6 18.7	1.0 07	06.6	8 18.2	1.0 06	06.4	1
2													5 15.0	1.0 06	06.0	5 44.9	1.0 06	05.9	6 14.8	1.0 06	05.9	8 14.4	1.0 06	05.7	2
3													5 11.5	1.0 05	05.2	5 41.4	1.0 05	05.2	6 11.3	1.0 05	05.1	8 11.0	1.0 05	05.0	3
4													5 08.5	1.0 04	04.5	5 38.4	1.0 04	04.4	6 08.3	1.0 04	04.4	8 08.1	1.0 04	04.3	4
175													5 05.9	1.0 04	03.7	5 35.8	1.0 04	03.7	6 05.8	1.0 03	03.7	8 05.6	1.0 03	03.6	175
6													5 03.8	1.0 03	03.0	5 33.7	1.0 03	03.0	6 03.7	1.0 03	02.9	8 03.6	1.0 03	02.9	6
7													5 02.1	1.0 02	02.2	5 32.1	1.0 02	02.2	6 02.1	1.0 02	02.2	8 02.0	1.0 02	02.1	7
8													5 00.9	1.0 01	01.5	5 30.9	1.0 01	01.5	6 00.9	1.0 01	01.5	8 00.9	1.0 01	01.4	8
9													5 00.2	1.0 00	00.7	5 30.2	1.0 00	00.7	6 00.2	1.0 00	00.7	8 00.2	1.0 00	00.7	9
180													5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	6 00.0	1.0 00	00.0	8 00.0	1.0 00	00.0	180

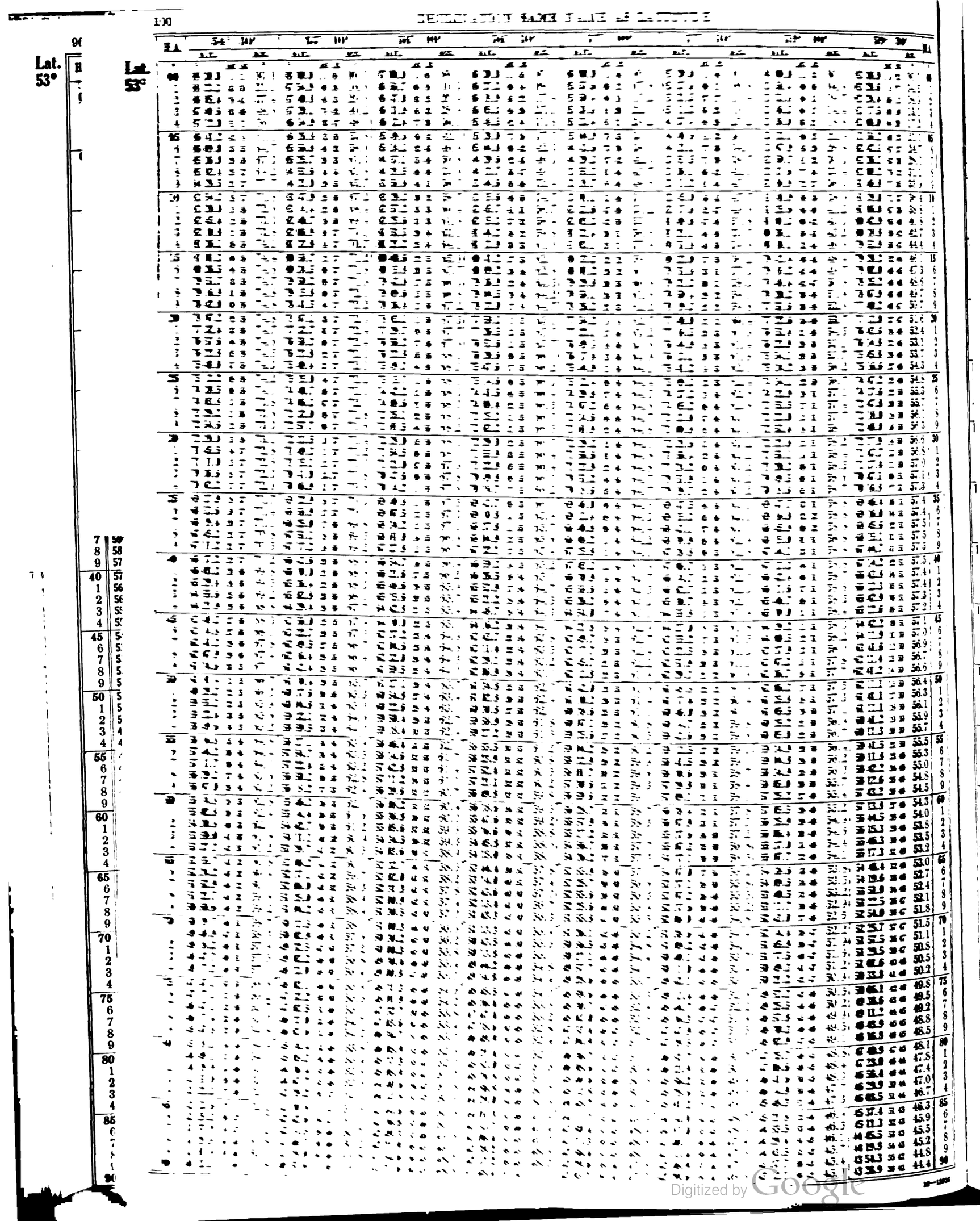
Lat. 53°

LHA	46° 00′		47° 00′		48° 30′		49° 30′		50° 30′		51° 30′		52° 30′		54° 00′		LHA
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	′	°	
00	53 00.0	180.0	54 00.0	180.0	55 30.0	180.0	56 30.0	180.0	57 30.0	180.0	58 30.0	180.0	59 30.0	180.0	60 00.0	180.0	00
1	52 58.2	174.2	53 57.9	173.5	55 27.4	171.6	56 26.7	169.5	57 25.5	167.7	58 22.8	165.7	59 12.9	162.2	59 58.2	129.2	1
2	52 52.9	168.3	53 51.9	167.1	55 19.6	163.5	56 17.0	159.5	57 12.6	152.9	58 03.3	142.2	58 41.4	111.6	58 56.3	49.1	2
3	52 44.1	162.3	53 42.0	161.0	55 07.8	156.0	56 01.7	150.6	56 51.3	142.2	57 37.8	125.1	57 57.8	104.2	57 57.3	59.5	3
4	52 32.2	156.1	53 28.5	155.3	54 50.4	149.1	55 41.9	142.5	56 28.9	133.7	57 07.7	119.9	57 31.7	100.1	57 25.2	65.6	4
05	52 17.3	150.2	53 11.8	149.9	54 30.1	142.9	55 18.4	136.2	56 01.4	128.9	56 35.5	119.1	56 56.3	97.4	56 51.8	69.4	05
6	52 00.7	144.5	52 52.4	144.9	54 07.8	137.5	54 52.2	130.6	55 31.5	121.6	55 57.9	109.8	56 09.1	95.4	56 17.1	71.9	6
7	51 39.7	138.7	52 30.5	140.4	53 43.5	132.7	54 23.8	125.5	55 00.9	117.2	55 27.7	108.0	55 44.1	95.9	55 43.2	73.7	7
8	51 17.6	132.8	52 06.5	136.3	53 14.1	128.5	53 53.8	121.5	54 27.4	113.6	54 52.8	106.0	55 06.1	96.0	55 08.4	74.9	8
9	50 52.7	126.9	51 40.6	132.5	52 45.1	124.5	53 22.5	116.3	53 53.9	108.7	54 17.6	102.0	54 32.0	97.6	54 33.5	75.8	9
10	50 25.1	123.2	51 13.3	129.1	52 14.8	121.5	52 50.3	115.2	53 19.8	108.9	53 42.2	102.6	53 55.9	98.7	53 58.4	76.5	10
1	49 56.1	119.6	50 44.7	125.9	51 43.6	118.5	52 17.2	112.6	52 45.3	106.8	53 06.5	101.4	53 19.8	99.4	53 23.3	76.9	1
2	49 26.9	116.2	50 14.9	122.8	51 11.4	115.9	51 43.6	110.2	52 10.4	105.1	52 30.7	100.4	52 43.7	99.1	52 48.1	77.2	2
3	48 57.7	113.0	49 44.3	120.0	50 38.6	113.5	51 09.5	108.1	51 35.2	103.5	51 54.8	99.5	52 07.6	98.4	52 12.8	77.4	3
4	48 28.5	110.2	49 13.8	117.5	50 05.3	111.4	50 35.0	106.2	50 59.8	102.1	51 18.8	98.3	51 31.5	97.8	51 37.6	77.5	4
15	47 59.5	107.6	48 43.6	115.4	49 33.4	109.4	49 00.2	104.5	49 24.2	100.7	49 43.8	97.3	49 57.4	97.3	50 03.4	77.6	15
1	47 30.9	105.2	48 13.9	113.5	49 03.6	107.6	48 30.1	102.9	48 48.5	99.4	49 08.7	96.3	49 23.3	96.9	49 29.4	77.6	1
2	47 02.6	102.9	47 44.5	111.7	48 34.0	105.9	48 00.3	101.4	48 12.6	98.2	48 33.7	95.4	48 49.4	96.6	48 55.6	77.6	2
3	46 34.6	100.7	47 15.4	110.0	48 04.7	104.4	47 30.7	100.1	47 36.7	97.1	47 58.8	94.6	48 15.6	96.4	48 21.8	77.6	3
4	46 06.5	98.6	46 46.4	108.4	47 35.5	103.0	47 01.3	98.8	47 00.7	96.0	47 24.0	93.9	47 42.0	96.3	47 48.1	77.7	4
20	45 38.9	96.6	46 17.6	107.1	47 06.4	101.6	46 32.4	97.6	46 24.8	95.0	46 50.3	93.4	47 08.6	96.3	47 14.4	77.7	20
1	45 11.7	94.7	45 48.9	105.8	46 37.3	100.3	46 03.6	96.5	45 48.9	94.0	46 16.9	92.5	46 35.6	96.4	46 40.8	77.8	1
2	44 44.8	92.9	45 20.4	104.6	46 08.3	99.1	45 35.0	95.5	45 13.2	93.1	45 43.8	91.6	46 03.0	96.6	46 07.2	77.9	2
3	44 18.1	91.2	44 52.1	103.4	45 39.5	98.0	45 07.5	94.5	44 38.7	92.2	45 11.9	90.8	45 31.6	96.8	45 34.0	78.0	3
4	43 51.6	89.6	44 24.0	102.1	45 11.0	96.9	44 40.2	93.5	44 04.4	91.4	44 40.2	90.2	45 00.4	97.2	45 01.0	78.1	4
25	43 25.3	88.4	43 56.1	100.9	44 43.0	95.9	44 13.2	92.6	43 30.4	90.7	44 09.0	89.9	44 29.6	97.7	44 28.2	78.2	25
1	42 59.2	87.3	43 28.4	99.8	44 15.2	94.9	43 46.4	91.7	43 06.6	90.2	43 38.4	89.6	43 59.0	98.3	43 56.2	78.3	1
2	42 33.2	86.2	43 01.0	98.8	43 47.5	94.0	43 19.8	90.9	42 43.0	89.8	43 08.1	89.4	43 29.4	98.9	43 24.4	78.4	2
3	42 07.4	85.2	42 33.8	97.8	43 20.0	93.1	42 53.4	90.1	42 19.6	89.5	42 38.1	89.3	42 59.8	99.5	42 52.6	78.5	3
4	41 41.8	84.2	42 06.8	96.9	42 52.6	92.2	42 27.1	89.3	41 56.0	89.3	42 08.0	89.3	42 30.2	100.1	42 20.8	78.6	4
30	41 16.4	83.3	41 40.0	96.0	42 25.2	91.3	42 01.0	88.5	41 33.5	89.2	41 38.0	89.2	42 01.0	100.8	41 49.0	78.7	30
1	40 51.2	82.4	41 13.3	95.2	41 58.0	90.5	41 35.1	87.8	41 11.2	89.0	41 08.1	89.2	41 31.9	101.6	41 17.2	78.8	1
2	40 26.2	81.5	40 46.8	94.4	41 31.0	89.7	41 09.4	87.0	40 49.1	88.9	40 38.4	89.1	41 03.0	102.4	40 45.4	78.9	2
3	40 01.4	80.6	40 20.6	93.6	41 04.0	88.9	40 43.9	86.3	40 27.3	88.7	40 09.0	89.1	40 34.3	103.2	40 13.8	79.0	3
4	39 36.8	79.8	39 54.6	92.8	40 37.1	88.1	40 18.6	85.6	40 05.8	88.5	39 39.8	89.0	40 05.8	104.0	39 42.4	79.1	4
35	39 12.3	79.1	39 29.2	92.0	40 10.4	87.4	39 53.5	85.0	39 44.4	88.2	39 10.8	89.0	39 37.5	104.8	39 11.2	79.2	35
6	38 48.0	78.4	39 04.0	91.2	39 44.0	86.7	39 29.5	84.3	39 24.1	88.0	38 42.0	89.0	39 10.0	105.6	38 40.2	79.3	6
7	38 24.0	77.8	38 39.0	90.4	39 18.0	86.0	39 05.9	83.7	39 04.1	87.8	38 13.4	89.0	38 42.8	106.4	38 09.4	79.4	7
8	37 59.4	77.2	38 14.3	89.7	38 52.2	85.3	38 42.6	83.0	38 44.2	87.7	37 45.1	89.0	38 16.0	107.2	37 38.8	79.5	8
9	37 34.8	76.6	37 49.6	88.9	38 26.4	84.6	38 19.6	82.4	38 24.6	87.6	37 17.1	89.0	37 49.4	108.0	37 08.4	79.6	9
40	37 10.2	76.0	37 25.0	88.1	38 00.7	83.9	37 56.8	81.8	38 05.1	87.5	36 49.1	89.0	37 22.8	108.8	36 37.8	79.7	40
1	36 45.6	75.4	37 00.4	87.3	37 35.0	83.3	37 34.0	81.2	37 45.7	87.4	36 21.1	89.0	36 56.4	109.6	36 07.2	79.8	1
2	36 21.0	74.8	36 35.8	86.5	37 09.4	82.6	36 51.2	80.6	37 26.4	87.3	35 53.1	89.0	36 30.0	110.4	35 36.6	79.9	2
3	35 56.4	74.2	36 11.2	85.7	36 43.8	82.0	36 28.4	80.0	37 07.1	87.2	35 25.1	89.0	36 03.6	111.2	35 06.0	80.0	3
4	35 31.8	73.6	35 47.0	84.9	36 18.2	81.3	36 05.6	79.4	36 47.8	87.1	34 57.1	89.0	35 37.2	112.0	34 35.4	80.1	4
45	35 07.2	73.0	35 22.2	84.1	35 52.6	80.7	35 42.8	78.8	36 29.4	86.9	34 29.1	89.0	35 11.0	112.8	34 04.8	80.2	45
6	34 42.6	72.3	34 57.4	83.3	35 27.0	80.0	35 20.0	78.2	36 11.0	86.8	34 01.1	89.0	34 44.8	113.6	33 34.2	80.3	6
7	34 18.0	71.7	34 32.6	82.5	35 01.4	79.4	34 57.2	77.7	35 52.6	86.7	33 33.1	89.0	34 18.6	114.4	33 03.6	80.4	7
8	33 53.4	71.1	34 07.8	81.8	34 35.8	78.8	34 34.4	77.1	35 34.2	86.6	33 05.1	89.0	33 52.4	115.2	32 33.0	80.5	8
9	33 28.8	70.6	33 43.0	81.2	34 10.2	78.3	33 51.6	76.5	35 16.0	86.5	32 37.1	89.0	33 26.2	116.0	32 02.4	80.6	9
50	33 04.2	70.0	33 18.2	80.6	33 44.6	77.7	33 08.8	75.9	34 57.8	86.4	32 09.1	89.0	32 59.8	116.8	31 31.8	80.7	50
1	32 39.6	69.4	32 53.4	80.0	33 19.0	77.2	32 46.0	75.4	34 39.4	86.3	31 41.1	89.0	32 33.4	117.6	31 01.2	80.8	1
2	32 15.0	68.9	32 28.6	79.4	32 53.4	76.6	32 23.2	74.8	34 21.0	86.2	31 13.1	89.0	32 07.0	118.4	30 30.6	80.9	2
3	31 50.4	68.3	32 03.8	78.8	32 27.8	76.1	32 00.4	74.3	34 02.6	86.1	30 45.1	89.0	31 40.6	119.2	29 59.8	81.0	3
4	31 25.8	67.7	31 39.0	78.2	32 02.2	75.5	31 37.6	73.7	33 44.2	86.0	30 17.1	89.0	31 14.2	120.0	29 29.0	81.1	4
55	31 01.2	67.1	31 14.2	77.6	31 36.6	74.9	31 14.8	73.1	33 26.8	85.9	29 49.1	89.0	30 48.0	120.8	28 58.2	81.2	55
6	30 36.6	66.5	30 49.4	77.0	31 11.0	74.4	30 52.0	72.6	33 09.4	85.8	29 21.1	89.0	30 21.8	121.6	28 27.4	81.3	6
7	30 12.0	65.9	30 24.6	76.4	30 45.4	73.8	30 29.2	72.0	32 52.0	85.7	28 53.1	89.0	29 55.6	122.4	27 56.6	81.4	7
8	29 47.4	65.3	29 59.8	75.8	30 19.8	73.2	30 06.4	71.4	32 34.6	85.6	28 25.1	89.0	29 29.4	123.2	27 25.8	81.5	8
9	29 22.8	64.7	29 35.0	75.2	29 54.2	72.7	29 43.6	70.9	32 17.2	85.5	27 57.1	89.0	29 03.2	124.0	26 55.0	81.6	9
60	28 58.2	64.1	29 10.2	74.6	29 28.6	72.1	29 20.8	70.3	31 59.8	85.4	27 29.1	89.0	28 37.0	124.8	26 24.2	81.7	60
1	28 33.6	63.5	28 45.4	74.0	29 03.0	71.5	28 58.0	69.7	31 42.4	85.3	27 01.1	89.0	28 10.8	125.6	25 53.4	81.8	1
2	28 09.0	62.9	28 20.6	73.4	28 37.4	70.9	28 35.2	69.1	31 25.0	85.2	26 33.1	89.0	27 44.6	126.4	25 22.6	81.9	2
3	27 44.4	62.3	27 55.8	72.8	28 11.8	70.3	27 52.4	68.5	31 07.6	85.1	26 05.1	89.0	27 18.4	127.2	24 51.8	82.0	3
4	27 19.8	61.7	27 31.0	72.2	27 46.2	69.7	27 29.6	67.9	30 50.2	85.0	25 37.1	89.0	26 52.2	128.0	24 21.0	82.1	4
65	26 55.2	61.1	27 06.2	71.6	27 20.6	69.1	27 06.8	67.3	30 32.8	84.9	25 09.1	89.0	26 26.0	128.8	23 50.2	82.2	65
6	26 30.6	60.5	26 41.4	71.0	26 54.8	68.5	26 44.0	66.7	30 15.4	84.8	24 41.1	89.0	25 59.8	129.6	23 19.4	82.3	6
7	26 06.0	59.9	26 16.6	70.4	26 29.0	67.9	26 21.2	66.1	29 58.0	84.7	24 13.1	89.0	25 33.6	130.4	22 48.6	82.4	7
8	25 41.4	59.3	25 51.8	69.8	26 03.2	67.3	25 58.4	65.5	29 40.6	84.6	23 45.1	89.0	25 07.4	131.2	22 17.8	82.5	8
9	25 16.8	58.7	25 27.0	69.2	25 37.4	66.7	25 35.6	64.9	29 23.2	84.5	23 17.1	89.0	24 41.2	132.0	21 47.0	82.6	9
70	24 52.2	58.1	25 02.2	68.6	25 11.6	66.1	25 12.8	64.3	29 05.8	84.4	22 49.1	89.0	24 15.0	132.8	21 16.2	82.7	70
1	24 27.6	57.5	24 37.4	68.0	24 45.8	65.5	24 50.0	63.7	28 48.4	84.3	22 21.1	89.0	23 48.8	133.6	20 45.4	82.8	1
2	24 03.0	56.9	24 12.6	67.4	24 20.0	64.9	24 27.2	63.1	28 31.0	84.2	21 53.1	89.0	23 22.6	134.4	20 14.6	82.9	2
3	23 38.4	56.3	23 47.8	66.8	23 54.2	64.3	24 04.4	62.5	28 13.6	84.1	21 25.1	89.0	22 56.4	135.2	19 43.8	83.0	3
4	23 13.8	55.7	23 23.0	66.2	23 28.4	63.7	23 41.6	61.9	27 56.2	84.0	20 57.1	89.0	22 30.2	136.0	19 13.0	83.1	4
75	22 49.2	55.1	22 58.2	65.6	23 02.6	63.1	23 18.8	61.3	27 38.8	83.9	20 29.1	89.0	22 04.0	136.8	18 42.2	83.2	75
6	22 24.6	54.5	22 33.4	65.0	22 36.8	62.5	22 56.0	60.7	27 21.4	83.8	20 01.1	89.0	21 37.8	137.6	18 11.4	83.3	6
7	22 00.0	53.9	22 08.6	64.4	22 11.0	61.9	22 33.2	60.1	27 04.0	83.7	19 33.1	89.0	21 11.6	138.4	17 40.6	83.4	7
8	21 35.4	53.3	21 43.8	63.8	21 45.2	61.3	21 50.4	59.5	26 46.6	83.6	19 05.1	89.0	20 45.4	139.2	17 09.8	83.5	8
9	21 10.8	52.7	21 19.0	63.2	21 19.4	60.7	21 27.6	58.9	26 29.2	83.5	18 37.1	89.0	20 19.2	140.0	16 39.0	83.6	9
80	20 46.2	52.1	20 54.2	62.6	20 53.6	60.1	21 04.8	58.3	26 11.8	83.4	18 09.1	89.0	19 53.0	140.8	16 08.2	83.7	80
1	20 21.6	51.5	20 29.4	62.0	20 27.8	59.5	20 42.0	57.7	25 54.4	83.3	17 41.1	89.0	19 26.8	141.6	15 37.4	83.8	1
2	19 57.0	50.9	20 04.6	61.4	20 02.0	58.9	20 19.2	57.1	25 37.0	83.2	17 13.1	89.0	19 00.6	142.4	15 06.6	83.9	2
3	19 32.4	50.3	19 39.8	60.8	19 36.2	58.3	19 56.4	56.5	25 19.6	83.1	16 45.1	89.0	18 34.4	143.2	14 35.8	84.0	3
4	19 07.8	49.7	19 15.0	60.2	19 10.4	57.7	19 33.6	55.9	25 02.2	83.0	16 17.1	89.0	18 08.2	144.0	14 05.0	84.1	4
85	18 43.2	49.1	18 50.2	59.6	18 44.6	57.1	19 10.8	55.3	24 44.8	82.9	15 49.1	89.0	17 42.0	144.8	13 34.2	84.2	85
6	18 18.6	48.5	18 25.4	59.0	18 18.8	56.5	18 48.0	54.7	24 27.4	82.8	15 21.1	89.0	17 15.8	145.6	13 03.4	84.3	6
7	17 54.0	47.9	18 00.6	58.4	17 53.0	55.9	18 25.2	54.1	24 10.0	82.7	14 53.1	89.0	16 49.6	146.4	12 32.6	84.4	7
8	17 29.4	47.3	17 35.8	57.8	17 27.2	55.3	18 02.4	53.5	23 52.6	82.6	14 25.1	89.0	16 23.4	147.2	12 01.8	84.5	8
9	17 04.8	46.7	17 11.0	57.2	17 01.4	54.7	17 39.6	52.9	23 35.2	82.5	13 57.1	89.0	15 57.2	148.0	11 31.0	84.6	9
90	16 40.2	46.1	16 46.2	56.6	16 35.6	54.1	17 16.8	52.3	23 17.8	82.4	13 29.1	89.0	15 31.0	148.8	11 00.2	84.7	90

Digitized by Google

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	34 33.3	68 51	57.5	35 14.1	68 50	56.6	36 14.5	67 49	55.2	36 54.2	66 49	54.3	37 33.5	65 48	53.3	38 12.3	64 48	52.4	38 50.7	63 47	51.4	39 47.2	62 46	49.9	91
2	34 02.9	69 50	56.9	34 44.0	68 50	56.0	35 44.9	67 49	54.7	36 25.0	66 48	53.8	37 04.6	66 48	52.8	37 43.8	65 47	51.9	38 22.5	64 47	50.9	39 19.7	63 46	49.4	2
3	33 32.8	69 50	56.3	34 14.2	69 49	55.5	35 15.5	68 49	54.1	35 55.9	67 48	53.2	36 35.9	66 47	52.3	37 15.5	66 47	51.4	37 54.6	65 46	50.4	38 52.4	64 45	48.9	3
4	33 02.8	70 50	55.8	33 44.5	69 49	54.9	34 46.4	68 48	53.6	35 27.1	68 48	52.7	36 07.5	67 47	51.8	36 47.4	66 46	50.8	37 26.9	65 46	49.9	38 25.3	64 45	48.5	4
95	32 33.1	70 49	55.2	33 15.1	70 49	54.3	34 17.4	69 48	53.0	34 58.5	68 47	52.1	35 39.2	67 47	51.2	36 19.5	67 46	50.3	36 59.4	66 46	49.4	37 58.3	65 45	48.0	95
6	32 03.5	71 49	54.6	32 45.9	70 48	53.8	33 48.7	69 48	52.5	34 30.1	69 47	51.6	35 11.2	68 46	50.7	35 51.8	67 46	49.8	36 32.1	67 45	48.9	37 31.6	66 44	47.5	6
7	31 34.2	71 48	54.0	32 16.8	71 48	53.2	33 20.1	70 47	51.9	34 01.9	69 47	51.1	34 43.3	69 46	50.2	35 24.3	68 45	49.3	36 05.0	67 45	48.4	37 05.1	66 44	47.0	7
8	31 05.1	72 48	53.4	31 48.0	71 48	52.6	32 51.8	70 47	51.4	33 33.9	70 46	50.5	34 15.7	69 46	49.7	34 57.1	69 45	48.8	35 38.1	68 44	47.9	36 38.8	67 43	46.5	8
9	30 36.2	72 48	52.9	31 19.4	72 47	52.0	32 23.7	71 46	50.8	33 06.2	70 46	50.0	33 48.3	70 45	49.1	34 30.0	69 45	48.3	35 11.4	69 44	47.4	36 12.7	68 43	46.0	9
100	30 07.5	73 47	52.3	30 51.1	72 47	51.5	31 55.9	72 46	50.3	32 38.6	71 46	49.4	33 21.1	70 45	48.6	34 03.2	70 44	47.7	34 44.9	69 44	46.9	35 46.8	68 43	45.5	100
1	29 39.1	73 47	51.7	30 22.9	73 47	50.9	31 28.2	72 46	49.7	32 11.3	72 45	48.9	32 54.1	71 45	48.0	33 36.6	70 44	47.2	34 18.7	70 43	46.3	35 21.2	69 42	45.0	1
2	29 10.9	74 47	51.1	29 55.0	73 46	50.3	31 00.8	73 45	49.1	31 44.2	72 45	48.3	32 27.4	72 44	47.5	33 10.2	71 44	46.7	33 52.7	71 43	45.8	34 55.8	70 42	44.5	2
3	28 42.9	74 46	50.5	29 27.4	74 46	49.7	30 33.6	73 45	48.6	31 17.4	73 44	47.8	32 00.9	72 44	47.0	32 44.1	72 43	46.1	33 26.9	71 43	45.3	34 30.5	70 42	44.0	3
4	28 15.1	75 46	49.9	28 59.9	74 45	49.2	30 06.6	74 45	48.0	30 50.8	73 44	47.2	31 34.6	73 43	46.4	32 18.1	72 43	45.6	33 01.4	72 42	44.8	34 05.6	71 41	43.5	4
105	27 47.6	75 45	49.3	28 32.7	75 45	48.6	29 39.9	74 44	47.4	30 24.4	74 44	46.7	31 08.6	73 43	45.9	31 52.4	73 42	45.1	32 36.0	72 42	44.3	33 40.8	72 41	43.0	105
6	27 20.4	76 45	48.7	28 05.8	75 44	48.0	29 13.4	75 44	46.9	29 58.2	74 43	46.1	30 42.8	74 43	45.3	31 27.0	73 42	44.5	32 10.9	73 41	43.7	33 16.3	72 40	42.5	6
7	26 53.3	76 45	48.1	27 39.1	76 44	47.4	28 47.2	75 43	46.3	29 32.3	75 43	45.5	30 17.2	75 42	44.8	31 01.8	74 42	44.0	31 46.1	74 41	43.2	32 52.0	73 40	42.0	7
8	26 26.6	77 44	47.5	27 12.6	77 44	46.8	28 21.2	76 43	45.7	29 06.7	76 42	45.0	29 51.9	75 42	44.2	30 36.8	75 41	43.5	31 21.5	74 41	42.7	32 28.0	73 40	41.5	8
9	26 00.1	77 44	47.0	26 46.4	77 43	46.2	27 55.5	77 42	45.2	28 41.3	76 42	44.4	29 26.8	76 41	43.7	30 12.1	75 41	42.9	30 57.1	75 40	42.2	32 04.2	74 39	41.0	9
110	25 33.8	78 43	46.4	26 20.4	78 43	45.7	27 30.0	77 42	44.6	28 16.1	77 42	43.9	29 02.0	76 41	43.1	29 47.6	76 40	42.4	30 33.0	75 40	41.6	31 40.6	75 39	40.5	110
1	25 07.8	78 43	45.8	25 54.7	78 42	45.1	27 04.8	78 42	44.0	27 51.2	77 41	43.3	28 37.5	77 40	42.6	29 23.4	76 40	41.8	30 09.2	76 39	41.1	31 17.3	75 38	40.0	1
2	24 42.1	79 42	45.1	25 29.3	79 42	44.5	26 39.8	78 41	43.4	27 26.6	78 41	42.7	28 13.2	77 40	42.0	28 59.5	77 40	41.3	29 45.6	77 39	40.6	30 54.2	76 38	39.4	2
3	24 16.6	79 42	44.5	25 04.2	79 42	43.9	26 15.2	79 41	42.9	27 02.2	78 40	42.2	27 49.1	78 40	41.5	28 35.8	78 39	40.7	29 22.2	77 38	40.0	30 31.4	77 38	38.9	3
4	23 51.4	80 42	43.9	24 39.3	80 41	43.3	25 50.7	79 40	42.3	26 38.1	79 40	41.6	27 25.3	79 39	40.9	28 12.3	78 39	40.2	28 59.1	78 38	39.5	30 08.9	77 37	38.4	4
115	23 26.5	80 41	43.3	24 14.7	80 41	42.7	25 26.6	80 40	41.7	26 14.3	79 39	41.0	27 01.8	79 39	40.3	27 49.2	79 38	39.6	28 36.3	78 38	38.9	29 46.6	78 37	37.9	115
6	23 01.9	81 41	42.7	23 50.3	81 40	42.1	25 02.7	80 39	41.1	25 50.7	80 39	40.4	26 38.6	80 38	39.8	27 26.3	79 38	39.1	28 13.7	79 37	38.4	29 24.5	78 36	37.3	6
7	22 37.5	81 40	42.1	23 26.3	81 40	41.5	24 39.1	81 39	40.5	25 27.5	80 38	39.9	26 15.7	80 38	39.2	27 03.7	80 37	38.5	27 51.5	80 37	37.8	29 02.8	79 36	36.8	7
8	22 13.4	82 40	41.5	23 02.5	82 39	40.9	24 15.8	81 38	39.9	25 04.5	81 38	39.3	25 53.0	81 37	38.6	26 41.3	80 37	38.0	27 29.4	80 36	37.3	28 41.3	80 35	36.3	8
9	21 49.6	82 39	40.9	22 39.0	82 39	40.3	23 52.8	82 38	39.3	24 41.7	82 37	38.7	25 30.6	81 37	38.1	26 19.2	81 36	37.4	27 07.7	81 36	36.7	28 20.1	80 35	35.7	9
120	21 26.2	83 39	40.3	22 15.8	83 38	39.7	23 30.0	82 37	38.7	24 19.3	82 37	38.1	25 08.5	82 36	37.5	25 57.4	81 36	36.8	26 46.2	81 35	36.2	27 59.1	81 34	35.2	120
1	21 03.0	83 38	39.6	21 52.9	83 38	39.0	23 07.6	83 37	38.1	23 57.2	83 36	37.5	24 46.6	82 36	36.9	25 35.9	82 35	36.3	26 25.1	82 35	35.6	27 38.4	81 34	34.7	1
2	20 40.1	84 38	39.0	21 30.3	84 37	38.4	22 45.4	83 36	37.5	23 35.3	83 36	36.9	24 25.1	83 35	36.3	25 14.7	83 35	35.7	26 04.2	82 34	35.1	27 18.0	82 34	34.1	2
3	20 17.5	84 37	38.4	21 08.0	84 37	37.8	22 23.6	84 36	36.9	23 13.8	84 35	36.4	24 03.8	83 35	35.7	24 53.8	83 34	35.1	25 43.6	83 34	34.5	26 57.9	82 33	33.6	3
4	19 55.2	85 37	37.8	20 46.0	85 36	37.2	22 02.0	84 35	36.3	22 52.5	84 35	35.8	23 42.9	84 34	35.2	24 33.1	84 34	34.6	25 23.2	83 33	34.0	26 38.1	83 33	33.0	4
125	19 33.3	85 36	37.1	20 24.4	85 36	36.6	21 40.8	85 35	35.7	22 31.6	85 34	35.2	23 22.3	84 34	34.6	24 12.8	84 33	34.0	25 03.2	84 33	33.4	26 18.5	84 32	32.5	125
6	19 11.6	86 36	36.5	20 03.0	86 35	36.0	21 19.8	85 34	35.1	22 10.9	85 34	34.6	23 01.9	85 33	34.0	23 52.8	85 33	33 4	24 43.5	84 32	32.8	25 59.3	84 32	31.9	6
7	18 50.3	86 35	35.9	19 41.9	86 35	35.3	20 59.2	86 34	34.5	21 50.6	86 33	34.0	22 41.9	85 33	33.4	23 33.0	85 32	32.8	24 24.1	85 32	32.3	25 40.3	85 31	31.4	7
8	18 29.3	87 34	35.3	19 21.2	86 34	34.7	20 38.9	86 33	33.9	21 30.6	86 33	33.4	22 22.1	86 32	32.8	23 13.6	86 32	32.3	24 04.9	85 31	31.7	25 21.7	85 31	30.8	8
9	18 08.6	87 34	34.6	19 00.8	87 33	34.1	20 18.9	87 33	33.3	21 10.9	87 32	32.8	22 02.7	86 32	32.2	22 54.5	86 31	31.7	23 46.1	86 31	31.1	25 03.3	86 30	30.3	9
130	17 48.3	87 33	34.0	18 40.7	87 33	33.5	19 59.3	87 32	32.7	20 51.5	87 32	32.2	21 43.6	87 31	31.6	22 35.7	87 31	31.1	23 27.6	86 30	30.6	24 45.3	86 30	29.7	130
1	17 28.3	88 33	33.3	18 21.0	88 32	32.8	19 39.9	88 32	32.1	20 32.4	87 31	31.6	21 24.8	87 31	31.0	22 17.2	87 30	30.5	23 09.4	87 30	30.0	24 27.5	87 29	29.2	1
2	17 08.6	88 32	32.7	18 01.6	88 32	32.2	19 20.9	88 31	31.5	20 13.7	88 31	31.0	21 06.4	88 30	30.4	21 59.0	88 30	29.9	22 51.5	87 29	29.4	24 10.1	87 29	28.6	2
3	16 49.2	89 32	32.1	17 42.5	89 31	31.6	19 02.2	88 31	30.8	19 55.3	88 30	30.3	20 48.3	88 30	29.8	21 41.1	88 29	29.3	22 33.9	88 29	28.8	23 52.9	88 28	28.0	3
4	16 30.2	89 31	31.4	17 23.8	89 31	30.9	18 43.9	89 30	30.2	19 37.2	89 30	29.7	20 30.5	89 29	29.2	21 23.6	89 29	28.7	22 16.7	88 28	28.2	23 36.1	88 28	27.5	4
135	16 11.6	90 30	30.8	17 05.4	90 30	30.3	18 25.9	89 29	29.6	19 19.5	89 29	29.1	20 13.0	89 29	28.6	21 06.4	89 28	28.2	21 59.8	89 28	27.7	23 19.6	89 27	26.9	135
6	15 53.3	90 30	30.1	16 47.3	90 30	29.7	18 08.2	90 29	29.0	19 02.1	90 28	28.5	19 55.8	90 28	28.0	20 49.5	89 28	27.6	21 43.2	89 27	27.1	23 03.4	89 26	26.3	6
7	15 35.4	90 29	29.5	16 29.6	90 29	29.0	17 50.9	90 28	28.3	18 45.0	90 28	27.9	19 39.0	90 27	27.4	20 33.0	90 27	27.0	21 26.9	90 27	26.5	22 47.6	90 26	25.8	7
8	15 17.8	91 29	28.8	16 12.3	91 28	28.4	17 33.9	91 28	27.7	18 28.3	91 27	27.3	19 22.6	90 27	26.8	20 16.8	90 26	26.4	21 11.0	90 26	25.9	22 32.0	90 25	25.2	8
9	15 00.6	91 28	28.2	15 55.3	91 28	27.7	17 17.3	91 27	27.1	18 11.9	91 27	26.6	19 06.5	91 26	26.2	20 00.9	91 26	25.8	20 55.3	91 25	25.3	22 16.8	90 25	24.6	9
140	14 43.7	92 27	27.5	15 38.7	92 27	27.1	17 01.0	91 26	26.5	17 55.9	91 26	26.0	18 50.7	91 26	25.6	19 45.4	91 25	25.2	20 40.1	91 25	24.7	22 01.9	91 24	24.1	140
1	14 27.2	92 27	26.8	15 22.4	92 26	26.4	16 45.1	92 26	25.8	17 40.2	92 26	25.4	18 35.3	92 25	25.0	19 30.2	92 25	24.6	20 25.1	91 24	24.1	21 47.4	91 24	23.5	1
2	14 11.1	92 26	26.2	15 06.5	92 26	25.8	16 29.6	92 25	25.2	17 24.9	92 25	24.8	18 20.2	92 25	24.4	19 15.4	92 24	24.0	20 10.6	92 24	23.5	21 33.2	92 23	22.9	2
3	13 55.4	93 26	25.5	14 51.0	93 25	25.1	16 14.4	93 25	24.5	17 10.0	93 24	24.1	18 05.5	92 24	23.7	19 00.9	92 24	23.3	19 56.3	92 23	22.9	21 19.3	92 23	22.3	3
4	13 40.0	93 25	24.8	14 35.9	93 25	24.5	15 59.6	93 24	23.9	16 55.4	93 24	23.5	17 51.1	93 23	23.1	18 46.8	93 23	22.7	19 42.4	93 23	22.3	21 05.8	93 22	21.7	4
145	13 25.0	93 24	24.2	14 21.1	93 24	23.8	15 45.2	93 23	23.3	16 41.2	93 23	22.9	17 37.1	93 23	22.5	18 33.0	93 22	22.1	19 28.9	93 22	21.7	20 52.6	93 21	21.2	145
6	13 10.4	94 24	23.5	14 06.7	94 23	23.2	15 31.1	94 23	22.6	16 27.3	94 22	22.3	17 23.5	94 22	21.9	18 19.6	94 22	21.5	19 15.7	93 21	21.1	20 39.7	93 21	20.6	6
7	12 56.2	94 23	22.8	13 52.7	94 23	22.5	15 17.4	94 22	22.0	16 13.8	94 22	21.6	17 10.2	94 22	21.3	18 06.5	94 21	20.9	19 02.8	94 21	20.5	20 27.2	94 20	20.0	7
8	12 42.4	95 22	22.2	13 39.1	94 22	21.8	15 04.1	94 22	21.3	16 00.7	94 21	21.0	16 57.3	94 21	20.6	17 53.8	94 21	20.3	18 50.3	94 20	19.9	20 15.0	94 20	19.4	8
9	12 29.0	95 22	21.5	13 25.9	95 21	21.2	14 51.1	95 21	20.7	15 47.9	95 21	20.3	16 44.7	95 20	20.0	17 41.5	95 20	19.7	18 38.2	94 20	19.3	20 03.2	94 19	18.8	9
150	12 15.9	95 21	20.8	13 13.0	95 21	20.5	14 38.6	95 20	20.0	15 35.6	95 20	19.7	16 32.6	95 20	19.4	17 29.5	95 19	19.0	18 26.4	95 19	18.7	19 51.7	95 18	18.2	150
1	12 03.3	95 20	20.1	13 00.6	95 20	19.8	14 26.4	95 20	19.4	15 23.6	95 19	19.1	16 20.8	95 19	18.7	17 17.9	95 19	18.4	18 15.0	95 18	18.1	19 40.6	95 18	17.6	1
2	11 51.1	96 20	19.5	12 48.5	96 19	19.2	14 14.6	96 19	18.7	15 12.0	96 19	18.4	16 09.4	96 18	18.1	17 06.7	96 18	17.8	18 04.0	95 18	17.5	19 29.9	95 17	17.0	2
3	11 39.2	96 19	18.8	12 36.8	96 19	18.5	14 03.2	96 18	18.1	15 00.8	96 18	17.8	15 58.3	96 18	17.5	16 55.8	96 17	17.2	17 53.3	96 17	16.9	19 19.5	96 17	16.4	3
4	11 27.8	96 18	18.1	12 25.6	96 18	17.8	13 52.2	96 18	17.4	14 50.0	96 17	17.1	15 47.7	96 17	16.8	16 45.4	96 17	16.6	17 43.0	96 17	16.3	19 09.5	96 16	15.8	4
155	11 16.8	97 18	17.4	12 14.7	97 17	17.2	13 41.6	97 17	16.8	14 39.5	96 17	16.5	15 37.4	96 16	16.2	16 35.3	96 16	15.9	17 33.1	96 16	15.7	18 59.8	96 16	15.2	155
6	11 06.2	97 17	16.7	12 04.3	97 17	16.5	13 31.4	97 16	16.1	14 29.5	97 16	15.8	15 27.5	97 16	15.6	16 25.5	97 16	15.3	17 23.5	97 15	15.0	18 50.5	97 15	14.6	6
7	10 56.0	97 16	16.0	11 54.3	97 16	15.8	13 21.6	97 16	15.4	14 19.8	97 15	15.2	15 18.0	97 15	14.9	16 16.2	97 15	14.7	17 14.4	97 15	14.4	18 41.6	97 14	14.0	7
8	10 46.2	97 16	15.4	11 44.6	97 15	15.1	13 12.2	97 15	14.8	14 10.6	97 15	14.5	15 08.9	97 15	14.3	16 07.2	97 14	14.0	17 05.6	97 14	13.8	18 33.0	97 14	13.4	8
9	10 36.9	98 15	14.7	11 35.4	98 15	14.4	13 03.2	98 14	14.1	14 01.7	97 14	13.9	15 00.2	97 14	13.7	15 58.7	97 14	13.4	16 57.1	97 13	13.2	18 24.8	97 13	12.8	9
160	10 27.9	98 14	14.0	11 26.6	98 14	13.8	12 54.6	98 14	13.4	13 53.2	98 13	13.2	14 51.9	98 13	13.0	15 50.5	98 13	12.8	16 49.1	98 13	12.6	18 17.0	98 12	12.2	160
1	10 19.4	98 14	13.3	11 18.2	98 13	13.1	12 46.4	98 13	12.8	13 45.2	98 13	12.6	14 43.9	98 13	12.4	15 42.7	98 12	12.2	16 41.4	98 12	11.9	18 09.5	98 12	11.6	1
2	10 11.3	98 13	12.6	11 10.3	98 13	12.4	12 38.6	98 12	12.1	13 37.5	98 12	11.9	14 36.4	98 12	11.7	15 35.3	98 12	11.5	16 34.1	98 11	11.3	18 02.4	98 11	11.0	2
3	10 03.7	98 12	11.9	11 02.7	98 12	11.7	12 31.2	98 12	11.4	13 30.3	98 11	11.3	14 29.3	98 11	11.1	15 28.3	98 11	10.9	16 27.2	98 11	10.7	17 55.7	98 11	10.4	3
4	9 56.4	99 11	11.2	10 55.6	99 11	11.0	12 24.3	99 11	10.8	13 23.4	99 11	10.6	14 22.5	99 11	10.4	15 21.6	99 10	10.2	16 20.7	98 10	10.1	17 49.4	98 10	09.8	4
165	9 49.6	99 11	10.5	10 48.9	99 10	10.4	12 17.7	99 10	10.1	13 17.0	99 10	09.9	14 16.2	99 10	09.8	15 15.4	99 10	09.6	16 14.6	99 10	09.4	17 43.4	99 09	09.2	165
6	9 43.3	99 10	09.8	10 42.6	99 10	09.7	12 11.6	99 10	09.4	13 10.9	99 09	09.3	14 10.3	99 09	09.1	15 09.6	99 09	09.0	16 08.9	99 09	08.8	17 37.8	99 09	08.6	6
7	9 37.3	99 09	09.1	10 36.8	99 09	09.0	12 05.9	99 09	08.8	13 05.3	99 09	08.6	14 04.7	99 09	08.5	15 04.1	99 08	08.3	16 03.5	99 08	08.2	17 32.6	99 08	08.0	7
8	9 31.8	99 08	08.4	10 31.3	99 08	08.3	12 00.6	99 08	08.1	13 00.1	99 08	08.0	13 59.6	99 08	07.8	14 59.1	99 08	07.7	15 58.6	99 08	07.6	17 27.8	99 07	07.4	8
9	9 26.8	99 08	07.7	10 26.3	99 08	07.6	11 55.7	99 07	07.4	12 55.3	99 07	07.3	13 54.9	99 07	07.2	14 54.5	99 07	07.1	15 54.0	99 07	06.9	17 23.4	99 07	06.7	9
170	9 22.1	99 07	07.0	10 21.8	99 07	06.9	11 51.3	99 07	06.8	12 50.9	99 07	06.6	13 50.6	99 07	06.5	14 50.2	99 06	06.4	15 49.9	99 06	06.3	17 19.3	99 06	06.1	170
1	9 17.9	1.0 06	06.3	10 17.6	1.0 06	06.2	11 47.2	1.0 06	06.1	12 47.0	1.0 06	06.0	13 46.7	1.0 06	05.9	14 46.4	1.0 06	05.8	15 46.1	1.0 06	05.7	17 15.7	1.0 05	05.5	1
2	9 14.2	1.0 06	05.6	10 13.9	1.0 05	05.5	11 43.6	1.0 05	05.4	12 43.4	1.0 05	05.3	13 43.2	1.0 05	05.2	14 43.0	1.0 05	05.1	15 42.7	1.0 05	05.0	17 12.4	1.0 05	04.9	2
3	9 10.8	1.0 05	04.9	10 10.7	1.0 05	04.8	11 40.4	1.0 05	04.7	12 40.3	1.0 05	04.7	13 40.1	1.0 04	04.6	14 39.9	1.0 04	04.5	15 39.7	1.0 04	04.4	17 09.5	1.0 04	04.3	3
4	9 08.0	1.0 04	04.2	10 07.9	1.0 04	04.2	11 37.7	1.0 04	04.1	12 37.5	1.0 04	04.0	13 37.4	1.0 04	03.9	14 37.3	1.0 04	03.9	15 37.2	1.0 04	03.8	17 07.0	1.0 04	03.7	4
175	9 05.5	1.0 03	03.5	10 05.5	1.0 03	03.5	11 35.3	1.0 03	03.4	12 35.2	1.0 03	03.3	13 35.2	1.0 03	03.3	14 35.1	1.0 03	03.2	15 35.0	1.0 03	03.2	17 04.8	1.0 03	03.1	175
6	9 03.5	1.0 03	02.8	10 03.5	1.0 03	02.8	11 33.4	1.0 02	02.7	12 33.4	1.0 02	02.7	13 33.3	1.0 02	02.6	14 33.2	1.0 02	02.6	15 33.2	1.0 02	02.5	17 03.1	1.0 02	02.5	6
7	9 02.0	1.0 02	02.1	10 02.0	1.0 02	02.1	11 31.9	1.0 02	02.0	12 31.9	1.0 02	02.0	13 31.9	1.0 02	02.0	14 31.8	1.0 02	01.9	15 31.8	1.0 02	01.9	17 01.7	1.0 02	01.8	7
8	9 00.9	1.0 01	01.4	10 00.9	1.0 01	01.4	11 30.9	1.0 01	01.4	12 30.8	1.0 01	01.3	13 30.8	1.0 01	01.3	14 30.8	1.0 01	01.3	15 30.8	1.0 01	01.3	17 00.8	1.0 01	01.2	8
9	9 00.2	1.0 00	00.7	10 00.2	1.0 00	00.7	11 30.2	1.0 00	00.7	12 30.2	1.0 00	00.7	13 30.2	1.0 00	00.7	14 30.2	1.0 00	00.6	15 30.2	1.0 00	00.6	17 00.2	1.0 00	00.6	9
180	9 00.0	1.0 00	00.0	10 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 30.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 30.0	1.0 00	00.0	17 00.0	1.0 00	00.0	180

Lat. 53°



Digitized by Google

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			58° 00′			58° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	40 05.8	62 46	49.4	40 24.3	61 45	48.9	41 00.8	60 44	47.8	41 18.8	60 44	47.3	41 36.7	59 44	46.7	41 54.4	59 43	46.2	42 46.7	57 42	44.6	43 03.8	57 42	44.0	91
2	39 38.5	62 45	48.9	39 57.2	62 45	48.4	40 34.1	61 44	47.4	40 52.4	61 44	46.8	41 10.5	60 43	46.3	41 28.4	60 43	45.8	42 21.4	58 42	44.2	42 38.8	58 41	43.6	2
3	39 11.4	63 45	48.4	39 30.3	63 44	47.9	40 07.6	62 44	46.9	40 26.1	61 43	46.4	40 44.4	61 43	45.9	41 02.6	60 43	45.4	41 56.4	59 41	43.7	42 14.0	58 41	43.2	3
4	38 44.5	64 45	48.0	39 03.6	63 44	47.5	39 41.4	63 43	46.5	40 00.1	62 43	46.0	40 18.6	62 43	45.4	40 37.1	61 42	44.9	41 31.5	60 41	43.3	41 49.3	59 41	42.8	4
95	38 17.8	65 44	47.5	38 37.1	64 44	47.0	39 15.3	63 43	46.0	39 34.2	63 43	45.5	39 53.0	62 42	45.0	40 11.7	62 42	44.5	41 06.8	61 41	42.9	41 24.9	60 40	42.4	95
6	37 51.2	65 44	47.0	38 10.7	65 44	46.5	38 49.4	64 43	45.5	39 08.5	64 42	45.1	39 27.6	63 42	44.6	39 46.4	63 42	44.0	40 42.3	61 40	42.5	41 00.6	61 40	42.0	6
7	37 24.9	66 44	46.5	37 44.6	66 43	46.0	38 23.7	65 42	45.1	38 43.1	64 42	44.6	39 02.3	64 42	44.1	39 21.4	63 41	43.6	40 18.0	62 40	42.1	40 36.6	62 40	41.6	7
8	36 58.8	67 43	46.0	37 18.8	66 43	45.6	37 58.3	65 42	44.6	38 17.8	65 42	44.1	38 37.3	65 41	43.7	38 56.6	64 41	43.2	39 53.9	63 40	41.7	40 12.7	63 39	41.2	8
9	36 32.9	67 43	45.6	36 53.1	67 42	45.1	37 33.0	66 42	44.2	37 52.8	66 41	43.7	38 12.5	65 41	43.2	38 32.0	65 41	42.7	39 30.0	64 40	41.2	39 49.1	63 39	40.7	9
100	36 07.3	68 42	45.1	36 27.6	68 42	44.6	37 08.0	67 41	43.7	37 28.0	67 41	43.2	37 47.9	66 41	42.7	38 07.6	66 40	42.3	39 06.3	65 39	40.8	39 25.6	64 39	40.3	100
1	35 41.8	69 42	44.6	36 02.4	68 42	44.1	36 43.1	68 41	43.2	37 03.3	67 41	42.8	37 23.5	67 40	42.3	37 43.5	66 40	41.8	38 42.8	65 39	40.4	39 02.3	65 38	39.9	1
2	35 16.6	69 42	44.1	35 37.3	69 41	43.6	36 18.5	68 41	42.7	36 38.9	68 40	42.3	36 59.3	68 40	41.8	37 19.5	67 40	41.4	38 19.5	66 38	40.0	38 39.3	66 38	39.5	2
3	34 51.6	70 41	43.6	35 12.5	70 41	43.2	35 54.1	69 40	42.3	36 14.7	69 40	41.8	36 35.3	68 40	41.4	36 55.7	68 39	40.9	37 56.4	67 38	39.5	38 16.4	66 38	39.0	3
4	34 26.8	71 41	43.1	34 47.9	70 41	42.7	35 29.9	70 40	41.8	35 50.8	69 40	41.4	36 11.5	69 39	40.9	36 32.2	68 39	40.5	37 33.5	68 38	39.1	37 53.8	67 37	38.6	4
105	34 02.2	71 41	42.6	34 23.6	71 40	42.2	35 06.0	70 40	41.3	35 27.0	70 39	40.9	35 48.0	70 39	40.4	36 08.9	69 38	40.0	37 10.9	68 37	38.6	37 31.4	68 37	38.2	105
6	33 37.9	72 40	42.1	33 59.4	72 40	41.7	34 42.2	71 39	40.8	35 03.5	71 39	40.4	35 24.7	70 38	40.0	35 45.8	70 38	39.5	36 48.4	69 37	38.2	37 09.1	69 37	37.7	6
7	33 13.8	73 40	41.6	33 35.5	72 39	41.2	34 18.8	72 39	40.3	34 40.2	71 38	39.9	35 01.6	71 38	39.5	35 22.9	71 38	39.1	36 26.2	70 37	37.8	36 47.1	70 36	37.3	7
8	32 50.0	73 39	41.1	33 11.9	73 39	40.7	33 55.5	72 38	39.9	34 17.2	72 38	39.4	34 38.8	72 38	39.0	35 00.3	72 37	38.6	36 04.2	71 36	37.3	36 25.4	70 36	36.9	8
9	32 26.3	74 39	40.6	32 48.5	74 39	40.2	33 32.5	73 38	39.4	33 54.3	73 38	39.0	34 16.1	73 37	38.5	34 37.9	72 37	38.1	35 42.5	71 36	36.8	36 03.8	71 36	36.4	9
110	32 03.0	74 39	40.1	32 25.3	74 38	39.7	33 09.7	74 38	38.9	33 31.8	73 37	38.5	33 53.8	73 37	38.1	34 15.7	73 37	37.7	35 20.9	72 36	36.4	35 42.5	72 35	36.0	110
1	31 39.9	75 38	39.6	32 02.4	75 38	39.2	32 47.1	74 37	38.4	33 09.4	74 37	38.0	33 31.6	74 36	37.6	33 53.7	74 36	37.2	34 59.6	73 35	35.9	35 21.4	72 35	35.5	1
2	31 17.0	76 38	39.1	31 39.7	76 37	38.7	32 24.8	75 37	37.9	32 47.3	75 36	37.5	33 09.7	75 36	37.1	33 32.0	74 36	36.7	34 38.5	73 35	35.5	35 00.5	73 34	35.1	2
3	30 54.4	76 37	38.5	31 17.2	76 37	38.2	32 02.8	76 36	37.4	32 25.5	75 36	37.0	32 48.1	75 36	36.6	33 10.6	75 35	36.2	34 17.7	74 34	35.0	34 39.9	74 34	34.6	3
4	30 32.0	77 37	38.0	30 55.1	77 37	37.6	31 41.0	76 36	36.9	32 03.8	76 36	36.5	32 26.6	76 35	36.1	32 49.4	76 35	35.7	33 57.1	75 34	34.6	34 19.5	75 34	34.2	4
115	30 09.9	78 36	37.5	30 33.1	77 36	37.1	31 19.4	77 36	36.4	31 42.5	77 35	36.0	32 05.5	77 35	35.6	32 28.4	76 35	35.3	33 36.7	76 34	34.1	33 59.4	75 33	33.7	115
6	29 48.0	78 36	37.0	30 11.5	78 36	36.6	30 58.1	78 35	35.9	31 21.4	77 35	35.5	31 44.6	77 34	35.1	32 07.7	77 34	34.8	33 16.6	76 33	33.6	33 39.5	76 33	33.2	6
7	29 26.4	79 36	36.5	29 50.1	79 35	36.1	30 37.1	78 35	35.4	31 00.5	78 34	35.0	31 23.9	78 34	34.6	31 47.2	78 34	34.3	32 56.8	77 33	33.2	33 19.8	77 32	32.8	7
8	29 05.1	79 35	35.9	29 28.9	79 35	35.6	30 16.3	79 34	34.9	30 39.9	79 34	34.5	31 03.5	78 34	34.2	31 27.0	78 33	33.8	32 37.1	78 32	32.7	33 00.4	77 32	32.3	8
9	28 44.1	80 35	35.4	29 08.0	80 34	35.1	29 55.8	79 34	34.4	30 19.6	79 33	34.0	30 43.4	79 33	33.7	31 07.1	79 33	33.3	32 17.8	78 32	32.2	32 41.2	78 32	31.8	9
120	28 23.3	81 34	34.9	28 47.4	80 34	34.5	29 35.6	80 33	33.8	29 59.6	80 33	33.5	30 23.5	80 33	33.1	30 47.4	79 32	32.8	31 58.6	79 31	31.7	32 22.3	79 31	31.4	120
1	28 02.8	81 34	34.3	28 27.1	81 33	34.0	29 15.6	81 33	33.3	29 39.8	80 33	33.0	30 03.9	80 32	32.6	30 27.9	80 32	32.3	31 39.8	80 31	31.2	32 03.6	79 31	30.9	1
2	27 42.6	82 33	33.8	28 07.1	82 33	33.5	28 55.9	81 32	32.8	29 20.2	81 32	32.5	29 44.5	81 32	32.1	30 08.8	81 32	31.8	31 21.2	80 31	30.8	31 45.2	80 30	30.4	2
3	27 22.6	82 33	33.3	27 47.3	82 32	32.9	28 36.5	82 32	32.3	29 01.0	82 32	32.0	29 25.5	81 31	31.6	29 49.9	81 31	31.3	31 02.9	81 30	30.3	31 27.1	81 30	29.9	3
4	27 03.0	83 32	32.7	27 27.8	83 32	32.4	28 17.3	82 31	31.8	28 42.0	82 31	31.4	29 06.7	82 31	31.1	29 31.3	82 31	30.8	30 44.8	81 30	29.8	31 09.2	81 29	29.5	4
125	26 43.6	83 32	32.2	27 08.6	83 32	31.9	27 58.4	83 31	31.2	28 23.3	83 31	30.9	28 48.1	83 30	30.6	29 12.9	83 30	30.3	30 27.0	82 29	29.3	30 51.6	82 29	29.0	125
6	26 24.5	84 31	31.6	26 49.7	84 31	31.3	27 39.9	84 30	30.7	28 04.9	83 30	30.4	28 29.9	83 30	30.1	28 54.9	83 30	29.8	30 09.4	83 29	28.8	30 34.2	82 28	28.5	6
7	26 05.7	84 31	31.1	26 31.0	84 31	30.8	27 21.6	84 30	30.2	27 46.8	84 30	29.9	28 11.9	84 29	29.6	28 37.1	84 29	29.3	29 52.2	83 28	28.3	30 17.1	83 28	28.0	7
8	25 47.2	85 30	30.5	26 12.7	85 30	30.3	27 03.5	85 30	29.7	27 28.9	85 29	29.4	27 54.3	84 29	29.1	28 19.6	84 29	28.8	29 35.2	84 28	27.8	30 00.3	84 28	27.5	8
9	25 29.0	86 30	30.0	25 54.6	85 30	29.7	26 45.8	85 29	29.1	27 11.4	85 29	28.8	27 36.9	85 28	28.5	28 02.3	85 28	28.2	29 18.5	84 27	27.3	29 43.8	84 27	27.0	9
130	25 11.1	86 29	29.4	25 36.9	86 29	29.2	26 28.4	86 29	28.6	26 54.1	86 28	28.3	27 19.8	85 28	28.0	27 45.4	85 28	27.7	29 02.0	85 27	26.8	29 27.5	85 27	26.5	130
1	24 53.5	87 29	28.9	25 19.5	86 29	28.6	26 11.3	86 28	28.1	26 37.1	86 28	27.8	27 02.9	86 28	27.5	27 28.7	86 27	27.2	28 45.9	86 26	26.3	29 11.5	85 26	26.0	1
2	24 36.2	87 28	28.3	25 02.3	87 28	28.1	25 54.4	87 28	27.5	26 20.4	87 27	27.2	26 46.4	87 27	27.0	27 12.4	86 27	26.7	28 30.0	86 26	25.8	28 55.8	86 26	25.5	2
3	24 19.2	88 28	27.8	24 45.5	87 28	27.5	25 37.9	87 27	27.0	26 04.1	87 27	26.7	26 30.2	87 27	26.4	26 56.3	87 26	26.2	28 14.4	87 26	25.3	28 40.4	87 25	25.0	3
4	24 02.6	88 27	27.2	24 29.0	88 27	27.0	25 21.7	88 27	26.4	25 48.0	88 26	26.2	26 14.3	88 26	25.9	26 40.5	87 26	25.6	27 59.1	87 25	24.8	28 25.3	87 25	24.5	4
135	23 46.2	89 27	26.7	24 12.7	88 27	26.4	25 05.8	88 26	25.9	25 32.2	88 26	25.6	25 58.7	88 26	25.4	26 25.1	88 25	25.1	27 44.1	88 25	24.3	28 10.4	88 24	24.0	135
6	23 30.2	89 26	26.1	23 56.8	89 26	25.8	24 50.1	89 26	25.3	25 16.8	89 25	25.1	25 43.3	89 25	24.8	26 09.9	88 25	24.6	27 29.4	88 24	23.8	27 55.9	88 24	23.5	6
7	23 14.4	89 26	25.5	23 41.3	89 25	25.3	24 34.8	89 25	24.8	25 01.6	89 25	24.5	25 28.3	89 24	24.3	25 55.0	89 24	24.0	27 15.0	89 24	23.3	27 41.6	89 23	23.0	7
8	22 59.0	90 25	25.0	23 26.0	90 25	24.7	24 19.9	90 24	24.2	24 46.8	90 24	24.0	25 13.6	90 24	23.8	25 40.5	89 24	23.5	27 00.9	89 23	22.8	27 27.6	89 23	22.5	8
9	22 43.9	90 25	24.4	23 11.0	90 24	24.2	24 05.2	90 24	23.7	24 32.2	90 24	23.5	24 59.2	90 23	23.2	25 26.2	90 23	23.0	26 47.1	90 23	22.2	27 14.0	90 22	22.0	9
140	22 29.2	91 24	23.8	22 56.4	91 24	23.6	23 50.8	91 23	23.1	24 18.0	91 23	22.9	24 45.2	90 23	22.7	25 12.3	90 23	22.4	26 33.6	90 22	21.7	27 00.6	90 22	21.5	140
1	22 14.8	91 23	23.3	22 42.1	91 23	23.0	23 36.8	91 23	22.6	24 04.1	91 23	22.4	24 31.4	91 22	22.1	24 58.7	91 22	21.9	26 20.3	91 22	21.2	26 47.5	91 21	21.0	1
2	22 00.7	92 23	22.7	22 28.2	92 23	22.5	23 23.1	91 22	22.0	23 50.5	91 22	21.8	24 18.0	91 22	21.6	24 45.4	91 22	21.4	26 07.4	91 21	20.7	26 34.8	91 21	20.5	2
3	21 46.9	92 22	22.1	22 14.5	92 22	21.9	23 09.7	92 22	21.5	23 37.3	92 22	21.3	24 04.8	92 21	21.0	24 32.4	92 21	20.8	25 54.8	92 20	20.2	26 22.3	91 20	19.9	3
4	21 33.5	92 22	21.5	22 01.2	92 22	21.3	22 56.7	92 21	20.9	23 24.4	92 21	20.7	23 52.0	92 21	20.5	24 19.7	92 21	20.3	25 42.5	92 20	19.6	26 10.1	92 20	19.4	4
145	21 20.4	93 21	21.0	21 48.3	93 21	20.8	22 43.9	93 21	20.3	23 11.8	93 20	20.1	23 39.6	93 20	19.9	24 07.3	93 20	19.7	25 30.6	92 19	19.1	25 58.3	92 19	18.9	145
6	21 07.7	93 21	20.4	21 35.7	93 20	20.2	22 31.6	93 20	19.8	22 59.5	93 20	19.6	23 27.4	93 20	19.4	23 55.3	93 20	19.2	25 18.9	93 19	18.6	25 46.7	93 19	18.4	6
7	20 55.3	94 20	19.8	21 23.4	94 20	19.6	22 19.5	94 20	19.2	22 47.5	93 19	19.0	23 15.6	93 19	18.8	23 43.6	93 19	18.6	25 07.6	93 18	18.0	25 35.5	93 18	17.8	7
8	20 43.2	94 20	19.2	21 11.4	94 19	19.0	22 07.8	94 19	18.7	22 35.9	94 19	18.5	23 04.1	94 19	18.3	23 32.2	94 18	18.1	24 56.5	94 18	17.5	25 24.6	94 18	17.3	8
9	20 31.5	94 19	18.6	20 59.8	94 19	18.4	21 56.4	94 18	18.1	22 24.7	94 18	17.9	22 52.9	94 18	17.7	23 21.2	94 18	17.5	24 45.8	94 17	17.0	25 14.0	94 17	16.8	9
150	20 20.2	95 18	18.0	20 48.6	95 18	17.9	21 45.4	95 18	17.5	22 13.7	95 18	17.3	22 42.1	95 17	17.2	23 10.5	94 17	17.0	24 35.4	94 17	16.5	25 03.7	94 17	16.3	150
1	20 09.2	95 18	17.5	20 37.7	95 18	17.3	21 34.7	95 17	16.9	22 03.1	95 17	16.8	22 31.6	95 17	16.6	23 00.1	95 17	16.4	24 25.4	95 16	15.9	24 53.8	95 16	15.7	1
2	19 58.5	95 17	16.9	20 27.1	95 17	16.7	21 24.3	95 17	16.4	21 52.9	95 16	16.2	22 21.5	95 16	16.1	22 50.0	95 16	15.9	24 15.6	95 16	15.4	24 44.2	95 16	15.2	2
3	19 48.2	96 17	16.3	20 16.9	96 16	16.1	21 14.3	96 16	15.8	21 43.0	96 16	15.6	22 11.6	96 16	15.5	22 40.3	96 16	15.3	24 06.2	95 15	14.8	24 34.8	95 15	14.7	3
4	19 38.3	96 16	15.7	20 07.1	96 16	15.5	21 04.6	96 16	15.2	21 33.4	96 15	15.1	22 02.2	96 15	14.9	22 30.9	96 15	14.8	23 57.1	96 15	14.3	24 25.9	96 14	14.1	4
155	19 28.7	96 15	15.1	19 57.6	96 15	14.9	20 55.3	96 15	14.7	21 24.2	96 15	14.5	21 53.0	96 15	14.4	22 21.9	96 14	14.2	23 48.4	96 14	13.8	24 17.2	96 14	13.6	155
6	19 19.5	97 15	14.5	19 48.4	97 15	14.4	20 46.4	97 14	14.1	21 15.3	96 14	13.9	21 44.3	96 14	13.8	22 13.2	96 14	13.7	23 40.0	96 14	13.2	24 08.9	96 13	13.1	6
7	19 10.6	97 14	13.9	19 39.7	97 14	13.8	20 37.8	97 14	13.5	21 06.8	97 14	13.4	21 35.8	97 13	13.2	22 04.8	97 13	13.1	23 31.9	97 13	12.7	24 00.9	97 13	12.5	7
8	19 02.1	97 14	13.3	19 31.3	97 13	13.2	20 29.5	97 13	12.9	20 58.6	97 13	12.8	21 27.7	97 13	12.7	21 56.8	97 13	12.5	23 24.1	97 12	12.1	23 53.2	97 12	12.0	8
9	18 54.0	97 13	12.7	19 23.2	97 13	12.6	20 21.6	97 13	12.3	20 50.8	97 12	12.2	21 20.0	97 12	12.1	21 49.2	97 12	12.0	23 16.7	97 12	11.6	23 45.8	97 12	11.5	9
160	18 46.2	98 12	12.1	19 15.5	98 12	12.0	20 14.1	98 12	11.8	20 43.3	98 12	11.6	21 12.6	98 12	11.5	21 41.9	98 12	11.4	23 09.6	97 11	11.0	23 38.8	97 11	10.9	160
1	18 38.9	98 12	11.5	19 08.2	98 12	11.4	20 06.9	98 11	11.2	20 36.2	98 11	11.1	21 05.6	98 11	11.0	21 34.9	98 11	10.8	23 02.8	98 11	10.5	23 32.2	98 11	10.4	1
2	18 31.8	98 11	10.9	19 01.2	98 11	10.8	20 00.1	98 11	10.6	20 29.5	98 11	10.5	20 58.9	98 11	10.4	21 28.3	98 10	10.3	22 56.4	98 10	10.0	23 25.8	98 10	09.8	2
3	18 25.2	98 10	10.3	18 54.7	98 10	10.2	19 53.6	98 10	10.0	20 23.1	98 10	09.9	20 52.5	98 10	09.8	21 22.0	98 10	09.7	22 50.4	98 10	09.4	23 19.8	98 09	09.3	3
4	18 18.9	98 10	09.7	18 48.4	98 10	09.6	19 47.5	98 10	09.4	20 17.0	98 09	09.3	20 46.6	98 09	09.2	21 16.1	98 09	09.1	22 44.6	98 09	08.9	23 14.1	98 09	08.8	4
165	18 13.0	99 09	09.1	18 42.6	99 09	09.0	19 41.8	99 09	08.8	20 11.4	99 09	08.8	20 40.9	99 09	08.7	21 10.5	99 09	08.6	22 39.3	99 08	08.3	23 08.8	99 08	08.2	165
6	18 07.5	99 09	08.5	18 37.1	99 08	08.4	19 36.4	99 08	08.3	20 06.1	99 08	08.2	20 35.7	99 08	08.1	21 05.3	99 08	08.0	22 34.2	99 08	07.8	23 03.8	99 08	07.7	6
7	18 02.3	99 08	07.9	18 32.0	99 08	07.8	19 31.4	99 08	07.7	20 01.1	99 08	07.6	20 30.8	99 08	07.5	21 00.5	99 08	07.4	22 29.5	99 07	07.2	22 59.2	99 07	07.1	7
8	17 57.6	99 07	07.3	18 27.3	99 07	07.2	19 26.8	99 07	07.1	19 56.5	99 07	07.0	20 26.2	99 07	06.9	20 56.0	99 07	06.9	22 25.2	99 07	06.7	22 54.9	99 07	06.6	8
9	17 53.2	99 07	06.7	18 22.9	99 07	06.6	19 22.5	99 06	06.5	19 52.3	99 06	06.4	20 22.1	99 06	06.4	20 51.8	99 06	06.3	22 21.1	99 06	06.1	22 50.9	99 06	06.0	9
170	17 49.2	99 06	06.1	18 19.0	99 06	06.0	19 18.6	99 06	05.9	19 48.4	99 06	05.8	20 18.2	99 06	05.8	20 48.0	99 06	05.7	22 17.5	99 06	05.5	22 47.3	99 05	05.5	170
1	17 45.5	1.0 05	05.5	18 15.4	1.0 05	05.4	19 15.1	1.0 05	05.3	19 44.9	99 05	05.3	20 14.8	99 05	05.2	20 44.6	99 05	05.2	22 14.2	99 05	05.0	22 44.0	99 05	04.9	1
2	17 42.3	1.0 05	04.9	18 12.1	1.0 05	04.8	19 11.9	1.0 05	04.7	19 41.8	1.0 05	04.7	20 11.7	1.0 05	04.6	20 41.6	1.0 04	04.6	22 11.2	1.0 04	04.4	22 41.1	1.0 04	04.4	2
3	17 39.4	1.0 04	04.3	18 09.3	1.0 04	04.2	19 09.1	1.0 04	04.1	19 39.0	1.0 04	04.1	20 08.9	1.0 04	04.1	20 38.8	1.0 04	04.0	22 08.6	1.0 04	03.9	22 38.5	1.0 04	03.8	3
4	17 36.9	1.0 04	03.7	18 06.8	1.0 03	03.6	19 06.7	1.0 03	03.5	19 36.6	1.0 03	03.5	20 06.6	1.0 03	03.5	20 36.5	1.0 03	03.4	22 06.3	1.0 03	03.3	22 36.2	1.0 03	03.3	4
175	17 34.8	1.0 03	03.0	18 04.7	1.0 03	03.0	19 04.7	1.0 03	03.0	19 34.6	1.0 03	02.9	20 04.6	1.0 03	02.9	20 34.5	1.0 03	02.9	22 04.4	1.0 03	02.8	22 34.3	1.0 03	02.7	175
6	17 33.1	1.0 02	02.4	18 03.0	1.0 02	02.4	19 03.0	1.0 02	02.4	19 33.0	1.0 02	02.3	20 02.9	1.0 02	02.3	20 32.9	1.0 02	02.3	22 02.8	1.0 02	02.2	22 32.8	1.0 02	02.2	6
7	17 31.7	1.0 02	01.8	18 01.7	1.0 02	01.8	19 01.7	1.0 02	01.8	19 31.7	1.0 02	01.8	20 01.6	1.0 02	01.7	20 31.6	1.0 02	01.7	22 01.6	1.0 01	01.7	22 31.6	1.0 01	01.6	7
8	17 30.8	1.0 01	01.2	18 00.8	1.0 01	01.2	19 00.7	1.0 01	01.2	19 30.7	1.0 01	01.2	20 00.7	1.0 01	01.2	20 30.7	1.0 01	01.1	22 00.7	1.0 01	01.1	22 30.7	1.0 01	01.1	8
9	17 30.2	1.0 00	00.6	18 00.2	1.0 00	00.6	19 00.2	1.0 00	00.6	19 30.2	1.0 00	00.6	20 00.2	1.0 00	00.6	20 30.2	1.0 00	00.6	22 00.2	1.0 00	00.6	22 30.2	1.0 00	00.5	
180	17 30.0	1.0 00	00.0	18 00.0	1.0 00	00.0	19 00.0	1.0 00	00.0	19 30.0	1.0 00	00.0	20 00.0	1.0 00	00.0	20 30.0	1.0 00	00.0	22 00.0	1.0 00	00.0	22 30.0	1.0 00	00.0	

Lat. 53°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 80′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	83 00.0	1.0 02	00.0	82 30.0	1.0 02	00.0	81 00.0	1.0 02	00.0	80 30.0	1.0 01	00.0	80 00.0	1.0 01	00.0	74 00.0	1.0 01	00.0	73 30.0	1.0 01	00.0	68 30.0	1.0 00	00.0	00
1	82 58.7	1.0 06	04.1	82 28.8	1.0 06	03.8	80 59.0	1.0 05	03.0	80 29.1	1.0 04	02.8	79 59.2	1.0 04	02.6	73 59.6	1.0 02	01.3	73 29.6	1.0 02	01.2	68 29.8	1.0 01	00.7	1
2	82 54.9	99 11	08.1	82 25.3	99 10	07.5	80 56.2	99 08	06.0	80 26.5	99 07	05.6	79 56.7	99 07	05.2	73 58.4	1.0 03	02.6	73 28.4	1.0 03	02.5	68 29.1	1.0 02	01.5	2
3	82 48.5	97 15	12.1	82 19.4	97 13	11.1	80 51.6	98 11	08.9	80 22.1	98 10	08.3	79 52.6	98 09	07.8	73 56.3	99 05	03.9	73 26.5	99 05	03.7	68 27.9	1.0 03	02.2	3
4	82 39.8	94 18	15.9	82 11.4	95 17	14.6	80 45.1	97 14	11.8	80 16.1	97 13	11.0	79 47.0	97 12	10.3	73 53.5	99 06	05.2	73 23.8	99 06	04.9	68 26.3	99 03	02.9	4
05	82 28.8	92 22	19.5	82 01.2	93 20	18.0	80 36.9	95 16	14.5	80 08.4	95 15	13.6	79 39.8	96 14	12.7	73 49.8	98 07	06.4	73 20.3	98 07	06.1	68 24.3	99 04	03.6	05
6	82 15.8	88 25	22.8	81 49.1	90 23	21.2	80 27.0	93 19	17.2	79 59.1	93 18	16.1	79 31.1	94 17	15.1	73 45.4	97 09	07.7	73 16.1	98 08	07.3	68 23.8	99 05	04.3	6
7	82 00.9	85 28	26.0	81 35.1	87 26	24.2	80 15.5	90 22	19.8	79 48.4	91 20	18.5	79 20.9	92 19	17.4	73 40.2	97 10	08.9	73 11.2	97 10	08.5	68 18.8	98 06	05.1	7
8	81 44.2	81 30	29.0	81 19.5	83 29	27.0	80 02.6	87 24	22.2	79 36.2	89 23	20.9	79 09.5	90 21	19.6	73 34.2	96 11	10.2	73 05.5	96 11	09.6	68 15.4	97 06	05.8	8
9	81 26.0	78 33	31.7	81 02.4	80 31	29.6	79 48.3	85 26	24.5	79 22.7	86 25	23.1	78 56.7	87 23	21.7	73 27.4	94 12	11.4	72 59.1	95 12	10.8	68 11.6	97 07	06.5	9
10	81 06.3	74 35	34.2	80 43.8	76 33	32.1	79 32.7	82 28	26.7	79 07.9	83 27	25.2	78 42.7	85 25	23.8	73 19.9	93 14	12.5	72 52.0	93 13	11.9	68 07.3	96 08	07.2	10
1	80 45.5	70 37	36.4	80 24.1	73 35	34.3	79 15.9	79 30	28.7	78 52.0	80 28	27.1	78 27.6	82 27	25.7	73 11.8	92 15	13.7	72 44.2	92 14	13.0	68 02.6	95 09	07.8	1
2	80 23.5	66 38	38.5	80 03.2	69 36	36.3	78 58.0	76 32	30.7	78 35.0	77 30	29.0	78 11.5	79 29	27.5	73 02.9	90 16	14.8	72 35.7	91 15	14.1	67 57.4	94 09	08.5	2
3	80 00.5	63 40	40.4	79 41.3	65 38	38.2	78 39.1	73 33	32.5	78 17.0	75 32	30.8	77 54.4	76 30	29.2	72 53.3	89 17	15.9	72 26.6	89 16	15.1	67 51.9	93 10	09.2	3
4	79 36.7	59 41	42.1	79 18.5	62 39	40.0	78 19.2	69 34	34.1	77 58.1	72 33	32.4	77 36.3	73 31	30.8	72 43.1	87 18	17.0	72 16.8	88 17	16.2	67 45.9	92 11	09.8	4
15	79 12.1	56 42	43.7	78 55.0	59 40	41.5	77 58.6	66 36	35.7	77 38.3	69 34	33.9	77 17.4	71 33	32.3	72 32.2	85 19	18.0	72 06.5	86 18	17.2	67 39.5	91 11	10.5	15
6	78 46.8	52 43	45.1	78 30.7	55 42	43.0	77 37.1	63 37	37.1	77 17.8	66 35	35.4	76 57.8	68 34	33.7	72 20.8	84 20	19.0	71 55.5	85 19	18.1	67 32.8	90 12	11.1	6
7	78 21.0	49 44	46.4	78 05.8	52 42	44.3	77 15.0	60 38	38.5	76 56.5	63 36	36.7	76 37.4	65 35	35.0	72 08.7	82 21	20.0	71 44.0	83 20	19.1	67 25.6	89 13	11.7	7
8	77 54.6	46 45	47.5	77 40.3	49 43	45.5	76 52.2	57 39	39.7	76 34.7	60 37	37.9	76 16.4	62 36	36.2	71 56.1	80 22	20.9	71 32.0	81 21	20.0	67 18.1	88 13	12.4	8
9	77 27.7	43 45	48.6	77 14.3	46 44	46.5	76 28.9	55 40	40.8	76 12.2	57 38	39.1	75 54.7	59 37	37.4	71 42.9	78 23	21.8	71 19.4	79 22	20.9	67 10.2	86 14	13.0	9
20	77 00.4	40 46	49.5	76 47.9	43 45	47.5	76 05.0	52 41	41.9	75 49.1	54 39	40.1	75 32.5	57 38	38.5	71 29.3	76 24	22.7	71 06.3	77 23	21.7	67 01.9	85 14	13.5	20
1	76 32.8	38 47	50.4	76 21.1	41 45	48.4	75 40.7	49 41	42.9	75 25.6	52 40	41.1	75 09.8	54 39	39.4	71 15.1	74 24	23.6	70 52.7	75 23	22.5	66 53.2	84 15	14.1	1
2	76 04.8	35 47	51.1	75 53.9	38 46	49.2	75 15.9	46 42	43.7	75 01.7	49 41	42.0	74 46.6	51 39	40.4	71 00.4	72 25	24.4	70 38.6	73 24	23.3	66 44.3	82 16	14.7	2
3	75 36.6	32 48	51.8	75 26.4	35 46	49.9	74 50.8	44 43	44.6	74 37.3	46 41	42.9	74 23.0	49 40	41.2	70 45.3	70 26	25.1	70 24.1	71 25	24.1	66 34.9	81 16	15.2	3
4	75 08.1	30 48	52.4	74 58.7	33 47	50.6	74 25.3	41 43	45.3	74 12.5	44 42	43.6	73 59.1	46 41	42.0	70 29.7	68 27	25.9	70 09.1	69 26	24.8	66 25.3	79 17	15.8	4
25	74 39.3	28 48	53.0	74 30.6	30 47	51.2	73 59.4	39 44	46.0	73 47.5	41 42	44.4	73 34.7	44 41	42.7	70 13.8	66 27	26.6	69 53.8	67 26	25.5	66 15.3	78 17	16.3	25
6	74 10.4	25 48	53.5	74 02.4	28 47	51.7	73 33.3	36 44	46.6	73 22.1	39 43	45.0	73 10.1	41 42	43.4	69 57.4	64 28	27.3	69 38.0	65 27	26.2	66 05.0	76 18	16.8	6
7	73 41.3	23 49	53.9	73 33.9	26 48	52.2	73 07.0	34 44	47.2	72 56.4	36 43	45.6	72 45.1	39 42	44.0	69 40.7	62 28	27.9	69 21.9	63 27	26.8	65 54.5	74 18	17.3	7
8	73 12.1	21 49	54.3	73 05.3	24 48	52.6	72 40.3	32 45	47.7	72 30.5	34 44	46.2	72 19.9	37 42	44.6	69 23.6	60 29	28.6	69 05.5	61 28	27.4	65 43.6	73 19	17.8	8
9	72 42.7	19 49	54.7	72 36.6	22 48	53.0	72 13.5	29 45	48.2	72 04.3	32 44	46.7	71 54.4	34 43	45.1	69 06.2	58 30	29.1	68 48.7	59 29	28.0	65 32.4	71 19	18.2	9
30	72 13.2	17 49	55.0	72 07.6	20 48	53.3	71 46.5	27 45	48.6	71 38.0	30 44	47.1	71 28.7	32 43	45.6	68 48.4	55 30	29.7	68 31.6	57 29	28.6	65 21.0	69 20	18.7	30
1	71 43.5	15 50	55.2	71 38.6	18 49	53.6	71 19.3	25 46	49.0	71 11.4	28 45	47.5	71 02.8	30 43	46.0	68 30.4	53 31	30.2	68 14.1	55 30	29.1	65 09.3	68 20	19.1	1
2	71 13.9	13 50	55.4	71 09.5	16 49	53.9	70 52.0	23 46	49.4	70 44.7	25 45	47.9	70 36.7	28 44	46.4	68 12.0	51 31	30.8	67 56.4	53 30	29.6	64 57.3	66 20	19.5	2
3	70 44.1	11 50	55.6	70 40.3	14 49	54.1	70 24.5	21 46	49.7	70 17.8	23 45	48.2	70 10.5	26 44	46.8	67 53.4	49 31	31.2	67 38.5	51 30	30.1	64 45.1	64 21	20.0	3
4	70 14.3	10 50	55.8	70 11.0	12 49	54.3	69 56.9	19 46	50.0	69 50.8	21 45	48.5	69 44.1	24 44	47.1	67 34.6	47 32	31.7	67 20.2	49 31	30.5	64 32.7	62 21	20.3	4
35	69 44.4	08 50	55.9	69 41.6	10 49	54.5	69 29.2	17 46	50.2	69 23.7	19 45	48.8	69 17.5	22 44	47.4	67 15.5	45 32	32.1	67 01.8	47 31	31.0	64 20.0	60 22	20.7	35
6	69 14.4	06 50	56.0	69 12.2	09 49	54.6	69 01.4	15 46	50.4	68 56.5	18 46	49.1	68 50.9	20 45	47.7	66 56.2	43 33	32.5	66 43.1	45 32	31.4	64 07.1	59 22	21.1	6
7	68 44.5	05 50	56.1	68 42.8	07 49	54.7	68 33.6	14 47	50.6	68 29.2	16 46	49.3	68 24.1	18 45	47.9	66 36.7	41 33	32.9	66 24.2	43 32	31.8	63 54.0	57 22	21.4	7
8	68 14.5	03 50	56.1	68 13.3	05 49	54.8	68 05.6	12 47	50.8	68 01.8	14 46	49.5	67 57.3	16 45	48.1	66 17.0	39 33	33.3	66 05.0	41 32	32.1	63 40.7	55 22	21.8	8
9	67 44.5	02 50	56.2	67 43.7	04 49	54.9	67 37.6	10 47	50.9	67 34.3	12 46	49.6	67 30.4	14 45	48.3	65 57.1	37 33	33.6	65 45.7	39 32	32.5	63 27.2	53 23	22.1	9
40	67 14.5	00 50	56.2	67 14.2	02 49	54.9	67 09.6	08 47	51.0	67 06.8	10 46	49.7	67 03.4	12 45	48.5	65 37.0	35 34	33.9	65 26.3	37 33	32.8	63 13.6	51 23	22.4	40
1	66 44.5	02 50	56.2	66 44.7	01 49	54.9	66 41.5	07 47	51.1	66 39.2	09 46	49.9	66 36.3	11 45	48.6	65 16.8	33 34	34.2	65 06.6	35 33	33.1	62 59.7	49 23	22.7	1
2	66 14.5	03 50	56.1	66 15.1	01 49	54.9	66 13.3	05 47	51.2	66 11.6	07 46	49.9	66 09.2	09 45	48.7	64 56.4	31 34	34.5	64 46.9	33 33	33.4	62 45.7	48 24	23.0	2
3	65 44.6	04 50	56.1	65 45.6	02 49	54.9	65 45.2	03 47	51.2	65 43.9	05 46	50.0	65 42.0	07 45	48.8	64 35.9	29 34	34.7	64 26.9	31 33	33.6	62 31.5	46 24	23.3	3
4	65 14.6	06 50	56.0	65 16.1	04 49	54.8	65 17.0	02 47	51.3	65 16.2	04 46	50.1	65 14.9	06 45	48.9	64 15.3	27 35	35.0	64 06.9	29 34	33.9	62 17.2	44 24	23.5	4
45	64 44.7	07 50	56.0	64 46.5	05 49	54.8	64 48.9	00 47	51.3	64 48.5	02 46	50.1	64 47.7	04 45	48.9	63 54.5	25 35	35.2	63 46.7	27 34	34.1	62 02.7	42 24	23.8	45
6	64 14.7	09 50	55.9	64 17.1	07 49	54.7	64 20.7	01 47	51.3	64 20.8	00 46	50.1	64 20.4	02 45	49.0	63 33.7	23 35	35.4	63 26.4	25 34	34.3	61 48.0	40 25	24.0	6
7	63 44.9	10 50	55.8	63 47.6	08 49	54.6	63 52.5	03 47	51.2	63 53.1	01 46	50.1	63 53.2	01 45	49.0	63 12.7	22 35	35.6	63 06.0	23 34	34.5	61 33.3	38 25	24.2	7
8	63 15.0	11 50	55.6	63 18.2	10 49	54.5	63 24.4	04 47	51.2	63 25.4	03 46	50.1	63 26.0	01 45	49.0	62 51.7	20 35	35.7	62 45.5	21 34	34.6	61 18.4	36 25	24.4	8
9	62 45.3	13 50	55.5	62 48.8	11 49	54.4	62 56.3	06 47	51.2	62 57.7	04 46	50.1	62 58.7	02 45	49.0	62 30.5	18 35	35.9	62 24.9	19 34	34.8	61 03.4	35 25	24.6	9
50	62 15.5	14 49	55.4	62 19.4	12 49	54.3	62 28.2	07 47	51.1	62 30.1	06 46	50.0	62 31.5	04 45	48.9	62 09.4	16 35	36.0	62 04.3	18 35	34.9	60 48.3	33 25	24.8	50
1	61 45.8	15 49	55.2	61 50.1	13 49	54.2	62 00.1	09 47	51.0	62 02.4	07 46	49.9	62 04.3	05 45	48.9	61 48.1	14 36	36.1	61 43.6	16 35	35.1	60 33.1	31 26	25.0	1
2	61 16.2	16 49	55.1	61 20.9	15 49	54.0	61 32.0	10 47	50.9	61 34.8	08 46	49.9	61 37.1	07 45	48.8	61 26.8	12 36	36.2	61 22.8	14 35	35.2	60 17.8	29 26	25.2	2
3	60 46.6	18 49	54.9	60 51.7	16 49	53.9	61 04.0	11 47	50.8	61 07.2	10 46	49.8	61 09.9	08 45	48.7	61 05.4	11 36	36.3	61 02.0	12 35	35.3	60 02.4	27 26	25.3	3
4	60 17.1	19 49	54.7	60 22.5	17 48	53.7	60 36.1	13 47	50.7	60 39.7	11 46	49.7	60 42.8	10 45	48.7	60 44.0	09 36	36.4	60 41.1	11 35	35.4	59 47.0	25 26	25.4	4
55	59 47.7	20 49	54.5	59 53.5	19 48	53.5	60 08.2	14 46	50.6	60 12.2	13 46	49.6	60 15.7	11 45	48.6	60 22.6	07 36	36.4	60 20.2	09 35	35.4	59 31.4	24 26	25.6	55
6	59 18.3	21 49	54.3	59 24.5	20 48	53.3	59 40.3	15 46	50.4	59 44.7	14 46	49.4	59 48.7	12 45	48.5	60 01.1	06 36	36.5	59 59.2	07 35	35.5	59 15.8	22 26	25.7	6
7	58 49.1	22 49	54.1	58 55.5	21 48	53.1	59 12.5	17 46	50.3	59 17.3	15 46	49.3	59 21.7	14 45	48.3	59 39.7	04 36	36.5	59 38.3	05 35	35.5	59 00.1	20 26	25.8	7
8	58 19.9	23 49	53.9	58 26.7	22 48	52.9	58 44.8	18 46	50.1	58 49.9	17 45	49.2	58 54.7	15 45	48.2	59 18.2	02 36	36.5	59 17.3	04 35	35.6	58 44.4	18 26	25.9	8
9	57 50.7	25 48	53.6	57 57.9	23 48	52.7	58 17.1	19 46	50.0	58 22.6	18 45	49.0	58 27.8	17 45	48.1	58 56.7	01 36	36.5	58 56.3	02 35	35.6	58 28.6	16 26	26.0	9
60	57 21.7	26 48	53.4	57 29.2	24 48	52.5	57 49.5	21 46	49.8	57 55.4	19 45	48.9	58 01.0	18 45	47.9	58 35.2	01 36	36.5	58 35.3	00 35	35.6	58 12.7	15 26	26.1	60
1	56 52.8	27 48	53.2	57 00.6	26 48	52.3	57 21.9	22 46	49.6	57 28.3	20 45	48.7	57 34.2	19 44	47.8	58 13.7	03 36	36.5	58 14.3	01 35	35.6	57 56.8	13 27	26.1	1
2	56 23.9	28 48	52.9	56 32.1	27 47	52.0	56 54.5	23 46	49.4	57 01.2	22 45	48.5	57 07.5	20 44	47.6	57 52.2	04 36	36.5	57 53.2	03 35	35.6	57 40.9	11 27	26.2	2
3	55 55.2	29 48	52.7	56 03.7	28 47	51.8	56 27.1	24 46	49.2	56 34.2	23 45	48.3	56 40.9	22 44	47.4	57 30.7	06 36	36.5	57 32.2	04 35	35.5	57 25.0	09 27	26.2	3
4	55 26.5	30 48	52.4	55 35.4	29 47	51.6	55 59.8	25 45	49.0	56 07.3	24 45	48.1	56 14.3	23 44	47.2	57 09.3	07 36	36.4	57 11.3	06 35	35.5	57 09.0	08 27	26.3	4
65	54 57.9	31 47	52.1	55 07.1	30 47	51.3	55 32.6	27 45	48.8	55 40.4	25 45	47.9	55 47.9	24 44	47.1	56 47.8	09 36	36.4	56 50.3	08 35	35.5	56 53.0	06 27	26.3	65
6	54 29.5	32 47	51.9	54 39.0	31 47	51.0	55 05.5	28 45	48.5	55 13.7	27 44	47.7	55 21.5	26 44	46.9	56 26.4	10 36	36.3	56 29.4	09 35	35.4	56 37.0	04 27	26.3	6
7	54 01.1	33 47	51.6	54 11.0	32 46	50.8	54 38.5	29 45	48.3	54 47.0	28 44	47.5	54 55.2	27 44	46.6	56 05.1	12 36	36.2	56 08.5	11 35	35.4	56 21.0	02 27	26.4	7
8	53 32.9	34 47	51.3	53 43.1	33 46	50.5	54 11.6	30 45	48.1	54 20.4	29 44	47.3	54 29.0	28 44	46.4	55 43.7	13 35	36.2	55 47.6	12 35	35.3	56 04.9	01 27	26.4	8
9	53 04.8	35 47	51.0	53 15.3	34 46	50.2	53 44.8	31 44	47.8	53 54.0	30 44	47.0	54 02.8	29 43	46.2	55 22.4	15 35	36.1	55 26.7	14 35	35.2	55 48.9	01 27	26.4	9
70	52 36.8	36 46	50.7	52 47.6	35 46	49.9	53 18.1	32 44	47.6	53 27.6	31 44	46.8	53 36.8	30 43	46.0	55 01.2	16 35	36.0	55 06.0	15 35	35.1	55 32.9	03 27	26.4	70
1	52 08.9	37 46	50.4	52 20.0	36 46	49.6	52 51.5	33 44	47.3	53 01.3	32 44	46.5	53 10.9	31 43	45.7	54 40.0	18 35	35.9	54 45.2	17 34	35.0	55 16.8	04 27	26.3	1
2	51 41.2	38 46	50.1	51 52.5	37 46	49.3	52 25.0	35 44	47.1	52 35.2	34 43	46.3	52 45.1	33 43	45.5	54 18.9	19 35	35.8	54 24.5	18 34	34.9	55 00.8	06 27	26.3	2
3	51 13.5	39 46	49.8	51 25.2	39 45	49.0	51 58.6	36 44	46.8	52 09.1	35 43	46.0	52 19.4	34 43	45.3	53 57.8	21 35	35.6	54 03.9	20 34	34.8	54 44.8	08 27	26.3	3
4	50 46.0	40 46	49.5	50 58.0	40 45	48.7	51 32.3	37 44	46.5	51 43.2	36 43	45.8	51 53.8	35 42	45.0	53 36.8	22 35	35.5	53 43.3	21 34	34.7	54 28.8	09 27	26.2	4
75	50 18.6	41 45	49.1	50 30.9	41 45	48.4	51 06.2	38 43	46.2	51 17.4	37 43	45.5	51 28.3	36 42	44.7	53 15.9	24 35	35.4	53 22.8	22 34	34.5	54 12.9	11 27	26.2	75
6	49 51.4	42 45	48.8	50 04.0	42 45	48.1	50 40.2	39 43	46.0	50 51.7	38 43	45.2	51 03.0	37 42	44.5	52 55.0	25 35	35.2	53 02.4	24 34	34.4	53 57.0	12 26	26.1	6
7	49 24.3	43 45	48.5	49 37.2	43 44	47.8	50 14.3	40 43	45.7	50 26.1	39 42	44.9	50 37.7	38 42	44.2	52 34.3	26 34	35.1	52 42.0	25 34	34.3	53 41.1	14 26	26.1	7
8	48 57.3	44 45	48.1	49 10.5	43 44	47.5	49 48.5	41 43	45.4	50 00.7	40 42	44.7	50 12.6	39 42	43.9	52 13.5	28 34	34.9	52 21.7	27 34	34.1	53 25.2	16 26	26.0	8
9	48 30.5	45 44	47.8	48 44.0	44 44	47.1	49 22.9	42 42	45.1	49 35.4	41 42	44.4	49 47.6	40 41	43.7	51 52.9	29 34	34.7	52 01.5	28 34	34.0	53 09.4	17 26	25.9	9
80	48 03.8	46 44	47.5	48 17.6	45 44	46.8	48 57.4	43 42	44.8	49 10.2	42 42	44.1	49 22.7	41 41	43.4	51 32.4	30 34	34.6	51 41.3	29 33	33.8	52 53.6	19 26	25.9	80
1	47 37.3	47 44	47.1	47 51.3	46 44	46.5	48 32.1	44 42	44.4	48 45.2	43 42	43.8	48 58.0	42 41	43.1	51 12.0	32 34	34.4	51 21.3	31 33	33.6	52 37.9	20 26	25.8	1
2	47 10.9	48 44	46.8	47 25.2	47 43	46.1	48 06.8	45 42	44.1	48 20.2	44 41	43.5	48 33.4	44 41	42.8	50 51.6	33 34	34.2	51 01.3	32 33	33.5	52 22.2	22 26	25.7	2
3	46 44.7	49 43	46.4	46 59.3	48 43	45.8	47 41.8	46 42	43.8	47 55.5	45 41	43.2	48 09.0	45 41	42.5	50 31.3	34 34	34.0	50 41.5	33 33	33.3	52 06.6	23 26	25.6	3
4	46 18.6	50 43	46.0	46 33.5	49 43	45.4	47 16.8	47 41	43.5	47 30.9	46 41	42.8	47 44.6	46 40	42.2	50 11.2	36 33	33.8	50 21.7	35 33	33.1	51 51.0	25 26	25.5	4
85	45 52.7	51 43	45.7	46 07.9	50 42	45.1	46 52.1	48 41	43.2	47 06.4	47 41	42.5	47 20.5	47 40	41.9	49 51.2	37 33	33.6	50 02.1	36 33	32.9	51 35.5	26 26	25.4	85
6	45 27.0	52 43	45.3	45 42.4	51 42	44.7	46 27.4	49 41	42.8	46 42.1	48 40	42.2	46 56.4	48 40	41.6	49 31.2	38 33	33.4	49 42.5	37 32	32.7	51 20.1	28 26	25.3	6
7	45 01.4	53 42	44.9	45 17.1	52 42	44.3	46 03.0	50 41	42.5	46 17.9	49 40	41.9	46 32.6	49 40	41.2	49 11.4	39 33	33.2	49 23.0	38 32	32.5	51 04.7	29 26	25.1	7
8	44 35.9	54 42	44.6	44 51.9	53 42	44.0	45 38.7	51 40	42.2	45 53.9	50 40	41.5	46 08.8	50 39	40.9	48 51.7	41 33	33.0	49 03.7	40 32	32.3	50 49.4	31 25	25.0	8
9	44 10.7	54 42	44.2	44 26.9	54 41	43.6	45 14.5	52 40	41.8	45 30.0	51 40	41.2	45 45.3	51 39	40.6	48 32.1	42 32	32.8	48 44.5	41 32	32.1	50 34.2	32 25	24.9	9
90	43 45.6	55 42	43.8	44 02.1	55 41	43.2	44 50.5	53 40	41.5	45 06.3	52 39	40.9	45 21.9	52 39	40.3	48 12.6	43 32	32.5	48 25.4	42 32	31.9	50 19.0	33 25	24.7	90

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	
91	43 20.7	56 41	43.4	43 37.5	56 41	42.9	44 26.7	54 39	41.1	44 42.7	53 39	40.5	44 58.6	53 38	39.9	47 53.2	44 32	32.3	48 06.4	43 31	31.6	50 04.0	35 25	24.6	91
2	42 56.0	57 41	43.0	43 13.0	56 40	42.5	44 03.0	55 39	40.8	44 19.4	54 39	40.2	44 35.5	54 38	39.6	47 34.0	45 32	32.1	47 47.5	45 31	31.4	49 49.0	36 25	24.5	2
3	42 31.4	58 41	42.6	42 48.7	57 40	42.1	43 39.5	56 39	40.4	43 56.2	55 38	39.8	44 12.6	54 38	39.2	47 14.9	46 32	31.8	47 28.7	46 31	31.2	49 34.1	38 25	24.3	3
4	42 07.0	59 40	42.3	42 24.6	58 40	41.7	43 16.2	57 39	40.0	43 33.1	56 38	39.5	43 49.8	55 38	38.9	46 55.9	48 31	31.6	47 10.1	47 31	30.9	49 19.2	39 25	24.1	4
95	41 42.8	60 40	41.9	42 00.6	59 40	41.3	42 53.1	57 38	39.7	43 10.3	57 38	39.1	43 27.3	56 37	38.5	46 37.1	49 31	31.3	46 51.6	48 31	30.7	49 04.5	40 24	24.0	95
6	41 18.8	60 40	41.5	41 36.9	60 39	40.9	42 30.1	58 38	39.3	42 47.6	58 38	38.7	43 04.9	57 37	38.2	46 18.4	50 31	31.1	46 33.3	49 30	30.4	48 49.9	42 24	23.8	6
7	40 55.0	61 39	41.1	41 13.3	61 39	40.5	42 07.4	59 38	38.9	42 25.1	59 37	38.4	42 42.6	58 37	37.8	45 59.8	51 31	30.8	46 15.1	50 30	30.2	48 35.4	43 24	23.6	7
8	40 31.4	62 39	40.6	40 50.0	62 39	40.1	41 44.8	60 37	38.5	42 02.7	60 37	38.0	42 20.6	59 36	37.5	45 41.4	52 30	30.5	45 57.0	52 30	29.9	48 20.9	44 24	23.5	8
9	40 08.0	63 39	40.2	40 26.8	62 38	39.7	41 22.4	61 37	38.2	41 40.6	61 37	37.6	41 58.7	60 36	37.1	45 23.1	53 30	30.3	45 39.0	53 30	29.7	48 06.6	46 24	23.3	9
100	39 44.8	64 38	39.8	40 03.8	63 38	39.3	41 00.1	62 37	37.8	41 18.7	61 36	37.3	41 37.0	61 36	36.7	45 05.0	54 30	30.0	45 21.2	54 29	29.4	47 52.4	47 24	23.1	100
1	39 21.7	65 38	39.4	39 41.0	64 38	38.9	40 38.1	63 36	37.4	40 56.9	62 36	36.9	41 15.5	62 36	36.4	44 47.1	55 30	29.7	45 03.6	55 29	29.1	47 38.3	48 23	22.9	1
2	38 58.9	65 38	39.0	39 18.5	65 37	38.5	40 16.3	64 36	37.0	40 35.3	63 36	36.5	40 54.2	63 35	36.0	44 29.2	56 29	29.4	44 46.1	56 29	28.8	47 24.3	49 23	22.7	2
3	38 36.3	66 37	38.6	38 56.1	66 37	38.1	39 54.7	64 36	36.6	40 13.9	64 35	36.1	40 33.1	64 35	35.6	44 11.6	58 29	29.1	44 28.7	57 29	28.6	47 10.4	51 23	22.5	3
4	38 13.9	67 37	38.1	38 33.9	67 37	37.7	39 33.2	65 35	36.2	39 52.8	65 35	35.7	40 12.2	64 35	35.2	43 54.1	59 29	28.9	44 11.6	58 28	28.3	46 56.6	52 23	22.3	4
105	37 51.7	68 37	37.7	38 11.9	67 36	37.2	39 12.0	66 35	35.8	39 31.8	66 35	35.3	39 51.4	65 34	34.8	43 36.7	60 29	28.6	43 54.5	59 28	28.0	46 43.0	53 23	22.1	105
6	37 29.7	68 36	37.3	37 50.2	68 36	36.8	38 51.0	67 35	35.4	39 11.0	67 34	34.9	39 30.9	66 34	34.4	43 19.5	61 28	28.3	43 37.6	60 28	27.7	46 29.4	54 22	21.9	6
7	37 08.0	69 36	36.9	37 28.7	69 36	36.4	38 30.1	68 34	35.0	38 50.4	67 34	34.5	39 10.6	67 34	34.1	43 02.5	62 28	28.0	43 20.9	61 28	27.4	46 16.0	55 22	21.7	7
8	36 46.4	70 36	36.4	37 07.3	70 35	36.0	38 09.5	69 34	34.6	38 30.1	68 34	34.1	38 50.5	68 33	33.7	42 45.7	63 28	27.7	43 04.4	62 27	27.1	46 02.7	57 22	21.5	8
9	36 25.1	71 35	36.0	36 46.2	70 35	35.5	37 49.1	69 34	34.2	38 09.9	69 33	33.7	38 30.5	69 33	33.3	42 29.0	64 28	27.4	42 48.0	63 27	26.8	45 49.6	58 22	21.3	9
110	36 04.0	71 35	35.5	36 25.4	71 34	35.1	37 29.0	70 33	33.8	37 50.0	70 33	33.3	38 10.8	69 32	32.9	42 12.5	65 27	27.0	42 31.8	64 27	26.5	45 36.5	59 22	21.0	110
1	35 43.1	72 34	35.1	36 04.7	72 34	34.7	37 09.0	71 33	33.4	37 30.2	71 32	32.9	37 51.4	70 32	32.5	41 56.2	66 27	26.7	42 15.8	65 26	26.2	45 23.6	60 21	20.8	1
2	35 22.5	73 34	34.6	35 44.3	73 34	34.2	36 49.2	72 33	32.9	37 10.7	71 32	32.5	37 32.1	71 32	32.1	41 40.0	66 27	26.4	41 59.9	66 26	25.9	45 10.9	61 21	20.6	2
3	35 02.0	74 34	34.2	35 24.1	73 33	33.8	36 29.7	72 32	32.5	36 51.4	72 32	32.1	37 13.0	72 31	31.7	41 24.0	67 26	26.1	41 44.2	67 26	25.6	44 58.3	62 21	20.3	3
4	34 41.9	74 33	33.8	35 04.1	74 33	33.3	36 10.4	73 32	32.1	36 32.3	73 31	31.7	36 54.2	73 31	31.2	41 08.3	68 26	25.8	41 28.7	68 26	25.3	44 45.8	63 21	20.1	4
115	34 21.9	75 33	33.3	34 44.4	75 32	32.9	35 51.4	74 31	31.7	36 13.5	74 31	31.2	36 35.6	73 31	30.8	40 52.6	69 26	25.4	41 13.4	69 25	25.0	44 33.4	64 20	19.9	115
6	34 02.2	76 32	32.8	34 24.9	76 32	32.4	35 32.5	75 31	31.2	35 54.9	74 31	30.8	36 17.2	74 30	30.4	40 37.2	70 25	25.1	40 58.2	70 25	24.6	44 21.2	65 20	19.6	6
7	33 42.8	76 32	32.4	34 05.7	76 32	32.0	35 13.9	75 31	30.8	35 36.5	75 30	30.4	35 59.0	75 30	30.0	40 22.0	71 25	24.8	40 43.3	71 25	24.3	44 09.2	66 20	19.4	7
8	33 23.5	77 32	31.9	33 46.7	77 31	31.5	34 55.5	76 30	30.4	35 18.3	76 30	30.0	35 41.1	76 30	29.6	40 07.0	72 25	24.4	40 28.5	72 24	24.0	43 57.3	67 20	19.1	8
9	33 04.6	78 31	31.5	33 27.9	78 31	31.1	34 37.4	77 30	29.9	35 00.4	77 29	29.5	35 23.4	76 29	29.1	39 52.1	73 24	24.1	40 13.9	72 24	23.7	43 45.5	68 19	18.9	9
120	32 45.9	78 31	31.0	33 09.4	78 30	30.6	34 19.5	78 29	29.5	34 42.7	77 29	29.1	35 05.9	77 29	28.7	39 37.5	74 24	23.8	39 59.5	73 24	23.3	43 33.9	69 19	18.6	120
1	32 27.4	79 30	30.5	32 51.1	79 30	30.2	34 01.8	78 29	29.1	34 25.3	78 29	28.7	34 48.7	78 28	28.3	39 23.0	74 24	23.4	39 45.3	74 23	23.0	43 22.4	70 19	18.4	1
2	32 09.2	80 30	30.1	32 33.1	80 30	29.7	33 44.4	79 29	28.6	34 08.1	79 28	28.2	34 31.7	79 28	27.9	39 08.8	75 23	23.1	39 31.3	75 23	22.6	43 11.1	71 19	18.1	2
3	31 51.2	80 29	29.6	32 15.3	80 29	29.2	33 27.3	80 28	28.2	33 51.1	79 28	27.8	34 14.9	79 28	27.4	38 54.7	76 23	22.7	39 17.5	76 23	22.3	43 00.0	72 18	17.8	3
4	31 33.5	81 29	29.1	31 57.8	81 29	28.8	33 10.4	80 28	27.7	33 34.4	80 27	27.4	33 58.4	80 27	27.0	38 40.9	77 23	22.4	39 03.9	77 22	22.0	42 49.0	73 18	17.6	4
125	31 16.1	82 29	28.6	31 40.6	82 28	28.3	32 53.7	81 27	27.3	33 17.9	81 27	26.9	33 42.1	81 27	26.6	38 27.2	78 22	22.0	38 50.5	77 22	21.6	42 38.2	74 18	17.3	125
6	30 58.9	82 28	28.2	31 23.6	82 28	27.8	32 37.3	82 27	26.8	33 01.7	81 27	26.5	33 26.1	81 26	26.1	38 13.8	78 22	21.7	38 37.3	78 22	21.3	42 27.5	75 18	17.0	6
7	30 42.0	83 28	27.7	31 06.9	83 27	27.3	32 21.1	82 26	26.3	32 45.8	82 26	26.0	33 10.4	82 26	25.7	38 00.6	79 22	21.3	38 24.3	79 21	20.9	42 17.0	76 17	16.8	7
8	30 25.4	84 27	27.2	30 50.4	83 27	26.9	32 05.2	83 26	25.9	32 30.1	83 26	25.6	32 54.8	83 25	25.2	37 47.6	80 21	20.9	38 11.5	80 21	20.6	42 06.7	77 17	16.5	8
9	30 09.0	84 27	26.7	30 34.2	84 27	26.4	31 49.6	83 26	25.4	32 14.6	83 25	25.1	32 39.6	83 25	24.8	37 34.8	81 21	20.6	37 59.0	80 21	20.2	41 56.5	78 17	16.2	9
130	29 52.9	85 26	26.2	30 18.3	85 26	25.9	31 34.2	84 25	25.0	31 59.4	84 25	24.6	32 24.6	84 25	24.3	37 22.2	81 21	20.2	37 46.6	81 20	19.8	41 46.5	79 16	15.9	130
1	29 37.1	85 26	25.7	30 02.7	85 26	25.4	31 19.1	85 25	24.5	31 44.5	85 24	24.2	32 09.8	84 24	23.9	37 09.8	82 20	19.8	37 34.5	82 20	19.5	41 36.7	79 16	15.6	1
2	29 21.6	86 25	25.2	29 47.3	86 25	24.9	31 04.3	85 24	24.0	31 29.8	85 24	23.7	31 55.3	85 24	23.4	36 57.7	83 20	19.5	37 22.5	83 20	19.1	41 27.0	80 16	15.4	2
3	29 06.3	86 25	24.7	29 32.2	86 25	24.5	30 49.7	86 24	23.6	31 15.4	86 24	23.3	31 41.1	86 23	23.0	36 45.8	84 20	19.1	37 10.8	83 19	18.8	41 17.6	81 16	15.1	3
4	28 51.4	87 24	24.2	29 17.4	87 24	24.0	30 35.4	86 23	23.1	31 01.3	86 23	22.8	31 27.2	86 23	22.5	36 34.1	84 19	18.7	36 59.3	84 19	18.4	41 08.3	82 15	14.8	4
135	28 36.7	87 24	23.7	29 02.9	87 24	23.5	30 21.4	87 23	22.6	30 47.4	87 23	22.3	31 13.5	87 22	22.0	36 22.6	85 19	18.3	36 48.0	85 18	18.0	40 59.1	83 15	14.5	135
6	28 22.3	88 24	23.2	28 48.7	88 23	23.0	30 07.6	88 22	22.2	30 33.8	87 22	21.9	31 00.1	87 22	21.6	36 11.3	86 18	18.0	36 37.0	85 18	17.6	40 50.2	83 15	14.2	6
7	28 08.2	89 23	22.7	28 34.7	88 23	22.5	29 54.1	88 22	21.7	30 20.5	88 22	21.4	30 46.9	88 21	21.1	36 00.3	86 18	17.6	36 26.1	86 18	17.3	40 41.4	84 14	13.9	7
8	27 54.4	89 23	22.2	28 21.0	89 22	22.0	29 40.9	89 22	21.2	30 07.5	89 21	20.9	30 34.0	88 21	20.7	35 49.5	87 18	17.2	36 15.5	87 17	16.9	40 32.8	85 14	13.6	8
9	27 40.8	90 22	21.7	28 07.7	89 22	21.5	29 28.0	89 21	20.7	29 54.7	89 21	20.5	30 21.4	89 21	20.2	35 39.0	87 17	16.8	36 05.2	87 17	16.5	40 24.4	86 14	13.3	9
140	27 27.6	90 22	21.2	27 54.6	90 21	21.0	29 15.4	90 21	20.2	29 42.3	90 20	20.0	30 09.1	89 20	19.7	35 28.6	88 17	16.4	35 55.0	88 17	16.1	40 16.2	86 13	13.0	140
1	27 14.7	90 21	20.7	27 41.8	90 21	20.5	29 03.0	90 20	19.8	29 30.1	90 20	19.5	29 57.1	90 20	19.3	35 18.5	89 16	16.0	35 45.1	88 16	15.8	40 08.2	87 13	12.7	1
2	27 02.0	91 21	20.2	27 29.3	91 20	20.0	28 51.0	91 20	19.3	29 18.1	91 19	19.0	29 45.3	90 19	18.8	35 08.7	89 16	15.7	35 35.4	89 16	15.4	40 00.3	88 13	12.4	2
3	26 49.7	91 20	19.7	27 17.1	91 20	19.5	28 39.2	91 19	18.8	29 06.5	91 19	18.5	29 33.8	91 19	18.3	34 59.0	90 16	15.3	35 25.9	90 15	15.0	39 52.6	88 12	12.1	3
4	26 37.7	92 20	19.2	27 05.2	92 19	19.0	28 27.7	92 19	18.3	28 55.2	91 18	18.1	29 22.6	91 18	17.8	34 49.7	90 15	14.9	35 16.7	90 15	14.6	39 45.2	89 12	11.8	4
145	26 26.0	92 19	18.7	26 53.6	92 19	18.5	28 16.5	92 18	17.8	28 44.1	92 18	17.6	29 11.7	92 18	17.4	34 40.5	91 15	14.5	35 07.7	91 15	14.2	39 37.9	89 12	11.5	145
6	26 14.6	93 18	18.2	26 42.4	93 18	18.0	28 05.6	92 18	17.3	28 33.4	92 17	17.1	29 01.1	92 17	16.9	34 31.6	91 14	14.1	34 59.0	91 14	13.8	39 30.8	90 12	11.2	6
7	26 03.5	93 18	17.6	26 31.4	93 18	17.4	27 55.0	93 17	16.8	28 22.9	93 17	16.6	28 50.7	93 17	16.4	34 22.9	92 14	13.7	34 50.5	92 14	13.4	39 23.9	91 11	10.9	7
8	25 52.7	94 17	17.1	26 20.7	93 17	16.9	27 44.7	93 17	16.3	28 12.7	93 16	16.1	28 40.7	93 16	15.9	34 14.5	92 14	13.3	34 42.2	92 13	13.0	39 17.2	91 11	10.5	8
9	25 42.2	94 17	16.6	26 10.4	94 17	16.4	27 34.7	94 16	15.8	28 02.8	94 16	15.6	28 30.9	94 16	15.4	34 06.4	93 13	12.9	34 34.2	93 13	12.7	39 10.7	92 11	10.2	9
150	25 32.0	94 16	16.1	26 00.3	94 16	15.9	27 25.0	94 16	15.3	27 53.3	94 15	15.1	28 21.5	94 15	14.9	33 58.4	93 13	12.5	34 26.4	93 13	12.3	39 04.4	92 10	09.9	150
1	25 22.2	95 16	15.6	25 50.6	95 16	15.4	27 15.7	94 15	14.8	27 44.0	94 15	14.6	28 12.3	94 15	14.5	33 50.8	94 12	12.1	34 18.8	94 12	11.9	38 58.3	93 10	09.6	1
2	25 12.7	95 15	15.0	25 41.2	95 15	14.9	27 06.6	95 15	14.3	27 35.0	95 14	14.2	28 03.4	95 14	14.0	33 43.3	94 12	11.7	34 11.5	94 12	11.5	38 52.3	93 10	09.3	2
3	25 03.5	96 15	14.5	25 32.0	95 15	14.3	26 57.8	95 14	13.8	27 26.3	95 14	13.7	27 54.9	95 14	13.5	33 36.1	94 12	11.3	34 04.5	94 11	11.1	38 46.6	94 09	09.0	3
4	24 54.6	96 14	14.0	25 23.3	96 14	13.8	26 49.3	96 14	13.3	27 17.9	95 13	13.2	27 46.6	95 13	13.0	33 29.2	95 11	10.9	33 57.7	95 11	10.7	38 41.1	94 09	08.6	4
155	24 46.0	96 14	13.5	25 14.8	96 14	13.3	26 41.1	96 13	12.8	27 09.9	96 13	12.7	27 38.6	96 13	12.5	33 22.5	95 11	10.4	33 51.1	95 10	10.3	38 35.8	95 09	08.3	155
6	24 37.8	96 13	12.9	25 06.6	96 13	12.8	26 33.3	96 13	12.3	27 02.1	96 12	12.2	27 30.9	96 12	12.0	33 16.1	96 10	10.0	33 44.8	96 10	09.9	38 30.7	95 08	08.0	6
7	24 29.8	97 13	12.4	24 58.8	97 12	12.3	26 25.7	96 12	11.8	26 54.6	96 12	11.7	27 23.6	96 12	11.5	33 09.9	96 10	09.6	33 38.7	96 10	09.5	38 25.7	95 08	07.7	7
8	24 22.3	97 12	11.9	24 51.3	97 12	11.7	26 18.5	97 12	11.3	26 47.5	97 11	11.2	27 16.5	97 11	11.0	33 04.0	96 09	09.2	33 32.9	96 09	09.1	38 21.0	96 08	07.3	8
9	24 15.0	97 12	11.3	24 44.1	97 11	11.2	26 11.5	97 11	10.8	26 40.7	97 11	10.7	27 09.8	97 11	10.5	32 58.4	97 09	08.8	33 27.4	97 09	08.7	38 16.5	96 07	07.0	9
160	24 08.1	97 11	10.8	24 37.3	97 11	10.7	26 04.9	97 10	10.3	26 34.1	97 10	10.2	27 03.3	97 10	10.0	32 53.0	97 09	08.4	33 22.1	97 08	08.2	38 12.2	97 07	06.7	160
1	24 01.5	98 10	10.3	24 30.8	98 10	10.1	25 58.6	98 10	09.8	26 27.9	98 10	09.7	26 57.2	98 10	09.5	32 47.8	97 08	08.0	33 17.0	97 08	07.8	38 08.1	97 06	06.4	1
2	23 55.2	98 10	09.7	24 24.6	98 10	09.6	25 52.6	98 09	09.3	26 22.0	98 09	09.2	26 51.3	98 09	09.0	32 43.0	98 08	07.6	33 12.2	97 08	07.4	38 04.2	97 06	06.0	2
3	23 49.3	98 09	09.2	24 18.7	98 09	09.1	25 47.0	98 09	08.8	26 16.4	98 09	08.7	26 45.8	98 09	08.5	32 38.3	98 07	07.1	33 07.7	98 07	07.0	38 00.6	97 06	05.7	3
4	23 43.7	98 09	08.7	24 13.2	98 09	08.6	25 41.6	98 08	08.3	26 11.1	98 08	08.2	26 40.6	98 08	08.1	32 34.0	98 07	06.7	33 03.4	98 07	06.6	37 57.1	98 05	05.4	4
165	23 38.4	99 08	08.1	24 07.9	99 08	08.0	25 36.6	98 08	07.7	26 06.2	98 08	07.6	26 35.7	98 08	07.6	32 29.9	98 06	06.3	32 59.4	98 06	06.2	37 53.8	98 05	05.0	165
6	23 33.5	99 08	07.6	24 03.1	99 08	07.5	25 31.9	99 07	07.2	26 01.5	99 07	07.1	26 31.1	99 07	07.1	32 26.0	99 06	05.9	32 55.6	98 06	05.8	37 50.7	98 05	04.7	6
7	23 28.9	99 07	07.0	23 58.5	99 07	07.0	25 27.5	99 07	06.7	25 57.2	99 07	06.6	26 26.8	99 07	06.5	32 22.5	99 06	05.5	32 52.1	99 05	05.4	37 47.9	99 04	04.4	7
8	23 24.6	99 07	06.5	23 54.3	99 06	06.4	25 23.5	99 06	06.2	25 53.2	99 06	06.1	26 22.9	99 06	06.0	32 19.1	99 05	05.1	32 48.8	99 05	05.0	37 45.3	99 04	04.0	8
9	23 20.7	99 06	06.0	23 50.4	99 06	05.9	25 19.7	99 06	05.7	25 49.5	99 06	05.6	26 19.2	99 06	05.5	32 16.1	99 05	04.6	32 45.8	99 05	04.6	37 42.8	99 04	03.7	9
170	23 17.1	99 05	05.4	23 46.9	99 05	05.4	25 16.3	99 05	05.2	25 46.1	99 05	05.1	26 15.9	99 05	05.0	32 13.3	99 04	04.2	32 43.1	99 04	04.1	37 40.6	99 03	03.4	170
1	23 13.8	99 05	04.9	23 43.7	99 05	04.8	25 13.2	99 05	04.7	25 43.0	99 05	04.6	26 12.9	99 04	04.5	32 10.8	99 04	03.8	32 40.6	99 04	03.7	37 38.6	99 03	03.0	1
2	23 10.9	1.0 04	04.3	23 40.8	1.0 04	04.3	25 10.4	1.0 04	04.1	25 40.3	1.0 04	04.1	26 10.2	1.0 04	04.0	32 08.5	1.0 03	03.4	32 38.4	1.0 03	03.3	37 36.8	99 03	02.7	2
3	23 08.4	1.0 04	03.8	23 38.3	1.0 04	03.8	25 08.0	1.0 04	03.6	25 37.9	1.0 04	03.6	26 07.8	1.0 03	03.5	32 06.5	1.0 03	03.0	32 36.4	1.0 03	02.9	37 35.2	1.0 02	02.4	3
4	23 06.2	1.0 03	03.3	23 36.1	1.0 03	03.2	25 05.9	1.0 03	03.1	25 35.8	1.0 03	03.1	26 05.7	1.0 03	03.0	32 04.8	1.0 02	02.5	32 34.7	1.0 02	02.5	37 33.8	1.0 02	02.0	4
175	23 04.3	1.0 03	02.7	23 34.2	1.0 03	02.7	25 04.1	1.0 02	02.6	25 34.0	1.0 02	02.6	26 04.0	1.0 02	02.5	32 03.3	1.0 02	02.1	32 33.3	1.0 02	02.1	37 32.7	1.0 02	01.7	175
6	23 02.7	1.0 02	02.2	23 32.7	1.0 02	02.1	25 02.6	1.0 02	02.1	25 32.6	1.0 02	02.0	26 02.5	1.0 02	02.0	32 02.1	1.0 02	01.7	32 32.1	1.0 02	01.7	37 31.7	1.0 01	01.3	6
7	23 01.5	1.0 01	01.6	23 31.5	1.0 01	01.6	25 01.5	1.0 01	01.6	25 31.5	1.0 01	01.5	26 01.4	1.0 01	01.5	32 01.2	1.0 01	01.3	32 31.2	1.0 01	01.2	37 31.0	1.0 01	01.0	7
8	23 00.7	1.0 01	01.1	23 30.7	1.0 01	01.1	25 00.7	1.0 01	01.0	25 30.6	1.0 01	01.0	26 00.6	1.0 01	01.0	32 00.5	1.0 01	00.8	32 30.5	1.0 01	00.8	37 30.4	1.0 01	00.7	8
9	23 00.2	1.0 00	00.5	23 30.2	1.0 00	00.5	25 00.2	1.0 00	00.5	25 30.2	1.0 00	00.5	26 00.2	1.0 00	00.5	32 00.1	1.0 00	00.4	32 30.1	1.0 00	00.4	37 30.1	1.0 00	00.3	9
180	23 00.0	1.0 00	00.0	23 30.0	1.0 00	00.0	25 00.0	1.0 00	00.0	25 30.0	1.0 00	00.0	26 00.0	1.0 00	00.0	32 00.0	1.0 00	00.0	32 30.0	1.0 00	00.0	37 30.0	1.0 00	00.0	

Lat. 53°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	65 00.0	1.0 01	180.0	65 30.0	1.0 01	180.0	66 00.0	1.0 01	180.0	67 00.0	1.0 01	180.0	69 00.0	1.0 01	180.0	71 00.0	1.0 01	180.0	71 30.0	1.0 01	180.0	72 30.0	1.0 01	180.0	00
1	64 59.3	1.0 03	177.9	65 29.3	1.0 03	177.9	65 59.3	1.0 03	177.9	66 59.3	1.0 04	177.8	68 59.3	1.0 04	177.6	70 59.2	1.0 04	177.5	71 29.2	1.0 04	177.4	72 29.1	1.0 04	177.3	1
2	64 57.4	1.0 05	175.8	65 27.3	1.0 06	175.8	65 57.3	1.0 06	175.7	66 57.2	1.0 06	175.6	68 57.0	1.0 06	175.3	70 56.8	1.0 07	174.9	71 26.7	1.0 07	174.8	72 26.6	1.0 07	174.6	2
3	64 54.1	1.0 08	173.7	65 24.0	1.0 08	173.7	65 53.9	1.0 08	173.6	66 53.7	1.0 08	173.4	68 53.3	1.0 09	172.9	70 52.8	1.0 09	172.4	71 22.7	1.0 09	172.2	72 22.4	99 10	171.9	3
4	64 49.5	1.0 10	171.7	65 19.4	99 10	171.6	65 49.2	99 10	171.4	66 48.9	99 10	171.2	68 48.1	99 11	170.6	70 47.2	99 12	169.9	71 17.0	99 12	169.7	72 16.4	99 13	169.3	4
05	64 43.6	99 12	169.6	65 13.4	99 12	169.5	65 43.2	99 12	169.3	66 42.7	99 13	169.0	68 41.5	99 13	168.3	70 40.1	99 14	167.4	71 09.7	99 15	167.1	72 08.9	99 15	166.6	05
6	64 36.5	99 14	167.6	65 06.2	99 14	167.4	65 35.8	99 14	167.2	66 35.1	99 15	166.8	68 33.4	99 16	166.0	70 31.5	98 17	164.9	71 00.9	98 17	164.6	71 59.7	98 18	164.0	6
7	64 28.1	99 16	165.5	64 57.7	98 16	165.3	65 27.2	98 16	165.1	66 26.2	98 17	164.7	68 24.0	98 18	163.7	70 21.4	98 19	162.5	70 50.6	97 20	162.2	71 49.0	97 20	161.5	7
8	64 18.5	98 18	163.5	64 47.9	98 18	163.3	65 17.3	98 19	163.1	66 16.0	98 19	162.6	68 13.2	97 20	161.5	70 09.8	97 22	160.1	70 38.8	97 22	159.8	71 36.8	96 23	158.9	8
9	64 07.6	98 20	161.5	64 36.9	98 20	161.3	65 06.2	97 21	161.0	66 04.6	97 21	160.5	68 01.0	97 22	159.2	69 56.8	96 24	157.8	70 25.6	96 24	157.4	71 23.1	96 25	156.5	9
10	63 55.6	97 22	159.6	64 24.7	97 22	159.3	64 53.8	97 22	159.0	65 51.9	97 23	158.4	67 47.6	96 24	157.1	69 42.5	96 26	155.5	70 11.1	95 26	155.0	71 08.0	95 27	154.1	10
1	63 42.5	97 24	157.6	64 11.4	96 24	157.3	64 40.3	96 24	157.0	65 38.0	96 25	156.4	67 32.9	95 26	154.9	69 26.9	94 28	153.2	69 55.2	94 29	152.7	70 51.5	94 30	151.7	1
2	63 28.2	96 26	155.7	63 56.9	96 26	155.4	64 25.7	96 26	155.1	65 23.0	95 27	154.4	67 17.0	95 28	152.8	69 10.0	94 30	151.0	69 38.0	93 31	150.5	70 33.8	93 32	149.4	2
3	63 12.8	95 27	153.9	63 41.4	95 28	153.5	64 09.9	95 28	153.2	65 06.8	95 29	152.4	67 00.0	94 30	150.8	68 51.9	93 32	148.9	69 19.6	92 33	148.3	70 14.8	92 34	147.2	3
4	62 56.3	95 29	152.0	63 24.7	95 29	151.6	63 53.1	94 30	151.3	64 49.6	94 30	150.5	66 41.8	93 32	148.8	68 32.6	92 34	146.7	69 00.1	91 34	146.2	69 54.7	91 35	145.0	4
15	62 38.9	94 31	150.2	63 07.1	94 31	149.8	63 35.2	94 31	149.4	64 31.3	93 32	148.6	66 22.5	92 34	146.8	68 12.3	91 36	144.7	68 39.5	90 36	144.1	69 33.4	90 37	142.9	15
6	62 20.4	93 32	148.4	62 48.4	93 33	148.0	63 16.3	93 33	147.6	64 12.0	92 34	146.7	66 02.2	91 35	144.9	67 50.9	90 37	142.7	68 17.8	89 38	142.1	69 11.1	88 39	140.8	6
7	62 01.0	93 34	146.6	62 28.8	92 34	146.2	62 56.5	92 35	145.8	63 51.7	92 35	144.9	65 41.0	90 37	143.0	67 28.5	89 39	140.7	67 55.1	88 39	140.1	68 47.9	87 40	138.8	7
8	61 40.7	92 35	144.9	62 08.3	92 36	144.5	62 35.8	91 36	144.0	63 30.5	91 37	143.1	65 18.8	90 38	141.1	67 05.2	88 40	138.9	67 31.5	87 41	138.2	68 23.6	86 42	136.9	8
9	61 19.5	91 37	143.2	61 46.9	91 37	142.8	62 14.1	91 37	142.3	63 08.4	90 38	141.4	64 55.7	89 40	139.3	66 41.0	87 42	137.0	67 07.0	86 42	136.4	67 58.5	85 43	135.0	9
20	60 57.5	91 38	141.5	61 24.6	90 38	141.1	61 51.6	90 39	140.6	62 45.4	89 40	139.7	64 31.7	88 41	137.6	66 16.0	86 43	135.2	66 41.7	85 44	134.6	67 32.6	84 44	133.2	20
1	60 34.6	90 39	139.9	61 01.5	90 40	139.4	61 28.3	89 40	139.0	62 21.7	89 41	138.0	64 07.0	87 43	135.9	65 50.2	85 44	133.5	66 15.6	84 45	132.8	67 05.9	83 46	131.4	1
2	60 11.0	89 41	138.3	60 37.7	89 41	137.8	61 04.2	88 41	137.4	61 57.1	88 42	136.4	63 41.5	86 44	134.2	65 23.6	84 45	131.8	65 48.7	84 46	131.1	66 38.5	82 47	129.7	2
3	59 46.6	88 42	136.7	60 13.1	88 42	136.3	60 39.4	88 43	135.8	61 31.8	87 43	134.8	63 15.2	85 45	132.6	64 56.3	83 47	130.1	65 21.2	83 47	129.5	66 10.4	81 48	128.1	3
4	59 21.5	88 43	135.2	59 47.7	87 43	134.7	60 13.9	87 44	134.2	61 05.9	86 44	133.2	62 48.3	84 46	131.0	64 28.4	82 48	128.5	64 53.0	82 48	127.8	65 41.6	80 49	126.4	4
25	58 55.7	87 44	133.7	59 21.8	87 44	133.2	59 47.7	86 45	132.7	60 39.2	85 45	131.7	62 20.7	84 47	129.4	63 59.8	81 49	126.9	64 24.2	81 49	126.3	65 12.3	80 50	124.9	25
6	58 29.3	86 45	132.2	58 55.1	86 45	131.7	59 20.8	86 46	131.2	60 11.9	85 46	130.2	61 52.6	83 48	127.9	63 30.7	81 49	125.4	63 54.8	80 50	124.8	64 42.4	79 51	123.4	6
7	58 02.2	86 46	130.8	58 27.9	85 46	130.3	58 53.4	85 47	129.8	59 44.1	84 47	128.7	61 23.8	82 49	126.5	63 01.0	80 50	124.0	63 24.9	79 51	123.3	64 12.0	78 52	121.9	7
8	57 34.6	85 47	129.4	58 00.0	85 47	128.9	58 25.4	84 48	128.4	59 15.6	83 48	127.3	60 54.5	81 50	125.0	62 30.8	79 51	122.5	62 54.4	78 52	121.8	63 41.1	77 52	120.4	8
9	57 06.4	84 48	128.0	57 31.7	84 48	127.5	57 56.8	84 48	127.0	58 46.6	83 49	125.9	60 24.7	81 50	123.6	62 00.1	78 52	121.1	62 23.5	78 52	120.4	63 09.7	76 53	119.0	9
30	56 37.7	84 49	126.6	57 02.7	83 49	126.1	57 27.7	83 49	125.6	58 17.1	82 50	124.5	59 54.4	80 51	122.3	61 29.0	78 53	119.7	61 52.2	77 53	119.1	62 38.0	76 54	117.7	30
1	56 08.5	83 50	125.3	56 33.3	83 50	124.8	56 58.1	82 50	124.3	57 47.2	81 51	123.2	59 23.6	79 52	120.9	60 57.4	77 53	118.4	61 20.4	76 54	117.7	62 05.8	75 54	116.4	1
2	55 38.7	82 50	124.0	56 03.4	82 51	123.5	56 28.0	82 51	123.0	57 16.7	81 51	121.9	58 52.4	79 53	119.6	60 25.5	76 54	117.1	60 48.3	76 54	116.5	61 33.3	74 55	115.1	2
3	55 08.6	82 51	122.7	55 33.1	82 51	122.2	55 57.5	81 52	121.7	56 45.9	80 52	120.6	58 20.8	78 53	118.3	59 53.1	76 54	115.8	60 15.8	75 55	115.2	61 00.4	74 55	113.8	3
4	54 38.0	81 52	121.5	55 02.3	81 52	121.0	55 26.6	80 52	120.4	56 14.6	80 53	119.4	57 48.9	78 54	117.1	59 20.5	75 55	114.6	59 42.9	74 55	114.0	60 27.2	73 56	112.6	4
35	54 07.0	81 52	120.2	54 31.2	80 53	119.7	54 55.2	80 53	119.2	55 42.9	79 53	118.1	57 16.5	77 54	115.9	58 47.5	75 55	113.4	59 09.8	74 56	112.8	59 53.7	73 56	111.4	35
6	53 35.6	80 53	119.0	53 59.6	80 53	118.5	54 23.5	79 53	118.0	55 10.9	78 54	116.9	56 43.9	76 55	114.7	58 14.2	74 56	112.2	58 36.3	73 56	111.6	59 20.0	72 57	110.2	6
7	53 03.8	80 54	117.8	53 27.7	79 54	117.3	53 51.5	79 54	116.8	54 38.5	78 54	115.8	56 10.9	76 55	113.5	57 40.7	74 56	111.1	58 02.6	73 57	110.4	58 46.0	72 57	109.1	7
8	52 31.7	79 54	116.7	52 55.5	79 54	116.2	53 19.1	78 54	115.7	54 05.9	78 55	114.6	55 37.7	75 56	112.4	57 06.8	73 57	109.9	57 28.7	72 57	109.3	58 11.7	71 57	108.0	8
9	51 59.3	79 55	115.5	52 22.9	78 55	115.0	52 46.4	78 55	114.5	53 32.9	77 55	113.5	55 04.1	75 56	111.2	56 32.8	73 57	108.8	56 54.5	72 57	108.2	57 37.3	71 58	106.9	9
40	51 26.6	78 55	114.4	51 50.0	78 55	113.9	52 13.4	78 55	113.4	52 59.6	77 56	112.4	54 30.4	75 57	110.1	55 58.5	72 57	107.8	56 20.1	72 58	107.1	57 02.7	70 58	105.9	40
1	50 53.6	78 55	113.3	51 16.9	78 56	112.8	51 40.1	77 56	112.3	52 26.1	76 56	111.3	53 56.3	74 57	109.1	55 24.0	72 58	106.7	55 45.5	71 58	106.1	56 27.8	70 58	104.8	1
2	50 20.3	78 56	112.2	50 43.5	77 56	111.7	51 06.6	77 56	111.2	51 52.3	76 57	110.2	53 22.1	74 57	108.0	54 49.3	72 58	105.7	55 10.7	71 58	105.0	55 52.8	70 59	103.8	2
3	49 46.7	77 56	111.2	50 09.8	77 56	110.7	50 32.8	76 57	110.2	51 18.3	75 57	109.1	52 47.7	73 58	107.0	54 14.5	71 58	104.6	54 35.7	71 58	104.0	55 17.7	69 59	102.8	3
4	49 12.9	77 57	110.1	49 35.9	76 57	109.6	49 58.8	76 57	109.1	50 44.1	75 57	108.1	52 13.0	73 58	105.9	53 39.5	71 59	103.6	54 00.6	70 59	103.0	54 42.4	69 59	101.8	4
45	48 38.9	76 57	109.1	49 01.8	76 57	108.6	49 24.6	76 57	108.1	50 09.7	75 58	107.1	51 38.2	73 58	104.9	53 04.3	71 59	102.7	53 25.4	70 59	102.1	54 07.0	69 59	100.8	45
6	48 04.7	76 57	108.1	48 27.5	76 58	107.6	48 50.1	75 58	107.1	49 35.1	74 58	106.1	51 03.3	73 59	104.0	52 29.0	70 59	101.7	52 50.0	70 59	101.1	53 31.5	69 59	99.9	6
7	47 30.3	76 58	107.1	47 53.0	75 58	106.6	48 15.5	75 58	106.1	49 00.3	74 58	105.1	50 28.2	72 59	103.0	51 53.6	70 59	100.7	52 14.5	70 59	100.2	52 55.9	68 60	99.0	7
8	46 55.7	76 58	106.1	47 18.3	75 58	105.6	47 40.8	75 58	105.1	48 25.4	74 58	104.1	49 52.9	72 59	102.0	51 18.0	70 59	99.8	51 38.9	69 60	99.2	52 20.2	68 60	98.1	8
9	46 20.9	75 58	105.1	46 43.4	75 58	104.6	47 05.8	74 58	104.2	47 50.3	74 59	103.2	49 17.5	72 59	101.1	50 42.4	70 60	98.9	51 03.2	69 60	98.3	51 44.4	68 60	97.2	9
50	45 46.0	75 58	104.2	46 08.4	75 59	103.7	46 30.7	74 59	103.2	47 15.0	73 59	102.2	48 42.0	72 59	100.2	50 06.7	70 60	98.0	50 27.5	69 60	97.4	51 08.5	68 60	96.3	50
1	45 10.9	75 59	103.2	45 33.3	74 59	102.7	45 55.5	74 59	102.3	46 39.7	73 59	101.3	48 06.4	71 59	99.2	49 30.9	69 60	97.1	49 51.6	69 60	96.5	50 32.6	68 60	95.4	1
2	44 35.7	75 59	102.3	44 58.0	74 59	101.8	45 20.2	74 59	101.3	46 04.2	73 59	100.4	47 30.8	71 60	98.3	48 55.0	69 60	96.2	49 15.7	69 60	95.7	49 56.6	68 60	94.5	2
3	44 00.3	74 59	101.4	44 22.6	74 59	100.9	44 44.7	74 59	100.4	45 28.7	73 59	99.5	46 55.0	71 60	97.5	48 19.1	69 60	95.3	48 39.8	69 60	94.8	49 20.6	68 60	93.7	3
4	43 24.9	74 59	100.5	43 47.1	74 59	100.0	44 09.2	73 59	99.5	44 53.0	73 60	98.6	46 19.2	71 60	96.6	47 43.1	69 60	94.5	48 03.8	69 60	93.9	48 44.6	67 60	92.8	4
55	42 49.3	74 59	99.6	43 11.5	74 59	99.1	43 33.5	73 60	98.6	44 17.2	73 60	97.7	45 43.3	71 60	95.7	47 07.1	69 60	93.6	47 27.7	68 60	93.1	48 08.5	67 60	92.0	55
6	42 13.6	74 60	98.7	42 35.8	74 60	98.2	42 57.8	73 60	97.8	43 41.4	72 60	96.8	45 07.3	71 60	94.9	46 31.1	69 60	92.8	46 51.7	68 60	92.3	47 32.4	67 60	91.2	6
7	41 37.9	74 60	97.8	42 00.0	73 60	97.4	42 22.0	73 60	96.9	43 05.5	72 60	96.0	44 31.3	71 60	94.0	45 55.0	69 60	92.0	46 15.6	68 60	91.5	46 56.3	67 60	90.4	7
8	41 02.1	74 60	96.9	41 24.1	73 60	96.5	41 46.1	73 60	96.0	42 29.6	72 60	95.1	43 55.3	71 60	93.2	45 18.9	69 60	91.2	45 39.5	68 60	90.6	46 20.2	67 60	89.6	8
9	40 26.2	74 60	96.1	40 48.2	73 60	95.6	41 10.1	73 60	95.2	41 53.6	72 60	94.3	43 19.2	71 60	92.4	44 42.8	69 60	90.4	45 03.4	68 60	89.8	45 44.1	67 60	88.8	9
60	39 50.3	73 60	95.2	40 12.3	73 60	94.8	40 34.2	73 60	94.3	41 17.6	72 60	93.4	42 43.1	70 60	91.5	44 06.7	69 60	89.6	44 27.2	68 60	89.1	45 08.0	67 60	88.0	60
1	39 14.3	73 60	94.4	39 36.3	73 60	94.0	39 58.1	73 60	93.5	40 41.5	72 60	92.6	42 07.0	70 60	90.7	43 30.6	69 60	88.8	43 51.1	68 60	88.3	44 31.9	67 60	87.2	1
2	38 38.3	73 60	93.6	39 00.2	73 60	93.1	39 22.1	73 60	92.7	40 05.4	72 60	91.8	41 30.9	70 60	89.9	42 54.5	69 60	88.0	43 15.1	68 60	87.5	43 55.8	67 60	86.5	2
3	38 02.2	73 60	92.7	38 24.2	73 60	92.3	38 46.0	73 60	91.9	39 29.3	72 60	91.0	40 54.8	70 60	89.1	42 18.4	69 60	87.2	42 39.0	68 60	86.7	43 19.8	68 60	85.7	3
4	37 26.2	73 60	91.9	37 48.1	73 60	91.5	38 09.9	73 60	91.1	38 53.2	72 60	90.2	40 18.7	70 60	88.3	41 42.4	69 60	86.4	42 03.0	69 60	86.0	42 43.8	68 60	85.0	4
65	36 50.1	73 60	91.1	37 12.0	73 60	90.7	37 33.8	73 60	90.2	38 17.1	72 60	89.4	39 42.6	71 60	87.6	41 06.3	69 60	85.7	41 27.0	69 60	85.2	42 07.9	68 60	84.2	65
6	36 14.0	73 60	90.3	36 35.9	73 60	89.9	36 57.7	73 60	89.5	37 41.0	72 60	88.6	39 06.5	71 60	86.8	40 30.3	69 60	84.9	40 51.0	69 60	84.4	41 32.0	68 60	83.5	6
7	35 37.8	73 60	89.5	35 59.8	73 60	89.1	36 21.6	73 60	88.7	37 04.9	72 60	87.8	38 30.5	71 60	86.0	39 54.4	69 60	84.2	40 15.1	69 60	83.7	40 56.1	68 60	82.7	7
8	35 01.7	73 60	88.7	35 23.7	73 60	88.3	35 45.5	73 60	87.9	36 28.9	72 60	87.0	37 54.5	71 60	85.3	39 18.5	69 60	83.4	39 39.2	69 60	83.0	40 20.3	68 60	82.0	8
9	34 25.6	73 60	87.9	34 47.6	73 60	87.5	35 09.4	73 60	87.1	35 52.8	72 60	86.2	37 18.5	71 60	84.5	38 42.7	69 60	82.7	39 03.4	69 60	82.2	39 44.6	68 59	81.3	9
70	33 49.6	73 60	87.1	34 11.5	73 60	86.7	34 33.4	73 60	86.3	35 16.8	72 60	85.5	36 42.6	71 60	83.8	38 06.9	70 60	82.0	38 27.7	69 59	81.5	39 09.0	68 59	80.6	70
1	33 13.5	73 60	86.4	33 35.5	73 60	86.0	33 57.3	73 60	85.5	34 40.8	72 60	84.7	36 06.7	71 60	83.0	37 31.1	70 59	81.2	37 52.0	69 59	80.8	38 33.4	69 59	79.9	1
2	32 37.5	73 60	85.6	32 59.5	73 60	85.2	33 21.4	73 60	84.8	34 04.9	72 60	84.0	35 30.9	71 60	82.3	36 55.5	70 59	80.5	37 16.4	69 59	80.1	37 57.9	69 59	79.1	2
3	32 01.5	73 60	84.8	32 23.5	73 60	84.4	32 45.4	73 60	84.0	33 29.0	72 60	83.2	34 55.2	71 59	81.5	36 19.9	70 59	79.8	36 40.9	70 59	79.3	37 22.4	69 59	78.4	3
4	31 25.6	74 60	84.1	31 47.6	73 60	83.7	32 09.5	73 60	83.3	32 53.2	72 60	82.5	34 19.5	71 59	80.8	35 44.4	70 59	79.1	36 05.4	70 59	78.6	36 47.1	69 59	77.7	4
75	30 49.7	74 60	83.3	31 11.7	73 60	82.9	31 33.7	73 60	82.5	32 17.4	73 59	81.7	33 43.9	72 59	80.1	35 09.0	70 59	78.3	35 30.1	70 59	77.9	36 11.9	69 59	77.0	75
6	30 13.9	74 60	82.6	30 35.9	73 60	82.2	30 57.9	73 60	81.8	31 41.7	73 59	81.0	33 08.4	72 59	79.3	34 33.7	71 59	77.6	34 54.8	70 59	77.2	35 36.7	70 58	76.3	6
7	29 38.1	74 60	81.8	30 00.2	74 59	81.4	30 22.2	73 59	81.0	31 06.1	73 59	80.2	32 32.9	72 59	78.6	33 58.5	71 59	76.9	34 19.6	70 58	76.5	35 01.7	70 58	75.6	7
8	29 02.4	74 59	81.1	29 24.5	74 59	80.7	29 46.6	73 59	80.3	30 30.6	73 59	79.5	31 57.6	72 59	77.9	33 23.4	71 58	76.2	33 44.6	71 58	75.8	34 26.8	70 58	74.9	8
9	28 26.7	74 59	80.3	28 48.9	74 59	79.9	29 11.1	74 59	79.5	29 55.1	73 59	78.8	31 22.3	72 59	77.2	32 48.3	71 58	75.5	33 09.6	71 58	75.1	33 52.0	70 58	74.2	9
80	27 51.2	74 59	79.6	28 13.4	74 59	79.2	28 35.6	74 59	78.8	29 19.7	73 59	78.0	30 47.2	72 58	76.4	32 13.4	71 58	74.8	32 34.8	71 58	74.4	33 17.3	71 58	73.6	80
1	27 15.7	74 59	78.8	27 38.0	74 59	78.5	28 00.2	74 59	78.1	28 44.5	74 59	77.3	30 12.1	73 58	75.7	31 38.6	72 58	74.1	32 00.1	71 58	73.7	32 42.7	71 57	72.9	1
2	26 40.3	75 59	78.1	27 02.7	74 59	77.7	27 24.9	74 59	77.3	28 09.3	74 58	76.6	29 37.2	73 58	75.0	31 04.0	72 58	73.4	31 25.5	72 57	73.0	32 08.3	71 57	72.2	2
3	26 05.1	75 59	77.4	26 27.4	74 59	77.0	26 49.8	74 58	76.6	27 34.2	74 58	75.9	29 02.4	73 58	74.3	30 29.4	72 57	72.7	30 51.0	72 57	72.3	31 34.0	71 57	71.5	3
4	25 29.9	75 58	76.6	25 52.3	75 58	76.3	26 14.7	74 58	75.9	26 59.3	74 58	75.1	28 27.7	73 58	73.6	29 55.0	72 57	72.0	30 16.7	72 57	71.6	30 59.8	72 57	70.8	4
85	24 54.8	75 58	75.9	25 17.3	75 58	75.5	25 39.7	75 58	75.2	26 24.4	74 58	74.4	27 53.1	73 57	72.9	29 20.7	73 57	71.3	29 42.5	72 57	70.9	30 25.7	72 56	70.1	85
6	24 19.8	75 58	75.2	24 42.4	75 58	74.8	25 04.9	75 58	74.4	25 49.7	75 58	73.7	27 18.6	74 57	72.2	28 46.6	73 57	70.7	29 08.4	73 57	70.3	29 51.9	72 56	69.5	6
7	23 45.0	75 58	74.4	24 07.6	75 58	74.1	24 30.2	75 58	73.7	25 15.1	75 57	73.0	26 44.3	74 57	71.5	28 12.6	73 56	70.0	28 34.5	73 56	69.6	29 18.1	72 56	68.8	7
8	23 10.3	76 58	73.7	23 32.9	75 58	73.3	23 55.6	75 57	73.0	24 40.6	75 57	72.3	26 10.2	74 57	70.8	27 38.7	73 56	69.3	28 00.7	73 56	68.9	28 44.5	73 56	68.1	8
9	22 35.7	76 57	73.0	22 58.4	76 57	72.6	23 21.1	76 57	72.3	24 06.3	75 57	71.6	25 36.1	74 56	70.1	27 05.0	74 56	68.6	27 27.1	73 56	68.2	28 11.1	73 55	67.4	9
90	22 01.2	76 57	72.3	22 24.0	76 57	71.9	22 46.8	76 57	71.6	23 32.1	75 57	70.8	25 02.3	75 56	69.4	26 31.5	74 56	67.9	26 53.7	74 55	67.5	27 37.8	73 55	66.8	90

Digitized by Google

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0	8 00.0	1.0 00	180.0	7 00.0	1.0 00	180.0	5 00.0	1.0 00	180.0										00
1	8 59.7	1.0 01	179.1	8 29.7	1.0 01	179.1	7 59.7	1.0 01	179.1	6 59.7	1.0 01	179.1													1
2	8 58.9	1.0 02	178.2	8 28.9	1.0 02	178.2	7 58.9	1.0 02	178.2	6 58.9	1.0 02	178.3													2
3	8 57.5	1.0 03	177.3	8 27.5	1.0 03	177.3	7 57.5	1.0 03	177.4	6 57.5	1.0 03	177.4													3
4	8 55.5	1.0 04	176.4	8 25.5	1.0 04	176.4	7 55.5	1.0 04	176.5	6 55.6	1.0 04	176.5													4
05	8 53.0	1.0 05	175.5	8 23.0	1.0 05	175.6	7 53.0	1.0 05	175.6	6 53.1	1.0 05	175.6													05
6	8 49.9	1.0 06	174.6	8 19.9	1.0 06	174.7	7 50.0	1.0 06	174.7	6 50.1	1.0 06	174.8													6
7	8 46.2	1.0 07	173.7	8 16.3	1.0 07	173.8	7 46.4	1.0 07	173.8	6 46.5	1.0 07	173.9													7
8	8 42.0	1.0 08	172.9	8 12.1	1.0 08	172.9	7 42.2	1.0 08	172.9	6 42.4	1.0 08	173.0													8
9	8 37.2	1.0 09	172.0	8 07.4	1.0 09	172.0	7 37.5	1.0 09	172.1	6 37.8	1.0 09	172.2													9
10	8 31.9	99 10	171.1	8 02.1	99 10	171.1	7 32.3	99 10	171.2	6 32.6	99 10	171.3													10
1	8 26.0	99 11	170.2	7 56.2	99 11	170.3	7 26.5	99 11	170.3	6 26.9	99 10	170.4													1
2	8 19.6	99 12	169.3	7 49.9	99 12	169.4	7 20.1	99 11	169.4	6 20.6	99 11	169.6													2
3	8 12.6	99 13	168.4	7 42.9	99 12	168.5	7 13.2	99 12	168.6	6 13.8	99 12	168.7													3
4	8 05.1	99 13	167.5	7 35.5	99 13	167.6	7 05.8	99 13	167.7	6 06.4	99 13	167.8													4
15	7 57.1	99 14	166.7	7 27.4	99 14	166.7	6 57.8	99 14	166.8	5 58.6	99 14	167.0													15
6	7 48.5	99 15	165.8	7 18.9	99 15	165.9	6 49.3	99 15	165.9	5 50.2	99 15	166.1													6
7	7 39.3	98 16	164.9	7 09.8	98 16	165.0	6 40.3	98 16	165.1	5 41.2	98 16	165.3													7
8	7 29.7	98 17	164.0	7 00.2	98 17	164.1	6 30.7	98 17	164.2	5 31.8	98 17	164.4													8
9	7 19.5	98 18	163.2	6 50.0	98 18	163.3	6 20.6	98 18	163.4	5 21.8	98 17	163.5													9
20	7 08.7	98 19	162.3	6 39.4	98 19	162.4	6 10.0	98 19	162.5	5 11.3	98 18	162.7													20
1	6 57.5	98 20	161.4	6 28.2	98 20	161.5	5 58.9	98 19	161.6	5 00.3	98 19	161.8													1
2	6 45.7	97 20	160.5	6 16.5	97 20	160.7	5 47.3	97 20	160.8																2
3	6 33.4	97 21	159.7	6 04.3	97 21	159.8	5 35.1	97 21	159.9																3
4	6 20.6	97 22	158.8	5 51.6	97 22	158.9	5 22.5	97 22	159.1																4
25	6 07.3	97 23	158.0	5 38.3	97 23	158.1	5 09.3	97 23	158.2																25
6	5 53.5	96 24	157.1	5 24.6	96 24	157.2																			6
7	5 39.2	96 25	156.2	5 10.4	96 24	156.4																			7
8	5 24.4	96 25	155.4																						8
9	5 09.2	96 26	154.5																						9

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	21 26.9	76 57	71.5	21 49.8	76 57	71.2	22 12.6	76 57	70.8	22 58.1	76 56	70.1	24 28.5	75 56	68.7	25 58.1	74 55	67.2	26 20.4	74 55	66.8	27 04.7	74 55	66.1	91
2	20 52.7	77 57	70.8	21 15.7	76 57	70.5	21 38.6	76 56	70.1	22 24.2	76 56	69.4	23 55.0	75 56	68.0	25 24.9	75 55	66.5	25 47.3	74 55	66.2	26 31.8	74 55	65.4	2
3	20 18.7	77 56	70.1	20 41.7	77 56	69.7	21 04.7	76 56	69.4	21 50.5	76 56	68.7	23 21.6	76 55	67.3	24 51.9	75 55	65.9	25 14.3	75 55	65.5	25 59.1	74 54	64.7	3
4	19 44.8	77 56	69.4	20 07.9	77 56	69.0	20 31.0	77 56	68.7	21 16.9	76 56	68.0	22 48.4	76 55	66.6	24 19.0	75 54	65.2	24 41.6	75 54	64.8	25 26.5	75 54	64.1	4
95	19 11.1	77 56	68.6	19 34.3	77 56	68.3	19 57.4	77 56	68.0	20 43.5	77 55	67.3	22 15.3	76 55	65.9	23 46.4	76 54	64.5	24 09.0	75 54	64.1	24 54.1	75 54	63.4	95
6	18 37.6	78 56	67.9	19 00.8	77 56	67.6	19 24.0	77 55	67.2	20 10.3	77 55	66.6	21 42.4	76 54	65.2	23 13.9	76 54	63.8	23 36.6	76 54	63.4	24 21.9	75 53	62.7	6
7	18 04.2	78 55	67.2	18 27.5	78 55	66.9	18 50.8	78 55	66.5	19 37.3	77 55	65.9	21 09.7	77 54	64.5	22 41.6	76 54	63.1	23 04.4	76 53	62.8	23 49.9	76 53	62.1	7
8	17 31.0	78 55	66.5	17 54.4	78 55	66.1	18 17.8	78 55	65.8	19 04.4	78 54	65.2	20 37.3	77 54	63.8	22 09.5	77 53	62.4	22 32.4	76 53	62.1	23 18.1	76 53	61.4	8
9	16 58.0	78 55	65.8	17 21.5	78 55	65.4	17 44.9	78 54	65.1	18 31.7	78 54	64.4	20 05.0	77 54	63.1	21 37.5	77 53	61.7	22 00.6	77 53	61.4	22 46.5	76 52	60.7	9
100	16 25.2	79 54	65.0	16 48.7	79 54	64.7	17 12.3	78 54	64.4	17 59.3	78 54	63.7	19 32.8	78 53	62.4	21 05.8	77 52	61.1	21 29.0	77 52	60.7	22 15.2	77 52	60.0	100
1	15 52.5	79 54	64.3	16 16.2	79 54	64.0	16 39.8	79 54	63.7	17 27.0	79 53	63.0	19 01.0	78 53	61.7	20 34.3	78 52	60.4	20 57.6	77 52	60.0	21 44.0	77 52	59.4	1
2	15 20.1	79 54	63.6	15 43.8	79 54	63.3	16 07.6	79 53	62.9	16 54.9	79 53	62.3	18 29.3	78 52	61.0	20 03.1	78 52	59.7	20 26.4	78 52	59.3	21 13.0	78 51	58.7	2
3	14 47.9	80 53	62.9	15 11.7	79 53	62.5	15 35.5	79 53	62.2	16 23.0	79 53	61.6	17 57.8	79 52	60.3	19 32.0	78 51	59.0	19 55.5	78 51	58.7	20 42.3	78 51	58.0	3
4	14 15.8	80 53	62.1	14 39.8	80 53	61.8	15 03.7	80 53	61.5	15 51.4	79 52	60.9	17 26.5	79 52	59.6	19 01.2	79 51	58.3	19 24.7	79 51	58.0	20 11.8	78 50	57.3	4
105	13 44.0	80 53	61.4	14 08.0	80 52	61.1	14 32.0	80 52	60.8	15 20.0	80 52	60.2	16 55.5	79 51	58.9	18 30.6	79 51	57.6	18 54.2	79 50	57.3	19 41.5	79 50	56.6	105
6	13 12.4	80 52	60.7	13 36.5	80 52	60.4	14 00.6	80 52	60.1	14 48.8	80 52	59.4	16 24.7	80 51	58.2	18 00.2	79 50	56.9	18 24.0	79 50	56.6	19 11.5	79 50	56.0	6
7	12 41.1	81 52	59.9	13 05.3	81 52	59.6	13 29.5	81 52	59.3	14 17.8	80 51	58.7	15 54.1	80 51	57.5	17 30.0	80 50	56.2	17 54.0	80 50	55.9	18 41.7	79 49	55.3	7
8	12 09.9	81 52	59.2	12 34.2	81 51	58.9	12 58.5	81 51	58.6	13 47.0	81 51	58.0	15 23.8	80 50	56.8	17 00.2	80 49	55.5	17 24.2	80 49	55.2	18 12.1	80 49	54.6	8
9	11 39.0	81 51	58.5	12 03.4	81 51	58.2	12 27.8	81 51	57.9	13 16.5	81 50	57.3	14 53.7	81 50	56.1	16 30.5	80 49	54.8	16 54.6	80 49	54.5	17 42.8	80 48	53.9	9
110	11 08.4	82 51	57.7	11 32.9	82 50	57.4	11 57.4	82 50	57.2	12 46.3	81 50	56.6	14 23.9	81 49	55.4	16 01.1	81 49	54.1	16 25.4	81 48	53.8	17 13.8	81 48	53.2	110
1	10 38.0	82 50	57.0	11 02.6	82 50	56.7	11 27.2	82 50	56.4	12 16.3	82 50	55.8	13 54.3	82 49	54.6	15 32.0	81 48	53.4	15 56.3	81 48	53.1	16 45.0	81 48	52.5	1
2	10 07.8	82 50	56.3	10 32.5	82 50	56.0	10 57.2	82 50	55.7	11 46.5	82 49	55.1	13 25.0	82 48	53.9	15 03.1	82 48	52.7	15 27.6	82 47	52.4	16 16.4	81 47	51.8	2
3	9 37.9	83 49	55.5	10 02.7	83 49	55.2	10 27.5	83 49	55.0	11 17.0	83 49	54.4	12 55.9	82 48	53.2	14 34.5	82 47	52.0	14 59.1	82 47	51.8	15 48.2	82 47	51.2	3
4	9 08.3	83 49	54.8	9 33.2	83 49	54.5	9 58.1	83 49	54.2	10 47.8	83 48	53.7	12 27.1	83 48	52.5	14 06.2	82 47	51.3	14 30.9	82 47	51.1	15 20.2	82 46	50.5	4
115	8 38.9	83 48	54.0	9 03.9	83 48	53.8	9 28.9	83 48	53.5	10 18.9	83 48	52.9	11 58.6	83 47	51.8	13 38.1	83 46	50.6	14 02.9	83 46	50.3	14 52.5	83 46	49.8	115
6	8 09.8	84 48	53.3	8 34.9	84 48	53.0	9 00.0	84 48	52.7	9 50.2	84 47	52.2	11 30.4	83 47	51.1	13 10.3	83 46	49.9	13 35.3	83 46	49.6	14 25.1	83 45	49.1	6
7	7 41.0	84 48	52.5	8 06.2	84 47	52.3	8 31.4	84 47	52.0	9 21.8	84 47	51.4	11 02.5	84 46	50.3	12 42.8	84 45	49.2	13 07.9	83 45	48.9	13 57.9	83 45	48.4	7
8	7 12.5	84 47	51.8	7 37.8	84 47	51.5	8 03.1	84 47	51.3	8 53.7	84 46	50.7	10 34.8	84 46	49.6	12 15.6	84 45	48.5	12 40.8	84 45	48.2	13 31.1	84 44	47.7	8
9	6 44.3	85 47	51.0	7 09.7	85 46	50.8	7 35.1	85 46	50.5	8 25.9	85 46	50.0	10 07.4	85 45	48.9	11 48.7	84 44	47.8	12 14.0	84 44	47.5	13 04.5	84 44	47.0	9
120	6 16.3	85 46	50.3	6 41.9	85 46	50.0	7 07.4	85 46	49.8	7 58.4	85 45	49.2	9 40.4	85 45	48.2	11 22.1	85 44	47.1	11 47.5	85 44	46.8	12 38.3	85 43	46.3	120
1	5 48.7	86 46	49.5	6 14.4	85 45	49.3	6 40.0	85 45	49.0	7 31.2	85 45	48.5	9 13.6	85 44	47.4	10 55.9	85 43	46.4	11 21.4	85 43	46.1	12 12.4	85 43	45.6	1
2	5 21.4	86 45	48.8	5 47.1	86 45	48.5	6 12.9	86 45	48.3	7 04.4	86 44	47.7	8 47.2	86 44	46.7	10 29.9	85 43	45.6	10 55.5	85 43	45.4	11 46.7	85 42	44.9	2
3				5 20.3	86 44	47.8	5 46.1	86 44	47.5	6 37.8	86 44	47.0	8 21.1	86 43	46.0	10 04.2	86 42	44.9	10 30.0	86 42	44.7	11 21.4	86 42	44.1	3
4							5 19.7	87 44	46.7	6 11.6	86 43	46.2	7 55.3	86 42	45.2	9 38.9	86 42	44.2	10 04.7	86 42	43.9	10 56.4	86 41	43.4	4
125										5 45.7	87 43	45.5	7 29.8	87 42	44.5	9 13.9	87 41	43.5	9 39.9	87 41	43.2	10 31.8	87 41	42.7	125
6										5 20.1	87 42	44.7	7 04.7	87 41	43.7	8 49.2	87 41	42.7	9 15.3	87 40	42.5	10 07.5	87 40	42.0	6
7													6 39.9	88 41	43.0	8 24.9	87 40	42.0	8 51.1	87 40	41.8	9 43.5	87 39	41.3	7
8													6 15.5	88 40	42.2	8 00.9	88 39	41.3	8 27.2	88 39	41.0	9 19.8	88 39	40.6	8
9													5 51.4	88 40	41.5	7 37.2	88 39	40.5	8 03.7	88 39	40.3	8 56.5	88 38	39.8	9
130													5 27.6	89 39	40.7	7 13.9	89 38	39.8	7 40.5	89 38	39.6	8 33.6	88 38	39.1	130
1													5 04.2	89 38	40.0	6 51.0	89 38	39.1	7 17.7	89 37	38.8	8 11.0	89 37	38.4	1
2																6 28.4	89 37	38.3	6 55.2	89 37	38.1	7 48.7	89 36	37.6	2
3																6 06.2	90 36	37.6	6 33.1	90 36	37.4	7 26.9	90 36	36.9	3
4																5 44.4	90 36	36.8	6 11.4	90 36	36.6	7 05.4	90 35	36.2	4
135																5 22.9	90 35	36.1	5 50.0	90 35	35.9	6 44.3	90 35	35.4	135
6																5 01.9	91 35	35.3	5 29.1	91 34	35.1	6 23.5	91 34	34.7	6
7																			5 08.5	91 34	34.4	6 03.2	91 33	33.9	7
8																						5 43.2	91 33	33.2	8
9																						5 23.6	92 32	32.4	9
140																						5 04.5	92 31	31.7	140

Digitized by Google

Lat. 53°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	°
00	73 00.0	1.0 01	180.0	74 00.0	1.0 02	180.0	75 30.0	1.0 02	180.0	77 00.0	1.0 02	180.0	79 00.0	1.0 02	180.0	79 30.0	1.0 02	180.0	80 00.0	1.0 02	180.0	82 00.0	1.0 03	180.0	00
1	72 59.1	1.0 04	177.2	73 59.1	1.0 05	177.1	75 29.0	1.0 05	176.9	76 58.9	1.0 05	176.6	78 58.8	1.0 06	176.1	79 28.7	1.0 06	176.0	79 58.7	1.0 07	175.8	81 58.4	1.0 08	174.9	1
2	72 56.5	1.0 07	174.5	73 56.4	1.0 08	174.2	75 26.1	1.0 08	173.8	76 55.7	1.0 09	173.2	78 55.1	99 10	172.2	79 24.9	99 10	171.9	79 54.7	99 11	171.6	81 53.6	99 13	169.9	2
3	72 52.2	99 10	171.7	73 51.8	99 11	171.4	75 21.2	99 11	170.7	76 50.4	99 12	169.9	78 49.0	99 14	168.4	79 18.6	99 14	168.0	79 48.2	98 15	167.5	81 45.8	98 18	165.0	3
4	72 46.1	99 13	169.0	73 45.5	99 13	168.5	75 14.4	99 14	167.6	76 43.0	98 16	166.6	78 40.6	98 18	164.7	79 09.9	97 18	164.1	79 39.1	97 19	163.5	81 35.0	96 23	160.3	4
05	72 38.4	98 16	166.3	73 37.4	98 16	165.7	75 05.7	98 17	164.6	76 33.6	97 19	163.3	78 30.0	96 21	161.0	78 58.9	96 22	160.4	79 27.7	96 23	159.6	81 21.5	94 27	155.8	05
6	72 29.1	98 18	163.7	73 27.7	98 19	162.9	74 55.3	97 20	161.7	76 22.3	96 22	160.1	78 17.2	95 25	157.5	78 45.7	95 25	156.7	79 14.0	94 26	155.8	81 05.5	91 31	151.5	6
7	72 18.2	97 21	161.1	73 16.3	97 22	160.2	74 43.0	96 23	158.8	76 09.1	95 25	157.0	78 02.4	94 28	154.1	78 30.4	93 29	153.2	78 58.2	92 30	152.2	80 47.1	89 34	147.4	7
8	72 05.7	96 23	158.5	73 03.3	96 24	157.6	74 29.1	95 26	156.0	75 54.2	94 28	154.0	77 45.7	92 31	150.8	78 13.2	91 32	149.8	78 40.4	90 33	148.8	80 26.7	86 37	143.6	8
9	71 51.7	95 26	156.0	72 48.8	95 27	155.0	74 13.7	94 28	153.2	75 37.5	93 30	151.1	77 27.2	90 34	147.6	77 54.2	89 34	146.6	78 20.8	88 35	145.5	80 04.4	84 40	140.1	9
10	71 36.3	94 28	153.6	72 32.8	94 29	152.5	73 56.6	93 31	150.6	75 19.3	91 33	148.3	77 07.1	88 36	144.6	77 33.5	87 37	143.5	77 59.6	86 38	142.4	79 40.4	81 42	136.8	10
1	71 19.6	93 30	151.2	72 15.4	93 31	150.0	73 38.2	91 33	148.0	74 59.7	90 35	145.6	76 45.5	87 38	141.8	77 11.3	86 39	140.6	77 36.8	84 40	139.4	79 15.0	79 45	133.7	1
2	71 01.6	92 32	148.8	71 56.7	91 33	147.6	73 18.4	90 35	145.5	74 38.6	88 37	143.0	76 22.4	85 40	139.0	76 47.7	84 41	137.9	77 12.6	82 42	136.6	78 48.2	76 46	130.8	2
3	70 42.3	91 34	146.6	71 36.7	90 35	145.3	72 57.3	89 37	143.1	74 16.3	87 39	140.5	75 58.1	83 42	136.4	76 22.9	82 43	135.2	76 47.2	81 44	134.0	78 20.4	74 48	128.1	3
4	70 21.8	90 36	144.4	71 15.6	89 37	143.0	72 35.0	87 39	140.8	73 52.7	85 41	138.1	75 32.7	81 44	133.9	75 56.9	80 45	132.7	76 20.7	79 46	131.5	77 51.4	72 50	125.6	4
15	70 00.2	89 38	142.2	70 53.3	88 39	140.9	72 11.7	86 41	138.5	73 28.1	84 43	135.8	75 06.2	80 46	131.6	75 29.8	78 47	130.4	75 53.1	77 47	129.1	77 21.7	70 51	123.2	15
6	69 37.6	88 39	140.2	70 30.0	87 40	138.7	71 47.2	85 42	136.4	73 02.4	82 44	133.6	74 38.7	78 47	129.3	75 01.9	77 48	128.1	75 24.7	75 49	126.8	76 51.1	68 52	121.0	6
7	69 14.0	87 41	138.2	70 05.7	86 42	136.7	71 21.8	83 44	134.3	72 35.8	81 46	131.5	74 10.3	76 49	127.2	74 33.0	75 49	126.0	74 55.4	74 50	124.7	76 19.8	67 53	119.0	7
8	68 49.4	86 42	136.2	69 40.5	84 43	134.7	70 55.5	82 45	132.3	72 08.4	80 47	129.5	73 41.2	75 50	125.2	74 03.5	74 50	124.0	74 25.3	72 51	122.7	75 47.9	65 54	117.0	8
9	68 24.0	85 44	134.3	69 14.4	83 45	132.8	70 28.4	81 46	130.3	71 40.1	78 48	127.5	73 11.3	74 51	123.2	73 33.2	72 52	122.0	73 54.6	71 52	120.8	75 15.5	64 55	115.2	9
20	67 57.8	84 45	132.5	68 47.5	82 46	131.0	70 00.5	80 48	128.5	71 11.1	77 49	125.7	72 40.8	72 52	121.4	73 02.3	71 52	120.2	73 23.3	69 53	119.0	74 42.6	63 56	113.5	20
1	67 30.8	83 46	130.7	68 19.9	81 47	129.2	69 31.9	79 49	126.7	70 41.5	76 50	123.9	72 09.7	71 53	119.6	72 30.8	70 53	118.4	72 51.4	68 54	117.2	74 09.3	61 56	111.9	1
2	67 03.1	82 47	129.0	67 51.6	80 48	127.5	69 02.6	78 50	124.9	70 11.2	75 51	122.2	71 38.0	70 54	117.9	71 58.8	68 54	116.8	72 19.1	67 55	115.6	73 35.6	60 57	110.3	2
3	66 34.7	81 48	127.3	67 22.6	79 49	125.8	68 32.7	77 51	123.3	69 40.3	74 52	120.5	71 05.9	69 54	116.3	71 26.3	67 55	115.2	71 46.3	66 55	114.0	73 01.6	59 57	108.8	3
4	66 05.6	80 49	125.7	66 53.0	78 50	124.2	68 02.2	76 52	121.7	69 09.0	73 53	118.9	70 33.3	68 55	114.8	70 53.4	66 55	113.7	71 13.1	65 56	112.5	72 27.3	58 58	107.4	4
25	65 36.0	79 50	124.1	66 22.9	77 51	122.6	67 31.3	75 52	120.1	68 37.1	72 54	117.4	70 00.3	67 56	113.3	70 20.2	65 56	112.2	70 39.6	64 56	111.0	71 52.7	58 58	106.1	25
6	65 05.9	78 51	122.6	65 52.2	76 52	121.1	66 59.8	74 53	118.6	68 04.9	71 54	115.9	69 27.0	66 56	111.9	69 46.6	65 56	110.8	70 05.7	63 57	109.7	71 17.9	57 58	104.8	6
7	64 35.2	77 52	121.1	65 21.0	76 53	119.6	66 27.9	73 54	117.2	67 32.2	70 55	114.5	68 53.3	65 57	110.5	69 12.7	64 57	109.4	69 31.6	62 57	108.3	70 42.9	56 59	103.6	7
8	64 04.1	76 53	119.7	64 49.4	75 53	118.2	65 55.5	72 55	115.8	66 59.1	69 56	113.1	68 19.4	64 57	109.2	68 38.5	63 57	108.1	68 57.2	62 58	107.0	70 07.7	56 59	102.4	8
9	63 32.5	76 53	118.3	64 17.4	74 54	116.8	65 22.8	71 55	114.4	66 25.8	68 56	111.8	67 45.1	64 57	107.9	68 04.0	62 58	106.9	68 22.6	61 58	105.8	69 32.4	55 59	101.3	9
30	63 00.5	75 54	117.0	63 45.0	73 55	115.5	64 49.8	71 56	113.1	65 52.1	68 57	110.5	67 10.6	63 58	106.7	67 29.4	62 58	105.7	67 47.7	60 58	104.6	68 56.9	55 59	100.2	30
1	62 28.2	74 55	115.6	63 12.2	73 55	114.2	64 16.4	70 56	111.8	65 18.1	67 57	109.2	66 35.9	63 58	105.5	66 54.5	61 58	104.5	67 12.7	60 59	103.5	68 21.3	54 60	99.1	1
2	61 55.4	74 55	114.4	62 39.1	72 56	112.9	63 42.7	69 57	110.5	64 43.9	66 57	108.0	66 01.0	62 58	104.3	66 19.5	61 59	103.4	66 37.5	59 59	102.4	67 45.6	54 60	98.1	2
3	61 22.4	73 56	113.1	62 05.7	71 56	111.7	63 08.8	69 57	109.3	64 09.4	66 58	106.8	65 26.0	62 59	103.2	65 44.2	60 59	102.3	66 02.2	59 59	101.3	67 09.8	54 60	97.1	3
4	60 49.0	72 56	111.9	61 32.0	71 57	110.5	62 34.6	68 57	108.2	63 34.8	65 58	105.7	64 50.7	61 59	102.1	65 08.9	60 59	101.2	65 26.7	59 59	100.2	66 33.9	53 60	96.2	4
35	60 15.4	72 56	110.7	60 58.0	70 57	109.3	62 00.2	68 58	107.0	62 59.9	65 58	104.6	64 15.4	61 59	101.1	64 33.4	60 59	100.2	64 51.1	58 59	99.2	65 58.0	53 60	95.2	35
6	59 41.5	71 57	109.6	60 23.8	70 57	108.1	61 25.5	67 58	105.9	62 24.9	65 59	103.5	63 39.9	60 59	100.1	63 57.8	59 60	99.1	64 15.4	58 60	98.2	65 22.0	53 60	94.3	6
7	59 07.3	71 57	108.4	59 49.4	69 58	107.0	60 50.7	67 58	104.8	61 49.7	64 59	102.4	63 04.3	60 60	99.1	63 22.1	59 60	98.2	63 39.6	58 60	97.3	64 46.0	53 60	93.4	7
8	58 33.0	70 58	107.3	59 14.8	69 58	105.9	60 15.7	66 59	103.7	61 14.4	64 59	101.4	62 28.6	60 60	98.1	62 46.3	59 60	97.2	63 03.8	58 60	96.3	64 09.9	53 60	92.6	8
9	57 58.4	70 58	106.2	58 40.0	69 58	104.9	59 40.6	66 59	102.7	60 38.9	63 59	100.4	61 52.8	60 60	97.1	62 10.5	58 60	96.3	62 27.8	57 60	95.4	63 33.8	53 60	91.7	9
40	57 23.6	70 58	105.2	58 05.0	68 59	103.8	59 05.3	66 59	101.7	60 03.4	63 59	99.4	61 16.9	59 60	96.2	61 34.5	58 60	95.4	61 51.9	57 60	94.5	62 57.7	53 60	90.9	40
1	56 48.7	69 58	104.2	57 29.8	68 59	102.8	58 29.9	66 59	100.7	59 27.7	63 60	98.5	60 41.0	59 60	95.3	60 58.6	58 60	94.5	61 15.8	57 60	93.6	62 21.6	53 60	90.1	1
2	56 13.6	69 59	103.1	56 54.6	68 59	101.8	57 54.3	65 59	99.7	58 51.9	63 60	97.5	60 05.0	59 60	94.4	60 22.6	58 60	93.6	60 39.8	57 60	92.8	61 45.5	53 60	89.3	2
3	55 38.4	69 59	102.2	56 19.2	67 59	100.8	57 18.7	65 60	98.8	58 16.1	63 60	96.6	59 29.0	59 60	93.5	59 46.5	58 60	92.7	60 03.7	57 60	91.9	61 09.4	53 60	88.5	3
4	55 03.0	68 59	101.2	55 43.6	67 59	99.9	56 43.0	65 60	97.9	57 40.2	62 60	95.7	58 52.9	59 60	92.7	59 10.4	58 60	91.9	59 27.6	57 60	91.1	60 33.3	53 60	87.7	4
45	54 27.5	68 59	100.2	55 08.0	67 60	98.9	56 07.2	65 60	96.9	57 04.2	62 60	94.8	58 16.8	59 60	91.9	58 34.3	58 60	91.1	58 51.5	57 60	90.3	59 57.3	53 60	87.0	45
6	53 52.0	68 59	99.3	54 32.3	67 60	98.0	55 31.3	64 60	96.0	56 28.2	62 60	94.0	57 40.8	59 60	91.0	57 58.2	58 60	90.3	58 15.4	57 60	89.5	59 21.2	53 60	86.3	6
7	53 16.3	68 60	98.4	53 56.5	66 60	97.1	54 55.3	64 60	95.2	55 52.2	62 60	93.1	57 04.6	59 60	90.2	57 22.1	58 60	89.5	57 39.3	57 60	88.7	58 45.2	53 60	85.5	7
8	52 40.5	68 60	97.4	53 20.6	66 60	96.2	54 19.4	64 60	94.3	55 16.1	62 60	92.3	56 28.5	59 60	89.4	56 46.0	58 60	88.7	57 03.2	57 60	87.9	58 09.2	53 60	84.8	8
9	52 04.7	67 60	96.6	52 44.7	66 60	95.3	53 43.3	64 60	93.4	54 40.0	62 60	91.4	55 52.4	59 60	88.6	56 09.9	58 60	87.9	56 27.1	57 60	87.2	57 33.3	53 60	84.1	9
50	51 28.8	67 60	95.7	52 08.7	66 60	94.5	53 07.3	64 60	92.6	54 03.9	62 60	90.6	55 16.3	59 60	87.9	55 33.8	58 60	87.2	55 51.1	57 60	86.4	56 57.4	53 60	83.4	50
1	50 52.8	67 60	94.8	51 32.7	66 60	93.6	52 31.2	64 60	91.8	53 27.8	62 60	89.8	54 40.3	59 60	87.1	54 57.8	58 60	86.4	55 15.1	57 60	85.7	56 21.5	54 60	82.7	1
2	50 16.8	67 60	94.0	50 56.7	66 60	92.8	51 55.1	64 60	90.9	52 51.7	62 60	89.0	54 04.2	59 60	86.4	54 21.8	58 60	85.7	54 39.1	57 60	85.0	55 45.8	54 60	82.0	2
3	49 40.8	67 60	93.1	50 20.6	66 60	91.9	51 19.0	64 60	90.1	52 15.6	62 60	88.3	53 28.2	59 60	85.6	53 45.8	58 60	84.9	54 03.1	57 60	84.2	55 10.0	54 59	81.4	3
4	49 04.7	67 60	92.3	49 44.5	66 60	91.1	50 42.9	64 60	89.3	51 39.5	62 60	87.5	52 52.2	59 60	84.9	53 09.8	58 60	84.2	53 27.2	58 60	83.5	54 34.4	54 59	80.7	4
55	48 28.6	67 60	91.5	49 08.4	66 60	90.3	50 06.8	64 60	88.6	51 03.5	62 60	86.7	52 16.3	59 60	84.2	52 33.9	59 60	83.5	52 51.4	58 60	82.8	53 58.8	55 59	80.0	55
6	47 52.5	67 60	90.6	48 32.3	66 60	89.5	49 30.7	64 60	87.8	50 27.4	62 60	86.0	51 40.4	59 60	83.4	51 58.1	59 60	82.8	52 15.6	58 60	82.1	53 23.2	55 59	79.4	6
7	47 16.4	67 60	89.8	47 56.2	66 60	88.7	48 54.6	64 60	87.0	49 51.4	62 60	85.2	51 04.5	60 60	82.7	51 22.3	59 60	82.1	51 39.8	58 59	81.4	52 47.8	55 59	78.7	7
8	46 40.3	67 60	89.1	47 20.1	66 60	88.0	48 18.6	64 60	86.3	49 15.5	62 60	84.5	50 28.7	60 60	82.0	50 46.6	59 59	81.4	51 04.2	58 59	80.8	52 12.4	55 59	78.1	8
9	46 04.2	67 60	88.3	46 44.0	66 60	87.2	47 42.5	64 60	85.5	48 39.6	62 60	83.8	49 53.0	60 59	81.3	50 10.9	59 59	80.7	50 28.6	59 59	80.1	51 37.1	56 59	77.5	9
60	45 28.1	67 60	87.5	46 08.0	66 60	86.4	47 06.6	64 60	84.8	48 03.7	63 60	83.0	49 17.3	60 59	80.7	49 35.3	59 59	80.0	49 53.0	59 59	79.4	51 01.9	56 59	76.8	60
1	44 52.0	67 60	86.7	45 31.9	66 60	85.7	46 30.6	64 60	84.0	47 27.9	63 60	82.3	48 41.7	60 59	80.0	48 59.8	60 59	79.4	49 17.6	59 59	78.7	50 26.8	56 58	76.2	1
2	44 16.0	67 60	86.0	44 56.0	66 60	84.9	45 54.7	65 60	83.3	46 52.1	63 60	81.6	48 06.2	61 59	79.3	48 24.3	60 59	78.7	48 42.2	59 59	78.1	49 51.8	57 58	75.6	2
3	43 40.0	67 60	85.2	44 20.0	66 60	84.2	45 18.9	65 60	82.6	46 16.4	63 59	80.9	47 30.8	61 59	78.6	47 48.9	60 59	78.0	48 06.9	60 59	77.4	49 16.8	57 58	75.0	3
4	43 04.1	67 60	84.5	43 44.1	66 60	83.4	44 43.1	65 60	81.9	45 40.8	63 59	80.2	46 55.4	61 59	78.0	47 13.7	60 59	77.4	47 31.7	60 58	76.8	48 42.0	57 58	74.4	4
65	42 28.1	67 60	83.7	43 08.3	66 60	82.7	44 07.4	65 59	81.1	45 05.3	63 59	79.5	46 20.2	61 59	77.3	46 38.5	61 58	76.7	46 56.6	60 58	76.1	48 07.3	58 58	73.7	65
6	41 52.3	67 60	83.0	42 32.5	67 60	82.0	43 31.8	65 59	80.4	44 29.8	64 59	78.8	45 45.0	62 58	76.6	46 03.4	61 58	76.1	46 21.6	60 58	75.5	47 32.7	58 58	73.1	6
7	41 16.5	68 60	82.3	41 56.8	67 59	81.3	42 56.2	65 59	79.7	43 54.4	64 59	78.2	45 09.9	62 58	76.0	45 28.4	61 58	75.4	45 46.7	61 58	74.9	46 58.2	58 57	72.5	7
8	40 40.7	68 59	81.5	41 21.1	67 59	80.5	42 20.7	66 59	79.0	43 19.1	64 59	77.5	44 34.9	62 58	75.3	44 53.5	62 58	74.8	45 11.9	61 58	74.2	46 23.8	59 57	71.9	8
9	40 05.0	68 59	80.8	40 45.5	67 59	79.8	41 45.3	66 59	78.3	42 43.9	64 58	76.8	44 00.0	62 58	74.7	44 18.7	62 58	74.1	44 37.2	61 58	73.6	45 49.5	59 57	71.3	9
70	39 29.4	68 59	80.1	40 10.0	67 59	79.1	41 10.0	66 59	77.7	42 08.8	65 58	76.1	43 25.3	63 58	74.0	43 44.0	62 58	73.5	44 02.6	62 57	73.0	45 15.4	60 57	70.7	70
1	38 53.9	68 59	79.4	39 34.6	67 59	78.4	40 34.8	66 59	77.0	41 33.8	65 58	75.5	42 50.6	63 58	73.4	43 09.5	63 57	72.9	43 28.1	62 57	72.3	44 41.4	60 56	70.1	1
2	38 18.4	68 59	78.7	38 59.3	68 59	77.7	39 59.6	66 58	76.3	40 58.9	65 58	74.8	42 16.1	63 57	72.8	42 35.0	63 57	72.2	42 53.8	62 57	71.7	44 07.5	60 56	69.5	2
3	37 43.1	69 59	78.0	38 24.0	68 59	77.0	39 24.6	67 58	75.6	40 24.1	65 58	74.2	41 41.6	64 57	72.1	42 00.7	63 57	71.6	42 19.6	63 57	71.1	43 33.7	61 56	68.9	3
4	37 07.8	69 59	77.3	37 48.9	68 58	76.4	38 49.7	67 58	74.9	39 49.4	66 58	73.5	41 07.3	64 57	71.5	41 26.5	64 57	71.0	41 45.5	63 57	70.5	43 00.1	61 56	68.3	4
75	36 32.6	69 58	76.6	37 13.8	68 58	75.7	38 14.9	67 58	74.3	39 14.9	66 57	72.8	40 33.2	64 57	70.9	40 52.4	64 57	70.4	41 11.5	64 56	69.8	42 26.6	62 56	67.8	75
6	35 57.6	69 58	75.9	36 38.9	69 58	75.0	37 40.2	68 58	73.6	38 40.4	66 57	72.2	39 59.1	65 57	70.2	40 18.5	64 56	69.7	40 37.7	64 56	69.2	41 53.2	62 55	67.2	6
7	35 22.6	69 58	75.2	36 04.1	69 58	74.3	37 05.6	68 57	72.9	38 06.1	67 57	71.5	39 25.2	65 56	69.6	39 44.7	65 56	69.1	40 04.0	64 56	68.6	41 20.0	62 55	66.6	7
8	34 47.8	70 58	74.5	35 29.4	69 58	73.6	36 31.1	68 57	72.3	37 31.9	67 57	70.9	38 51.4	65 56	69.0	39 11.0	65 56	68.5	39 30.4	65 56	68.0	40 47.0	63 55	66.0	8
9	34 13.0	70 58	73.8	34 54.8	69 57	72.9	35 56.8	68 57	71.6	36 57.9	67 57	70.2	38 17.8	66 56	68.4	38 37.5	65 56	67.9	38 57.0	65 55	67.4	40 14.1	63 55	65.4	9
80	33 38.4	70 58	73.1	34 20.4	70 57	72.3	35 22.6	69 57	71.0	36 24.0	68 56	69.6	37 44.3	66 56	67.7	38 04.1	66 55	67.3	38 23.8	65 55	66.8	39 41.3	64 54	64.8	80
1	33 03.9	70 57	72.5	33 46.0	70 57	71.6	34 48.5	69 57	70.3	35 50.2	68 56	69.0	37 10.9	67 55	67.1	37 30.9	66 55	66.6	37 50.7	66 55	66.2	39 08.7	64 54	64.2	1
2	32 29.5	71 57	71.8	33 11.8	70 57	70.9	34 14.6	69 56	69.6	35 16.6	68 56	68.3	36 37.8	67 55	66.5	36 57.8	67 55	66.0	37 17.7	66 55	65.6	38 36.3	65 54	63.6	2
3	31 55.3	71 57	71.1	32 37.8	70 57	70.3	33 40.8	70 56	69.0	34 43.1	69 56	67.7	36 04.7	67 55	65.9	36 24.9	67 55	65.4	36 44.9	67 54	65.0	38 04.0	65 54	63.1	3
4	31 21.2	71 57	70.4	32 03.9	71 56	69.6	33 07.2	70 56	68.3	34 09.8	69 55	67.0	35 31.8	68 55	65.3	35 52.1	67 54	64.8	36 12.3	67 54	64.3	37 31.9	66 53	62.5	4
85	30 47.3	72 56	69.7	31 30.1	71 56	68.9	32 33.7	70 56	67.7	33 36.6	69 55	66.4	34 59.1	68 54	64.6	35 19.5	68 54	64.2	35 39.8	67 54	63.7	37 00.0	66 53	61.9	85
6	30 13.5	72 56	69.1	30 56.5	71 56	68.3	32 00.4	71 55	67.0	33 03.6	70 55	65.8	34 26.6	69 54	64.0	34 47.1	68 54	63.6	35 07.5	68 54	63.1	36 28.2	67 53	61.3	6
7	29 39.8	72 56	68.4	30 23.0	72 56	67.6	31 27.2	71 55	66.4	32 30.7	70 54	65.1	33 54.2	69 54	63.4	34 14.9	69 53	63.0	34 35.4	68 53	62.5	35 56.6	67 52	60.7	7
8	29 06.3	73 56	67.7	29 49.7	72 55	66.9	30 54.2	71 55	65.7	31 58.1	71 54	64.5	33 22.0	69 53	62.8	33 42.8	69 53	62.3	34 03.5	69 53	61.9	35 25.2	67 52	60.1	8
9	28 33.0	73 55	67.1	29 16.6	72 55	66.3	30 21.4	72 54	65.1	31 25.6	71 54	63.8	32 50.0	70 53	62.2	33 10.9	70 53	61.7	33 31.7	69 53	61.3	34 54.0	68 52	59.5	9
90	27 59.8	73 55	66.4	28 43.6	73 55	65.6	29 48.7	72 54	64.4	30 53.2	71 54	63.2	32 18.2	70 53	61.5	32 39.2	70 53	61.1	33 00.1	70 52	60.7	34 23.0	68 51	59.0	90

Digitized by Google

10—15906

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	27 26.8	74 55	65.7	28 10.8	73 54	64.9	29 16.3	72 54	63.8	30 21.1	72 53	62.6	31 46.5	71 52	60.9	32 07.7	70 52	60.5	32 28.7	70 52	60.1	33 52.1	69 51	58.4	91
2	26 54.0	74 54	65.0	27 38.2	73 54	64.3	28 44.0	73 54	63.1	29 49.1	72 53	61.9	31 15.0	71 52	60.3	31 36.3	71 52	59.9	31 57.5	71 52	59.5	33 21.5	69 51	57.8	2
3	26 21.4	74 54	64.4	27 05.7	74 54	63.6	28 11.9	73 53	62.5	29 17.4	72 53	61.3	30 43.8	71 52	59.7	31 05.2	71 52	59.3	31 26.5	71 51	58.9	32 51.0	70 50	57.2	3
4	25 48.9	75 54	63.7	26 33.5	74 53	63.0	27 39.9	74 53	61.8	28 45.8	73 52	60.7	30 12.7	72 51	59.1	30 34.2	72 51	58.7	30 55.7	71 51	58.3	32 20.8	70 50	56.6	4
95	25 16.6	75 54	63.0	26 01.4	74 53	62.3	27 08.2	74 53	61.2	28 14.4	73 52	60.0	29 41.8	72 51	58.5	30 03.5	72 51	58.1	30 25.1	72 51	57.7	31 50.7	71 50	56.0	95
6	24 44.5	75 53	62.4	25 29.5	75 53	61.6	26 36.7	74 52	60.5	27 43.2	74 52	59.4	29 11.1	73 51	57.8	29 33.0	73 51	57.4	29 54.7	72 50	57.0	31 20.9	71 49	55.4	6
7	24 12.6	76 53	61.7	24 57.9	75 52	61.0	26 05.3	75 52	59.9	27 12.3	74 51	58.7	28 40.7	73 50	57.2	29 02.6	73 50	56.8	29 24.5	73 50	56.4	30 51.3	72 49	54.8	7
8	23 40.9	76 52	61.0	24 26.4	76 52	60.3	25 34.2	75 52	59.2	26 41.5	75 51	58.1	28 10.4	74 50	56.6	28 32.5	73 50	56.2	28 54.5	73 50	55.8	30 21.9	72 49	54.2	8
9	23 09.5	76 52	60.4	23 55.1	76 52	59.6	25 03.3	75 51	58.6	26 11.0	75 51	57.5	27 40.4	74 50	56.0	28 02.6	74 49	55.6	28 24.7	74 49	55.2	29 52.7	73 48	53.7	9
100	22 38.2	77 52	59.7	23 24.1	76 51	59.0	24 32.6	76 51	57.9	25 40.6	75 50	56.8	27 10.6	75 49	55.4	27 32.9	74 49	55.0	27 55.2	74 49	54.6	29 23.7	73 48	53.1	100
1	22 07.1	77 51	59.0	22 53.2	77 51	58.3	24 02.1	76 50	57.3	25 10.5	76 50	56.2	26 41.0	75 49	54.7	27 03.5	75 49	54.4	27 25.9	75 48	54.0	28 54.9	74 48	52.5	1
2	21 36.3	77 51	58.3	22 22.6	77 51	57.6	23 31.8	77 50	56.6	24 40.6	76 49	55.5	26 11.6	75 49	54.1	26 34.2	75 48	53.7	26 56.8	75 48	53.4	28 26.4	74 47	51.9	2
3	21 05.7	78 51	57.7	21 52.2	78 50	57.0	23 01.8	77 50	56.0	24 11.0	77 49	54.9	25 42.5	76 48	53.5	26 05.2	76 48	53.1	26 27.9	76 48	52.8	27 58.1	75 47	51.3	3
4	20 35.3	78 50	57.0	21 22.1	78 50	56.3	22 32.0	77 49	55.3	23 41.5	77 49	54.3	25 13.6	76 48	52.9	25 36.5	76 48	52.5	25 59.3	76 47	52.1	27 30.1	75 46	50.7	4
105	20 05.1	79 50	56.3	20 52.1	78 50	55.6	22 02.4	78 49	54.6	23 12.3	77 48	53.6	24 44.9	77 47	52.2	25 07.9	77 47	51.9	25 30.9	76 47	51.5	27 02.3	76 46	50.1	105
6	19 35.2	79 49	55.6	20 22.5	79 49	55.0	21 33.1	78 48	54.0	22 43.4	78 48	53.0	24 16.5	77 47	51.6	24 39.7	77 47	51.2	25 02.8	77 46	50.9	26 34.7	76 46	49.6	6
7	19 05.5	79 49	55.0	19 53.0	79 49	54.3	21 04.0	79 48	53.3	22 14.7	78 47	52.3	23 48.3	78 47	51.0	24 11.6	78 46	50.6	24 34.9	77 46	50.3	26 07.4	77 45	48.9	7
8	18 36.0	80 49	54.3	19 23.8	79 48	53.6	20 35.2	79 48	52.7	21 46.2	79 47	51.7	23 20.4	78 46	50.3	23 43.8	78 46	50.0	24 07.2	78 46	49.6	25 40.3	77 45	48.3	8
9	18 06.9	80 48	53.6	18 54.9	80 48	53.0	20 06.6	80 47	52.0	21 18.0	79 47	51.0	22 52.7	79 46	49.7	23 16.3	79 45	49.4	23 39.8	78 45	49.0	25 13.5	78 44	47.7	9
110	17 37.9	80 48	52.9	18 26.2	80 47	52.3	19 38.3	80 47	51.3	20 50.1	80 46	50.4	22 25.3	79 45	49.1	22 49.0	79 45	48.7	23 12.7	79 45	48.4	24 46.9	78 44	47.0	110
1	17 09.3	81 47	52.2	17 57.7	81 47	51.6	19 10.2	80 46	50.7	20 22.4	80 46	49.7	21 58.2	80 45	48.4	22 22.0	79 45	48.1	22 45.8	79 44	47.8	24 20.7	79 43	46.4	1
2	16 40.8	81 47	51.5	17 29.6	81 46	50.9	18 42.4	81 46	50.0	19 55.0	80 45	49.1	21 31.3	80 44	47.8	21 55.3	80 44	47.5	22 19.2	80 44	47.1	23 54.6	79 43	45.8	2
3	16 12.7	82 46	50.9	17 01.7	82 46	50.2	18 14.9	81 45	49.3	19 27.9	81 45	48.4	21 04.7	80 44	47.1	21 28.8	80 44	46.8	21 52.9	80 43	46.5	23 28.9	80 42	45.2	3
4	15 44.8	82 46	50.2	16 34.0	82 46	49.6	17 47.6	82 45	48.7	19 01.0	81 44	47.8	20 38.4	81 43	46.5	21 02.6	81 43	46.2	21 26.8	81 43	45.9	23 03.4	80 42	44.6	4
115	15 17.2	82 46	49.5	16 06.7	82 45	48.9	17 20.7	82 44	48.0	18 34.4	82 44	47.1	20 12.3	81 43	45.9	20 36.7	81 43	45.6	21 01.1	81 42	45.2	22 38.2	81 42	44.0	115
6	14 49.9	83 45	48.8	15 39.6	83 45	48.2	16 54.0	82 44	47.3	18 08.1	82 43	46.4	19 46.5	82 42	45.2	20 11.1	82 42	44.9	20 35.6	82 42	44.6	22 13.2	81 41	43.4	6
7	14 22.9	83 45	48.1	15 12.9	83 44	47.5	16 27.6	83 44	46.6	17 42.1	83 43	45.8	19 21.0	82 42	44.6	19 45.7	82 42	44.3	20 10.4	82 42	44.0	21 48.6	82 41	42.7	7
8	13 56.2	84 44	47.4	14 46.4	84 44	46.8	16 01.5	83 43	46.0	17 16.4	83 42	45.1	18 55.9	83 42	43.9	19 20.7	83 41	43.6	19 45.4	83 41	43.3	21 24.2	82 40	42.1	8
9	13 29.8	84 44	46.7	14 20.2	84 43	46.1	15 35.7	84 42	45.3	16 50.9	84 42	44.4	18 31.0	83 41	43.3	18 55.9	83 41	43.0	19 20.8	83 41	42.7	21 00.2	83 40	41.5	9
120	13 03.7	84 43	46.0	13 54.3	84 43	45.4	15 10.1	84 42	44.6	16 25.8	84 41	43.8	18 06.4	84 40	42.6	18 31.4	84 40	42.3	18 56.5	83 40	42.0	20 36.4	83 39	40.9	120
1	12 37.8	85 42	45.3	13 28.7	85 42	44.7	14 44.9	85 42	43.9	16 01.0	84 41	43.1	17 42.1	84 40	42.0	18 07.3	84 40	41.7	18 32.4	84 40	41.4	20 12.9	84 39	40.2	1
2	12 12.3	85 42	44.6	13 03.5	85 42	44.0	14 20.1	85 41	43.2	15 36.5	85 40	42.4	17 18.1	85 39	41.3	17 43.4	84 39	41.0	18 08.7	84 39	40.7	19 49.7	84 38	39.6	2
3	11 47.1	86 41	43.9	12 38.5	86 41	43.3	13 55.5	85 40	42.5	15 12.3	85 40	41.7	16 54.4	85 39	40.6	17 19.9	85 39	40.4	17 45.3	85 38	40.1	19 26.9	84 38	39.0	3
4	11 22.3	86 41	43.2	12 13.9	86 40	42.6	13 31.2	86 40	41.9	14 48.4	86 39	41.1	16 31.0	85 38	40.0	16 56.6	85 38	39.7	17 22.2	85 38	39.4	19 04.3	85 37	38.3	4
125	10 57.7	86 40	42.5	11 49.6	86 40	41.9	13 07.3	86 39	41.2	14 24.8	86 39	40.4	16 08.0	86 38	39.3	16 33.7	86 38	39.1	16 59.4	86 37	38.8	18 42.1	85 37	37.7	125
6	10 33.5	87 40	41.7	11 25.6	87 39	41.2	12 43.7	87 39	40.5	14 01.6	86 38	39.7	15 45.3	86 37	38.7	16 11.1	86 37	38.4	16 37.0	86 37	38.1	18 20.2	86 36	37.1	6
7	10 09.7	87 39	41.0	11 02.0	87 39	40.5	12 20.4	87 38	39.8	13 38.7	87 38	39.0	15 22.9	87 37	38.0	15 48.9	87 37	37.7	16 14.8	87 36	37.5	17 58.6	86 35	36.4	7
8	9 46.1	88 39	40.3	10 38.7	88 38	39.8	11 57.5	87 38	39.1	13 16.1	87 37	38.3	15 00.8	87 36	37.3	15 26.9	87 36	37.1	15 53.0	87 36	36.8	17 37.3	87 35	35.8	8
9	9 22.9	88 38	39.6	10 15.8	88 38	39.1	11 34.9	88 37	38.4	12 53.9	88 36	37.6	14 39.1	88 36	36.7	15 05.3	87 35	36.4	15 31.6	87 35	36.1	17 16.3	87 34	35.1	9
130	9 00.1	88 37	38.9	9 53.2	88 37	38.4	11 12.6	88 36	37.7	12 32.0	88 36	37.0	14 17.7	88 35	36.0	14 44.1	88 35	35.7	15 10.4	88 35	35.5	16 55.7	88 34	34.5	130
1	8 37.6	89 37	38.1	9 30.9	89 36	37.7	10 50.8	89 36	37.0	12 10.5	89 35	36.3	13 56.7	88 34	35.3	14 23.2	88 34	35.1	14 49.7	88 34	34.8	16 35.5	88 33	33.8	1
2	8 15.5	89 36	37.4	9 09.0	89 36	37.0	10 29.2	89 35	36.3	11 49.3	89 35	35.6	13 36.0	89 34	34.6	14 02.6	89 34	34.4	14 29.2	89 33	34.1	16 15.5	88 33	33.2	2
3	7 53.8	90 36	36.7	8 47.5	90 35	36.2	10 08.0	89 35	35.6	11 28.5	89 34	34.9	13 15.6	89 33	33.9	13 42.4	89 33	33.7	14 09.1	89 33	33.5	15 55.9	89 32	32.5	3
4	7 32.4	90 35	35.9	8 26.3	90 35	35.5	9 47.2	90 34	34.8	11 08.0	90 33	34.2	12 55.6	90 33	33.3	13 22.5	90 32	33.0	13 49.4	90 32	32.8	15 36.7	89 32	31.9	4
135	7 11.4	90 34	35.2	8 05.6	90 34	34.8	9 26.8	90 33	34.1	10 47.9	90 33	33.5	12 36.0	90 32	32.6	13 03.0	90 32	32.4	13 30.0	90 32	32.1	15 17.8	90 31	31.2	135
6	6 50.7	91 34	34.5	7 45.1	91 33	34.0	9 06.7	91 33	33.4	10 28.2	91 32	32.8	12 16.8	90 31	31.9	12 43.9	90 31	31.7	13 11.0	90 31	31.5	14 59.2	90 30	30.6	6
7	6 30.5	91 33	33.7	7 25.1	91 33	33.3	8 47.0	91 32	32.7	10 08.9	91 32	32.1	11 57.9	91 31	31.2	12 25.1	91 31	31.0	12 52.3	91 30	30.8	14 41.1	91 30	29.9	7
8	6 10.6	91 32	33.0	7 05.5	91 32	32.6	8 27.7	91 32	32.0	9 49.9	91 31	31.3	11 39.3	91 30	30.5	12 06.7	91 30	30.3	12 34.0	91 30	30.1	14 23.2	91 29	29.2	8
9	5 51.2	92 32	32.2	6 46.2	92 31	31.8	8 08.8	92 31	31.2	9 31.3	92 30	30.6	11 21.2	92 30	29.8	11 48.7	92 29	29.6	12 16.1	91 29	29.4	14 05.8	91 28	28.6	9
140	5 32.1	92 31	31.5	6 27.4	92 31	31.1	7 50.3	92 30	30.5	9 13.1	92 30	29.9	11 03.4	92 29	29.1	11 31.0	92 29	28.9	11 58.6	92 29	28.7	13 48.7	92 28	27.9	140
1	5 13.4	92 30	30.7	6 08.9	92 30	30.4	7 32.1	92 30	29.8	8 55.3	92 29	29.2	10 46.0	92 28	28.4	11 13.7	92 28	28.2	11 41.4	92 28	28.0	13 32.0	92 27	27.2	1
2				5 50.9	93 29	29.6	7 14.4	93 29	29.1	8 37.8	93 28	28.5	10 29.1	93 28	27.7	10 56.8	93 28	27.5	11 24.6	93 27	27.3	13 15.6	92 27	26.6	2
3				5 33.2	93 29	28.9	6 57.0	93 28	28.3	8 20.8	93 28	27.8	10 12.4	93 27	27.0	10 40.3	93 27	26.8	11 08.2	93 27	26.7	12 59.7	93 26	25.9	3
4				5 16.0	93 28	28.1	6 40.1	93 28	27.6	8 04.2	93 27	27.1	9 56.2	93 26	26.3	10 24.2	93 26	26.1	10 52.2	93 26	26.0	12 44.1	93 25	25.2	4
145							6 23.6	94 27	26.9	7 48.0	94 26	26.3	9 40.4	94 26	25.6	10 08.5	94 26	25.4	10 36.6	94 25	25.3	12 28.9	94 25	24.5	145
6							6 07.5	94 26	26.1	7 32.2	94 26	25.6	9 25.0	94 25	24.9	9 53.2	94 25	24.7	10 21.4	94 25	24.6	12 14.1	94 24	23.9	6
7							5 51.8	94 25	25.4	7 16.8	94 25	24.9	9 10.0	94 24	24.2	9 38.3	94 24	24.0	10 06.6	94 24	23.9	11 59.7	94 23	23.2	7
8							5 36.6	95 25	24.6	7 01.8	95 24	24.1	8 55.4	95 24	23.5	9 23.8	95 24	23.3	9 52.2	95 23	23.2	11 45.7	95 23	22.5	8
9							5 21.7	95 24	23.9	6 47.2	95 24	23.4	8 41.2	95 23	22.8	9 09.7	95 23	22.6	9 38.2	95 23	22.5	11 32.1	95 22	21.8	9
150							5 07.3	95 23	23.1	6 33.1	95 23	22.7	8 27.4	95 22	22.1	8 56.0	95 22	21.9	9 24.6	95 22	21.8	11 18.8	95 21	21.1	150
1										6 19.4	96 22	21.9	8 14.1	96 22	21.3	8 42.8	96 21	21.2	9 11.4	96 21	21.0	11 06.0	95 21	20.4	1
2										6 06.1	96 21	21.2	8 01.2	96 21	20.6	8 29.9	96 21	20.5	8 58.7	96 21	20.3	10 53.6	96 20	19.8	2
3										5 53.3	96 21	20.5	7 48.6	96 20	19.9	8 17.5	96 20	19.8	8 46.3	96 20	19.6	10 41.6	96 19	19.1	3
4										5 40.9	96 20	19.7	7 36.6	96 19	19.2	8 05.5	96 19	19.1	8 34.4	96 19	18.9	10 30.0	96 19	18.4	4
155										5 28.9	97 19	19.0	7 24.9	97 19	18.5	7 53.9	97 19	18.3	8 22.9	97 18	18.2	10 18.8	97 18	17.7	155
6										5 17.4	97 18	18.2	7 13.7	97 18	17.7	7 42.8	97 18	17.6	8 11.8	97 18	17.5	10 08.1	97 17	17.0	6
7										5 06.3	97 18	17.5	7 02.9	97 17	17.0	7 32.1	97 17	16.9	8 01.2	97 17	16.8	9 57.7	97 17	16.3	7
8													6 52.6	97 16	16.3	7 21.8	97 16	16.2	7 51.0	97 16	16.1	9 47.8	97 16	15.6	8
9													6 42.7	98 16	15.6	7 11.9	98 16	15.4	7 41.2	98 16	15.3	9 38.3	98 15	14.9	9
160													6 33.2	98 15	14.8	7 02.5	98 15	14.7	7 31.9	98 15	14.6	9 29.3	98 14	14.2	160
1													6 24.2	98 14	14.1	6 53.6	98 14	14.0	7 23.0	98 14	13.9	9 20.6	98 14	13.5	1
2													6 15.6	98 14	13.4	6 45.1	98 13	13.3	7 14.6	98 13	13.2	9 12.4	98 13	12.8	2
3													6 07.5	98 13	12.6	6 37.0	98 13	12.5	7 06.6	98 13	12.4	9 04.6	98 12	12.1	3
4													5 59.8	99 12	11.9	6 29.4	99 12	11.8	6 59.0	99 12	11.7	8 57.3	99 12	11.4	4
165													5 52.6	99 11	11.1	6 22.3	99 11	11.1	6 51.9	99 11	11.0	8 50.4	99 11	10.7	165
6													5 45.9	99 10	10.4	6 15.5	99 10	10.3	6 45.2	99 10	10.3	8 43.9	99 10	10.0	6
7													5 39.6	99 10	09.7	6 09.3	99 10	09.6	6 39.0	99 10	09.5	8 37.9	99 09	09.3	7
8													5 33.7	99 09	08.9	6 03.5	99 09	08.9	6 33.3	99 09	08.8	8 32.3	99 09	08.5	8
9													5 28.4	99 08	08.2	5 58.2	99 08	08.1	6 28.0	99 08	08.1	8 27.2	99 08	07.8	9
170													5 23.5	99 07	07.4	5 53.3	99 07	07.4	6 23.1	99 07	07.3	8 22.5	99 07	07.1	170
1													5 19.0	1.0 07	06.7	5 48.9	1.0 07	06.7	6 18.7	1.0 07	06.6	8 18.2	1.0 06	06.4	1
2													5 15.0	1.0 06	06.0	5 44.9	1.0 06	05.9	6 14.8	1.0 06	05.9	8 14.4	1.0 06	05.7	2
3													5 11.5	1.0 05	05.2	5 41.4	1.0 05	05.2	6 11.3	1.0 05	05.1	8 11.0	1.0 05	05.0	3
4													5 08.5	1.0 04	04.5	5 38.4	1.0 04	04.4	6 08.3	1.0 04	04.4	8 08.1	1.0 04	04.3	4
175													5 05.9	1.0 04	03.7	5 35.8	1.0 04	03.7	6 05.8	1.0 03	03.7	8 05.6	1.0 03	03.6	175
6													5 03.8	1.0 03	03.0	5 33.7	1.0 03	03.0	6 03.7	1.0 03	02.9	8 03.6	1.0 03	02.9	6
7													5 02.1	1.0 02	02.2	5 32.1	1.0 02	02.2	6 02.1	1.0 02	02.2	8 02.0	1.0 02	02.1	7
8													5 00.9	1.0 01	01.5	5 30.9	1.0 01	01.5	6 00.9	1.0 01	01.5	8 00.9	1.0 01	01.4	8
9													5 00.2	1.0 00	00.7	5 30.2	1.0 00	00.7	6 00.2	1.0 00	00.7	8 00.2	1.0 00	00.7	9
180													5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	6 00.0	1.0 00	00.0	8 00.0	1.0 00	00.0	180

Lat. 53°

Lat. 54°

Lat. 55°

Lat. 56°

Lat. 57°

Lat. 58°

Navigation Solutions

Lat. 53°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	83 80.0	1.0 03	180.0	84 00.0	1.0 03	180.0	85 30.0	1.0 04	180.0	86 30.0	1.0 06	180.0	87 30.0	1.0 08	180.0	88 30.0	1.0 12	180.0	89 30.0	1.0 29	180.0	89 00.0	1.0 16	00.0	00
1	82 58.2	1.0 09	174.3	83 57.9	99 10	173.5	85 27.4	99 13	171.6	86 26.7	99 16	169.5	87 25.5	97 21	165.7	88 22.8	93 32	157.4	89 12.9	64 52	129.2	88 50.2	86 39	30.3	1
2	82 52.9	99 15	168.7	83 51.9	98 17	167.1	85 19.6	97 21	163.5	86 17.0	95 25	159.5	87 12.6	90 32	152.9	88 03.8	78 43	140.0	88 41.4	39 57	111.6	88 26.8	63 49	49.1	2
3	82 44.1	97 20	163.3	83 42.0	96 22	161.0	85 07.0	93 28	156.0	86 01.7	89 33	150.6	86 53.2	81 40	142.2	87 37.8	65 50	128.0	88 07.0	29 59	104.2	87 57.3	47 54	59.5	3
4	82 32.2	95 26	158.1	83 28.5	93 28	155.3	84 50.4	88 34	149.1	85 41.9	83 39	142.8	86 28.9	73 46	133.7	87 07.7	55 54	119.9	87 31.7	23 59	100.1	87 25.2	36 56	65.6	4
05	82 17.3	92 29	153.2	83 11.8	90 32	149.9	84 30.1	84 39	142.9	85 18.4	77 44	136.2	86 01.4	65 50	126.9	86 35.5	47 56	114.1	86 56.0	20 60	97.4	86 51.8	29 57	69.4	05
6	81 59.7	89 33	148.6	82 52.4	86 37	144.9	84 07.0	79 42	137.5	84 52.2	71 47	130.6	85 31.5	59 52	121.6	86 02.0	42 57	109.8	86 20.1	18 60	95.4	86 17.7	23 58	71.9	6
7	81 39.7	86 37	144.3	82 30.5	83 40	140.4	83 41.5	74 46	132.7	84 23.8	66 50	125.8	85 00.0	54 54	117.2	85 27.7	38 58	106.5	85 44.1	17 60	93.9	85 43.2	19 58	73.7	7
8	81 17.6	83 40	140.3	82 06.5	79 43	136.3	83 14.1	70 48	128.5	83 53.8	62 52	121.8	84 27.4	50 56	113.6	84 52.8	34 59	103.8	85 08.1	16 60	92.7	85 08.4	15 58	74.9	8
9	80 53.7	80 43	136.6	81 40.6	76 46	132.5	82 45.1	67 50	124.8	83 22.5	58 54	118.3	83 53.9	46 57	110.6	84 17.6	32 59	101.6	84 32.0	15 60	91.6	84 33.5	12 58	75.8	9
10	80 28.1	78 45	133.2	81 13.3	73 48	129.1	82 14.8	63 52	121.5	82 50.3	55 55	115.2	83 19.8	44 58	108.0	83 42.2	30 59	99.8	83 55.9	15 60	90.7	83 58.4	10 59	76.5	10
1	80 01.1	75 47	130.1	80 44.7	70 50	126.0	81 43.6	60 54	118.5	82 17.2	52 56	112.6	82 45.3	41 58	105.8	83 06.5	29 60	98.2	83 19.8	15 60	89.9	83 23.3	07 59	76.9	1
2	79 32.9	72 49	127.2	80 14.9	67 51	123.2	81 11.4	58 55	115.9	81 43.6	49 57	110.2	82 10.4	39 59	103.8	82 30.7	28 60	96.7	82 43.7	15 60	89.1	82 48.1	05 59	77.2	2
3	79 03.7	70 50	124.6	79 44.3	65 52	120.6	80 38.6	55 56	113.5	81 09.5	47 58	108.1	81 35.2	38 59	102.1	81 54.8	27 60	95.5	82 07.6	15 60	88.4	82 12.8	04 59	77.4	3
4	78 33.5	68 52	122.1	79 12.8	63 54	118.2	80 05.3	53 56	111.4	80 35.0	46 58	106.2	80 59.8	37 59	100.5	81 18.8	27 60	94.3	81 31.5	16 60	87.8	81 37.6	02 59	77.5	4
15	78 02.5	66 53	119.8	78 40.6	61 55	116.0	79 31.4	52 57	109.4	80 00.2	44 58	104.5	80 24.2	36 60	99.1	80 42.8	26 60	93.3	80 55.4	16 60	87.2	81 02.3	01 59	77.6	15
6	77 30.9	64 54	117.7	78 07.9	59 55	113.9	78 57.2	50 58	107.6	79 25.1	43 59	102.9	79 48.5	35 60	97.8	80 06.7	26 60	92.3	80 19.4	16 60	86.6	80 27.1	01 59	77.6	6
7	76 58.6	62 55	115.7	77 34.6	58 56	112.0	78 22.6	49 58	105.9	78 49.8	42 59	101.4	79 12.6	34 60	96.6	79 30.6	26 60	91.4	79 43.3	17 60	86.0	79 51.8	02 59	77.5	7
8	76 25.8	61 55	113.8	77 01.0	56 57	110.3	77 47.7	48 58	104.4	78 14.3	41 59	100.1	78 36.7	34 60	95.5	78 54.5	26 60	90.5	79 07.3	17 60	85.4	79 16.6	03 59	77.5	8
9	75 52.6	60 56	112.1	76 26.9	55 57	108.6	77 12.7	47 59	103.0	77 38.7	40 60	98.8	78 00.7	33 60	94.4	78 18.4	26 60	89.7	78 31.3	17 60	84.9	78 41.3	05 59	77.3	9
20	75 18.9	58 57	110.4	75 52.6	54 58	107.1	76 37.4	46 59	101.6	77 03.0	40 60	97.6	77 24.7	33 60	93.4	77 42.3	26 60	89.0	77 55.4	18 60	84.4	78 06.1	06 59	77.2	20
1	74 44.9	57 57	108.9	75 17.9	53 58	105.6	76 01.9	45 59	100.3	76 27.1	39 60	96.5	76 48.7	33 60	92.5	77 06.2	26 60	88.2	77 19.5	18 60	83.8	77 30.9	07 59	77.0	1
2	74 10.6	56 58	107.4	74 43.0	52 58	104.2	75 26.3	44 60	99.1	75 51.2	39 60	95.5	76 12.6	32 60	91.6	76 30.1	26 60	87.5	76 43.6	19 60	83.3	76 55.7	08 59	76.8	2
3	73 36.0	55 58	106.0	74 07.9	51 59	102.9	74 50.6	44 60	98.0	75 15.2	38 60	94.5	75 36.5	32 60	90.7	75 54.0	26 60	86.9	76 07.7	19 60	82.8	76 20.6	09 58	76.6	3
4	73 01.2	55 58	104.7	73 32.6	50 59	101.7	74 14.8	43 60	96.9	74 39.2	38 60	93.5	75 00.4	32 60	89.9	75 18.0	26 60	86.2	75 31.9	20 60	82.3	75 45.5	10 58	76.4	4
25	72 26.1	54 59	103.4	72 57.2	50 59	100.5	73 38.9	43 60	95.9	74 03.2	38 60	92.6	74 24.3	32 60	89.2	74 42.0	27 60	85.6	74 56.2	21 60	81.9	75 10.4	11 58	76.1	25
6	71 50.9	53 59	102.2	72 21.6	49 59	99.4	73 03.0	43 60	94.9	73 27.1	38 60	91.7	73 48.2	32 60	88.4	74 06.0	27 60	84.9	74 20.4	21 59	81.4	74 35.4	12 58	75.8	6
7	71 15.5	53 59	101.0	71 46.0	49 60	98.3	72 27.0	42 60	94.0	72 51.0	38 60	90.9	73 12.1	33 60	87.7	73 30.1	27 60	84.3	73 44.8	22 59	80.9	74 00.4	13 58	75.6	7
8	70 40.0	52 59	99.9	71 10.2	48 60	97.3	71 51.0	42 60	93.0	72 14.9	38 60	90.1	72 36.0	33 60	87.0	72 54.1	28 60	83.7	73 09.1	22 59	80.4	73 25.4	14 58	75.3	8
9	70 04.4	52 60	98.8	70 34.3	48 60	96.3	71 14.9	42 60	92.2	71 38.8	38 60	89.3	72 00.0	33 60	86.3	72 18.3	28 60	83.2	72 33.6	23 59	80.0	72 50.5	15 58	75.0	9
30	69 28.7	51 60	97.8	69 58.4	48 60	95.3	70 38.8	42 60	91.3	71 02.7	38 60	88.5	71 23.9	33 60	85.6	71 42.4	28 60	82.6	71 58.0	23 59	79.5	72 15.7	16 58	74.7	30
1	68 52.9	51 60	96.8	69 22.4	48 60	94.4	70 02.7	42 60	90.5	70 26.6	38 60	87.8	70 48.0	33 60	85.0	71 06.7	29 60	82.0	71 22.5	24 59	79.0	71 40.9	17 58	74.4	1
2	68 17.0	51 60	95.8	68 46.4	47 60	93.4	69 26.6	42 60	89.7	69 50.5	38 60	87.0	70 12.0	34 60	84.3	70 30.9	29 59	81.5	70 47.1	25 59	78.6	71 06.1	17 58	74.1	2
3	67 41.0	50 60	94.9	68 10.3	47 60	92.6	68 50.5	42 60	88.9	69 14.5	38 60	86.3	69 36.1	34 60	83.7	69 55.2	30 59	80.9	70 11.8	25 59	78.1	70 31.4	18 58	73.8	3
4	67 05.0	50 60	94.0	67 34.3	47 60	91.7	68 14.4	42 60	88.1	68 38.4	38 60	85.6	69 00.2	34 60	83.1	69 19.6	30 59	80.4	69 36.5	26 59	77.7	69 56.8	19 58	73.4	4
35	66 29.0	50 60	93.1	66 58.2	47 60	90.9	67 38.3	42 60	87.4	68 02.5	38 60	85.0	68 24.4	35 60	82.5	68 44.0	31 59	79.9	69 01.2	27 59	77.2	69 22.2	20 58	73.1	35
6	65 52.9	50 60	92.2	66 22.0	47 60	90.1	67 02.2	42 60	86.7	67 26.5	39 60	84.3	67 48.6	35 60	81.9	68 08.5	31 59	79.4	68 26.0	27 59	76.8	68 47.7	21 57	72.8	6
7	65 16.8	50 60	91.4	65 45.9	47 60	89.3	66 26.2	42 60	86.0	66 50.6	39 60	83.7	67 12.9	35 59	81.3	67 33.0	32 59	78.8	67 50.9	28 58	76.3	68 13.2	22 57	72.4	7
8	64 40.7	50 60	90.6	65 09.8	47 60	88.5	65 50.2	43 60	85.3	66 14.7	39 60	83.0	66 37.2	36 59	80.7	66 57.7	32 59	78.3	67 15.9	28 58	75.9	67 38.8	23 57	72.1	8
9	64 04.6	50 60	89.8	64 33.8	47 60	87.8	65 14.2	43 60	84.6	65 38.9	40 60	82.4	66 01.6	36 59	80.1	66 22.3	33 59	77.8	66 40.9	29 58	75.4	67 04.5	23 57	71.7	9
40	63 28.5	50 60	89.0	63 57.7	47 60	87.0	64 38.3	43 60	83.9	65 03.1	40 60	81.8	65 26.1	37 59	79.6	65 47.1	33 59	77.3	66 06.0	30 58	75.0	66 30.2	24 57	71.4	40
1	62 52.4	50 60	88.2	63 21.6	47 60	86.3	64 02.4	43 60	83.3	64 27.4	40 59	81.2	64 50.6	37 59	79.0	65 11.9	34 59	76.8	65 31.1	30 58	74.5	65 56.1	25 57	71.0	1
2	62 16.3	50 60	87.5	62 45.6	48 60	85.6	63 26.6	43 60	82.6	63 51.8	41 59	80.6	64 15.2	37 59	78.5	64 36.8	34 58	76.3	64 56.4	31 58	74.1	65 22.0	26 57	70.7	2
3	61 40.3	50 60	86.7	62 09.6	48 60	84.9	62 50.8	44 60	82.0	63 16.2	41 59	80.0	63 39.9	38 59	77.9	64 01.7	35 58	75.8	64 21.7	32 58	73.6	64 47.9	27 57	70.3	3
4	61 04.2	50 60	86.0	61 33.7	48 60	84.2	62 15.1	44 59	81.3	62 40.7	41 59	79.4	63 04.6	38 59	77.4	63 26.7	35 58	75.3	63 47.1	32 58	73.2	64 14.0	27 56	69.9	4
45	60 28.2	50 60	85.3	60 57.8	48 60	83.5	61 39.4	44 59	80.7	62 05.2	42 59	78.8	62 29.4	39 59	76.8	62 51.9	36 58	74.8	63 12.5	33 57	72.7	63 40.1	28 56	69.6	45
6	59 52.3	51 60	84.6	60 21.9	48 60	82.8	61 03.8	45 59	80.1	61 29.8	42 59	78.2	61 54.3	39 58	76.3	62 17.0	37 58	74.3	62 38.1	34 57	72.3	63 06.3	29 56	69.2	6
7	59 16.3	51 60	83.9	59 46.1	49 60	82.2	60 28.3	45 59	79.5	60 54.5	42 59	77.7	61 19.2	40 58	75.8	61 42.3	37 58	73.8	62 03.7	34 57	71.9	62 32.6	30 56	68.8	7
8	58 40.4	51 60	83.2	59 10.4	49 59	81.5	59 52.8	45 59	78.9	60 19.3	43 59	77.1	60 44.3	40 58	75.2	61 07.7	38 58	73.4	61 29.5	35 57	71.4	61 59.0	31 56	68.4	8
9	58 04.6	51 60	82.5	58 34.7	49 59	80.9	59 17.4	46 59	78.3	59 44.1	43 58	76.5	60 09.4	41 58	74.7	60 33.1	38 57	72.9	60 55.3	36 57	71.0	61 25.4	31 56	68.0	9
50	57 28.8	51 60	81.8	57 59.1	49 59	80.2	58 42.1	46 59	77.7	59 09.0	44 58	76.0	59 34.6	41 58	74.2	59 58.7	39 57	72.4	60 21.2	36 57	70.5	60 52.0	32 56	67.6	50
1	56 53.1	52 59	81.2	57 23.5	50 59	79.6	58 06.8	46 59	77.1	58 34.1	44 58	75.4	58 59.9	42 58	73.7	59 24.3	39 57	71.9	59 47.2	37 56	70.1	60 18.6	33 55	67.3	1
2	56 17.5	52 59	80.5	56 48.1	50 59	79.0	57 31.7	47 58	76.5	57 59.1	45 58	74.9	58 25.3	42 58	73.2	58 50.0	40 57	71.4	59 13.3	38 56	69.6	59 45.4	34 55	66.9	2
3	55 41.9	52 59	79.9	56 12.7	50 59	78.3	56 56.6	47 58	76.0	57 24.3	45 58	74.3	57 50.8	43 57	72.7	58 15.8	41 57	70.9	58 39.5	38 56	69.2	59 12.2	34 55	66.5	3
4	55 06.4	52 59	79.2	55 37.3	51 59	77.7	56 21.6	48 58	75.4	56 49.6	46 58	73.8	57 16.4	43 57	72.1	57 41.8	41 57	70.5	58 05.8	39 56	68.7	58 39.2	35 55	66.1	4
55	54 31.0	53 59	78.6	55 02.1	51 59	77.1	55 46.7	48 58	74.8	56 15.0	46 58	73.2	56 42.0	44 57	71.6	57 07.8	42 56	70.0	57 32.2	40 56	68.3	58 06.2	36 55	65.7	55
6	53 55.6	53 59	78.0	54 26.9	51 58	76.5	55 11.9	49 58	74.3	55 40.5	47 57	72.7	56 07.8	45 57	71.1	56 33.9	42 56	69.5	56 58.7	40 56	67.8	57 33.4	37 55	65.3	6
7	53 20.3	53 59	77.4	53 51.9	52 58	75.9	54 37.2	49 58	73.7	55 06.0	47 57	72.2	55 33.7	45 57	70.6	56 00.1	43 56	69.0	56 25.3	41 55	67.4	57 00.6	38 54	64.9	7
8	52 45.1	54 58	76.7	53 16.9	52 58	75.3	54 02.6	49 58	73.1	54 31.7	48 57	71.6	54 59.7	46 56	70.1	55 26.5	44 56	68.5	55 52.1	42 55	66.9	56 28.0	38 54	64.5	8
9	52 10.0	54 58	76.1	52 42.0	52 58	74.7	53 28.1	50 57	72.6	53 57.5	48 57	71.1	54 25.8	46 56	69.6	54 52.9	44 56	68.1	55 18.9	42 55	66.5	55 55.5	39 54	64.1	9
60	51 35.0	54 58	75.5	52 07.2	53 58	74.1	52 53.7	50 57	72.0	53 23.4	49 57	70.6	53 52.0	47 56	69.1	54 19.5	45 56	67.6	54 45.8	43 55	66.0	55 23.0	40 54	63.6	60
1	51 00.1	55 58	74.9	51 32.5	53 58	73.6	52 19.4	51 57	71.5	52 49.4	49 56	70.1	53 18.3	47 56	68.6	53 46.2	45 55	67.1	54 12.9	44 55	65.6	54 50.7	41 54	63.2	1
2	50 25.3	55 58	74.3	50 58.0	54 57	73.0	51 45.2	51 57	70.9	52 15.5	50 56	69.5	52 44.8	48 56	68.1	53 13.0	46 55	66.6	53 40.1	44 54	65.1	54 18.6	41 53	62.8	2
3	49 50.6	56 58	73.7	50 23.5	54 57	72.4	51 11.1	52 57	70.4	51 41.7	50 56	69.0	52 11.3	48 56	67.6	52 39.9	47 55	66.1	53 07.4	45 54	64.7	53 46.5	42 53	62.4	3
4	49 16.0	56 58	73.1	49 49.1	55 57	71.8	50 37.2	52 56	69.8	51 03.1	51 56	68.5	51 38.0	49 55	67.1	52 06.9	47 55	65.7	52 34.8	46 54	64.2	53 14.6	43 53	62.0	4
65	48 41.5	56 57	72.5	49 14.9	55 57	71.2	50 03.4	53 56	69.3	50 34.6	51 56	67.9	51 04.8	50 55	66.6	51 34.1	48 54	65.2	52 02.4	46 54	63.8	52 42.8	44 53	61.6	65
6	48 07.1	57 57	71.9	48 40.8	55 57	70.7	49 29.6	53 56	68.7	50 01.1	52 55	67.4	50 31.7	50 55	66.1	51 01.4	49 54	64.7	51 30.0	47 54	63.3	52 11.1	44 53	61.1	6
7	47 32.9	57 57	71.3	48 06.7	56 56	70.1	48 56.1	54 56	68.2	49 27.9	52 55	66.9	49 58.8	51 55	65.6	50 28.8	49 54	64.2	50 57.8	48 53	62.8	51 39.5	45 52	60.7	7
8	46 58.7	58 57	70.7	47 32.9	56 56	69.5	48 22.6	54 56	67.7	48 54.7	53 55	66.4	49 26.0	51 54	65.1	49 56.3	50 54	63.7	50 25.8	48 53	62.4	51 08.1	46 52	60.3	8
9	46 24.7	58 56	70.2	46 59.1	57 56	69.0	47 49.3	55 55	67.1	48 21.7	53 55	65.9	48 53.3	52 54	64.6	49 24.0	50 54	63.3	49 53.8	49 53	61.9	50 36.8	46 52	59.9	9
70	45 50.8	58 56	69.6	46 25.5	57 56	68.4	47 16.1	55 55	66.6	47 48.8	54 55	65.3	48 20.8	53 54	64.1	48 51.9	51 53	62.8	49 22.1	50 53	61.5	50 05.6	47 52	59.4	70
1	45 17.0	59 56	69.0	45 51.9	58 56	67.8	46 43.0	56 55	66.0	47 16.1	54 54	64.8	47 48.4	53 54	63.6	48 19.8	52 53	62.3	48 50.4	50 52	61.0	49 34.6	48 51	59.0	1
2	44 43.4	59 56	68.4	45 18.6	58 55	67.3	46 10.1	56 55	65.5	46 43.5	55 54	64.3	47 16.1	54 54	63.1	47 47.9	52 53	61.8	48 18.9	51 52	60.5	49 03.7	49 51	58.6	2
3	44 09.9	60 56	67.8	44 45.3	59 55	66.7	45 37.3	57 54	65.0	46 11.0	56 54	63.8	46 44.0	54 53	62.6	47 16.2	53 53	61.3	47 47.5	52 52	60.1	48 33.0	49 51	58.1	3
4	43 36.5	60 55	67.3	44 12.2	59 55	66.1	45 04.6	57 54	64.4	45 38.7	56 54	63.3	46 12.0	55 53	62.1	46 44.6	54 52	60.8	47 16.3	52 52	59.6	48 02.4	50 51	57.7	4
75	43 03.3	61 55	66.7	43 39.3	60 55	65.6	44 32.1	58 54	63.9	45 06.5	57 53	62.7	45 40.2	55 53	61.6	46 13.1	54 52	60.3	46 45.3	53 52	59.1	47 32.0	51 50	57.2	75
6	42 30.2	61 55	66.1	43 06.5	60 54	65.0	43 59.8	58 54	63.3	44 34.5	57 53	62.2	45 08.5	56 53	61.0	45 41.8	55 52	59.9	46 14.3	54 51	58.7	47 01.7	52 50	56.8	6
7	41 57.2	62 55	65.5	42 33.8	61 54	64.5	43 27.6	59 53	62.8	44 02.6	58 53	61.7	44 37.0	57 52	60.5	45 10.7	55 52	59.4	45 43.6	54 51	58.2	46 31.5	52 50	56.3	7
8	41 24.4	62 54	65.0	42 01.3	61 54	63.9	42 55.6	59 53	62.3	43 30.9	58 53	61.2	44 05.6	57 52	60.0	44 39.7	56 51	58.9	45 13.0	55 51	57.7	46 01.6	53 50	55.9	8
9	40 51.8	62 54	64.4	41 29.0	61 54	63.3	42 23.7	60 53	61.7	42 59.4	59 52	60.6	43 34.4	58 52	59.5	44 08.8	57 51	58.4	44 42.5	56 50	57.2	45 31.7	54 49	55.4	9
80	40 19.3	63 54	63.8	40 56.8	62 53	62.8	41 52.0	61 53	61.2	42 28.0	60 52	60.1	43 03.4	58 51	59.0	43 38.2	57 51	57.9	44 12.3	56 50	56.8	45 02.1	54 49	55.0	80
1	39 47.0	63 54	63.2	40 24.8	62 53	62.2	41 20.4	61 52	60.7	41 56.8	60 52	59.6	42 32.5	59 51	58.5	43 07.7	58 51	57.4	43 42.1	57 50	56.3	44 32.6	55 49	54.5	1
2	39 14.9	64 53	62.7	39 52.9	63 53	61.7	40 49.0	62 52	60.1	41 25.7	61 51	59.1	42 01.8	60 51	58.0	42 37.3	59 50	56.9	43 12.2	58 50	55.8	44 03.3	56 49	54.1	2
3	38 42.9	64 53	62.1	39 21.2	64 53	61.1	40 17.8	62 52	59.6	40 54.8	61 51	58.5	41 31.3	60 51	57.5	42 07.2	59 50	56.4	42 42.4	58 49	55.3	43 34.1	57 48	53.6	3
4	38 11.0	65 53	61.5	38 49.7	64 52	60.5	39 46.7	63 51	59.0	40 24.1	62 51	58.0	41 00.9	61 50	57.0	41 37.2	60 50	55.9	42 12.8	59 49	54.8	43 05.1	57 48	53.2	4
85	37 39.4	65 52	60.9	38 18.3	65 52	60.0	39 15.9	63 51	58.5	39 53.6	62 51	57.5	40 30.7	61 50	56.5	41 07.3	61 49	55.4	41 43.4	60 49	54.3	42 36.3	58 48	52.7	85
6	37 07.9	66 52	60.4	37 47.2	65 52	59.4	38 45.2	64 51	58.0	39 23.2	63 50	57.0	40 00.7	62 50	55.9	40 37.7	61 49	54.9	41 14.1	60 48	53.9	42 07.7	59 47	52.2	6
7	36 36.6	66 52	59.8	37 16.2	66 51	58.9	38 14.6	64 51	57.4	38 53.0	64 50	56.4	39 30.9	63 49	55.4	40 08.3	62 49	54.4	40 45.1	61 48	53.4	41 39.2	59 47	51.8	7
8	36 05.5	67 52	59.2	36 45.4	66 51	58.3	37 44.3	65 50	56.9	38 23.0	64 50	55.9	39 01.3	63 49	54.9	39 39.0	62 48	53.9	40 16.2	62 48	52.9	41 10.9	60 47	51.3	8
9	35 34.6	67 51	58.6	36 14.7	67 51	57.7	37 14.2	65 50	56.3	37 53.2	65 49	55.4	38 31.8	64 49	54.4	39 09.9	63 48	53.4	39 47.5	62 48	52.4	40 42.8	61 46	50 8	9
90	35 03.8	68 51	58.1	35 44.3	67 50	57.2	36 44.2	66 50	55.8	37 23.6	65 49	54.8	38 02.6	65 48	53.9	38 41.0	64 48	52.9	39 19.0	63 47	51.9	40 14.9	62 46	50.4	90

Digitized by Google

Lat. 53°

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	34 33.3	68 51	57.5	35 14.1	68 50	56.6	36 14.5	67 49	55.2	36 54.2	66 49	54.3	37 33.5	65 48	53.3	38 12.3	64 48	52.4	38 50.7	63 47	51.4	39 47.2	62 46	49.9	91
2	34 02.9	69 50	56.9	34 44.0	68 50	56.0	35 44.9	67 49	54.7	36 25.0	66 48	53.8	37 04.6	66 48	52.8	37 43.8	65 47	51.9	38 22.5	64 47	50.9	39 19.7	63 46	49.4	2
3	33 32.8	69 50	56.3	34 14.2	69 49	55.5	35 15.5	68 49	54.1	35 55.9	67 48	53.2	36 35.9	66 47	52.3	37 15.5	66 47	51.4	37 54.6	65 46	50.4	38 52.4	64 45	48.9	3
4	33 02.8	70 50	55.8	33 44.5	69 49	54.9	34 46.4	68 48	53.6	35 27.1	68 48	52.7	36 07.5	67 47	51.8	36 47.4	66 46	50.8	37 26.9	65 46	49.9	38 25.3	64 45	48.5	4
95	32 33.1	70 49	55.2	33 15.1	70 49	54.3	34 17.4	69 48	53.0	34 58.5	68 47	52.1	35 39.2	67 47	51.2	36 19.5	67 46	50.3	36 59.4	66 46	49.4	37 58.3	65 45	48.0	95
6	32 03.5	71 49	54.6	32 45.9	70 48	53.8	33 48.7	69 48	52.5	34 30.1	69 47	51.6	35 11.2	68 46	50.7	35 51.8	67 46	49.8	36 32.1	67 45	48.9	37 31.6	66 44	47.5	6
7	31 34.2	71 48	54.0	32 16.8	71 48	53.2	33 20.1	70 47	51.9	34 01.9	69 47	51.1	34 43.3	69 46	50.2	35 24.3	68 45	49.3	36 05.0	67 45	48.4	37 05.1	66 44	47.0	7
8	31 05.1	72 48	53.4	31 48.0	71 48	52.6	32 51.8	70 47	51.4	33 33.9	70 46	50.5	34 15.7	69 46	49.7	34 57.1	69 45	48.8	35 38.1	68 44	47.9	36 38.8	67 43	46.5	8
9	30 36.2	72 48	52.9	31 19.4	72 47	52.0	32 23.7	71 46	50.8	33 06.2	70 46	50.0	33 48.3	70 45	49.1	34 30.0	69 45	48.3	35 11.4	69 44	47.4	36 12.7	68 43	46.0	9
100	30 07.5	73 47	52.3	30 51.1	72 47	51.5	31 55.9	72 46	50.3	32 38.6	71 46	49.4	33 21.1	70 45	48.6	34 03.2	70 44	47.7	34 44.9	69 44	46.9	35 46.8	68 43	45.5	100
1	29 39.1	73 47	51.7	30 22.9	73 47	50.9	31 28.2	72 46	49.7	32 11.3	72 45	48.9	32 54.1	71 45	48.0	33 36.6	70 44	47.2	34 18.7	70 43	46.3	35 21.2	69 42	45.0	1
2	29 10.9	74 47	51.1	29 55.0	73 46	50.3	31 00.8	73 45	49.1	31 44.2	72 45	48.3	32 27.4	72 44	47.5	33 10.2	71 44	46.7	33 52.7	71 43	45.8	34 55.8	70 42	44.5	2
3	28 42.9	74 46	50.5	29 27.4	74 46	49.7	30 33.6	73 45	48.6	31 17.4	73 44	47.8	32 00.9	72 44	47.0	32 44.1	72 43	46.1	33 26.9	71 43	45.3	34 30.5	70 42	44.0	3
4	28 15.1	75 46	49.9	28 59.9	74 45	49.2	30 06.6	74 45	48.0	30 50.8	73 44	47.2	31 34.6	73 43	46.4	32 18.1	72 43	45.6	33 01.4	72 42	44.8	34 05.6	71 41	43.5	4
105	27 47.6	75 45	49.3	28 32.7	75 45	48.6	29 39.9	74 44	47.4	30 24.4	74 44	46.7	31 08.6	73 43	45.9	31 52.4	73 42	45.1	32 36.0	72 42	44.3	33 40.8	72 41	43.0	105
6	27 20.4	76 45	48.7	28 05.8	75 44	48.0	29 13.4	75 44	46.9	29 58.2	74 43	46.1	30 42.8	74 43	45.3	31 27.0	73 42	44.5	32 10.9	73 41	43.7	33 16.3	72 40	42.5	6
7	26 53.3	76 45	48.1	27 39.1	76 44	47.4	28 47.2	75 43	46.3	29 32.3	75 43	45.5	30 17.2	75 42	44.8	31 01.8	74 42	44.0	31 46.1	74 41	43.2	32 52.0	73 40	42.0	7
8	26 26.6	77 44	47.5	27 12.6	77 44	46.8	28 21.2	76 43	45.7	29 06.7	76 42	45.0	29 51.9	75 42	44.2	30 36.8	75 41	43.5	31 21.5	74 41	42.7	32 28.0	73 40	41.5	8
9	26 00.1	77 44	47.0	26 46.4	77 43	46.2	27 55.5	77 42	45.2	28 41.3	76 42	44.4	29 26.8	76 41	43.7	30 12.1	75 41	42.9	30 57.1	75 40	42.2	32 04.2	74 39	41.0	9
110	25 33.8	78 43	46.4	26 20.4	78 43	45.7	27 30.0	77 42	44.6	28 16.1	77 42	43.9	29 02.0	76 41	43.1	29 47.6	76 40	42.4	30 33.0	75 40	41.6	31 40.6	75 39	40.5	110
1	25 07.8	78 43	45.8	25 54.7	78 42	45.1	27 04.8	78 42	44.0	27 51.2	77 41	43.3	28 37.5	77 40	42.6	29 23.4	76 40	41.8	30 09.2	76 39	41.1	31 17.3	75 38	40.0	1
2	24 42.1	79 42	45.1	25 29.3	79 42	44.5	26 39.8	78 41	43.4	27 26.6	78 41	42.7	28 13.2	77 40	42.0	28 59.5	77 40	41.3	29 45.6	77 39	40.6	30 54.2	76 38	39.4	2
3	24 16.6	79 42	44.5	25 04.2	79 42	43.9	26 15.2	79 41	42.9	27 02.2	78 40	42.2	27 49.1	78 40	41.5	28 35.8	78 39	40.7	29 22.2	77 38	40.0	30 31.4	77 38	38.9	3
4	23 51.4	80 42	43.9	24 39.3	80 41	43.3	25 50.7	79 40	42.3	26 38.1	79 40	41.6	27 25.3	79 39	40.9	28 12.3	78 39	40.2	28 59.1	78 38	39.5	30 08.9	77 37	38.4	4
115	23 26.5	80 41	43.3	24 14.7	80 41	42.7	25 26.6	80 40	41.7	26 14.3	79 39	41.0	27 01.8	79 39	40.3	27 49.2	79 38	39.6	28 36.3	78 38	38.9	29 46.6	78 37	37.9	115
6	23 01.9	81 41	42.7	23 50.3	81 40	42.1	25 02.7	80 39	41.1	25 50.7	80 39	40.4	26 38.6	80 38	39.8	27 26.3	79 38	39.1	28 13.7	79 37	38.4	29 24.5	78 36	37.3	6
7	22 37.5	81 40	42.1	23 26.3	81 40	41.5	24 39.1	81 39	40.5	25 27.5	80 38	39.9	26 15.7	80 38	39.2	27 03.7	80 37	38.5	27 51.5	80 37	37.8	29 02.8	79 36	36.8	7
8	22 13.4	82 40	41.5	23 02.5	82 39	40.9	24 15.8	81 38	39.9	25 04.5	81 38	39.3	25 53.0	81 37	38.6	26 41.3	80 37	38.0	27 29.4	80 36	37.3	28 41.3	80 35	36.3	8
9	21 49.6	82 39	40.9	22 39.0	82 39	40.3	23 52.8	82 38	39.3	24 41.7	82 37	38.7	25 30.6	81 37	38.1	26 19.2	81 36	37.4	27 07.7	81 36	36.7	28 20.1	80 35	35.7	9
120	21 26.2	83 39	40.3	22 15.8	83 38	39.7	23 30.0	82 37	38.7	24 19.3	82 37	38.1	25 08.5	82 36	37.5	25 57.4	81 36	36.8	26 46.2	81 35	36.2	27 59.1	81 34	35.2	120
1	21 03.0	83 38	39.6	21 52.9	83 38	39.0	23 07.6	83 37	38.1	23 57.2	83 36	37.5	24 46.6	82 36	36.9	25 35.9	82 35	36.3	26 25.1	82 35	35.6	27 38.4	81 34	34.7	1
2	20 40.1	84 38	39.0	21 30.3	84 37	38.4	22 45.4	83 36	37.5	23 35.3	83 36	36.9	24 25.1	83 35	36.3	25 14.7	83 35	35.7	26 04.2	82 34	35.1	27 18.0	82 34	34.1	2
3	20 17.5	84 37	38.4	21 08.0	84 37	37.8	22 23.6	84 36	36.9	23 13.8	84 35	36.4	24 03.8	83 35	35.7	24 53.8	83 34	35.1	25 43.6	83 34	34.5	26 57.9	82 33	33.6	3
4	19 55.2	85 37	37.8	20 46.0	85 36	37.2	22 02.0	84 35	36.3	22 52.5	84 35	35.8	23 42.9	84 34	35.2	24 33.1	84 34	34.6	25 23.2	83 33	34.0	26 38.1	83 33	33.0	4
125	19 33.3	85 36	37.1	20 24.4	85 36	36.6	21 40.8	85 35	35.7	22 31.6	85 34	35.2	23 22.3	84 34	34.6	24 12.8	84 33	34.0	25 03.2	84 33	33.4	26 18.5	84 32	32.5	125
6	19 11.6	86 36	36.5	20 03.0	86 35	36.0	21 19.8	85 34	35.1	22 10.9	85 34	34.6	23 01.9	85 33	34.0	23 52.8	85 33	33 4	24 43.5	84 32	32.8	25 59.3	84 32	31.9	6
7	18 50.3	86 35	35.9	19 41.9	86 35	35.3	20 59.2	86 34	34.5	21 50.6	86 33	34.0	22 41.9	85 33	33.4	23 33.0	85 32	32.8	24 24.1	85 32	32.3	25 40.3	85 31	31.4	7
8	18 29.3	87 34	35.3	19 21.2	86 34	34.7	20 38.9	86 33	33.9	21 30.6	86 33	33.4	22 22.1	86 32	32.8	23 13.6	86 32	32.3	24 04.9	85 31	31.7	25 21.7	85 31	30.8	8
9	18 08.6	87 34	34.6	19 00.8	87 33	34.1	20 18.9	87 33	33.3	21 10.9	87 32	32.8	22 02.7	86 32	32.2	22 54.5	86 31	31.7	23 46.1	86 31	31.1	25 03.3	86 30	30.3	9
130	17 48.3	87 33	34.0	18 40.7	87 33	33.5	19 59.3	87 32	32.7	20 51.5	87 32	32.2	21 43.6	87 31	31.6	22 35.7	87 31	31.1	23 27.6	86 30	30.6	24 45.3	86 30	29.7	130
1	17 28.3	88 33	33.3	18 21.0	88 32	32.8	19 39.9	88 32	32.1	20 32.4	87 31	31.6	21 24.8	87 31	31.0	22 17.2	87 30	30.5	23 09.4	87 30	30.0	24 27.5	87 29	29.2	1
2	17 08.6	88 32	32.7	18 01.6	88 32	32.2	19 20.9	88 31	31.5	20 13.7	88 31	31.0	21 06.4	88 30	30.4	21 59.0	88 30	29.9	22 51.5	87 29	29.4	24 10.1	87 29	28.6	2
3	16 49.2	89 32	32.1	17 42.5	89 31	31.6	19 02.2	88 31	30.8	19 55.3	88 30	30.3	20 48.3	88 30	29.8	21 41.1	88 29	29.3	22 33.9	88 29	28.8	23 52.9	88 28	28.0	3
4	16 30.2	89 31	31.4	17 23.8	89 31	30.9	18 43.9	89 30	30.2	19 37.2	89 30	29.7	20 30.5	89 29	29.2	21 23.6	89 29	28.7	22 16.7	88 28	28.2	23 36.1	88 28	27.5	4
135	16 11.6	90 30	30.8	17 05.4	90 30	30.3	18 25.9	89 29	29.6	19 19.5	89 29	29.1	20 13.0	89 29	28.6	21 06.4	89 28	28.2	21 59.8	89 28	27.7	23 19.6	89 27	26.9	135
6	15 53.3	90 30	30.1	16 47.3	90 30	29.7	18 08.2	90 29	29.0	19 02.1	90 28	28.5	19 55.8	90 28	28.0	20 49.5	89 28	27.6	21 43.2	89 27	27.1	23 03.4	89 26	26.3	6
7	15 35.4	90 29	29.5	16 29.6	90 29	29.0	17 50.9	90 28	28.3	18 45.0	90 28	27.9	19 39.0	90 27	27.4	20 33.0	90 27	27.0	21 26.9	90 27	26.5	22 47.6	90 26	25.8	7
8	15 17.8	91 29	28.8	16 12.3	91 28	28.4	17 33.9	91 28	27.7	18 28.3	91 27	27.3	19 22.6	90 27	26.8	20 16.8	90 26	26.4	21 11.0	90 26	25.9	22 32.0	90 25	25.2	8
9	15 00.6	91 28	28.2	15 55.3	91 28	27.7	17 17.3	91 27	27.1	18 11.9	91 27	26.6	19 06.5	91 26	26.2	20 00.9	91 26	25.8	20 55.3	91 25	25.3	22 16.8	90 25	24.6	9
140	14 43.7	92 27	27.5	15 38.7	92 27	27.1	17 01.0	91 26	26.5	17 55.9	91 26	26.0	18 50.7	91 26	25.6	19 45.4	91 25	25.2	20 40.1	91 25	24.7	22 01.9	91 24	24.1	140
1	14 27.2	92 27	26.8	15 22.4	92 26	26.4	16 45.1	92 26	25.8	17 40.2	92 26	25.4	18 35.3	92 25	25.0	19 30.2	92 25	24.6	20 25.1	91 24	24.1	21 47.4	91 24	23.5	1
2	14 11.1	92 26	26.2	15 06.5	92 26	25.8	16 29.6	92 25	25.2	17 24.9	92 25	24.8	18 20.2	92 25	24.4	19 15.4	92 24	24.0	20 10.6	92 24	23.5	21 33.2	92 23	22.9	2
3	13 55.4	93 26	25.5	14 51.0	93 25	25.1	16 14.4	93 25	24.5	17 10.0	93 24	24.1	18 05.5	92 24	23.7	19 00.9	92 24	23.3	19 56.3	92 23	22.9	21 19.3	92 23	22.3	3
4	13 40.0	93 25	24.8	14 35.9	93 25	24.5	15 59.6	93 24	23.9	16 55.4	93 24	23.5	17 51.1	93 23	23.1	18 46.8	93 23	22.7	19 42.4	93 23	22.3	21 05.8	93 22	21.7	4
145	13 25.0	93 24	24.2	14 21.1	93 24	23.8	15 45.2	93 23	23.3	16 41.2	93 23	22.9	17 37.1	93 23	22.5	18 33.0	93 22	22.1	19 28.9	93 22	21.7	20 52.6	93 21	21.2	145
6	13 10.4	94 24	23.5	14 06.7	94 23	23.2	15 31.1	94 23	22.6	16 27.3	94 22	22.3	17 23.5	94 22	21.9	18 19.6	94 22	21.5	19 15.7	93 21	21.1	20 39.7	93 21	20.6	6
7	12 56.2	94 23	22.8	13 52.7	94 23	22.5	15 17.4	94 22	22.0	16 13.8	94 22	21.6	17 10.2	94 22	21.3	18 06.5	94 21	20.9	19 02.8	94 21	20.5	20 27.2	94 20	20.0	7
8	12 42.4	95 22	22.2	13 39.1	94 22	21.8	15 04.1	94 22	21.3	16 00.7	94 21	21.0	16 57.3	94 21	20.6	17 53.8	94 21	20.3	18 50.3	94 20	19.9	20 15.0	94 20	19.4	8
9	12 29.0	95 22	21.5	13 25.9	95 21	21.2	14 51.1	95 21	20.7	15 47.9	95 21	20.3	16 44.7	95 20	20.0	17 41.5	95 20	19.7	18 38.2	94 20	19.3	20 03.2	94 19	18.8	9
150	12 15.9	95 21	20.8	13 13.0	95 21	20.5	14 38.6	95 20	20.0	15 35.6	95 20	19.7	16 32.6	95 20	19.4	17 29.5	95 19	19.0	18 26.4	95 19	18.7	19 51.7	95 18	18.2	150
1	12 03.3	95 20	20.1	13 00.6	95 20	19.8	14 26.4	95 20	19.4	15 23.6	95 19	19.1	16 20.8	95 19	18.7	17 17.9	95 19	18.4	18 15.0	95 18	18.1	19 40.6	95 18	17.6	1
2	11 51.1	96 20	19.5	12 48.5	96 19	19.2	14 14.6	96 19	18.7	15 12.0	96 19	18.4	16 09.4	96 18	18.1	17 06.7	96 18	17.8	18 04.0	95 18	17.5	19 29.9	95 17	17.0	2
3	11 39.2	96 19	18.8	12 36.8	96 19	18.5	14 03.2	96 18	18.1	15 00.8	96 18	17.8	15 58.3	96 18	17.5	16 55.8	96 17	17.2	17 53.3	96 17	16.9	19 19.5	96 17	16.4	3
4	11 27.8	96 18	18.1	12 25.6	96 18	17.8	13 52.2	96 18	17.4	14 50.0	96 17	17.1	15 47.7	96 17	16.8	16 45.4	96 17	16.6	17 43.0	96 17	16.3	19 09.5	96 16	15.8	4
155	11 16.8	97 18	17.4	12 14.7	97 17	17.2	13 41.6	97 17	16.8	14 39.5	96 17	16.5	15 37.4	96 16	16.2	16 35.3	96 16	15.9	17 33.1	96 16	15.7	18 59.8	96 16	15.2	155
6	11 06.2	97 17	16.7	12 04.3	97 17	16.5	13 31.4	97 16	16.1	14 29.5	97 16	15.8	15 27.5	97 16	15.6	16 25.5	97 16	15.3	17 23.5	97 15	15.0	18 50.5	97 15	14.6	6
7	10 56.0	97 16	16.0	11 54.3	97 16	15.8	13 21.6	97 16	15.4	14 19.8	97 15	15.2	15 18.0	97 15	14.9	16 16.2	97 15	14.7	17 14.4	97 15	14.4	18 41.6	97 14	14.0	7
8	10 46.2	97 16	15.4	11 44.6	97 15	15.1	13 12.2	97 15	14.8	14 10.6	97 15	14.5	15 08.9	97 15	14.3	16 07.2	97 14	14.0	17 05.6	97 14	13.8	18 33.0	97 14	13.4	8
9	10 36.9	98 15	14.7	11 35.4	98 15	14.4	13 03.2	98 14	14.1	14 01.7	97 14	13.9	15 00.2	97 14	13.7	15 58.7	97 14	13.4	16 57.1	97 13	13.2	18 24.8	97 13	12.8	9
160	10 27.9	98 14	14.0	11 26.6	98 14	13.8	12 54.6	98 14	13.4	13 53.2	98 13	13.2	14 51.9	98 13	13.0	15 50.5	98 13	12.8	16 49.1	98 13	12.6	18 17.0	98 12	12.2	160
1	10 19.4	98 14	13.3	11 18.2	98 13	13.1	12 46.4	98 13	12.8	13 45.2	98 13	12.6	14 43.9	98 13	12.4	15 42.7	98 12	12.2	16 41.4	98 12	11.9	18 09.5	98 12	11.6	1
2	10 11.3	98 13	12.6	11 10.3	98 13	12.4	12 38.6	98 12	12.1	13 37.5	98 12	11.9	14 36.4	98 12	11.7	15 35.3	98 12	11.5	16 34.1	98 11	11.3	18 02.4	98 11	11.0	2
3	10 03.7	98 12	11.9	11 02.7	98 12	11.7	12 31.2	98 12	11.4	13 30.3	98 11	11.3	14 29.3	98 11	11.1	15 28.3	98 11	10.9	16 27.2	98 11	10.7	17 55.7	98 11	10.4	3
4	9 56.4	99 11	11.2	10 55.6	99 11	11.0	12 24.3	99 11	10.8	13 23.4	99 11	10.6	14 22.5	99 11	10.4	15 21.6	99 10	10.2	16 20.7	98 10	10.1	17 49.4	98 10	09.8	4
165	9 49.6	99 11	10.5	10 48.9	99 10	10.4	12 17.7	99 10	10.1	13 17.0	99 10	09.9	14 16.2	99 10	09.8	15 15.4	99 10	09.6	16 14.6	99 10	09.4	17 43.4	99 09	09.2	165
6	9 43.3	99 10	09.8	10 42.6	99 10	09.7	12 11.6	99 10	09.4	13 10.9	99 09	09.3	14 10.3	99 09	09.1	15 09.6	99 09	09.0	16 08.9	99 09	08.8	17 37.8	99 09	08.6	6
7	9 37.3	99 09	09.1	10 36.8	99 09	09.0	12 05.9	99 09	08.8	13 05.3	99 09	08.6	14 04.7	99 09	08.5	15 04.1	99 08	08.3	16 03.5	99 08	08.2	17 32.6	99 08	08.0	7
8	9 31.8	99 08	08.4	10 31.3	99 08	08.3	12 00.6	99 08	08.1	13 00.1	99 08	08.0	13 59.6	99 08	07.8	14 59.1	99 08	07.7	15 58.6	99 08	07.6	17 27.8	99 07	07.4	8
9	9 26.8	99 08	07.7	10 26.3	99 08	07.6	11 55.7	99 07	07.4	12 55.3	99 07	07.3	13 54.9	99 07	07.2	14 54.5	99 07	07.1	15 54.0	99 07	06.9	17 23.4	99 07	06.7	9
170	9 22.1	99 07	07.0	10 21.8	99 07	06.9	11 51.3	99 07	06.8	12 50.9	99 07	06.6	13 50.6	99 07	06.5	14 50.2	99 06	06.4	15 49.9	99 06	06.3	17 19.3	99 06	06.1	170
1	9 17.9	1.0 06	06.3	10 17.6	1.0 06	06.2	11 47.2	1.0 06	06.1	12 47.0	1.0 06	06.0	13 46.7	1.0 06	05.9	14 46.4	1.0 06	05.8	15 46.1	1.0 06	05.7	17 15.7	1.0 05	05.5	1
2	9 14.2	1.0 06	05.6	10 13.9	1.0 05	05.5	11 43.6	1.0 05	05.4	12 43.4	1.0 05	05.3	13 43.2	1.0 05	05.2	14 43.0	1.0 05	05.1	15 42.7	1.0 05	05.0	17 12.4	1.0 05	04.9	2
3	9 10.8	1.0 05	04.9	10 10.7	1.0 05	04.8	11 40.4	1.0 05	04.7	12 40.3	1.0 05	04.7	13 40.1	1.0 04	04.6	14 39.9	1.0 04	04.5	15 39.7	1.0 04	04.4	17 09.5	1.0 04	04.3	3
4	9 08.0	1.0 04	04.2	10 07.9	1.0 04	04.2	11 37.7	1.0 04	04.1	12 37.5	1.0 04	04.0	13 37.4	1.0 04	03.9	14 37.3	1.0 04	03.9	15 37.2	1.0 04	03.8	17 07.0	1.0 04	03.7	4
175	9 05.5	1.0 03	03.5	10 05.5	1.0 03	03.5	11 35.3	1.0 03	03.4	12 35.2	1.0 03	03.3	13 35.2	1.0 03	03.3	14 35.1	1.0 03	03.2	15 35.0	1.0 03	03.2	17 04.8	1.0 03	03.1	175
6	9 03.5	1.0 03	02.8	10 03.5	1.0 03	02.8	11 33.4	1.0 02	02.7	12 33.4	1.0 02	02.7	13 33.3	1.0 02	02.6	14 33.2	1.0 02	02.6	15 33.2	1.0 02	02.5	17 03.1	1.0 02	02.5	6
7	9 02.0	1.0 02	02.1	10 02.0	1.0 02	02.1	11 31.9	1.0 02	02.0	12 31.9	1.0 02	02.0	13 31.9	1.0 02	02.0	14 31.8	1.0 02	01.9	15 31.8	1.0 02	01.9	17 01.7	1.0 02	01.8	7
8	9 00.9	1.0 01	01.4	10 00.9	1.0 01	01.4	11 30.9	1.0 01	01.4	12 30.8	1.0 01	01.3	13 30.8	1.0 01	01.3	14 30.8	1.0 01	01.3	15 30.8	1.0 01	01.3	17 00.8	1.0 01	01.2	8
9	9 00.2	1.0 00	00.7	10 00.2	1.0 00	00.7	11 30.2	1.0 00	00.7	12 30.2	1.0 00	00.7	13 30.2	1.0 00	00.7	14 30.2	1.0 00	00.6	15 30.2	1.0 00	00.6	17 00.2	1.0 00	00.6	9
180	9 00.0	1.0 00	00.0	10 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 30.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 30.0	1.0 00	00.0	17 00.0	1.0 00	00.0	180

Lat. 54°

Lat. 55°

Lat. 56°

Lat. 57°

Lat. 58°

Lat. 53°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	88 30.0	1.0 11	00.0	88 00.0	1.0 08	00.0	87 00.0	1.0 06	00.0	86 30.0	1.0 05	00.0
1	88 23.3	93 30	21.1	87 54.9	96 24	16.0	86 56.7	98 16	10.5	86 27.2	99 14	09.0
2	88 05.4	78 41	37.4	87 40.8	85 35	29.6	86 47.0	93 25	20.4	86 18.9	95 22	17.4
3	87 40.6	63 48	48.6	87 20.1	74 42	40.2	86 31.9	85 32	28.9	86 05.8	89 29	25.1
4	87 12.0	51 51	56.0	86 54.9	63 47	48.0	86 12.4	77 38	36.1	85 48.5	82 34	31.8
05	86 41.2	42 54	61.1	86 26.8	53 50	53.8	85 49.6	69 42	42.0	85 28.0	75 39	37.5
6	86 09.0	35 55	64.7	85 56.8	46 52	58.0	85 24.3	62 45	46.9	85 04.8	68 42	42.3
7	85 36.0	29 56	67.3	85 25.7	39 53	61.3	84 57.1	55 48	50.8	84 39.6	62 45	46.3
8	85 02.4	25 57	69.2	84 53.6	34 54	63.8	84 28.5	49 49	53.9	84 12.7	56 47	49.6
9	84 28.5	21 57	70.7	84 21.0	29 55	65.7	83 58.8	44 51	56.5	83 44.6	50 48	52.4
10	83 54.3	18 57	71.8	83 47.9	25 56	67.2	83 28.3	39 52	58.7	83 15.6	46 50	54.7
1	83 20.0	15 58	72.6	83 14.4	22 56	68.4	82 57.2	35 53	60.4	82 45.7	41 51	56.7
2	82 45.4	12 58	73.3	82 40.7	19 56	69.4	82 25.6	31 53	61.9	82 15.3	37 52	58.4
3	82 10.8	10 58	73.8	82 06.9	16 57	70.1	81 53.5	28 54	63.1	81 44.3	34 52	59.8
4	81 36.1	08 58	74.1	81 32.8	14 57	70.7	81 21.2	25 54	64.1	81 12.9	30 53	61.0
15	81 01.3	06 58	74.4	80 58.7	12 57	71.2	80 48.6	22 55	65.0	80 41.2	27 53	62.0
6	80 26.5	04 58	74.6	80 24.5	09 57	71.6	80 15.8	20 55	65.7	80 09.2	24 54	62.8
7	79 51.7	03 58	74.7	79 50.2	08 57	71.9	79 42.8	17 55	66.3	79 36.9	22 54	63.5
8	79 16.9	01 58	74.8	79 15.8	06 57	72.1	79 09.6	15 55	66.8	79 04.5	19 54	64.2
9	78 42.0	00 58	74.8	78 41.5	04 57	72.2	78 36.4	13 56	67.2	78 32.0	17 54	64.7
20	78 07.2	02 58	74.8	78 07.1	03 57	72.3	78 03.1	11 56	67.5	77 59.3	15 55	65.1
1	77 32.4	03 58	74.7	77 32.7	01 57	72.4	77 29.7	09 56	67.7	77 26.5	13 55	65.5
2	76 57.6	04 58	74.6	76 58.3	00 57	72.4	76 56.3	07 56	67.9	76 53.6	11 55	65.7
3	76 22.8	05 58	74.5	76 23.8	02 57	72.3	76 22.8	05 56	68.1	76 20.6	09 55	66.0
4	75 48.0	07 58	74.3	75 49.4	03 57	72.3	75 49.3	04 56	68.2	75 47.6	07 55	66.2
25	75 13.2	08 58	74.2	75 15.0	04 57	72.2	75 15.7	02 56	68.3	75 14.6	06 55	66.3
6	74 38.5	09 58	74.0	74 40.7	06 57	72.1	74 42.2	01 56	68.3	74 41.5	04 55	66.4
7	74 03.8	10 58	73.8	74 06.3	07 57	72.0	74 08.6	01 56	68.3	74 08.4	02 55	66.5
8	73 29.2	11 58	73.6	73 32.0	08 57	71.8	73 35.1	02 56	68.3	73 35.3	01 55	66.5
9	72 54.6	12 58	73.3	72 57.7	09 57	71.6	73 01.5	-04 56	68.2	73 02.2	01 55	66.5
30	72 20.0	13 58	73.1	72 23.5	10 57	71.4	72 28.0	05 56	68.1	72 29.0	02 55	66.5
1	71 45.5	14 57	72.8	71 49.3	11 57	71.2	71 54.5	06 56	68.0	71 55.9	03 55	66.4
2	71 11.0	15 57	72.6	71 15.1	12 57	71.0	71 21.0	07 56	67.9	71 22.9	05 55	66.4
3	70 36.6	16 57	72.3	70 41.0	13 57	70.8	70 47.6	09 56	67.8	70 49.8	06 55	66.3
4	70 02.2	17 57	72.0	70 06.9	15 57	70.6	70 14.2	10 56	67.6	70 16.7	07 55	66.2
35	69 27.9	18 57	71.7	69 32.9	16 57	70.3	69 40.8	11 56	67.5	69 43.7	09 55	66.0
6	68 53.6	19 57	71.4	68 58.9	17 57	70.0	69 07.5	12 55	67.3	69 10.8	10 55	65.9
7	68 19.4	20 57	71.1	68 25.0	17 56	69.8	68 34.2	13 55	67.1	68 37.8	11 55	65.7
8	67 45.3	21 57	70.8	67 51.1	18 56	69.5	68 01.0	14 55	66.9	68 04.9	12 55	65.6
9	67 11.2	21 57	70.5	67 17.3	19 56	69.2	67 27.8	15 55	66.7	67 32.1	13 55	65.4
40	66 37.2	22 57	70.2	66 43.6	20 56	68.9	66 54.7	16 55	66.4	66 59.3	14 55	65.2
1	66 03.3	23 56	69.8	66 10.0	21 56	68.6	66 21.6	17 55	66.2	66 26.5	16 54	65.0
2	65 29.4	24 56	69.5	65 36.4	22 56	68.3	65 48.6	19 55	65.9	65 53.9	17 54	64.7
3	64 55.6	25 56	69.2	65 02.8	23 56	68.0	65 15.6	20 55	65.7	65 21.2	18 54	64.5
4	64 21.9	26 56	68.8	64 29.4	24 56	67.7	64 42.8	21 55	65.4	64 48.7	19 54	64.3
45	63 48.3	27 56	68.5	63 56.0	25 55	67.4	64 10.0	22 55	65.1	64 16.2	20 54	64.0
6	63 14.8	27 56	68.1	63 22.7	26 55	67.0	63 37.2	23 54	64.9	63 43.7	21 54	63.8
7	62 41.3	28 56	67.8	62 49.5	27 55	66.7	63 04.6	23 54	64.6	63 11.4	22 54	63.5
8	62 07.9	29 56	67.4	62 16.4	28 55	66.4	62 32.0	24 54	64.3	62 39.1	23 54	63.2
9	61 34.6	30 55	67.0	61 43.4	28 55	66.0	61 59.5	25 54	64.0	62 06.9	24 54	63.0
50	61 01.4	31 55	66.7	61 10.4	29 55	65.7	61 27.1	26 54	63.7	61 34.8	25 53	62.7
1	60 28.3	32 55	66.3	60 37.6	30 55	65.3	60 54.8	27 54	63.4	61 02.8	26 53	62.4
2	59 55.3	32 55	65.9	60 04.8	31 54	65.0	60 22.6	28 54	63.1	60 30.8	27 53	62.1
3	59 22.4	33 55	65.6	59 32.1	32 54	64.6	59 50.4	29 53	62.7	59 58.9	28 53	61.8
4	58 49.6	34 55	65.2	58 59.5	33 54	64.3	59 18.4	30 53	62.4	59 27.2	29 53	61.5
55	58 16.8	35 54	64.8	58 27.1	34 54	63.9	58 46.4	31 53	62.1	58 55.5	30 53	61.2
6	57 44.2	36 54	64.4	57 54.7	34 54	63.5	58 14.6	32 53	61.7	58 23.9	31 52	60.8
7	57 11.7	36 54	64.0	57 22.4	35 54	63.2	57 42.8	33 53	61.4	57 52.4	31 52	60.5
8	56 39.3	37 54	63.6	56 50.3	36 53	62.8	57 11.2	34 53	61.1	57 21.1	32 52	60.2
9	56 07.0	38 54	63.2	56 18.2	37 53	62.4	56 39.6	35 52	60.7	56 49.8	33 52	59.8
60	55 34.8	39 53	62.8	55 46.3	38 53	62.0	56 08.2	35 52	60.4	56 18.6	34 52	59.5
1	55 02.8	39 53	62.4	55 14.4	38 53	61.6	55 36.8	36 52	60.0	55 47.6	35 52	59.2
2	54 30.8	40 53	62.0	54 42.7	39 53	61.2	55 05.6	37 52	59.6	55 16.6	36 51	58.8
3	53 59.0	41 53	61.6	54 11.1	40 52	60.9	54 34.5	38 52	59.3	54 45.8	37 51	58.5
4	53 27.3	42 53	61.2	53 39.7	41 52	60.5	54 03.6	39 51	58.9	54 15.0	38 51	58.1
65	52 55.7	43 52	60.8	53 08.3	42 52	60.1	53 32.7	40 51	58.5	53 44.4	39 51	57.8
6	52 24.2	43 52	60.4	52 37.1	42 52	59.7	53 02.0	41 51	58.2	53 14.0	40 51	57.4
7	51 52.9	44 52	60.0	52 06.0	43 52	59.3	52 31.3	41 51	57.8	52 43.6	40 50	57.0
8	51 21.7	45 52	59.6	51 35.0	44 51	58.9	52 00.9	42 51	57.4	52 13.4	41 50	56.7
9	50 50.6	46 52	59.2	51 04.2	45 51	58.4	51 30.5	43 50	57.0	51 43.3	42 50	56.3
70	50 19.7	46 51	58.7	50 33.5	46 51	58.0	51 00.3	44 50	56.6	51 13.3	43 50	55.9
1	49 48.9	47 51	58.3	50 02.9	46 51	57.6	50 30.2	45 50	56.2	50 43.5	44 50	55.5
2	49 18.2	48 51	57.9	49 32.5	47 50	57.2	50 00.3	45 50	55.8	50 13.8	45 49	55.1
3	48 47.7	49 51	57.5	49 02.2	48 50	56.8	49 30.4	46 49	55.4	49 44.2	46 49	54.8
4	48 17.3	49 50	57.0	48 32.0	49 50	56.4	49 00.8	47 49	55.0	49 14.8	46 49	54.4
75	47 47.1	50 50	56.6	48 02.1	49 50	55.9	48 31.3	48 49	54.6	48 45.5	47 49	54.0
6	47 17.1	51 50	56.2	47 32.2	50 50	55.5	48 01.9	49 49	54.2	48 16.4	48 48	53.6
7	46 47.1	52 50	55.7	47 02.5	51 49	55.1	47 32.7	50 48	53.8	47 47.4	49 48	53.2
8	46 17.4	52 49	55.3	46 33.0	52 49	54.7	47 03.6	50 48	53.4	47 18.6	50 48	52.8
9	45 47.8	53 49	54.8	46 03.6	52 49	54.2	46 34.7	51 48	53.0	46 49.9	50 48	52.4
80	45 18.3	54 49	54.4	45 34.4	53 48	53.8	46 05.9	52 48	52.6	46 21.4	51 47	52.0
1	44 49.1	55 49	54.0	45 05.3	54 48	53.4	45 37.3	53 47	52.2	45 53.0	52 47	51.5
2	44 19.9	55 48	53.5	44 36.4	55 48	52.9	45 08.9	53 47	51.7	45 24.8	53 47	51.1
3	43 51.0	56 48	53.1	44 07.7	55 48	52.5	44 40.6	54 47	51.3	44 56.8	54 46	50.7
4	43 22.2	57 48	52.6	43 39.2	56 47	52.0	44 12.5	55 47	50.9	44 29.0	54 46	50.3
85	42 53.6	57 47	52.2	43 10.8	57 47	51.6	43 44.6	56 46	50.5	44 01.3	55 46	49.9
6	42 25.2	58 47	51.7	42 42.6	58 47	51.1	43 16.8	57 46	50.0	43 33.7	56 46	49.4
7	41 57.0	50 47	51.2	42 14.5	58 46	50.7	42 49.3	57 46	49.6	43 06.4	57 45	49.0
8	41 28.9	60 46	50.8	41 46.7	59 46	50.2	42 21.9	58 45	49.1	42 39.2	58 45	48.6
9	41 01.0	60 46	50.3	41 19.0	60 46	49.8	41 54.6	59 45	48.7	42 12.2	58 45	48.2
90	40 33.3	61 46	49.8	40 51.6	61 46	49.3	41 27.6	60 45	48.3	41 45.4	59 44	47.7

H.A.	57° 00′			57° 30′			59° 00′			59° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	86 00.0	1.0 04	00.0	85 30.0	1.0 04	00.0	84 00.0	1.0 03	00.0	83 30.0	1.0 02	00.0
1	85 57.6	99 12	07.8	85 27.8	99 11	06.8	83 58.4	99 08	04.9	83 28.6	1.0 07	04.5
2	85 50.4	96 19	15.2	85 21.5	97 17	13.4	83 53.8	98 13	09.7	83 24.4	98 12	08.9
3	85 38.8	91 26	22.1	85 11.2	93 23	19.6	83 46.3	96 17	14.4	83 17.5	96 16	13.1
4	85 23.4	85 31	28.2	84 57.4	88 28	25.2	83 36.0	93 21	18.8	83 08.0	94 20	17.2
05	85 04.9	79 35	33.6	84 40.6	82 32	30.3	83 23.1	89 25	22.9	82 56.2	90 23	21.1
6	84 43.6	73 39	38.3	84 21.1	77 36	34.8	83 07.9	85 29	26.8	82 42.1	87 27	24.7
7	84 20.3	67 42	42.3	83 59.5	71 39	38.7	82 50.7	81 32	30.3	82 26.1	83 30	28.0
8	83 55.2	61 44	45.7	83 36.1	66 42	42.1	82 31.6	77 34	33.4	82 08.2	79 32	31.1
9	83 28.7	56 46	48.6	83 11.2	61 44	45.1	82 10.9	72 37	36.3	81 48.8	75 35	33.9
10	83 01.1	51 48	51.1	82 45.0	56 45	47.7	81 48.9	68 39	38.9	81 28.0	71 37	36.4
1	82 32.6	47 49	53.2	82 17.8	52 47	49.9	81 25.6	64 40	41.2	81 06.0	67 39	38.8
2	82 03.3	42 50	55.0	81 49.8	47 48	51.8	81 01.3	60 42	43.3	80 42.9	63 40	40.8
3	81 33.4	39 51	56.6	81 21.1	44 49	53.5	80 36.1	56 43	45.2	80 18.8	59 42	42.7
4	81 03.1	35 51	57.9	80 51.8	40 50	54.9	80 10.1	52 44	46.9	79 53.9	56 43	44.4
15	80 32.3	32 52	59.0	80 22.0	37 50	56.2	79 43.4	49 45	48.4	79 28.3	52 44	46.0
6	80 01.2	29 52	60.0	79 51.8	33 51	57.3	79 16.2	45 46	49.7	79 02.0	49 45	47.3
7	79 29.8	26 53	60.9	79 21.3	30 51	58.3	78 48.4	42 47	50.9	78 35.2	46 46	48.6
8	78 58.1	24 53	61.6	78 50.4	28 52	59.1	78 20.2	39 48	51.9	78 07.9	43 46	49.7
9	78 26.2	21 53	62.2	78 19.3	25 52	59.8	77 51.6	36 48	52.9	77 40.2	40 47	50.7
20	77 54.2	19 54	62.7	77 48.0	23 52	60.4	77 22.6	34 49	53.7	77 12.0	37 47	51.6
1	77 22.1	17 54	63.2	77 16.5	20 53	60.9	76 53.4	31 49	54.5	76 43.6	34 48	52.4
2	76 49.3	14 54	63.6	76 44.9	18 53	61.4	76 23.9	28 50	55.1	76 14.8	32 48	53.1
3	76 17.4	13 54	63.9	76 13.1	16 53	61.8	75 54.1	26 50	55.7	75 45.8	29 49	53.7
4	75 44.9	11 54	64.1	75 41.2	14 53	62.1	75 24.2	24 50	56.2	75 16.6	27 49	54.3
25	75 12.4	09 54	64.4	75 09.3	12 53	62.4	74 54.1	22 50	56.7	74 47.2	25 49	54.8
6	74 39.8	07 54	64.5	74 37.2	10 54	62.6	74 23.9	19 51	57.1	74 17.6	22 50	55.3
7	74 07.2	05 54	64.6	74 05.2	08 54	62.8	73 53.5	17 51	57.4	73 47.8	20 50	55.7
8	73 34.6	04 54	64.7	73 33.0	07 54	63.0	73 23.0	15 51	57.7	73 18.0	18 50	56.0
9	73 01.9	02 54	64.8	73 00.8	05 54	63.1	72 52.4	14 51	58.0	72 48.0	16 50	56.3
30	72 29.2	01 54	64.8	72 28.6	03 54	63.2	72 21.8	12 51	58.2	72 17.9	14 50	56.6
1	71 56.6	01 54	64.8	71 56.4	02 54	63.2	71 51.1	10 51	58.4	71 47.7	13 50	56.8
2	71 23.9	02 54	64.8	71 24.2	00 54	63.2	71 20.3	08 51	58.5	71 17.4	11 50	57.0
3	70 51.2	04 54	64.7	70 51.9	01 54	63.2	70 49.5	06 51	58.6	70 47.1	09 51	57.1
4	70 18.6	05 54	64.7	70 19.7	02 54	63.2	70 18.6	05 51	58.7	70 16.8	07 51	57.3
35	69 46.0	06 54	64.6	69 47.5	04 54	63.1	69 47.7	03 51	58.8	69 46.4	06 51	57.4
6	69 13.4	08 54	64.5	69 15.3	05 54	63.1	69 16.8	02 52	58.8	69 16.0	04 51	57.4
7	68 40.8	09 54	64.4	68 43.1	07 54	63.0	68 45.9	00 52	58.8	68 45.6	02 51	57.5
8	68 08.2	10 54	64.2	68 10.9	08 54	62.9	68 15.0	01 51	58.8	68 15.1	01 51	57 5
9	67 35.8	11 54	64.1	67 38.8	09 53	62.8	67 44.1	03 51	58.8	67 44.7	01 51	57.5
40	67 03.3	12 54	63.9	67 06.7	10 53	62.6	67 13.3	04 51	58.8	67 14.2	02 51	57.5
1	66 30.9	14 54	63.7	66 34.7	12 53	62.5	66 42.4	06 51	58.7	66 43.8	04 51	57.4
2	65 58.6	15 54	63.5	66 02.7	13 53	62.3	66 11.6	07 51	58.6	66 13.3	05 51	57.4
3	65 26.3	16 54	63.3	65 30.7	14 53	62.1	65 40.7	08 51	58.5	65 42.9	06 51	57.3
4	64 54.0	17 54	63.1	64 58.8	15 53	61.9	65 10.0	10 51	58.4	65 12.6	08 51	57.2
45	64 21.8	18 54	62.9	64 27.0	16 53	61.8	64 39.2	11 51	58.3	64 42.2	09 51	57.1
6	63 49.7	19 53	62.7	63 55.2	17 53	61.5	64 08.5	12 51	58.2	64 11.9	10 50	57.0
7	63 17.7	20 53	62.4	63 23.5	19 53	61.3	63 37.9	13 51	58.0	63 41.6	12 50	56.9
8	62 45.7	21 53	62.2	62 51.9	20 53	61.1	63 07.3	15 51	57.8	63 11.4	13 50	56.7
9	62 13.8	22 53	61.9	62 20.3	21 52	60.9	62 36.7	16 51	57.7	62 41.2	14 50	56.6
50	61 42.0	23 53	61.6	61 48.8	22 52	60.6	62 06.3	17 51	57.5	62 11.1	15 50	56.4
1	61 10.3	24 53	61.4	61 17.4	23 52	60.4	61 35.8	18 51	57.3	61 41.1	17 50	56.3
2	60 38.6	25 53	61.1	60 46.0	24 52	60.1	61 05.5	19 50	57.1	61 11.1	18 50	56.1
3	60 07.1	26 52	60.8	60 14.7	25 52	59.8	60 35.2	21 50	56.9	60 41.2	19 50	55.9
4	59 35.6	27 52	60.5	59 43.6	26 52	59.6	60 05.0	22 50	56.7	60 11.3	20 50	55.7
55	59 04.2	28 52	60.2	59 12.5	27 52	59.3	59 34.9	23 50	56.4	59 41.5	21 50	55.5
6	58 32.9	29 52	59.9	58 41.5	28 52	59.0	59 04.8	24 50	56.2	59 11.8	23 49	55.3
7	58 01.7	30 52	59.6	58 10.6	29 51	58.7	58 34.9	25 50	56.0	58 42.2	24 49	55.0
8	57 30.6	31 52	59.3	57 39.8	30 51	58.4	58 05.0	26 50	55.7	58 12.6	25 49	54.8
9	56 59.6	32 52	59.0	57 09.1	31 51	58.1	57 35.2	27 49	55.4	57 43.2	26 49	54.5
60	56 28.7	33 51	58.7	56 38.4	32 51	57.8	57 05.5	28 49	55.2	57 13.8	27 49	54.3
1	55 57.9	34 51	58.3	56 07.9	33 51	57.5	56 35.9	29 49	54.9	56 44.5	28 49	54.0
2	55 27.2	35 51	58.0	55 37.6	34 50	57.2	56 06.4	30 49	54.6	56 15.3	29 48	53.8
3	54 56.7	36 51	57.7	55 07.3	35 50	56.8	55 37.0	31 49	54.4	55 46.3	30 48	53.5
4	54 26.2	37 51	57.3	54 37.1	36 50	56.5	55 07.7	32 49	54.1	55 17.3	31 48	53.2
65	53 55.9	38 50	57.0	54 07.0	37 50	56.2	54 38.6	33 48	53.8	54 48.4	32 48	53.0
6	53 25.7	39 50	56.6	53 37.1	38 50	55.8	54 09.5	34 48	53.5	54 19.6	33 48	52.7
7	52 55.6	39 50	56.3	53 07.3	38 49	55.5	53 40.5	35 48	53.2	53 51.0	34 48	52.4
8	52 25.6	40 50	55.9	52 37.6	39 49	55.2	53 11.7	36 48	52.9	53 22.5	35 47	52.1
9	51 55.8	41 50	55.5	52 08.0	40 49	54.8	52 43.0	37 48	52 5	52 54.0	36 47	51.8
70	51 26.1	42 49	55.2	51 38.6	41 49	54.4	52 14.4	38 47	52.2	52 25.7	37 47	51.5
1	50 56.5	43 49	54.8	51 09.2	42 49	54.1	51 45.9	39 47	51.9	51 57.5	38 47	51.1
2	50 27.1	44 49	54.4	50 40.1	43 48	53.7	51 17.5	40 47	51.6	51 29.5	39 47	50.8
3	49 57.7	45 49	54.1	50 11.0	44 48	53.4	50 49.3	41 47	51.2	51 01.6	40 46	50.5
4	49 28.6	46 48	53.7	49 42.1	45 48	53.0	50 21.2	42 47	50.9	50 33.8	41 46	50.2
75	48 59.6	46 48	53.3	49 13.4	46 48	52.6	49 53.3	43 46	50.5	50 06.1	42 46	49.8
6	48 30.7	47 48	52.9	48 44.7	46 47	52.2	49 25.5	44 46	50.2	49 38.6	43 46	49.5
7	48 02.0	48 48	52.5	48 16.3	47 47	51.9	48 57.8	45 46	49.9	49 11.2	44 45	49.2
8	47 33.4	49 47	52.1	47 47.9	48 47	51.5	48 30.3	46 46	49.5	48 43.9	45 45	48.8
9	47 04.9	50 47	51.7	47 19.8	49 47	51.1	48 02.9	47 45	49.1	48 16.8	46 45	48.5
80	46 36.7	51 47	51.3	46 51.7	50 46	50.7	47 35.7	48 45	48.8	47 49.9	47 45	48.1
1	46 08.6	51 47	50.9	46 23.9	51 46	50.3	47 08.6	49 45	48.4	47 23.0	48 44	47.8
2	45 40.6	52 46	50.5	45 56.2	52 46	49.9	46 41.6	50 45	48.0	46 56.4	49 44	47.4
3	45 12.8	53 46	50.1	45 28.6	52 46	49.5	46 14.9	50 44	47.7	46 29.9	50 44	47.0
4	44 45.2	54 46	49.7	45 01.2	53 45	49.1	45 48.3	51 44	47.3	46 03.5	51 44	46.7
85	44 17.7	55 45	49.3	44 34.0	54 45	48.7	45 21.8	52 44	46.9	45 37.4	51 43	46.3
6	43 50.4	55 45	48.9	44 07.0	55 45	48.3	44 55.5	53 44	46.5	45 11.3	52 43	45.9
7	43 23.3	56 45	48.5	43 40.1	56 44	47.9	44 29.4	54 43	46.1	44 45.5	53 43	45.5
8	42 56.4	57 45	48.0	43 13.4	56 44	47.5	44 03.5	55 43	45.7	44 19.8	54 43	45.2
9	42 29.6	58 44	47.6	42 46.9	57 44	47.1	43 37.7	56 43	45.4	43 54.3	55 42	44.8
90	42 03.1	59 44	47.2	42 20.6	58 44	46.6	43 12.1	56 42	45.0	43 28.9	56 42	44.4

Digitized by Google

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	40 05.8	62 46	49.4	40 24.3	61 45	48.9	41 00.8	60 44	47.8	41 18.8	60 44	47.3	41 36.7	59 44	46.7	41 54.4	59 43	46.2	42 46.7	57 42	44.6	43 03.8	57 42	44.0	91
2	39 38.5	62 45	48.9	39 57.2	62 45	48.4	40 34.1	61 44	47.4	40 52.4	61 44	46.8	41 10.5	60 43	46.3	41 28.4	60 43	45.8	42 21.4	58 42	44.2	42 38.8	58 41	43.6	2
3	39 11.4	63 45	48.4	39 30.3	63 44	47.9	40 07.6	62 44	46.9	40 26.1	61 43	46.4	40 44.4	61 43	45.9	41 02.6	60 43	45.4	41 56.4	59 41	43.7	42 14.0	58 41	43.2	3
4	38 44.5	64 45	48.0	39 03.6	63 44	47.5	39 41.4	63 43	46.5	40 00.1	62 43	46.0	40 18.6	62 43	45.4	40 37.1	61 42	44.9	41 31.5	60 41	43.3	41 49.3	59 41	42.8	4
95	38 17.8	65 44	47.5	38 37.1	64 44	47.0	39 15.3	63 43	46.0	39 34.2	63 43	45.5	39 53.0	62 42	45.0	40 11.7	62 42	44.5	41 06.8	61 41	42.9	41 24.9	60 40	42.4	95
6	37 51.2	65 44	47.0	38 10.7	65 44	46.5	38 49.4	64 43	45.5	39 08.5	64 42	45.1	39 27.6	63 42	44.6	39 46.4	63 42	44.0	40 42.3	61 40	42.5	41 00.6	61 40	42.0	6
7	37 24.9	66 44	46.5	37 44.6	66 43	46.0	38 23.7	65 42	45.1	38 43.1	64 42	44.6	39 02.3	64 42	44.1	39 21.4	63 41	43.6	40 18.0	62 40	42.1	40 36.6	62 40	41.6	7
8	36 58.8	67 43	46.0	37 18.8	66 43	45.6	37 58.3	65 42	44.6	38 17.8	65 42	44.1	38 37.3	65 41	43.7	38 56.6	64 41	43.2	39 53.9	63 40	41.7	40 12.7	63 39	41.2	8
9	36 32.9	67 43	45.6	36 53.1	67 42	45.1	37 33.0	66 42	44.2	37 52.8	66 41	43.7	38 12.5	65 41	43.2	38 32.0	65 41	42.7	39 30.0	64 40	41.2	39 49.1	63 39	40.7	9
100	36 07.3	68 42	45.1	36 27.6	68 42	44.6	37 08.0	67 41	43.7	37 28.0	67 41	43.2	37 47.9	66 41	42.7	38 07.6	66 40	42.3	39 06.3	65 39	40.8	39 25.6	64 39	40.3	100
1	35 41.8	69 42	44.6	36 02.4	68 42	44.1	36 43.1	68 41	43.2	37 03.3	67 41	42.8	37 23.5	67 40	42.3	37 43.5	66 40	41.8	38 42.8	65 39	40.4	39 02.3	65 38	39.9	1
2	35 16.6	69 42	44.1	35 37.3	69 41	43.6	36 18.5	68 41	42.7	36 38.9	68 40	42.3	36 59.3	68 40	41.8	37 19.5	67 40	41.4	38 19.5	66 38	40.0	38 39.3	66 38	39.5	2
3	34 51.6	70 41	43.6	35 12.5	70 41	43.2	35 54.1	69 40	42.3	36 14.7	69 40	41.8	36 35.3	68 40	41.4	36 55.7	68 39	40.9	37 56.4	67 38	39.5	38 16.4	66 38	39.0	3
4	34 26.8	71 41	43.1	34 47.9	70 41	42.7	35 29.9	70 40	41.8	35 50.8	69 40	41.4	36 11.5	69 39	40.9	36 32.2	69 39	40.5	37 33.5	68 38	39.1	37 53.8	67 37	38.6	4
105	34 02.2	71 41	42.6	34 23.6	71 40	42.2	35 06.0	70 40	41.3	35 27.0	70 39	40.9	35 48.0	70 39	40.4	36 08.9	69 38	40.0	37 10.9	68 37	38.6	37 31.4	68 37	38.2	105
6	33 37.9	72 40	42.1	33 59.4	72 40	41.7	34 42.2	71 39	40.8	35 03.5	71 39	40.4	35 24.7	70 38	40.0	35 45.8	70 38	39.5	36 48.4	69 37	38.2	37 09.1	69 37	37.7	6
7	33 13.8	73 40	41.6	33 35.5	72 39	41.2	34 18.8	72 39	40.3	34 40.2	71 38	39.9	35 01.6	71 38	39.5	35 22.9	71 38	39.1	36 26.2	70 37	37.8	36 47.1	70 36	37.3	7
8	32 50.0	73 39	41.1	33 11.9	73 39	40.7	33 55.5	72 38	39.9	34 17.2	72 38	39.4	34 38.8	72 38	39.0	35 00.3	72 37	38.6	36 04.2	71 36	37.3	36 25.4	70 36	36.9	8
9	32 26.3	74 39	40.6	32 48.5	74 39	40.2	33 32.5	73 38	39.4	33 54.3	73 38	39.0	34 16.1	73 37	38.5	34 37.9	72 37	38.1	35 42.5	71 36	36.8	36 03.8	71 36	36.4	9
110	32 03.0	74 39	40.1	32 25.3	74 38	39.7	33 09.7	74 38	38.9	33 31.8	73 37	38.5	33 53.8	73 37	38.1	34 15.7	73 37	37.7	35 20.9	72 36	36.4	35 42.5	72 35	36.0	110
1	31 39.9	75 38	39.6	32 02.4	75 38	39.2	32 47.1	74 37	38.4	33 09.4	74 37	38.0	33 31.6	74 36	37.6	33 53.7	74 36	37.2	34 59.6	73 35	35.9	35 21.4	72 35	35.5	1
2	31 17.0	76 38	39.1	31 39.7	76 37	38.7	32 24.8	75 37	37.9	32 47.3	75 36	37.5	33 09.7	75 36	37.1	33 32.0	74 36	36.7	34 38.5	73 35	35.5	35 00.5	73 34	35.1	2
3	30 54.4	76 37	38.5	31 17.2	76 37	38.2	32 02.8	76 36	37.4	32 25.5	75 36	37.0	32 48.1	75 36	36.6	33 10.6	75 35	36.2	34 17.7	74 34	35.0	34 39.9	74 34	34.6	3
4	30 32.0	77 37	38.0	30 55.1	77 37	37.6	31 41.0	76 36	36.9	32 03.8	76 36	36.5	32 26.6	76 35	36.1	32 49.4	76 35	35.7	33 57.1	75 34	34.6	34 19.5	75 34	34.2	4
115	30 09.9	78 36	37.5	30 33.1	77 36	37.1	31 19.4	77 36	36.4	31 42.5	77 35	36.0	32 05.5	77 35	35.6	32 28.4	76 35	35.3	33 36.7	76 34	34.1	33 59.4	75 33	33.7	115
6	29 48.0	78 36	37.0	30 11.5	78 36	36.6	30 58.1	78 35	35.9	31 21.4	77 35	35.5	31 44.6	77 34	35.1	32 07.7	77 34	34.8	33 16.6	76 33	33.6	33 39.5	76 33	33.2	6
7	29 26.4	79 36	36.5	29 50.1	79 35	36.1	30 37.1	78 35	35.4	31 00.5	78 34	35.0	31 23.9	78 34	34.6	31 47.2	78 34	34.3	32 56.8	77 33	33.2	33 19.8	77 32	32.8	7
8	29 05.1	79 35	35.9	29 28.9	79 35	35.6	30 16.3	79 34	34.9	30 39.9	79 34	34.5	31 03.5	78 34	34.2	31 27.0	78 33	33.8	32 37.1	78 32	32.7	33 00.4	77 32	32.3	8
9	28 44.1	80 35	35.4	29 08.0	80 34	35.1	29 55.8	79 34	34.4	30 19.6	79 33	34.0	30 43.4	79 33	33.7	31 07.1	79 33	33.3	32 17.8	78 32	32.2	32 41.2	78 32	31.8	9
120	28 23.3	81 34	34.9	28 47.4	80 34	34.5	29 35.6	80 33	33.8	29 59.6	80 33	33.5	30 23.5	80 33	33.1	30 47.4	79 32	32.8	31 58.6	79 31	31.7	32 22.3	79 31	31.4	120
1	28 02.8	81 34	34.3	28 27.1	81 33	34.0	29 15.6	81 33	33.3	29 39.8	80 33	33.0	30 03.9	80 32	32.6	30 27.9	80 32	32.3	31 39.8	80 31	31.2	32 03.6	79 31	30.9	1
2	27 42.6	82 33	33.8	28 07.1	82 33	33.5	28 55.9	81 32	32.8	29 20.2	81 32	32.5	29 44.5	81 32	32.1	30 08.8	81 32	31.8	31 21.2	80 31	30.8	31 45.2	80 30	30.4	2
3	27 22.6	82 33	33.3	27 47.3	82 32	32.9	28 36.5	82 32	32.3	29 01.0	82 32	32.0	29 25.5	81 31	31.6	29 49.9	81 31	31.3	31 02.9	81 30	30.3	31 27.1	81 30	29.9	3
4	27 03.0	83 32	32.7	27 27.8	83 32	32.4	28 17.3	82 31	31.8	28 42.0	82 31	31.4	29 06.7	82 31	31.1	29 31.3	82 31	30.8	30 44.8	81 30	29.8	31 09.2	81 29	29.5	4
125	26 43.6	83 32	32.2	27 08.6	83 32	31.9	27 58.4	83 31	31.2	28 23.3	83 31	30.9	28 48.1	83 30	30.6	29 12.9	83 30	30.3	30 27.0	82 29	29.3	30 51.6	82 29	29.0	125
6	26 24.5	84 31	31.6	26 49.7	84 31	31.3	27 39.9	84 30	30.7	28 04.9	83 30	30.4	28 29.9	83 30	30.1	28 54.9	83 30	29.8	30 09.4	83 29	28.8	30 34.2	82 28	28.5	6
7	26 05.7	84 31	31.1	26 31.0	84 31	30.8	27 21.6	84 30	30.2	27 46.8	84 30	29.9	28 11.9	84 29	29.6	28 37.1	84 29	29.3	29 52.2	83 28	28.3	30 17.1	83 28	28.0	7
8	25 47.2	85 30	30.5	26 12.7	85 30	30.3	27 03.5	85 30	29.7	27 28.9	85 29	29.4	27 54.3	84 29	29.1	28 19.6	84 29	28.8	29 35.2	84 28	27.8	30 00.3	84 28	27.5	8
9	25 29.0	86 30	30.0	25 54.6	85 30	29.7	26 45.8	85 29	29.1	27 11.4	85 29	28.8	27 36.9	85 28	28.5	28 02.3	85 28	28.2	29 18.5	84 27	27.3	29 43.8	84 27	27.0	9
130	25 11.1	86 29	29.4	25 36.9	86 29	29.2	26 28.4	86 29	28.6	26 54.1	86 28	28.3	27 19.8	85 28	28.0	27 45.4	85 28	27.7	29 02.0	85 27	26.8	29 27.5	85 27	26.5	130
1	24 53.5	87 29	28.9	25 19.5	86 29	28.6	26 11.3	86 28	28.1	26 37.1	86 28	27.8	27 02.9	86 28	27.5	27 28.7	86 27	27.2	28 45.9	86 26	26.3	29 11.5	85 26	26.0	1
2	24 36.2	87 28	28.3	25 02.3	87 28	28.1	25 54.4	87 28	27.5	26 20.4	87 27	27.2	26 46.4	87 27	27.0	27 12.4	86 27	26.7	28 30.0	86 26	25.8	28 55.8	86 26	25.5	2
3	24 19.2	88 28	27.8	24 45.5	87 28	27.5	25 37.9	87 27	27.0	26 04.1	87 27	26.7	26 30.2	87 27	26.4	26 56.3	87 26	26.2	28 14.4	87 26	25.3	28 40.4	87 25	25.0	3
4	24 02.6	88 27	27.2	24 29.0	88 27	27.0	25 21.7	88 27	26.4	25 48.0	88 26	26.2	26 14.3	88 26	25.9	26 40.5	87 26	25.6	27 59.1	87 25	24.8	28 25.3	87 25	24.5	4
135	23 46.2	89 27	26.7	24 12.7	88 27	26.4	25 05.8	88 26	25.9	25 32.2	88 26	25.6	25 58.7	88 26	25.4	26 25.1	88 25	25.1	27 44.1	88 25	24.3	28 10.4	88 24	24.0	135
6	23 30.2	89 26	26.1	23 56.8	89 26	25.8	24 50.1	89 26	25.3	25 16.8	89 25	25.1	25 43.3	89 25	24.8	26 09.9	88 25	24.6	27 29.4	88 24	23.8	27 55.9	88 24	23.5	6
7	23 14.4	89 26	25.5	23 41.3	89 25	25.3	24 34.8	89 25	24.8	25 01.6	89 25	24.5	25 28.3	89 24	24.3	25 55.0	89 24	24.0	27 15.0	89 24	23.3	27 41.6	89 23	23.0	7
8	22 59.0	90 25	25.0	23 26.0	90 25	24.7	24 19.9	90 24	24.2	24 46.8	90 24	24.0	25 13.6	90 24	23.8	25 40.5	89 24	23.5	27 00.9	89 23	22.8	27 27.6	89 23	22.5	8
9	22 43.9	90 25	24.4	23 11.0	90 24	24.2	24 05.2	90 24	23.7	24 32.2	90 24	23.5	24 59.2	90 23	23.2	25 26.2	90 23	23.0	26 47.1	90 23	22.2	27 14.0	90 22	22.0	9
140	22 29.2	91 24	23.8	22 56.4	91 24	23.6	23 50.8	91 23	23.1	24 18.0	91 23	22.9	24 45.2	90 23	22.7	25 12.3	90 23	22.4	26 33.6	90 22	21.7	27 00.6	90 22	21.5	140
1	22 14.8	91 23	23.3	22 42.1	91 23	23.0	23 36.8	91 23	22.6	24 04.1	91 23	22.4	24 31.4	91 22	22.1	24 58.7	91 22	21.9	26 20.3	91 22	21.2	26 47.5	91 21	21.0	1
2	22 00.7	92 23	22.7	22 28.2	92 23	22.5	23 23.1	91 22	22.0	23 50.5	91 22	21.8	24 18.0	91 22	21.6	24 45.4	91 22	21.4	26 07.4	91 21	20.7	26 34.8	91 21	20.5	2
3	21 46.9	92 22	22.1	22 14.5	92 22	21.9	23 09.7	92 22	21.5	23 37.3	92 22	21.3	24 04.8	92 21	21.0	24 32.4	92 21	20.8	25 54.8	92 20	20.2	26 22.3	91 20	19.9	3
4	21 33.5	92 22	21.5	22 01.2	92 22	21.3	22 56.7	92 21	20.9	23 24.4	92 21	20.7	23 52.0	92 21	20.5	24 19.7	92 21	20.3	25 42.5	92 20	19.6	26 10.1	92 20	19.4	4
145	21 20.4	93 21	21.0	21 48.3	93 21	20.8	22 43.9	93 21	20.3	23 11.8	93 20	20.1	23 39.6	93 20	19.9	24 07.3	93 20	19.7	25 30.6	92 19	19.1	25 58.3	92 19	18.9	145
6	21 07.7	93 21	20.4	21 35.7	93 20	20.2	22 31.6	93 20	19.8	22 59.5	93 20	19.6	23 27.4	93 20	19.4	23 55.3	93 20	19.2	25 18.9	93 19	18.6	25 46.7	93 19	18.4	6
7	20 55.3	94 20	19.8	21 23.4	94 20	19.6	22 19.5	94 20	19.2	22 47.5	93 19	19.0	23 15.6	93 19	18.8	23 43.6	93 19	18.6	25 07.6	93 18	18.0	25 35.5	93 18	17.8	7
8	20 43.2	94 20	19.2	21 11.4	94 19	19.0	22 07.8	94 19	18.7	22 35.9	94 19	18.5	23 04.1	94 19	18.3	23 32.2	94 18	18.1	24 56.5	94 18	17.5	25 24.6	94 18	17.3	8
9	20 31.5	94 19	18.6	20 59.8	94 19	18.4	21 56.4	94 18	18.1	22 24.7	94 18	17.9	22 52.9	94 18	17.7	23 21.2	94 18	17.5	24 45.8	94 17	17.0	25 14.0	94 17	16.8	9
150	20 20.2	95 18	18.0	20 48.6	95 18	17.9	21 45.4	95 18	17.5	22 13.7	95 18	17.3	22 42.1	95 17	17.2	23 10.5	94 17	17.0	24 35.4	94 17	16.5	25 03.7	94 17	16.3	150
1	20 09.2	95 18	17.5	20 37.7	95 18	17.3	21 34.7	95 17	16.9	22 03.1	95 17	16.8	22 31.6	95 17	16.6	23 00.1	95 17	16.4	24 25.4	95 16	15.9	24 53.8	95 16	15.7	1
2	19 58.5	95 17	16.9	20 27.1	95 17	16.7	21 24.3	95 17	16.4	21 52.9	95 16	16.2	22 21.5	95 16	16.1	22 50.0	95 16	15.9	24 15.6	95 16	15.4	24 44.2	95 16	15.2	2
3	19 48.2	96 17	16.3	20 16.9	96 16	16.1	21 14.3	96 16	15.8	21 43.0	96 16	15.6	22 11.6	96 16	15.5	22 40.3	96 16	15.3	24 06.2	95 15	14.8	24 34.8	95 15	14.7	3
4	19 38.3	96 16	15.7	20 07.1	96 16	15.5	21 04.6	96 16	15.2	21 33.4	96 15	15.1	22 02.2	96 15	14.9	22 30.9	96 15	14.8	23 57.1	96 15	14.3	24 25.9	96 14	14.1	4
155	19 28.7	96 15	15.1	19 57.6	96 15	14.9	20 55.3	96 15	14.7	21 24.2	96 15	14.5	21 53.0	96 15	14.4	22 21.9	96 14	14.2	23 48.4	96 14	13.8	24 17.2	96 14	13.6	155
6	19 19.5	97 15	14.5	19 48.4	97 15	14.4	20 46.4	97 14	14.1	21 15.3	96 14	13.9	21 44.3	96 14	13.8	22 13.2	96 14	13.7	23 40.0	96 14	13.2	24 08.9	96 13	13.1	6
7	19 10.6	97 14	13.9	19 39.7	97 14	13.8	20 37.8	97 14	13.5	21 06.8	97 14	13.4	21 35.8	97 13	13.2	22 04.8	97 13	13.1	23 31.9	97 13	12.7	24 00.9	97 13	12.5	7
8	19 02.1	97 14	13.3	19 31.3	97 13	13.2	20 29.5	97 13	12.9	20 58.6	97 13	12.8	21 27.7	97 13	12.7	21 56.8	97 13	12.5	23 24.1	97 12	12.1	23 53.2	97 12	12.0	8
9	18 54.0	97 13	12.7	19 23.2	97 13	12.6	20 21.6	97 13	12.3	20 50.8	97 12	12.2	21 20.0	97 12	12.1	21 49.2	97 12	12.0	23 16.7	97 12	11.6	23 45.8	97 12	11.5	9
160	18 46.2	98 12	12.1	19 15.5	98 12	12.0	20 14.1	98 12	11.8	20 43.3	98 12	11.6	21 12.6	98 12	11.5	21 41.9	98 12	11.4	23 09.6	97 11	11.0	23 38.8	97 11	10.9	160
1	18 38.9	98 12	11.5	19 08.2	98 12	11.4	20 06.9	98 11	11.2	20 36.2	98 11	11.1	21 05.6	98 11	11.0	21 34.9	98 11	10.8	23 02.8	98 11	10.5	23 32.2	98 11	10.4	1
2	18 31.8	98 11	10.9	19 01.2	98 11	10.8	20 00.1	98 11	10.6	20 29.5	98 11	10.5	20 58.9	98 11	10.4	21 28.3	98 10	10.3	22 56.4	98 10	10.0	23 25.8	98 10	09.8	2
3	18 25.2	98 10	10.3	18 54.7	98 10	10.2	19 53.6	98 10	10.0	20 23.1	98 10	09.9	20 52.5	98 10	09.8	21 22.0	98 10	09.7	22 50.4	98 10	09.4	23 19.8	98 09	09.3	3
4	18 18.9	98 10	09.7	18 48.4	98 10	09.6	19 47.5	98 10	09.4	20 17.0	98 09	09.3	20 46.6	98 09	09.2	21 16.1	98 09	09.1	22 44.6	98 09	08.9	23 14.1	98 09	08.8	4
165	18 13.0	99 09	09.1	18 42.6	99 09	09.0	19 41.8	99 09	08.8	20 11.4	99 09	08.8	20 40.9	99 09	08.7	21 10.5	99 09	08.6	22 39.3	99 08	08.3	23 08.8	99 08	08.2	165
6	18 07.5	99 09	08.5	18 37.1	99 08	08.4	19 36.4	99 08	08.3	20 06.1	99 08	08.2	20 35.7	99 08	08.1	21 05.3	99 08	08.0	22 34.2	99 08	07.8	23 03.8	99 08	07.7	6
7	18 02.3	99 08	07.9	18 32.0	99 08	07.8	19 31.4	99 08	07.7	20 01.1	99 08	07.6	20 30.8	99 08	07.5	21 00.5	99 08	07.4	22 29.5	99 07	07.2	22 59.2	99 07	07.1	7
8	17 57.6	99 07	07.3	18 27.3	99 07	07.2	19 26.8	99 07	07.1	19 56.5	99 07	07.0	20 26.2	99 07	06.9	20 56.0	99 07	06.9	22 25.2	99 07	06.7	22 54.9	99 07	06.6	8
9	17 53.2	99 07	06.7	18 22.9	99 07	06.6	19 22.5	99 06	06.5	19 52.3	99 06	06.4	20 22.1	99 06	06.4	20 51.8	99 06	06.3	22 21.1	99 06	06.1	22 50.9	99 06	06.0	9
170	17 49.2	99 06	06.1	18 19.0	99 06	06.0	19 18.6	99 06	05.9	19 48.4	99 06	05.8	20 18.2	99 06	05.8	20 48.0	99 06	05.7	22 17.5	99 06	05.5	22 47.3	99 05	05.5	170
1	17 45.5	1.0 05	05.5	18 15.4	1.0 05	05.4	19 15.1	1.0 05	05.3	19 44.9	99 05	05.3	20 14.8	99 05	05.2	20 44.6	99 05	05.2	22 14.2	99 05	05.0	22 44.0	99 05	04.9	1
2	17 42.3	1.0 05	04.9	18 12.1	1.0 05	04.8	19 11.9	1.0 05	04.7	19 41.8	1.0 05	04.7	20 11.7	1.0 05	04.6	20 41.6	1.0 04	04.6	22 11.2	1.0 04	04.4	22 41.1	1.0 04	04.4	2
3	17 39.4	1.0 04	04.3	18 09.3	1.0 04	04.2	19 09.1	1.0 04	04.1	19 39.0	1.0 04	04.1	20 08.9	1.0 04	04.1	20 38.8	1.0 04	04.0	22 08.6	1.0 04	03.9	22 38.5	1.0 04	03.8	3
4	17 36.9	1.0 04	03.7	18 06.8	1.0 03	03.6	19 06.7	1.0 03	03.5	19 36.6	1.0 03	03.5	20 06.6	1.0 03	03.5	20 36.5	1.0 03	03.4	22 06.3	1.0 03	03.3	22 36.2	1.0 03	03.3	4
175	17 34.8	1.0 03	03.0	18 04.7	1.0 03	03.0	19 04.7	1.0 03	03.0	19 34.6	1.0 03	02.9	20 04.6	1.0 03	02.9	20 34.5	1.0 03	02.9	22 04.4	1.0 03	02.8	22 34.3	1.0 03	02.7	175
6	17 33.1	1.0 02	02.4	18 03.0	1.0 02	02.4	19 03.0	1.0 02	02.4	19 33.0	1.0 02	02.3	20 02.9	1.0 02	02.3	20 32.9	1.0 02	02.3	22 02.8	1.0 02	02.2	22 32.8	1.0 02	02.2	6
7	17 31.7	1.0 02	01.8	18 01.7	1.0 02	01.8	19 01.7	1.0 02	01.8	19 31.7	1.0 02	01.8	20 01.6	1.0 02	01.7	20 31.6	1.0 02	01.7	22 01.6	1.0 01	01.7	22 31.6	1.0 01	01.6	7
8	17 30.8	1.0 01	01.2	18 00.8	1.0 01	01.2	19 00.7	1.0 01	01.2	19 30.7	1.0 01	01.2	20 00.7	1.0 01	01.2	20 30.7	1.0 01	01.1	22 00.7	1.0 01	01.1	22 30.7	1.0 01	01.1	8
9	17 30.2	1.0 00	00.6	18 00.2	1.0 00	00.6	19 00.2	1.0 00	00.6	19 30.2	1.0 00	00.6	20 00.2	1.0 00	00.6	20 30.2	1.0 00	00.6	22 00.2	1.0 00	00.6	22 30.2	1.0 00	00.5	9
180	17 30.0	1.0 00	00.0	18 00.0	1.0 00	00.0	19 00.0	1.0 00	00.0	19 30.0	1.0 00	00.0	20 00.0	1.0 00	00.0	20 30.0	1.0 00	00.0	22 00.0	1.0 00	00.0	22 30.0	1.0 00	00.0	180

Lat. 53°

Lat. 54°

Lat. 55°

Lat. 56°

Lat. 57°

Lat. 58°

Lat. 59°

Lat. 53°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
00	83 00.0	1.0 02	00.0	82 30.0	1.0 02	00.0	81 00.0	1.0 02	00.0	80 30.0	1.0 01	00.0	80 00.0	1.0 01	00.0	74 00.0	1.0 01	00.0	73 30.0	1.0 01	00.0	68 30.0	1.0 00	00.0	00
1	82 58.7	1.0 06	04.1	82 28.8	1.0 06	03.8	80 59.0	1.0 05	03.0	80 29.1	1.0 04	02.8	79 59.2	1.0 04	02.6	73 59.6	1.0 02	01.3	73 29.6	1.0 02	01.2	68 29.8	1.0 01	00.7	1
2	82 54.9	99 11	08.1	82 25.3	99 10	07.5	80 56.2	99 08	06.0	80 26.5	99 07	05.6	79 56.7	99 07	05.2	73 58.4	1.0 03	02.6	73 28.4	1.0 03	02.5	68 29.1	1.0 02	01.5	2
3	82 48.5	97 15	12.1	82 19.4	97 13	11.1	80 51.6	98 11	08.9	80 22.1	98 10	08.3	79 52.6	98 09	07.8	73 56.3	99 05	03.9	73 26.5	99 05	03.7	68 27.9	1.0 03	02.2	3
4	82 39.8	94 18	15.9	82 11.4	95 17	14.6	80 45.1	97 14	11.8	80 16.1	97 13	11.0	79 47.0	97 12	10.3	73 53.5	99 06	05.2	73 23.8	99 06	04.9	68 26.3	99 03	02.9	4
05	82 28.8	92 22	19.5	82 01.2	93 20	18.0	80 36.9	95 16	14.5	80 08.4	95 15	13.6	79 39.8	96 14	12.7	73 49.8	98 07	06.4	73 20.3	98 07	06.1	68 24.3	99 04	03.6	05
6	82 15.8	88 25	22.8	81 49.1	90 23	21.2	80 27.0	93 19	17.2	79 59.1	93 18	16.1	79 31.1	94 17	15.1	73 45.4	97 09	07.7	73 16.1	98 08	07.3	68 21.8	99 05	04.3	6
7	82 00.9	85 28	26.0	81 35.1	87 26	24.2	80 15.5	90 22	19.8	79 48.4	91 20	18.5	79 20.9	92 19	17.4	73 40.2	97 10	08.9	73 11.2	97 10	08.5	68 18.8	98 06	05.1	7
8	81 44.2	81 30	29.0	81 19.5	83 29	27.0	80 02.6	87 24	22.2	79 36.2	89 23	20.9	79 09.5	90 21	19.6	73 34.2	96 11	10.2	73 05.5	96 11	09.6	68 15.4	97 06	05.8	8
9	81 26.0	78 33	31.7	81 02.4	80 31	29.6	79 48.3	85 26	24.5	79 22.7	86 25	23.1	78 56.7	87 23	21.7	73 27.4	94 12	11.4	72 59.1	95 12	10.8	68 11.6	97 07	06.5	9
10	81 06.3	74 35	34.2	80 43.8	76 33	32.1	79 32.7	82 28	26.7	79 07.9	83 27	25.2	78 42.7	85 25	23.8	73 19.9	93 14	12.5	72 52.0	93 13	11.9	68 07.3	96 08	07.2	10
1	80 45.5	70 37	36.4	80 24.1	73 35	34.3	79 15.9	79 30	28.7	78 52.0	80 28	27.1	78 27.6	82 27	25.7	73 11.8	92 15	13.7	72 44.2	92 14	13.0	68 02.6	95 09	07.8	1
2	80 23.5	66 38	38.5	80 03.2	69 36	36.3	78 58.0	76 32	30.7	78 35.0	77 30	29.0	78 11.5	79 29	27.5	73 02.9	90 16	14.8	72 35.7	91 15	14.1	67 57.4	94 09	08.5	2
3	80 00.5	63 40	40.4	79 41.3	65 38	38.2	78 39.1	73 33	32.5	78 17.0	75 32	30.8	77 54.4	76 30	29.2	72 53.3	89 17	15.9	72 26.6	89 16	15.1	67 51.9	93 10	09.2	3
4	79 36.7	59 41	42.1	79 18.5	62 39	40.0	78 19.2	69 34	34.1	77 58.1	72 33	32.4	77 36.3	73 31	30.8	72 43.1	87 18	17.0	72 16.8	88 17	16.2	67 45.9	92 11	09.8	4
15	79 12.1	56 42	43.7	78 55.0	59 40	41.5	77 58.6	66 36	35.7	77 38.3	69 34	33.9	77 17.4	71 33	32.3	72 32.2	85 19	18.0	72 06.5	86 18	17.2	67 39.5	91 11	10.5	15
6	78 46.8	52 43	45.1	78 30.7	55 42	43.0	77 37.1	63 37	37.1	77 17.8	66 35	35.4	76 57.8	68 34	33.7	72 20.8	84 20	19.0	71 55.5	85 19	18.1	67 32.8	90 12	11.1	6
7	78 21.0	49 44	46.4	78 05.8	52 42	44.3	77 15.0	60 38	38.5	76 56.5	63 36	36.7	76 37.4	65 35	35.0	72 08.7	82 21	20.0	71 44.0	83 20	19.1	67 25.6	89 13	11.7	7
8	77 54.6	46 45	47.5	77 40.3	49 43	45.5	76 52.2	57 39	39.7	76 34.7	60 37	37.9	76 16.4	62 36	36.2	71 56.1	80 22	20.9	71 32.0	81 21	20.0	67 18.1	88 13	12.4	8
9	77 27.7	43 45	48.6	77 14.3	46 44	46.5	76 28.9	55 40	40.8	76 12.2	57 38	39.1	75 54.7	59 37	37.4	71 42.9	78 23	21.8	71 19.4	79 22	20.9	67 10.2	86 14	13.0	9
20	77 00.4	40 46	49.5	76 47.9	43 45	47.5	76 05.0	52 41	41.9	75 49.1	54 39	40.1	75 32.5	57 38	38.5	71 29.3	76 24	22.7	71 06.3	77 23	21.7	67 01.9	85 14	13.5	20
1	76 32.8	38 47	50.4	76 21.1	41 45	48.4	75 40.7	49 41	42.9	75 25.6	52 40	41.1	75 09.8	54 39	39.4	71 15.1	74 24	23.6	70 52.7	75 23	22.5	66 53.2	84 15	14.1	1
2	76 04.8	35 47	51.1	75 53.9	38 46	49.2	75 15.9	46 42	43.7	75 01.7	49 41	42.0	74 46.6	51 39	40.4	71 00.4	72 25	24.4	70 38.6	73 24	23.3	66 44.3	82 16	14.7	2
3	75 36.6	32 48	51.8	75 26.4	35 46	49.9	74 50.8	44 43	44.6	74 37.3	46 41	42.9	74 23.0	49 40	41.2	70 45.3	70 26	25.1	70 24.1	71 25	24.1	66 34.9	81 16	15.2	3
4	75 08.1	30 48	52.4	74 58.7	33 47	50.6	74 25.3	41 43	45.3	74 12.5	44 42	43.6	73 59.1	46 41	42.0	70 29.7	68 27	25.9	70 09.1	69 26	24.8	66 25.3	79 17	15.8	4
25	74 39.3	28 48	53.0	74 30.6	30 47	51.2	73 59.4	39 44	46.0	73 47.5	41 42	44.4	73 34.7	44 41	42.7	70 13.8	66 27	26.6	69 53.8	67 26	25.5	66 15.3	78 17	16.3	25
6	74 10.4	25 48	53.5	74 02.4	28 47	51.7	73 33.3	36 44	46.6	73 22.1	39 43	45.0	73 10.1	41 42	43.4	69 57.4	64 28	27.3	69 38.0	65 27	26.2	66 05.0	76 18	16.8	6
7	73 41.3	23 49	53.9	73 33.9	26 48	52.2	73 07.0	34 44	47.2	72 56.4	36 43	45.6	72 45.1	39 42	44.0	69 40.7	62 28	27.9	69 21.9	63 27	26.8	65 54.5	74 18	17.3	7
8	73 12.1	21 49	54.3	73 05.3	24 48	52.6	72 40.3	32 45	47.7	72 30.5	34 44	46.2	72 19.9	37 42	44.6	69 23.6	60 29	28.6	69 05.5	61 28	27.4	65 43.6	73 19	17.8	8
9	72 42.7	19 49	54.7	72 36.6	22 48	53.0	72 13.5	29 45	48.2	72 04.3	32 44	46.7	71 54.4	34 43	45.1	69 06.2	58 30	29.1	68 48.7	59 29	28.0	65 32.4	71 19	18.2	9
30	72 13.2	17 49	55.0	72 07.6	20 48	53.3	71 46.5	27 45	48.6	71 38.0	30 44	47.1	71 28.7	32 43	45.6	68 48.4	55 30	29.7	68 31.6	57 29	28.6	65 21.0	69 20	18.7	30
1	71 43.5	15 50	55.2	71 38.6	18 49	53.6	71 19.3	25 46	49.0	71 11.4	28 45	47.5	71 02.8	30 43	46.0	68 30.4	53 31	30.2	68 14.1	55 30	29.1	65 09.3	68 20	19.1	1
2	71 13.9	13 50	55.4	71 09.5	16 49	53.9	70 52.0	23 46	49.4	70 44.7	25 45	47.9	70 36.7	28 44	46.4	68 12.0	51 31	30.8	67 56.4	53 30	29.6	64 57.3	66 20	19.5	2
3	70 44.1	11 50	55.6	70 40.3	14 49	54.1	70 24.5	21 46	49.7	70 17.8	23 45	48.2	70 10.5	26 44	46.8	67 53.4	49 31	31.2	67 38.5	51 30	30.1	64 45.1	64 21	20.0	3
4	70 14.3	10 50	55.8	70 11.0	12 49	54.3	69 56.9	19 46	50.0	69 50.8	21 45	48.5	69 44.1	24 44	47.1	67 34.6	47 32	31.7	67 20.2	49 31	30.5	64 32.7	62 21	20.3	4
35	69 44.4	08 50	55.9	69 41.6	10 49	54.5	69 29.2	17 46	50.2	69 23.7	19 45	48.8	69 17.5	22 44	47.4	67 15.5	45 32	32.1	67 01.8	47 31	31.0	64 20.0	60 22	20.7	35
6	69 14.4	06 50	56.0	69 12.2	09 49	54.6	69 01.4	15 46	50.4	68 56.5	18 46	49.1	68 50.9	20 45	47.7	66 56.2	43 33	32.5	66 43.1	45 32	31.4	64 07.1	59 22	21.1	6
7	68 44.5	05 50	56.1	68 42.8	07 49	54.7	68 33.6	14 47	50.6	68 29.2	16 46	49.3	68 24.1	18 45	47.9	66 36.7	41 33	32.9	66 24.2	43 32	31.8	63 54.0	57 22	21.4	7
8	68 14.5	03 50	56.1	68 13.3	05 49	54.8	68 05.6	12 47	50.8	68 01.8	14 46	49.5	67 57.3	16 45	48.1	66 17.0	39 33	33.3	66 05.0	41 32	32.1	63 40.7	55 22	21.8	8
9	67 44.5	02 50	56.2	67 43.7	04 49	54.9	67 37.6	10 47	50.9	67 34.3	12 46	49.6	67 30.4	14 45	48.3	65 57.1	37 33	33.6	65 45.7	39 32	32.5	63 27.2	53 23	22.1	9
40	67 14.5	00 50	56.2	67 14.2	02 49	54.9	67 09.6	08 47	51.0	67 06.8	10 46	49.7	67 03.4	12 45	48.5	65 37.0	35 34	33.9	65 26.3	37 33	32.8	63 13.6	51 23	22.4	40
1	66 44.5	02 50	56.2	66 44.7	01 49	54.9	66 41.5	07 47	51.1	66 39.2	09 46	49.9	66 36.3	11 45	48.6	65 16.8	33 34	34.2	65 06.6	35 33	33.1	62 59.7	49 23	22.7	1
2	66 14.5	03 50	56.1	66 15.1	01 49	54.9	66 13.3	05 47	51.2	66 11.6	07 46	49.9	66 09.2	09 45	48.7	64 56.4	31 34	34.5	64 46.9	33 33	33.4	62 45.7	48 24	23.0	2
3	65 44.6	04 50	56.1	65 45.6	02 49	54.9	65 45.2	03 47	51.2	65 43.9	05 46	50.0	65 42.0	07 45	48.8	64 35.9	29 34	34.7	64 26.9	31 33	33.6	62 31.5	46 24	23.3	3
4	65 14.6	06 50	56.0	65 16.1	04 49	54.8	65 17.0	02 47	51.3	65 16.2	04 46	50.1	65 14.9	06 45	48.9	64 15.3	27 35	35.0	64 06.9	29 34	33.9	62 17.2	44 24	23.5	4
45	64 44.7	07 50	56.0	64 46.5	05 49	54.8	64 48.9	00 47	51.3	64 48.5	02 46	50.1	64 47.7	04 45	48.9	63 54.5	25 35	35.2	63 46.7	27 34	34.1	62 02.7	42 24	23.8	45
6	64 14.7	09 50	55.9	64 17.1	07 49	54.7	64 20.7	01 47	51.3	64 20.8	00 46	50.1	64 20.4	02 45	49.0	63 33.7	23 35	35.4	63 26.4	25 34	34.3	61 48.0	40 25	24.0	6
7	63 44.9	10 50	55.8	63 47.6	08 49	54.6	63 52.5	03 47	51.2	63 53.1	01 46	50.1	63 53.2	01 45	49.0	63 12.7	22 35	35.6	63 06.0	23 34	34.5	61 33.3	38 25	24.2	7
8	63 15.0	11 50	55.6	63 18.2	10 49	54.5	63 24.4	04 47	51.2	63 25.4	03 46	50.1	63 26.0	01 45	49.0	62 51.7	20 35	35.7	62 45.5	21 34	34.6	61 18.4	36 25	24.4	8
9	62 45.3	13 50	55.5	62 48.8	11 49	54.4	62 56.3	06 47	51.2	62 57.7	04 46	50.1	62 58.7	02 45	49.0	62 30.5	18 35	35.9	62 24.9	19 34	34.8	61 03.4	35 25	24.6	9
50	62 15.5	14 49	55.4	62 19.4	12 49	54.3	62 28.2	07 47	51.1	62 30.1	06 46	50.0	62 31.5	04 45	48.9	62 09.4	16 35	36.0	62 04.3	18 35	34.9	60 48.3	33 25	24.8	50
1	61 45.8	15 49	55.2	61 50.1	13 49	54.2	62 00.1	09 47	51.0	62 02.4	07 46	49.9	62 04.3	05 45	48.9	61 48.1	14 36	36.1	61 43.6	16 35	35.1	60 33.1	31 26	25.0	1
2	61 16.2	16 49	55.1	61 20.9	15 49	54.0	61 32.0	10 47	50.9	61 34.8	08 46	49.9	61 37.1	07 45	48.8	61 26.8	12 36	36.2	61 22.8	14 35	35.2	60 17.8	29 26	25.2	2
3	60 46.6	18 49	54.9	60 51.7	16 49	53.9	61 04.0	11 47	50.8	61 07.2	10 46	49.8	61 09.9	08 45	48.7	61 05.4	11 36	36.3	61 02.0	12 35	35.3	60 02.4	27 26	25.3	3
4	60 17.1	19 49	54.7	60 22.5	17 48	53.7	60 36.1	13 47	50.7	60 39.7	11 46	49.7	60 42.8	10 45	48.7	60 44.0	09 36	36.4	60 41.1	11 35	35.4	59 47.0	25 26	25.4	4
55	59 47.7	20 49	54.5	59 53.5	19 48	53.5	60 08.2	14 46	50.6	60 12.2	13 46	49.6	60 15.7	11 45	48.6	60 22.6	07 36	36.4	60 20.2	09 35	35.4	59 31.4	24 26	25.6	55
6	59 18.3	21 49	54.3	59 24.5	20 48	53.3	59 40.3	15 46	50.4	59 44.7	14 46	49.4	59 48.7	12 45	48.5	60 01.1	06 36	36.5	59 59.2	07 35	35.5	59 15.8	22 26	25.7	6
7	58 49.1	22 49	54.1	58 55.5	21 48	53.1	59 12.5	17 46	50.3	59 17.3	15 46	49.3	59 21.7	14 45	48.3	59 39.7	04 36	36.5	59 38.3	05 35	35.5	59 00.1	20 26	25.8	7
8	58 19.9	23 49	53.9	58 26.7	22 48	52.9	58 44.8	18 46	50.1	58 49.9	17 45	49.2	58 54.7	15 45	48.2	59 18.2	02 36	36.5	59 17.3	04 35	35.6	58 44.4	18 26	25.9	8
9	57 50.7	25 48	53.6	57 57.9	23 48	52.7	58 17.1	19 46	50.0	58 22.6	18 45	49.0	58 27.8	17 45	48.1	58 56.7	01 36	36.5	58 56.3	02 35	35.6	58 28.6	16 26	26.0	9
60	57 21.7	26 48	53.4	57 29.2	24 48	52.5	57 49.5	21 46	49.8	57 55.4	19 45	48.9	58 01.0	18 45	47.9	58 35.2	01 36	36.5	58 35.3	00 35	35.6	58 12.7	15 26	26.1	60
1	56 52.8	27 48	53.2	57 00.6	26 48	52.3	57 21.9	22 46	49.6	57 28.3	20 45	48.7	57 34.2	19 44	47.8	58 13.7	03 36	36.5	58 14.3	01 35	35.6	57 56.8	13 27	26.1	1
2	56 23.9	28 48	52.9	56 32.1	27 47	52.0	56 54.5	23 46	49.4	57 01.2	22 45	48.5	57 07.5	20 44	47.6	57 52.2	04 36	36.5	57 53.2	03 35	35.6	57 40.9	11 27	26.2	2
3	55 55.2	29 48	52.7	56 03.7	28 47	51.8	56 27.1	24 46	49.2	56 34.2	23 45	48.3	56 40.9	22 44	47.4	57 30.7	06 36	36.5	57 32.2	04 35	35.5	57 25.0	09 27	26.2	3
4	55 26.5	30 48	52.4	55 35.4	29 47	51.6	55 59.8	25 45	49.0	56 07.3	24 45	48.1	56 14.3	23 44	47.2	57 09.3	07 36	36.4	57 11.3	06 35	35.5	57 09.0	08 27	26.3	4
65	54 57.9	31 47	52.1	55 07.1	30 47	51.3	55 32.6	27 45	48.8	55 40.4	25 45	47.9	55 47.9	24 44	47.1	56 47.8	09 36	36.4	56 50.3	08 35	35.5	56 53.0	06 27	26.3	65
6	54 29.5	32 47	51.9	54 39.0	31 47	51.0	55 05.5	28 45	48.5	55 13.7	27 44	47.7	55 21.5	25 44	46.9	56 26.4	10 36	36.3	56 29.4	09 35	35.4	56 37.0	04 27	26.3	6
7	54 01.1	33 47	51.6	54 11.0	32 46	50.8	54 38.5	29 45	48.3	54 47.0	28 44	47.5	54 55.2	27 44	46.6	56 05.1	12 36	36.2	56 08.5	11 35	35.4	56 21.0	02 27	26.4	7
8	53 32.9	34 47	51.3	53 43.1	33 46	50.5	54 11.6	30 45	48.1	54 20.4	29 44	47.3	54 29.0	28 44	46.4	55 43.7	13 35	36.2	55 47.6	12 35	35.3	56 04.9	01 27	26.4	8
9	53 04.8	35 47	51.0	53 15.3	34 46	50.2	53 44.8	31 44	47.8	53 54.0	30 44	47.0	54 02.8	29 43	46.2	55 22.4	15 35	36.1	55 26.7	14 35	35.2	55 48.9	01 27	26.4	9
70	52 36.8	36 46	50.7	52 47.6	35 46	49.9	53 18.1	32 44	47.6	53 27.6	31 44	46.8	53 36.8	30 43	46.0	55 01.2	16 35	36.0	55 06.0	15 35	35.1	55 32.9	03 27	26.4	70
1	52 08.9	37 46	50.4	52 20.0	36 46	49.6	52 51.5	33 44	47.3	53 01.3	32 44	46.5	53 10.9	31 43	45.7	54 40.0	18 35	35.9	54 45.2	17 34	35.0	55 16.8	04 27	26.3	1
2	51 41.2	38 46	50.1	51 52.5	37 46	49.3	52 25.0	35 44	47.1	52 35.2	34 43	46.3	52 45.1	33 43	45.5	54 18.9	19 35	35.8	54 24.5	18 34	34.9	55 00.8	06 27	26.3	2
3	51 13.5	39 46	49.8	51 25.2	39 45	49.0	51 58.6	36 44	46.8	52 09.1	35 43	46.0	52 19.4	34 43	45.3	53 57.8	21 35	35.6	54 03.9	20 34	34.8	54 44.8	08 27	26.3	3
4	50 46.0	40 46	49.5	50 58.0	40 45	48.7	51 32.3	37 44	46.5	51 43.2	36 43	45.8	51 53.8	35 42	45.0	53 36.8	22 35	35.5	53 43.3	21 34	34.7	54 28.8	09 27	26.2	4
75	50 18.6	41 45	49.1	50 30.9	41 45	48.4	51 06.2	38 43	46.2	51 17.4	37 43	45.5	51 28.3	36 42	44.7	53 15.9	24 35	35.4	53 22.8	22 34	34.5	54 12.9	11 27	26.2	75
6	49 51.4	42 45	48.8	50 04.0	42 45	48.1	50 40.2	39 43	46.0	50 51.7	38 43	45.2	51 03.0	37 42	44.5	52 55.0	25 35	35.2	53 02.4	24 34	34.4	53 57.0	12 26	26.1	6
7	49 24.3	43 45	48.5	49 37.2	43 44	47.8	50 14.3	40 43	45.7	50 26.1	39 42	44.9	50 37.7	38 42	44.2	52 34.3	26 34	35.1	52 42.0	25 34	34.3	53 41.1	14 26	26.1	7
8	48 57.3	44 45	48.1	49 10.5	43 44	47.5	49 48.5	41 43	45.4	50 00.7	40 42	44.7	50 12.6	39 42	43.9	52 13.5	28 34	34.9	52 21.7	27 34	34.1	53 25.2	16 26	26.0	8
9	48 30.5	45 44	47.8	48 44.0	44 44	47.1	49 22.9	42 42	45.1	49 35.4	41 42	44.4	49 47.6	40 41	43.7	51 52.9	29 34	34.7	52 01.5	28 34	34.0	53 09.4	17 26	25.9	9
80	48 03.8	46 44	47.5	48 17.6	45 44	46.8	48 57.4	43 42	44.8	49 10.2	42 42	44.1	49 22.7	41 41	43.4	51 32.4	30 34	34.6	51 41.3	29 33	33.8	52 53.6	19 26	25.9	80
1	47 37.3	47 44	47.1	47 51.3	46 44	46.5	48 32.1	44 42	44.4	48 45.2	43 42	43.8	48 58.0	42 41	43.1	51 12.0	32 34	34.4	51 21.3	31 33	33.6	52 37.9	20 26	25.8	1
2	47 10.9	48 44	46.8	47 25.2	47 43	46.1	48 06.8	45 42	44.1	48 20.2	44 41	43.5	48 33.4	44 41	42.8	50 51.6	33 34	34.2	51 01.3	32 33	33.5	52 22.2	22 26	25.7	2
3	46 44.7	49 43	46.4	46 59.3	48 43	45.8	47 41.8	46 42	43.8	47 55.5	45 41	43.2	48 09.0	45 41	42.5	50 31.3	34 34	34.0	50 41.5	33 33	33.3	52 06.6	23 26	25.6	3
4	46 18.6	50 43	46.0	46 33.5	49 43	45.4	47 16.8	47 41	43.5	47 30.9	46 41	42.8	47 44.6	46 40	42.2	50 11.2	36 33	33.8	50 21.7	35 33	33.1	51 51.0	25 26	25.5	4
85	45 52.7	51 43	45.7	46 07.9	50 42	45.1	46 52.1	48 41	43.2	47 06.4	47 41	42.5	47 20.5	47 40	41.9	49 51.2	37 33	33.6	50 02.1	36 33	32.9	51 35.5	26 26	25.4	85
6	45 27.0	52 43	45.3	45 42.4	51 42	44.7	46 27.4	49 41	42.8	46 42.1	48 40	42.2	46 56.4	48 40	41.6	49 31.2	38 33	33.4	49 42.5	37 32	32.7	51 20.1	28 26	25.3	6
7	45 01.4	53 42	44.9	45 17.1	52 42	44.3	46 03.0	50 41	42.5	46 17.9	49 40	41.9	46 32.6	49 40	41.2	49 11.4	39 33	33.2	49 23.0	38 32	32.5	51 04.7	29 26	25.1	7
8	44 35.9	54 42	44.6	44 51.9	53 42	44.0	45 38.7	51 40	42.2	45 53.9	50 40	41.5	46 08.8	50 39	40.9	48 51.7	41 33	33.0	49 03.7	40 32	32.3	50 49.4	31 25	25.0	8
9	44 10.7	54 42	44.2	44 26.9	54 41	43.6	45 14.5	52 40	41.8	45 30.0	51 40	41.2	45 45.3	51 39	40.6	48 32.1	42 32	32.8	48 44.5	41 32	32.1	50 34.2	32 25	24.9	9
90	43 45.6	55 42	43.8	44 02.1	55 41	43.2	44 50.5	53 40	41.5	45 06.3	52 39	40.9	45 21.9	52 39	40.3	48 12.6	43 32	32.5	48 25.4	42 32	31.9	50 19.0	33 25	24.7	90

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	43 29.7	56 41	43.4	43 37.5	56 41	42.9	44 26.7	54 39	41.1	44 42.7	53 39	40.5	44 58.6	53 38	39.9	47 53.2	44 32	32.3	48 06.4	43 31	31.6	50 04.9	35 25	24.6	91
2	42 56.9	57 41	43.0	43 13.0	56 40	42.5	44 03.0	55 39	40.8	44 19.4	54 39	40.2	44 35.5	54 38	39.6	47 34.0	45 32	32.1	47 47.5	45 31	31.4	49 49.0	36 25	24.5	2
3	42 31.4	58 41	42.6	42 48.7	57 40	42.1	43 39.5	56 39	40.4	43 56.2	55 38	39.8	44 12.6	54 38	39.2	47 14.9	46 32	31.8	47 28.7	46 31	31.2	49 34.1	38 25	24.3	3
4	42 07.0	59 40	42.3	42 24.6	58 40	41.7	43 16.2	57 39	40.0	43 33.1	56 38	39.5	43 49.8	55 38	38.9	46 55.9	48 31	31.6	47 10.1	47 31	30.9	49 19.2	39 25	24.1	4
95	41 42.8	60 40	41.9	42 00.6	59 40	41.3	42 53.1	57 38	39.7	43 10.3	57 38	39.1	43 27.3	56 37	38.5	46 37.1	49 31	31.3	46 51.6	48 31	30.7	49 04.5	40 24	24.0	95
6	41 18.8	60 40	41.5	41 36.9	60 39	40.9	42 30.1	58 38	39.3	42 47.6	58 38	38.7	43 04.9	57 37	38.2	46 18.4	50 31	31.1	46 33.3	49 30	30.4	48 49.9	42 24	23.8	6
7	40 55.0	61 39	41.1	41 13.3	61 39	40.5	42 07.4	59 38	38.9	42 25.1	59 37	38.4	42 42.6	58 37	37.8	45 59.8	51 31	30.8	46 15.1	50 30	30.2	48 35.4	43 24	23.6	7
8	40 31.4	62 39	40.6	40 50.0	62 39	40.1	41 44.8	60 37	38.5	42 02.7	60 37	38.0	42 20.6	59 36	37.5	45 41.4	52 30	30.5	45 57.0	52 30	29.9	48 20.9	44 24	23.5	8
9	40 08.0	63 39	40.2	40 26.8	62 38	39.7	41 22.4	61 37	38.2	41 40.6	61 37	37.6	41 58.7	60 36	37.1	45 23.1	53 30	30.3	45 39.9	53 30	29.7	48 06.6	46 24	23.3	9
100	39 44.8	64 38	39.8	40 03.8	63 38	39.3	41 00.1	62 37	37.8	41 18.7	61 36	37.3	41 37.0	61 36	36.7	45 05.0	54 30	30.0	45 21.2	54 29	29.4	47 52.4	47 24	23.1	100
1	39 21.7	65 38	39.4	39 41.0	64 38	38.9	40 38.1	63 36	37.4	40 56.9	62 36	36.9	41 15.5	62 36	36.4	44 47.1	55 30	29.7	45 03.6	55 29	29.1	47 38.3	48 23	22.9	1
2	38 58.9	65 38	39.0	39 18.5	65 37	38.5	40 16.3	64 36	37.0	40 35.3	63 36	36.5	40 54.2	63 35	36.0	44 29.2	56 29	29.4	44 46.1	56 29	28.8	47 24.3	49 23	22.7	2
3	38 36.3	66 37	38.6	38 56.1	66 37	38.1	39 54.7	64 36	36.6	40 13.9	64 35	36.1	40 33.1	64 35	35.6	44 11.6	58 29	29.1	44 28.7	57 29	28.6	47 10.4	51 23	22.5	3
4	38 13.9	67 37	38.1	38 33.9	67 37	37.7	39 33.2	65 35	36.2	39 52.8	65 35	35.7	40 12.2	64 35	35.2	43 54.1	59 29	28.9	44 11.6	58 28	28.3	46 56.6	52 23	22.3	4
105	37 51.7	68 37	37.7	38 11.9	67 36	37.2	39 12.0	66 35	35.8	39 31.8	66 35	35.3	39 51.4	65 34	34.8	43 36.7	60 29	28.6	43 54.5	59 28	28.0	46 43.0	53 23	22.1	105
6	37 29.7	68 36	37.3	37 50.2	68 36	36.8	38 51.0	67 35	35.4	39 11.0	67 34	34.9	39 30.9	66 34	34.4	43 19.5	61 28	28.3	43 37.6	60 28	27.7	46 29.4	54 22	21.9	6
7	37 08.0	69 36	36.9	37 28.7	69 36	36.4	38 30.1	68 34	35.0	38 50.4	67 34	34.5	39 10.6	67 34	34.1	43 02.5	62 28	28.0	43 20.9	61 28	27.4	46 16.0	55 22	21.7	7
8	36 46.4	70 36	36.4	37 07.3	70 35	36.0	38 09.5	69 34	34.6	38 30.1	68 34	34.1	38 50.5	68 33	33.7	42 45.7	63 28	27.7	43 04.4	62 27	27.1	46 02.7	57 22	21.5	8
9	36 25.1	71 35	36.0	36 46.2	70 35	35.5	37 49.1	69 34	34.2	38 09.9	69 33	33.7	38 30.5	69 33	33.3	42 29.0	64 28	27.4	42 48.0	63 27	26.8	45 49.6	58 22	21.3	9
110	36 04.0	71 35	35.5	36 25.4	71 34	35.1	37 29.0	70 33	33.8	37 50.0	70 33	33.3	38 10.8	69 32	32.9	42 12.5	65 27	27.0	42 31.8	64 27	26.5	45 36.5	59 22	21.0	110
1	35 43.1	72 34	35.1	36 04.7	72 34	34.7	37 09.0	71 33	33.4	37 30.2	71 32	32.9	37 51.4	70 32	32.5	41 56.2	66 27	26.7	42 15.8	65 26	26.2	45 23.6	60 21	20.8	1
2	35 22.5	73 34	34.6	35 44.3	73 34	34.2	36 49.2	72 33	32.9	37 10.7	71 32	32.5	37 32.1	71 32	32.1	41 40.0	66 27	26.4	41 59.9	66 26	25.9	45 10.9	61 21	20.6	2
3	35 02.0	74 34	34.2	35 24.1	73 33	33.8	36 29.7	72 32	32.5	36 51.4	72 32	32.1	37 13.0	72 31	31.7	41 24.0	67 26	26.1	41 44.2	67 26	25.6	44 58.3	62 21	20.3	3
4	34 41.9	74 33	33.8	35 04.1	74 33	33.3	36 10.4	73 32	32.1	36 32.3	73 31	31.7	36 54.2	73 31	31.2	41 08.3	68 26	25.8	41 28.7	68 26	25.3	44 45.8	63 21	20.1	4
115	34 21.9	75 33	33.3	34 44.4	75 32	32.9	35 51.4	74 31	31.7	36 13.5	74 31	31.2	36 35.6	73 31	30.8	40 52.6	69 26	25.4	41 13.4	69 25	25.0	44 33.4	64 20	19.9	115
6	34 02.2	76 32	32.8	34 24.9	76 32	32.4	35 32.5	75 31	31.2	35 54.9	74 31	30.8	36 17.2	74 30	30.4	40 37.2	70 25	25.1	40 58.2	70 25	24.6	44 21.2	65 20	19.6	6
7	33 42.8	76 32	32.4	34 05.7	76 32	32.0	35 13.9	75 31	30.8	35 36.5	75 30	30.4	35 59.0	75 30	30.0	40 22.0	71 25	24.8	40 43.3	71 25	24.3	44 09.2	66 20	19.4	7
8	33 23.5	77 32	31.9	33 46.7	77 31	31.5	34 55.5	76 30	30.4	35 18.3	76 30	30.0	35 41.1	76 30	29.6	40 07.0	72 25	24.4	40 28.5	72 24	24.0	43 57.3	67 20	19.1	8
9	33 04.6	78 31	31.5	33 27.9	78 31	31.1	34 37.4	77 30	29.9	35 00.4	77 29	29.5	35 23.4	76 29	29.1	39 52.1	73 24	24.1	40 13.9	72 24	23.7	43 45.5	68 19	18.9	9
120	32 45.9	78 31	31.0	33 09.4	78 30	30.6	34 19.5	78 29	29.5	34 42.7	77 29	29.1	35 05.9	77 29	28.7	39 37.5	74 24	23.8	39 59.5	73 24	23.3	43 33.9	69 19	18.6	120
1	32 27.4	79 30	30.5	32 51.1	79 30	30.2	34 01.8	78 29	29.1	34 25.3	78 29	28.7	34 48.7	78 28	28.3	39 23.0	74 24	23.4	39 45.3	74 23	23.0	43 22.4	70 19	18.4	1
2	32 09.2	80 30	30.1	32 33.1	80 30	29.7	33 44.4	79 29	28.6	34 08.1	79 28	28.2	34 31.7	79 28	27.9	39 08.8	75 23	23.1	39 31.3	75 23	22.6	43 11.1	71 19	18.1	2
3	31 51.2	80 29	29.6	32 15.3	80 29	29.2	33 27.3	80 28	28.2	33 51.1	79 28	27.8	34 14.9	79 28	27.4	38 54.7	76 23	22.7	39 17.5	76 23	22.3	43 00.0	72 18	17.8	3
4	31 33.5	81 29	29.1	31 57.8	81 29	28.8	33 10.4	80 28	27.7	33 34.4	80 27	27.4	33 58.4	80 27	27.0	38 40.9	77 23	22.4	39 03.9	77 22	22.0	42 49.0	73 18	17.6	4
125	31 16.1	82 29	28.6	31 40.6	82 28	28.3	32 53.7	81 27	27.3	33 17.9	81 27	26.9	33 42.1	81 27	26.6	38 27.2	78 22	22.0	38 50.5	77 22	21.6	42 38.2	74 18	17.3	125
6	30 58.9	82 28	28.2	31 23.6	82 28	27.8	32 37.3	82 27	26.8	33 01.7	81 27	26.5	33 26.1	81 26	26.1	38 13.8	78 22	21.7	38 37.3	78 22	21.3	42 27.5	75 18	17.0	6
7	30 42.0	83 28	27.7	31 06.9	83 27	27.3	32 21.1	82 26	26.3	32 45.8	82 26	26.0	33 10.4	82 26	25.7	38 00.6	79 22	21.3	38 24.3	79 21	20.9	42 17.0	76 17	16.8	7
8	30 25.4	84 27	27.2	30 50.4	83 27	26.9	32 05.2	83 26	25.9	32 30.1	83 26	25.6	32 54.8	83 25	25.2	37 47.6	80 21	20.9	38 11.5	80 21	20.6	42 06.7	77 17	16.5	8
9	30 09.0	84 27	26.7	30 34.2	84 27	26.4	31 49.6	83 26	25.4	32 14.6	83 25	25.1	32 39.6	83 25	24.8	37 34.8	81 21	20.6	37 59.0	80 21	20.2	41 56.5	78 17	16.2	9
130	29 52.9	85 26	26.2	30 18.3	85 26	25.9	31 34.2	84 25	25.0	31 59.4	84 25	24.6	32 24.6	84 25	24.3	37 22.2	81 21	20.2	37 46.6	81 20	19.8	41 46.5	79 16	15.9	130
1	29 37.1	85 26	25.7	30 02.7	85 26	25.4	31 19.1	85 25	24.5	31 44.5	85 24	24.2	32 09.8	84 24	23.9	37 09.8	82 20	19.8	37 34.5	82 20	19.5	41 36.7	79 16	15.6	1
2	29 21.6	86 25	25.2	29 47.3	86 25	24.9	31 04.3	85 24	24.0	31 29.8	85 24	23.7	31 55.3	85 24	23.4	36 57.7	83 20	19.5	37 22.5	83 20	19.1	41 27.0	80 16	15.4	2
3	29 06.3	86 25	24.7	29 32.2	86 25	24.5	30 49.7	86 24	23.6	31 15.4	86 24	23.3	31 41.1	86 23	23.0	36 45.8	84 20	19.1	37 10.8	83 19	18.8	41 17.6	81 16	15.1	3
4	28 51.4	87 24	24.2	29 17.4	87 24	24.0	30 35.4	86 23	23.1	31 01.3	86 23	22.8	31 27.2	86 23	22.5	36 34.1	84 19	18.7	36 59.3	84 19	18.4	41 08.3	82 15	14.8	4
135	28 36.7	87 24	23.7	29 02.9	87 24	23.5	30 21.4	87 23	22.6	30 47.4	87 23	22.3	31 13.5	87 22	22.0	36 22.6	85 19	18.3	36 48.0	85 18	18.0	40 59.1	83 15	14.5	135
6	28 22.3	88 24	23.2	28 48.7	88 23	23.0	30 07.6	88 22	22.2	30 33.8	87 22	21.9	31 00.1	87 22	21.6	36 11.3	86 18	18.0	36 37.0	85 18	17.6	40 50.2	83 15	14.2	6
7	28 08.2	89 23	22.7	28 34.7	88 23	22.5	29 54.1	88 22	21.7	30 20.5	88 22	21.4	30 46.9	88 21	21.1	36 00.3	86 18	17.6	36 26.1	86 18	17.3	40 41.4	84 14	13.9	7
8	27 54.4	89 23	22.2	28 21.0	89 22	22.0	29 40.9	89 22	21.2	30 07.5	89 21	20.9	30 34.0	88 21	20.7	35 49.5	87 18	17.2	36 15.5	87 17	16.9	40 32.8	85 14	13.6	8
9	27 40.8	90 22	21.7	28 07.7	89 22	21.5	29 28.0	89 21	20.7	29 54.7	89 21	20.5	30 21.4	89 21	20.2	35 39.0	87 17	16.8	36 05.2	87 17	16.5	40 24.4	86 14	13.3	9
140	27 27.6	90 22	21.2	27 54.6	90 21	21.0	29 15.4	90 21	20.2	29 42.3	90 20	20.0	30 09.1	89 20	19.7	35 28.6	88 17	16.4	35 55.0	88 17	16.1	40 16.2	86 13	13.0	140
1	27 14.7	90 21	20.7	27 41.8	90 21	20.5	29 03.0	90 20	19.8	29 30.1	90 20	19.5	29 57.1	90 20	19.3	35 18.5	89 16	16.0	35 45.1	88 16	15.8	40 08.2	87 13	12.7	1
2	27 02.0	91 21	20.2	27 29.3	91 20	20.0	28 51.0	91 20	19.3	29 18.1	91 19	19.0	29 45.3	90 19	18.8	35 08.7	89 16	15.7	35 35.4	89 16	15.4	40 00.3	88 13	12.4	2
3	26 49.7	91 20	19.7	27 17.1	91 20	19.5	28 39.2	91 19	18.8	29 06.5	91 19	18.5	29 33.8	91 19	18.3	34 59.0	90 16	15.3	35 25.9	90 15	15.0	39 52.6	88 12	12.1	3
4	26 37.7	92 20	19.2	27 05.2	92 19	19.0	28 27.7	92 19	18.3	28 55.2	91 18	18.1	29 22.6	91 18	17.8	34 49.7	90 15	14.9	35 16.7	90 15	14.6	39 45.2	89 12	11.8	4
145	26 26.0	92 19	18.7	26 53.6	92 19	18.5	28 16.5	92 18	17.8	28 44.1	92 18	17.6	29 11.7	92 18	17.4	34 40.5	91 15	14.5	35 07.7	91 15	14.2	39 37.9	89 12	11.5	145
6	26 14.6	93 18	18.2	26 42.4	93 18	18.0	28 05.6	92 18	17.3	28 33.4	92 17	17.1	29 01.1	92 17	16.9	34 31.6	91 14	14.1	34 59.0	91 14	13.8	39 30.8	90 12	11.2	6
7	26 03.5	93 18	17.6	26 31.4	93 18	17.4	27 55.0	93 17	16.8	28 22.9	93 17	16.6	28 50.7	93 17	16.4	34 22.9	92 14	13.7	34 50.5	92 14	13.4	39 23.9	91 11	10.9	7
8	25 52.7	94 17	17.1	26 20.7	93 17	16.9	27 44.7	93 17	16.3	28 12.7	93 16	16.1	28 40.7	93 16	15.9	34 14.5	92 14	13.3	34 42.2	92 13	13.0	39 17.2	91 11	10.5	8
9	25 42.2	94 17	16.6	26 10.4	94 17	16.4	27 34.7	94 16	15.8	28 02.8	94 16	15.6	28 30.9	94 16	15.4	34 06.4	93 13	12.9	34 34.2	93 13	12.7	39 10.7	92 11	10.2	9
150	25 32.0	94 16	16.1	26 00.3	94 16	15.9	27 25.0	94 16	15.3	27 53.3	94 15	15.1	28 21.5	94 15	14.9	33 58.4	93 13	12.5	34 26.4	93 13	12.3	39 04.4	92 10	09.9	150
1	25 22.2	95 16	15.6	25 50.6	95 16	15.4	27 15.7	94 15	14.8	27 44.0	94 15	14.6	28 12.3	94 15	14.5	33 50.8	94 12	12.1	34 18.8	94 12	11.9	38 58.3	93 10	09.6	1
2	25 12.7	95 15	15.0	25 41.2	95 15	14.9	27 06.6	95 15	14.3	27 35.0	95 14	14.2	28 03.4	95 14	14.0	33 43.3	94 12	11.7	34 11.5	94 12	11.5	38 52.3	93 10	09.3	2
3	25 03.5	96 15	14.5	25 32.0	96 15	14.3	26 57.8	96 14	13.8	27 26.3	95 14	13.7	27 54.9	95 14	13.5	33 36.1	94 12	11.3	34 04.5	94 11	11.1	38 46.6	94 09	09.0	3
4	24 54.6	96 14	14.0	25 23.3	96 14	13.8	26 49.3	96 14	13.3	27 17.9	96 13	13.2	27 46.6	95 13	13.0	33 29.2	95 11	10.9	33 57.7	95 11	10.7	38 41.1	94 09	08.6	4
155	24 46.0	96 14	13.5	25 14.8	96 14	13.3	26 41.1	96 13	12.8	27 09.9	96 13	12.7	27 38.6	96 13	12.5	33 22.5	95 11	10.4	33 51.1	95 10	10.3	38 35.8	95 09	08.3	155
6	24 37.8	96 13	12.9	25 06.6	96 13	12.8	26 33.3	96 13	12.3	27 02.1	96 12	12.2	27 30.9	96 12	12.0	33 16.1	96 10	10.0	33 44.8	96 10	09.9	38 30.7	95 08	08.0	6
7	24 29.8	97 13	12.4	24 58.8	97 12	12.3	26 25.7	96 12	11.8	26 54.6	96 12	11.7	27 23.6	96 12	11.5	33 09.9	96 10	09.6	33 38.7	96 10	09.5	38 25.7	95 08	07.7	7
8	24 22.3	97 12	11.9	24 51.3	97 12	11.7	26 18.5	97 12	11.3	26 47.5	97 11	11.2	27 16.5	97 11	11.0	33 04.0	96 09	09.2	33 32.9	96 09	09.1	38 21.0	96 08	07.3	8
9	24 15.0	97 12	11.3	24 44.1	97 11	11.2	26 11.5	97 11	10.8	26 40.7	97 11	10.7	27 09.8	97 11	10.5	32 58.4	97 09	08.8	33 27.4	97 09	08.7	38 16.5	96 07	07.0	9
160	24 08.1	97 11	10.8	24 37.3	97 11	10.7	26 04.9	97 10	10.3	26 34.1	97 10	10.2	27 03.3	97 10	10.0	32 53.0	97 09	08.4	33 22.1	97 08	08.2	38 12.2	97 07	06.7	160
1	24 01.5	98 10	10.3	24 30.8	98 10	10.1	25 58.6	98 10	09.8	26 27.9	98 10	09.7	26 57.2	98 10	09.5	32 47.8	97 08	08.0	33 17.0	97 08	07.8	38 08.1	97 06	06.4	1
2	23 55.2	98 10	09.7	24 24.6	98 10	09.6	25 52.6	98 09	09.3	26 22.0	98 09	09.2	26 51.3	98 09	09.0	32 43.0	98 08	07.6	33 12.2	97 08	07.4	38 04.2	97 06	06.0	2
3	23 49.3	98 09	09.2	24 18.7	98 09	09.1	25 47.0	98 09	08.8	26 16.4	98 09	08.7	26 45.8	98 09	08.5	32 38.3	98 07	07.1	33 07.7	98 07	07.0	38 00.6	97 06	05.7	3
4	23 43.7	98 09	08.7	24 13.2	98 09	08.6	25 41.6	98 08	08.3	26 11.1	98 08	08.2	26 40.6	98 08	08.1	32 34.0	98 07	06.7	33 03.4	98 07	06.6	37 57.1	98 06	05.4	4
165	23 38.4	99 08	08.1	24 07.9	99 08	08.0	25 36.6	98 08	07.7	26 06.2	98 08	07.6	26 35.7	98 08	07.6	32 29.9	98 06	06.3	32 59.4	98 06	06.2	37 53.8	98 05	05.0	165
6	23 33.5	99 08	07.6	24 03.1	99 08	07.5	25 31.9	99 07	07.2	26 01.5	99 07	07.1	26 31.1	99 07	07.1	32 26.0	99 06	05.9	32 55.6	98 06	05.8	37 50.7	98 05	04.7	6
7	23 28.9	99 07	07.0	23 58.5	99 07	07.0	25 27.5	99 07	06.7	25 57.2	99 07	06.6	26 26.8	99 07	06.5	32 22.5	99 06	05.5	32 52.1	99 05	05.4	37 47.9	99 04	04.4	7
8	23 24.6	99 07	06.5	23 54.3	99 06	06.4	25 23.5	99 06	06.2	25 53.2	99 06	06.1	26 22.9	99 06	06.0	32 19.1	99 05	05.1	32 48.8	99 05	05.0	37 45.3	99 04	04.0	8
9	23 20.7	99 06	06.0	23 50.4	99 06	05.9	25 19.7	99 06	05.7	25 49.5	99 06	05.6	26 19.2	99 06	05.5	32 16.1	99 05	04.6	32 45.8	99 05	04.6	37 42.8	99 04	03.7	9
170	23 17.1	99 05	05.4	23 46.9	99 05	05.4	25 16.3	99 05	05.2	25 46.1	99 05	05.1	26 15.9	99 05	05.0	32 13.3	99 04	04.2	32 43.1	99 04	04.1	37 40.6	99 03	03.4	170
1	23 13.8	99 05	04.9	23 43.7	99 05	04.8	25 13.2	99 05	04.7	25 43.0	99 05	04.6	26 12.9	99 04	04.5	32 10.8	99 04	03.8	32 40.6	99 04	03.7	37 38.6	99 03	03.0	1
2	23 10.9	1.0 04	04.3	23 40.8	1.0 04	04.3	25 10.4	1.0 04	04.1	25 40.3	1.0 04	04.1	26 10.2	1.0 04	04.0	32 08.5	1.0 03	03.4	32 38.4	1.0 03	03.3	37 36.8	99 03	02.7	2
3	23 08.4	1.0 04	03.8	23 38.3	1.0 04	03.8	25 08.0	1.0 04	03.6	25 37.9	1.0 04	03.6	26 07.8	1.0 03	03.5	32 06.5	1.0 03	03.0	32 36.4	1.0 03	02.9	37 35.2	1.0 02	02.4	3
4	23 06.2	1.0 03	03.3	23 36.1	1.0 03	03.2	25 05.9	1.0 03	03.1	25 35.8	1.0 03	03.1	26 05.7	1.0 03	03.0	32 04.8	1.0 02	02.5	32 34.7	1.0 02	02.5	37 33.8	1.0 02	02.0	4
175	23 04.3	1.0 03	02.7	23 34.2	1.0 03	02.7	25 04.1	1.0 02	02.6	25 34.0	1.0 02	02.6	26 04.0	1.0 02	02.5	32 03.3	1.0 02	02.1	32 33.3	1.0 02	02.1	37 32.7	1.0 02	01.7	175
6	23 02.7	1.0 02	02.2	23 32.7	1.0 02	02.1	25 02.6	1.0 02	02.1	25 32.6	1.0 02	02.0	26 02.5	1.0 02	02.0	32 02.1	1.0 02	01.7	32 32.1	1.0 02	01.7	37 31.7	1.0 01	01.3	6
7	23 01.5	1.0 01	01.6	23 31.5	1.0 01	01.6	25 01.5	1.0 01	01.6	25 31.5	1.0 01	01.5	26 01.4	1.0 01	01.5	32 01.2	1.0 01	01.3	32 31.2	1.0 01	01.2	37 31.0	1.0 01	01.0	7
8	23 00.7	1.0 01	01.1	23 30.7	1.0 01	01.1	25 00.7	1.0 01	01.0	25 30.6	1.0 01	01.0	26 00.6	1.0 01	01.0	32 00.5	1.0 00	00.8	32 30.5	1.0 01	00.8	37 30.4	1.0 01	00.7	8
9	23 00.2	1.0 00	00.5	23 30.2	1.0 00	00.5	25 00.2	1.0 00	00.5	25 30.2	1.0 00	00.5	26 00.2	1.0 00	00.5	32 00.1	1.0 00	00.4	32 30.1	1.0 00	00.4	37 30.1	1.0 00	00.3	9
180	23 00.0	1.0 00	00.0	23 30.0	1.0 00	00.0	25 00.0	1.0 00	00.0	25 30.0	1.0 00	00.0	26 00.0	1.0 00	00.0	32 00.0	1.0 00	00.0	32 30.0	1.0 00	00.0	37 30.0	1.0 00	00.0	180

Lat. 53°

Lat. 54°

Lat. 55°

Lat. 56°

Lat. 57°

Lat. 58°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 53°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	41	180	45	180	49	180	53	180	57	180	61	180	65	180	69	180	73	180	77	180	81	180	00
4	41	175	45	174	49	174	53	174	57	173	61	172	65	172	69	171	73	169	77	167	81	162	4
8	41	169	45	169	49	168	52	167	56	166	60	165	64	164	68	161	72	159	76	154	80	146	8
12	40	164	44	163	48	162	52	161	56	160	60	158	63	156	67	153	71	149	75	143	78	134	12
16	39	159	43	158	47	157	51	155	55	153	59	151	62	148	66	145	70	140	73	134	76	124	16
20	38	154	42	153	46	151	50	149	54	147	57	145	61	142	65	138	68	132	71	126	74	116	20
24	37	149	41	148	45	146	48	144	52	141	56	139	59	135	63	131	66	126	69	119	72	110	24
28	36	145	40	143	43	141	47	139	51	136	54	133	58	129	61	125	64	120	67	113	70	105	28
32	34	140	38	138	42	136	45	134	49	131	52	128	56	124	59	120	62	114	65	108	67	100	32
36	33	136	36	134	40	131	43	129	47	126	50	123	54	119	57	115	60	110	62	104	65	96	36
40	31	132	35	129	38	127	42	124	45	121	48	118	51	114	55	110	57	105	60	99	62	93	40
44	29	127	33	125	36	123	40	120	43	117	46	114	49	110	52	106	55	101	58	96	60	89	44
48	27	124	31	121	34	119	37	116	41	113	44	110	47	106	50	102	53	97	55	92	58	86	48
52	25	120	29	117	32	115	35	112	38	109	42	106	45	102	48	98	50	94	53	89	55	84	52
56	23	116	26	114	30	111	33	108	36	105	39	102	42	99	45	95	48	91	50	86	53	81	56
60	21	112	24	110	27	107	31	105	34	102	37	99	40	95	43	92	45	87	48	83	50	78	60
64	19	109	22	106	25	104	28	101	31	98	34	95	37	92	40	88	43	84	46	80	48	76	64
68	16	105	20	103	23	100	26	98	29	95	32	92	35	89	38	85	41	82	43	77	46	73	68
72	14	102	17	100	20	97	24	94	27	92	30	89	33	86	36	82	38	79	41	75	44	71	72
76	12	99	15	96	18	94	21	91	24	88	27	86	30	83	33	79	36	76	39	72	41	68	76
80	09	96	12	93	16	91	19	88	22	85	25	83	28	80	31	76	34	73	36	70	39	66	80
84	07	92	10	90	13	87	16	85	19	82	22	79	25	77	28	74	31	70	34	67	37	63	84
88	04	89	08	87	11	84	14	82	17	79	20	76	23	74	26	71	29	68	32	64	35	61	88
92	02	86	05	84	08	81	12	79	15	76	18	74	21	71	24	68	27	65	30	62	33	59	92
96	*00*	83	03	80	06	78	09	76	12	73	16	71	19	68	22	65	25	62	28	59	31	56	96
100	*03*	80	00	77	04	75	07	72	10	70	13	68	16	65	20	62	23	60	26	57	29	54	100
104	*05*	76	*02*	74	01	72	05	69	08	67	11	65	14	62	17	60	21	57	24	54	27	51	104
108	*07*	73	*04*	71	*01*	68	02	66	06	64	09	62	12	59	15	57	19	54	22	52	25	49	108
112	*10*	70	*06*	68	*03*	65	00	63	04	61	07	59	10	56	13	54	17	52	20	49	23	46	112
116	*12*	66	*09*	64	*05*	62	*02*	60	01	58	05	55	08	53	12	51	15	49	18	46	21	44	116
120	*14*	63	*11*	61	*07*	59	*04*	57	*01*	54	03	52	06	50	10	48	13	46	16	44	20	41	120
124	*16*	59	*13*	57	*09*	55	*06*	53	*02*	51	01	49	04	47	08	45	11	43	15	41	18	39	124
128	*18*	56	*15*	54	*11*	52	*08*	50	*04*	48	*01*	46	03	44	06	42	10	40	13	38	17	36	128
132	*20*	52	*17*	50	*13*	48	*10*	46	*06*	45	*02*	43	01	41	05	39	08	37	12	36	15	34	132
136	*22*	48	*19*	47	*15*	45	*11*	43	*08*	41	*04*	40	*00*	38	03	36	07	34	10	33	14	31	136
140	*24*	45	*20*	43	*17*	41	*13*	39	*09*	38	*06*	36	*02*	35	02	33	06	31	09	30	13	28	140
144	*25*	41	*22*	39	*18*	37	*14*	36	*11*	34	*07*	33	*03*	31	01	30	04	28	08	27	12	26	144
148	*27*	36	*23*	35	*19*	33	*16*	32	*12*	31	*08*	29	*04*	28	*01*	27	03	25	07	24	11	23	148
152	*28*	32	*25*	31	*21*	29	*17*	28	*13*	27	*09*	26	*05*	25	*02*	23	02	22	06	21	10	20	152
156	*30*	28	*26*	27	*22*	25	*18*	24	*14*	23	*10*	22	*06*	21	*02*	20	01	19	05	18	09	17	156
160	*31*	23	*27*	22	*23*	21	*19*	20	*15*	19	*11*	19	*07*	18	*03*	17	01	16	05	15	09	14	160
164	*31*	19	*27*	18	*24*	17	*20*	16	*16*	16	*12*	15	*08*	14	*04*	14	00	13	04	12	08	12	164
168	*32*	14	*28*	14	*24*	13	*20*	12	*16*	12	*12*	11	*08*	11	*04*	10	*00*	10	04	09	08	09	168
172	*33*	09	*29*	09	*25*	09	*21*	08	*17*	08	*13*	07	*09*	07	*05*	07	*01*	06	03	06	07	06	172
176	*33*	05	*29*	05	*25*	04	*21*	04	*17*	04	*13*	04	*09*	04	*05*	03	*01*	03	03	03	07	03	176
180	*33*	00	*29*	00	*25*	00	*21*	00	*17*	00	*13*	00	*09*	00	*05*	00	*01*	00	03	00	07	00	180
	4°		8°		12°		18°		20°		24°		28°		32°		36°		40°		44°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

Lat. 53°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	85	180	89	180	87	00	83	00	79	00	75	00	71	00	67	00	63	00	59	00	55	00	00
4	84	151	87	111	86	36	83	16	79	09	75	06	71	04	67	02	63	02	59	01	55	00	4
8	83	131	85	98	84	54	82	29	78	17	75	11	71	07	67	05	63	03	59	02	55	00	8
12	81	118	83	93	82	62	80	39	77	25	74	16	70	11	67	07	63	05	59	02	55	01	12
16	79	110	80	89	80	66	79	45	76	31	73	21	70	14	66	10	62	06	59	03	55	01	16
20	76	103	78	87	78	67	77	50	75	35	72	25	69	17	66	12	62	07	59	04	55	01	20
24	74	99	75	84	76	68	75	52	74	39	71	28	68	20	65	14	62	09	58	05	55	01	24
28	72	94	73	82	74	68	73	54	72	42	70	31	67	22	65	15	61	10	58	05	55	02	28
32	69	91	71	80	71	68	71	55	70	44	69	33	67	24	64	17	61	11	58	06	55	02	32
36	67	88	68	78	69	67	69	56	69	45	67	35	66	26	63	18	61	12	58	07	55	02	36
40	64	85	66	76	67	66	67	56	67	46	66	36	64	27	62	20	60	13	57	07	55	02	40
44	62	82	64	74	65	65	65	56	65	46	65	37	63	29	62	21	60	14	57	08	54	02	44
48	60	80	61	72	63	64	63	56	63	47	63	38	62	29	61	22	59	14	57	08	54	03	48
52	57	77	59	71	60	63	61	55	62	47	62	38	61	30	60	22	58	15	56	09	54	03	52
56	55	75	57	69	58	62	59	54	60	46	60	38	60	31	59	23	58	16	56	09	54	03	56
60	53	73	55	67	56	60	57	53	58	46	59	38	58	31	58	23	57	16	56	09	54	03	60
64	50	70	52	65	54	59	55	52	56	45	57	38	57	31	57	24	56	16	55	09	54	03	64
68	48	68	50	63	52	57	54	51	55	45	56	38	56	31	56	24	56	17	55	10	54	03	68
72	46	66	48	61	50	56	52	50	53	44	54	37	55	31	55	24	55	17	54	10	54	03	72
76	44	64	46	59	48	54	50	49	51	43	53	37	54	30	54	24	54	17	54	10	53	03	76
80	42	62	44	57	46	53	48	47	50	42	51	36	52	30	53	23	54	17	54	10	53	03	80
84	39	60	42	55	44	51	46	46	48	41	50	35	51	29	52	23	53	17	53	10	53	03	84
88	37	57	40	53	42	49	45	45	47	40	48	34	50	29	51	23	52	16	53	10	53	03	88
92	35	55	38	51	41	47	43	43	45	38	47	33	49	28	50	22	52	16	52	10	53	03	92
96	33	53	36	49	39	46	41	41	44	37	46	32	48	27	49	22	51	16	52	10	53	03	96
100	32	51	34	47	37	44	40	40	42	36	45	31	47	26	49	21	50	15	52	10	53	03	100
104	30	48	33	45	35	42	38	38	41	34	43	30	46	25	48	20	50	15	51	09	52	03	104
108	28	46	31	43	34	40	37	36	40	33	42	29	45	24	47	20	49	15	51	09	52	03	108
112	26	44	29	41	32	38	35	35	38	31	41	27	44	23	46	19	48	14	50	09	52	03	112
116	25	41	28	39	31	36	34	33	37	30	40	26	43	22	45	18	48	13	50	08	52	03	116
120	23	39	26	37	30	34	33	31	36	28	39	25	42	21	45	17	47	13	50	08	52	03	120
124	22	37	25	34	28	32	32	29	35	26	38	23	41	20	44	16	47	12	49	08	52	03	124
128	20	34	24	32	27	30	30	27	34	25	37	22	40	19	43	15	46	11	49	07	52	03	128
132	19	32	22	30	26	28	29	25	33	23	36	20	39	17	43	14	46	11	49	07	52	02	132
136	18	29	21	27	25	25	28	23	32	21	35	19	39	16	42	13	45	10	49	06	52	02	136
140	17	27	20	25	24	23	27	21	31	19	35	17	38	15	42	12	45	09	48	06	51	02	140
144	16	24	19	23	23	21	27	19	30	17	34	15	38	13	41	11	45	08	48	05	51	02	144
148	15	21	18	20	22	19	26	17	30	15	33	14	37	12	41	10	44	07	48	05	51	02	148
152	14	19	18	18	21	16	25	15	29	14	33	12	37	10	40	09	44	07	48	04	51	01	152
156	13	16	17	15	21	14	25	13	28	12	32	10	36	09	40	07	44	06	47	04	51	01	156
160	12	14	16	13	20	12	24	11	28	10	32	09	36	07	40	06	43	05	47	03	51	01	160
164	12	11	16	10	20	09	24	09	28	08	32	07	36	06	39	05	43	04	47	02	51	01	164
168	12	08	15	08	19	07	23	07	27	06	31	05	35	05	39	04	43	03	47	02	51	01	168
172	11	05	15	05	19	05	23	04	27	04	31	03	35	03	39	02	43	02	47	01	51	00	172
176	11	03	15	03	19	02	23	02	27	02	31	02	35	02	39	01	43	01	47	01	51	00	176
180	11	00	15	00	19	00	23	00	27	00	31	00	35	00	39	00	43	00	47	00	51	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 54°

Lat. 55°

Lat. 56°

Lat. 57°

Lat. 58°

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

Lat. 54°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
°	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	°
	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	
00	36 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	37 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	38 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	39 00.0	1.0 01	180.0	39 30.0	1.0 01	180.0	00
1	35 59.6	1.0 02	178.8	36 29.6	1.0 02	178.8	36 59.6	1.0 02	178.7	37 29.6	1.0 02	178.7	37 59.6	1.0 02	178.7	38 29.6	1.0 02	178.7	38 59.6	1.0 02	178.7	39 29.6	1.0 02	178.7	1
2	35 58.5	1.0 03	177.5	36 28.5	1.0 03	177.5	36 58.5	1.0 03	177.5	37 28.4	1.0 03	177.5	37 58.4	1.0 03	177.5	38 28.4	1.0 03	177.4	38 58.4	1.0 03	177.4	39 28.4	1.0 03	177.4	2
3	35 56.6	1.0 04	176.3	36 26.6	1.0 04	176.3	36 56.5	1.0 04	176.2	37 26.5	1.0 05	176.2	37 56.5	1.0 05	176.2	38 26.5	1.0 05	176.2	38 56.4	1.0 05	176.1	39 26.4	1.0 05	176.1	3
4	35 53.9	1.0 06	175.1	36 23.9	1.0 06	175.0	36 53.8	1.0 06	175.0	37 23.8	1.0 06	175.0	37 53.8	1.0 06	174.9	38 23.7	1.0 06	174.9	38 53.7	1.0 06	174.9	39 23.6	1.0 06	174.8	4
05	35 50.5	1.0 07	173.8	36 20.4	1.0 07	173.8	36 50.4	1.0 07	173.7	37 20.3	1.0 07	173.7	37 50.3	1.0 07	173.7	38 20.2	1.0 07	173.6	38 50.1	1.0 07	173.6	39 20.1	1.0 07	173.5	05
6	35 46.3	1.0 08	172.6	36 16.3	1.0 08	172.6	36 46.2	1.0 08	172.5	37 16.1	1.0 08	172.5	37 46.0	1.0 08	172.4	38 15.9	1.0 08	172.4	38 45.8	1.0 09	172.3	39 15.7	1.0 09	172.3	6
7	35 41.4	1.0 09	171.4	36 11.3	1.0 10	171.3	36 41.2	1.0 10	171.3	37 11.1	1.0 10	171.2	37 40.9	1.0 10	171.1	38 10.8	1.0 10	171.1	38 40.7	1.0 10	171.0	39 10.6	1.0 10	171.0	7
8	35 35.8	99 11	170.1	36 05.6	99 11	170.1	36 35.4	99 11	170.0	37 05.3	99 11	170.0	37 35.1	99 11	169.9	38 05.0	99 11	169.8	38 34.8	99 11	169.8	39 04.6	99 11	169.7	8
9	35 29.3	99 12	168.9	35 59.2	99 12	168.9	36 29.0	99 12	168.8	36 58.8	99 12	168.7	37 28.6	99 12	168.6	37 58.4	99 12	168.6	38 28.2	99 12	168.5	38 57.9	99 12	168.4	9
10	35 22.2	99 13	167.7	35 52.0	99 13	167.6	36 21.7	99 13	167.5	36 51.5	99 13	167.5	37 21.2	99 13	167.4	37 51.0	99 14	167.3	38 20.7	99 14	167.2	38 50.5	99 14	167.1	10
1	35 14.3	99 14	166.5	35 44.0	99 14	166.4	36 13.8	99 14	166.3	36 43.5	99 15	166.2	37 13.2	99 15	166.1	37 42.9	99 15	166.1	38 12.6	99 15	166.0	38 42.2	99 15	165.9	1
2	35 05.7	99 16	165.3	35 35.4	99 16	165.2	36 05.0	99 16	165.1	36 34.7	99 16	165.0	37 04.3	99 16	164.9	37 34.0	99 16	164.8	38 03.6	99 16	164.7	38 33.3	99 16	164.6	2
3	34 56.4	99 17	164.1	35 26.0	99 17	164.0	35 55.6	99 17	163.9	36 25.2	99 17	163.8	36 54.8	99 17	163.7	37 24.4	99 17	163.6	37 54.0	99 17	163.5	38 23.5	99 17	163.4	3
4	34 46.4	98 18	162.9	35 15.9	98 18	162.8	35 45.5	98 18	162.7	36 15.0	98 18	162.5	36 44.5	98 18	162.4	37 14.0	98 18	162.3	37 43.6	98 19	162.2	38 13.1	98 19	162.1	4
15	34 35.6	98 19	161.7	35 05.1	98 19	161.6	35 34.6	98 19	161.4	36 04.1	98 19	161.3	36 33.5	98 20	161.2	37 03.0	98 20	161.1	37 32.4	98 20	161.0	38 01.9	98 20	160.9	15
6	34 24.2	98 20	160.5	34 53.6	98 20	160.4	35 23.0	98 20	160.2	35 52.4	98 21	160.1	36 21.8	98 21	160.0	36 51.2	98 21	159.9	37 20.6	98 21	159.7	37 49.9	98 21	159.6	6
7	34 12.1	98 21	159.3	34 41.4	98 21	159.2	35 10.8	98 22	159.0	35 40.1	98 22	158.9	36 09.4	98 22	158.8	36 38.7	98 22	158.7	37 08.0	98 22	158.5	37 37.3	98 22	158.4	7
8	33 59.3	98 23	158.1	34 28.5	98 23	158.0	34 57.8	98 23	157.9	35 27.0	97 23	157.7	35 56.3	97 23	157.6	36 25.5	97 23	157.4	36 54.7	97 23	157.3	37 23.9	97 23	157.2	8
9	33 45.8	97 24	156.9	34 15.0	97 24	156.8	34 44.2	97 24	156.7	35 13.3	97 24	156.5	35 42.5	97 24	156.4	36 11.6	97 24	156.2	36 40.8	97 24	156.1	37 09.9	97 25	155.9	9
20	33 31.7	97 25	155.8	34 00.8	97 25	155.6	34 29.9	97 25	155.5	34 58.9	97 25	155.3	35 28.0	97 25	155.2	35 57.1	97 25	155.0	36 26.1	97 26	154.9	36 55.2	97 26	154.7	20
1	33 16.9	97 26	154.6	33 45.9	97 26	154.5	34 14.9	97 26	154.3	34 43.9	97 26	154.2	35 12.9	97 26	154.0	35 41.9	97 26	153.8	36 10.8	97 27	153.7	36 39.8	96 27	153.5	1
2	33 01.4	96 27	153.5	33 30.4	96 27	153.3	33 59.3	96 27	153.1	34 28.2	96 27	153.0	34 57.1	96 27	152.8	35 26.0	96 28	152.7	35 54.9	96 28	152.5	36 23.7	96 28	152.3	2
3	32 45.3	96 28	152.3	33 14.2	96 28	152.2	33 43.0	96 28	152.0	34 11.9	96 28	151.8	34 40.7	96 28	151.7	35 09.5	96 29	151.5	35 38.3	96 29	151.3	36 07.0	96 29	151.1	3
4	32 28.7	96 29	151.2	32 57.4	96 29	151.0	33 26.2	96 29	150.8	33 54.9	96 29	150.7	34 23.6	96 29	150.5	34 52.3	96 30	150.3	35 21.0	96 30	150.1	35 49.7	96 30	150.0	4
25	32 11.3	96 30	150.0	32 40.0	96 30	149.9	33 08.7	95 30	149.7	33 37.3	95 30	149.5	34 05.9	95 30	149.3	34 34.5	95 31	149.2	35 03.1	95 31	149.0	35 31.7	95 31	148.8	25
6	31 53.4	95 31	148.9	32 22.0	95 31	148.7	32 50.6	95 31	148.6	33 19.1	95 31	148.4	33 47.6	95 32	148.2	34 16.2	95 32	148.0	34 44.7	95 32	147.8	35 13.1	95 32	147.6	6
7	31 34.9	95 32	147.8	32 03.4	95 32	147.6	32 31.9	95 32	147.4	33 00.3	95 32	147.2	33 28.8	95 32	147.0	33 57.2	95 33	146.9	34 25.6	95 33	146.7	34 53.9	95 33	146.5	7
8	31 15.8	95 33	146.7	31 44.2	95 33	146.5	32 12.6	95 33	146.3	32 41.0	94 33	146.1	33 09.3	94 33	145.9	33 37.6	94 34	145.7	34 05.9	94 34	145.5	34 34.2	94 34	145.3	8
9	30 56.2	94 34	145.6	31 24.5	94 34	145.4	31 52.7	94 34	145.2	32 21.0	94 34	145.0	32 49.2	94 34	144.8	33 17.4	94 35	144.6	33 45.6	94 35	144.4	34 13.8	94 35	144.2	9
30	30 36.0	94 35	144.5	31 04.2	94 35	144.3	31 32.3	94 35	144.1	32 00.5	94 35	143.9	32 28.6	94 35	143.7	32 56.7	94 35	143.5	33 24.8	94 36	143.3	33 52.9	94 36	143.0	30
1	30 15.2	94 35	143.4	30 43.3	94 36	143.2	31 11.4	94 36	143.0	31 39.4	93 36	142.8	32 07.5	93 36	142.6	32 35.5	93 36	142.4	33 03.5	93 37	142.1	33 31.4	93 37	141.9	1
2	29 53.9	93 36	142.3	30 21.9	93 37	142.1	30 49.9	93 37	141.9	31 17.8	93 37	141.7	31 45.8	93 37	141.5	32 13.7	93 37	141.3	32 41.5	93 37	141.0	33 09.4	93 38	140.8	2
3	29 32.1	93 37	141.2	30 00.0	93 37	141.0	30 27.9	93 38	140.8	30 55.7	93 38	140.6	31 23.5	93 38	140.4	31 51.3	93 38	140.2	32 19.1	93 38	139.9	32 46.9	92 38	139.7	3
4	29 09.8	93 38	140.2	29 37.6	93 38	140.0	30 05.3	93 38	139.7	30 33.1	92 39	139.5	31 00.8	92 39	139.3	31 28.5	92 39	139.1	31 56.1	92 39	138.9	32 23.8	92 39	138.6	4
35	28 46.9	92 39	139.1	29 14.6	92 39	138.9	29 42.3	92 39	138.7	30 09.9	92 39	138.5	30 37.5	92 40	138.2	31 05.1	92 40	138.0	31 32.7	92 40	137.8	32 00.2	92 40	137.5	35
6	28 23.6	92 40	138.1	28 51.2	92 40	137.8	29 18.8	92 40	137.6	29 46.3	92 40	137.4	30 13.8	92 40	137.2	30 41.3	92 41	136.9	31 08.7	91 41	136.7	31 36.2	91 41	136.5	6
7	27 59.8	92 40	137.0	28 27.3	92 41	136.8	28 54.8	91 41	136.6	29 22.2	91 41	136.3	29 49.6	91 41	136.1	30 17.0	91 41	135.9	30 44.3	91 41	135.6	31 11.6	91 42	135.4	7
8	27 35.6	91 41	136.0	28 02.9	91 41	135.8	28 30.3	91 42	135.5	28 57.6	91 42	135.3	29 24.9	91 42	135.1	29 52.2	91 42	134.8	30 19.4	91 42	134.6	30 46.7	91 42	134.3	8
9	27 10.8	91 42	135.0	27 38.1	91 42	134.7	28 05.3	91 42	134.5	28 32.6	91 42	134.3	28 59.8	91 43	134.0	29 26.9	91 43	133.8	29 54.1	90 43	133.5	30 21.2	90 43	133.3	9
40	26 45.7	91 43	134.0	27 12.8	91 43	133.7	27 40.0	90 43	133.5	28 07.1	90 43	133.2	28 34.2	90 43	133.0	29 01.3	90 44	132.7	29 28.3	90 44	132.5	29 55.3	90 44	132.2	40
1	26 20.1	90 43	132.9	26 47.1	90 44	132.7	27 14.2	90 44	132.5	27 41.2	90 44	132.2	28 08.2	90 44	132.0	28 35.1	90 44	131.7	29 02.1	90 44	131.5	29 29.0	90 45	131.2	1
2	25 54.0	90 44	131.9	26 21.0	90 44	131.7	26 47.9	90 44	131.4	27 14.9	90 45	131.2	27 41.8	90 45	131.0	28 08.6	90 45	130.7	28 35.5	89 45	130.4	29 02.3	89 45	130.2	2
3	25 27.6	90 45	130.9	25 54.5	90 45	130.7	26 21.3	89 45	130.4	26 48.1	89 46	130.2	27 14.9	89 45	129.9	27 41.7	89 46	129.7	28 08.4	89 46	129.4	28 35.1	89 46	129.2	3
4	25 00.8	89 45	130.0	25 27.5	89 46	129.7	25 54.3	89 46	129.5	26 21.0	89 46	129.2	26 47.7	89 46	128.9	27 14.3	89 46	128.7	27 41.0	89 46	128.4	28 07.6	89 47	128.2	4
45	24 33.5	89 46	129.0	25 00.2	89 46	128.7	25 26.8	89 46	128.5	25 53.5	89 46	128.2	26 20.1	89 47	128.0	26 46.6	89 47	127.7	27 13.2	88 47	127.4	27 39.7	88 47	127.2	45
6	24 05.9	89 47	128.0	24 32.5	89 47	127.7	24 59.0	88 47	127.5	25 25.6	88 47	127.2	25 52.1	88 47	127.0	26 18.5	88 47	126.7	26 45.0	88 48	126.4	27 11.4	88 48	126.2	6
7	23 37.9	88 47	127.0	24 04.4	88 47	126.8	24 30.9	88 48	126.5	24 57.3	88 48	126.3	25 23.7	88 48	126.0	25 50.1	88 48	125.7	26 16.4	88 48	125.5	26 42.7	88 48	125.2	7
8	23 09.6	88 48	126.1	23 36.0	88 48	125.8	24 02.4	88 48	125.6	24 28.7	88 48	125.3	24 55.0	88 48	125.0	25 21.3	88 49	124.8	25 47.5	87 49	124.5	26 13.7	87 49	124.2	8
9	22 40.9	88 48	125.1	23 07.2	88 48	124.9	23 33.5	88 49	124.6	23 59.7	87 49	124.3	24 26.0	87 49	124.1	24 52.1	87 49	123.8	25 18.3	87 49	123.5	25 44.4	87 49	123.3	9
50	22 11.9	87 49	124.2	22 38.1	87 49	123.9	23 04.3	87 49	123.6	23 30.5	87 49	123.4	23 56.6	87 50	123.1	24 22.7	87 50	122.8	24 48.7	87 50	122.6	25 14.8	87 50	122.3	50
1	21 42.6	87 49	123.2	22 08.7	87 50	123.0	22 34.8	87 50	122.7	23 00.8	87 50	122.4	23 26.9	87 50	122.2	23 52.9	87 50	121.9	24 18.8	87 50	121.6	24 44.8	86 50	121.3	1
2	21 12.9	87 50	122.3	21 39.0	87 50	122.0	22 04.9	87 50	121.8	22 30.9	87 50	121.5	22 56.9	86 51	121.2	23 22.8	86 51	120.9	23 48.7	86 51	120.7	24 14.5	86 51	120.4	2
3	20 43.0	86 50	121.4	21 08.9	86 51	121.1	21 34.8	86 51	120.8	22 00.7	86 51	120.6	22 26.6	86 51	120.3	22 52.4	86 51	120.0	23 18.2	86 51	119.7	23 44.0	86 51	119.5	3
4	20 12.7	86 51	120.4	20 38.6	86 51	120.2	21 04.4	86 51	119.9	21 30.2	86 51	119.6	21 56.0	86 51	119.4	22 21.7	86 52	119.1	22 47.4	86 52	118.8	23 13.1	86 52	118.5	4
55	19 42.2	86 51	119.5	20 07.9	86 52	119.3	20 33.7	86 52	119.0	20 59.4	86 52	118.7	21 25.1	86 52	118.4	21 50.7	85 52	118.2	22 16.4	85 52	117.9	22 42.0	85 52	117.6	55
6	19 11.3	86 52	118.6	19 37.0	86 52	118.3	20 02.7	85 52	118.1	20 28.3	85 52	117.8	20 53.9	85 52	117.5	21 19.5	85 52	117.2	21 45.1	85 53	117.0	22 10.6	85 53	116.7	6
7	18 40.3	85 52	117.7	19 05.9	85 52	117.4	19 31.4	85 52	117.2	19 57.0	85 53	116.9	20 22.5	85 53	116.6	20 48.0	85 53	116.3	21 13.5	85 53	116.0	21 39.0	85 53	115.8	7
8	18 08.9	85 53	116.8	18 34.4	85 53	116.5	18 59.9	85 53	116.3	19 25.4	85 53	116.0	19 50.9	85 53	115.7	20 16.3	85 53	115.4	20 41.7	85 53	115.1	21 07.1	85 54	114.9	8
9	17 37.3	85 53	115.9	18 02.8	85 53	115.6	18 28.2	85 53	115.4	18 53.6	85 53	115.1	19 19.0	85 54	114.8	19 44.3	84 54	114.5	20 09.7	84 54	114.2	20 35.0	84 54	114.0	9
60	17 05.5	85 53	115.0	17 30.8	85 54	114.8	17 56.2	84 54	114.5	18 21.5	84 54	114.2	18 46.8	84 54	113.9	19 12.1	84 54	113.6	19 37.4	84 54	113.3	20 02.6	84 54	113.1	60
1	16 33.4	84 54	114.2	16 58.7	84 54	113.9	17 24.0	84 54	113.6	17 49.3	84 54	113.3	18 14.5	84 54	113.0	18 39.7	84 54	112.7	19 04.9	84 54	112.5	19 30.1	84 55	112.2	1
2	16 01.1	84 54	113.3	16 26.4	84 54	113.0	16 51.6	84 54	112.7	17 16.8	84 54	112.4	17 41.9	84 55	112.1	18 07.1	84 55	111.9	18 32.2	84 55	111.6	18 57.3	84 55	111.3	2
3	15 28.6	84 55	112.4	15 53.8	84 55	112.1	16 18.9	84 55	111.8	16 44.1	84 55	111.6	17 09.2	84 55	111.3	17 34.2	84 55	111.0	17 59.3	83 55	110.7	18 24.3	83 55	110.4	3
4	14 55.9	84 55	111.5	15 21.0	84 55	111.2	15 46.1	84 55	111.0	16 11.2	84 55	110.7	16 36.2	83 55	110.4	17 01.2	83 55	110.1	17 26.2	83 55	109.8	17 51.2	83 56	109.5	4
65	14 23.0	84 55	110.7	14 48.0	83 55	110.4	15 13.1	83 55	110.1	15 38.1	83 55	109.8	16 03.1	83 56	109.5	16 28.0	83 56	109.2	16 52.9	83 56	108.9	17 17.9	83 56	108.7	65
6	13 49.9	83 55	109.8	14 14.9	83 56	109.5	14 39.9	83 56	109.2	15 04.8	83 56	108.9	15 29.7	83 56	108.7	15 54.6	83 56	108.4	16 19.5	83 56	108.1	16 44.4	83 56	107.8	6
7	13 16.6	83 56	109.0	13 41.6	83 56	108.7	14 06.5	83 56	108.4	14 31.4	83 56	108.1	14 56.2	83 56	107.8	15 21.1	83 56	107.5	15 45.9	83 56	107.2	16 10.7	83 56	106.9	7
8	12 43.2	83 56	108.1	13 08.1	83 56	107.8	13 32.9	83 56	107.5	13 57.8	83 56	107.2	14 22.6	83 56	106.9	14 47.4	83 56	106.7	15 12.1	83 57	106.4	15 36.9	82 57	106.1	8
9	12 09.6	83 56	107.3	12 34.4	83 56	107.0	12 59.2	83 56	106.7	13 24.0	83 56	106.4	13 48.8	83 57	106.1	14 13.5	82 57	105.8	14 38.2	82 57	105.5	15 02.9	82 57	105.2	9
70	11 35.8	83 56	106.4	12 00.6	83 57	106.1	12 25.4	82 57	105.8	12 50.1	82 57	105.5	13 14.8	82 57	105.2	13 39.5	82 57	105.0	14 04.2	82 57	104.7	14 28.8	82 57	104.4	70
1	11 01.9	82 57	105.6	11 26.7	82 57	105.3	11 51.4	82 57	105.0	12 16.0	82 57	104.7	12 40.7	82 57	104.4	13 05.4	82 57	104.1	13 30.0	82 57	103.8	13 54.6	82 57	103.5	1
2	10 27.9	82 57	104.7	10 52.6	82 57	104.4	11 17.2	82 57	104.1	11 41.9	82 57	103.9	12 06.5	82 57	103.6	12 31.1	82 57	103.3	12 55.7	82 57	103.0	13 20.2	82 57	102.7	2
3	9 53.7	82 57	103.9	10 18.4	82 57	103.6	10 43.0	82 57	103.3	11 07.6	82 57	103.0	11 32.2	82 57	102.7	11 56.7	82 58	102.4	12 21.3	82 58	102.1	12 45.8	82 58	101.8	3
4	9 19.4	82 57	103.1	9 44.0	82 57	102.8	10 08.6	82 58	102.5	10 33.2	82 58	102.2	10 57.7	82 58	101.9	11 22.2	82 58	101.6	11 46.7	82 58	101.3	12 11.2	82 58	101.0	4
75	8 45.0	82 58	102.2	9 09.6	82 58	101.9	9 34.1	82 58	101.6	9 58.6	82 58	101.4	10 23.1	82 58	101.1	10 47.6	82 58	100.8	11 12.1	82 58	100.5	11 36.6	81 58	100.2	75
6	8 10.5	82 58	101.4	8 35.0	82 58	101.1	8 59.5	82 58	100.8	9 24.0	82 58	100.5	9 48.5	82 58	100.2	10 12.9	81 58	99.9	10 37.4	81 58	99.6	11 01.8	81 58	99.4	6
7	7 35.9	82 58	100.6	8 00.4	82 58	100.3	8 24.8	82 58	100.0	8 49.3	81 58	99.7	9 13.7	81 58	99.4	9 38.2	81 58	99.1	10 02.6	81 58	98.8	10 27.0	81 58	98.5	7
8	7 01.2	82 58	99.8	7 25.6	81 58	99.5	7 50.1	81 58	99.2	8 14.5	81 58	98.9	8 38.9	81 58	98.6	9 03.3	81 58	98.3	9 27.7	81 58	98.0	9 52.0	81 58	97.7	8
9	6 26.4	81 58	98.9	6 50.8	81 58	98.6	7 15.2	81 58	98.4	7 39.6	81 58	98.1	8 04.0	81 58	97.8	8 28.4	81 58	97.5	8 52.7	81 58	97.2	9 17.1	81 58	96.9	9
80	5 51.5	81 58	98.1	6 15.9	81 58	97.8	6 40.3	81 58	97.5	7 04.6	81 58	97.2	7 29.0	81 58	96.9	7 53.4	81 58	96.7	8 17.7	81 58	96.4	8 42.0	81 58	96.1	80
1	5 16.5	81 58	97.3	5 40.9	81 58	97.0	6 05.3	81 58	96.7	6 29.6	81 58	96.4	6 54.0	81 58	96.1	7 18.3	81 58	95.8	7 42.6	81 59	95.5	8 06.9	81 59	95.2	1
2				5 05.9	81 58	96.2	5 30.2	81 58	95.9	5 54.6	81 59	95.6	6 18.9	81 59	95.3	6 43.2	81 59	95.0	7 07.5	81 59	94.7	7 31.8	81 59	94.4	2
3										5 19.4	81 59	94.8	5 43.7	81 59	94.5	6 08.0	81 59	94.2	6 32.3	81 59	93.9	6 56.6	81 59	93.6	3
4													5 08.6	81 59	93.7	5 32.8	81 59	93.4	5 57.1	81 59	93.1	6 21.4	81 59	92.8	4
85																			5 21.9	81 59	92.3	5 46.2	81 59	92.0	85
6																						5 10.9	81 59	91.2	6

Digitized by Google

Lat. 54°

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	°
00	36 00.0 1.0 01	180.0	35 30.0 1.0 01	180.0	35 00.0 1.0 01	180.0	34 30.0 1.0 01	180.0	34 00.0 1.0 01	180.0	33 30.0 1.0 01	180.0	33 00.0 1.0 01	180.0	32 30.0 1.0 01	180.0	00
1	35 59.6 1.0 02	178.8	35 29.6 1.0 02	178.8	34 59.6 1.0 02	178.8	34 29.6 1.0 02	178.8	33 59.6 1.0 02	178.8	33 29.6 1.0 02	178.8	32 59.6 1.0 02	178.8	32 29.6 1.0 02	178.8	1
2	35 58.5 1.0 03	177.5	35 28.5 1.0 03	177.5	34 58.5 1.0 03	177.6	34 28.5 1.0 03	177.6	33 58.5 1.0 03	177.6	33 28.5 1.0 03	177.6	32 58.5 1.0 03	177.6	32 28.5 1.0 03	177.6	2
3	35 56.6 1.0 04	176.3	35 26.6 1.0 04	176.3	34 56.6 1.0 04	176.3	34 26.6 1.0 04	176.4	33 56.7 1.0 04	176.4	33 26.7 1.0 04	176.4	32 56.7 1.0 04	176.4	32 26.7 1.0 04	176.5	3
4	35 53.9 1.0 06	175.1	35 24.0 1.0 06	175.1	34 54.0 1.0 06	175.1	34 24.0 1.0 06	175.2	33 54.1 1.0 06	175.2	33 24.1 1.0 06	175.2	32 54.1 1.0 06	175.2	32 24.2 1.0 05	175.3	4
05	35 50.5 1.0 07	173.8	35 20.6 1.0 07	173.9	34 50.6 1.0 07	173.9	34 20.7 1.0 07	173.9	33 50.7 1.0 07	174.0	33 20.8 1.0 07	174.0	32 50.9 1.0 07	174.1	32 20.9 1.0 07	174.1	05
6	35 46.3 1.0 08	172.6	35 16.4 1.0 08	172.6	34 46.5 1.0 08	172.7	34 16.6 1.0 08	172.7	33 46.7 1.0 08	172.8	33 16.8 1.0 08	172.8	32 46.8 1.0 08	172.9	32 16.9 1.0 08	172.9	6
7	35 41.4 1.0 09	171.4	35 11.5 1.0 09	171.4	34 41.7 1.0 09	171.5	34 11.8 1.0 09	171.5	33 41.9 1.0 09	171.6	33 12.0 1.0 09	171.6	32 42.1 1.0 09	171.7	32 12.2 1.0 09	171.7	7
8	35 35.8 99 11	170.1	35 05.9 99 11	170.2	34 36.1 1.0 11	170.3	34 06.2 1.0 10	170.3	33 36.3 1.0 10	170.4	33 06.5 1.0 10	170.4	32 36.6 1.0 10	170.5	32 06.8 1.0 10	170.6	8
9	35 29.3 99 12	168.9	34 59.5 99 12	169.0	34 29.7 99 12	169.1	33 59.9 99 12	169.1	33 30.1 99 12	169.2	33 00.3 99 12	169.3	32 30.5 99 12	169.3	32 00.6 99 11	169.4	9
10	35 22.2 99 13	167.7	34 52.4 99 13	167.8	34 22.7 99 13	167.9	33 52.9 99 13	167.9	33 23.1 99 13	168.0	32 53.3 99 13	168.1	32 23.6 99 13	168.1	31 53.8 99 13	168.2	10
1	35 14.3 99 14	166.5	34 44.6 99 14	166.6	34 14.9 99 14	166.7	33 45.2 99 14	166.7	33 15.4 99 14	166.8	32 45.7 99 14	166.9	32 16.0 99 14	167.0	31 46.2 99 14	167.1	1
2	35 05.7 99 16	165.3	34 36.1 99 15	165.4	34 06.4 99 15	165.5	33 36.7 99 15	165.5	33 07.0 99 15	165.6	32 37.4 99 15	165.7	32 07.7 99 15	165.8	31 38.0 99 15	165.9	2
3	34 56.4 99 17	164.1	34 26.8 99 17	164.2	33 57.2 99 17	164.3	33 27.6 99 16	164.4	32 57.9 99 16	164.5	32 28.3 99 16	164.6	31 58.7 99 16	164.6	31 29.0 99 16	164.7	3
4	34 46.4 98 18	162.9	34 16.8 99 18	163.0	33 47.3 99 18	163.1	33 17.7 99 18	163.2	32 48.1 99 18	163.3	32 18.6 99 17	163.4	31 49.0 99 17	163.5	31 19.4 99 17	163.6	4
15	34 35.6 98 19	161.7	34 06.2 98 19	161.8	33 36.7 98 19	161.9	33 07.2 98 19	162.0	32 37.7 98 19	162.1	32 08.1 98 19	162.2	31 38.6 98 18	162.3	31 09.1 98 18	162.4	15
6	34 24.2 98 20	160.5	33 54.8 98 20	160.6	33 25.4 98 20	160.7	32 55.9 98 20	160.8	32 26.5 98 20	160.9	31 57.0 98 20	161.1	31 27.6 98 20	161.2	30 58.1 98 19	161.3	6
7	34 12.1 98 21	159.3	33 42.7 98 21	159.4	33 13.4 98 21	159.5	32 44.0 98 21	159.7	32 14.6 98 21	159.8	31 45.3 98 21	159.9	31 15.9 98 21	160.0	30 46.5 98 20	160.1	7
8	33 59.3 98 22	158.1	33 30.0 98 22	158.2	33 00.7 98 22	158.4	32 31.4 98 22	158.5	32 02.1 98 22	158.6	31 32.8 98 22	158.8	31 03.5 98 22	158.9	30 34.2 98 22	159.0	8
9	33 45.8 97 24	156.9	33 16.6 97 23	157.1	32 47.4 97 23	157.2	32 18.2 97 23	157.4	31 48.9 97 23	157.5	31 19.7 97 23	157.6	30 50.5 97 23	157.7	30 21.2 98 23	157.9	9
20	33 31.7 97 25	155.8	33 02.5 97 25	155.9	32 33.4 97 24	156.1	32 04.3 97 24	156.2	31 35.1 97 24	156.3	31 06.0 97 24	156.5	30 36.8 97 24	156.6	30 07.6 97 24	156.8	20
1	33 16.9 97 26	154.6	32 47.8 97 26	154.8	32 18.8 97 25	154.9	31 49.7 97 25	155.1	31 20.6 97 25	155.2	30 51.6 97 25	155.3	30 22.5 97 25	155.5	29 53.4 97 25	155.6	1
2	33 01.4 96 27	153.5	32 32.5 97 27	153.6	32 03.5 97 26	153.8	31 34.5 97 26	153.9	31 05.5 97 26	154.1	30 36.5 97 26	154.2	30 07.5 97 26	154.4	29 38.5 97 26	154.5	2
3	32 45.3 96 28	152.3	32 16.5 96 28	152.5	31 47.6 96 28	152.6	31 18.7 96 27	152.8	30 49.8 96 27	153.0	30 20.9 96 27	153.1	29 52.0 96 27	153.3	29 23.0 96 27	153.4	3
4	32 28.7 96 29	151.2	31 59.9 96 29	151.3	31 31.1 96 29	151.5	31 02.3 96 28	151.7	30 33.5 96 28	151.8	30 04.6 96 28	152.0	29 35.8 96 28	152.2	29 07.0 96 28	152.3	4
25	32 11.3 96 30	150.0	31 42.7 96 30	150.2	31 14.0 96 30	150.4	30 45.2 96 29	150.6	30 16.5 96 29	150.7	29 47.8 96 29	150.9	29 19.0 96 29	151.1	28 50.3 96 29	151.2	25
6	31 53.4 95 31	148.9	31 24.8 95 31	149.1	30 56.2 95 31	149.3	30 27.6 95 30	149.4	29 59.0 95 30	149.6	29 30.3 96 30	149.8	29 01.7 96 30	150.0	28 33.0 96 30	150.1	6
7	31 34.9 95 32	147.8	31 06.4 95 32	148.0	30 37.9 95 31	148.2	30 09.4 95 31	148.3	29 40.8 95 31	148.5	29 12.3 95 31	148.7	28 43.7 95 31	148.9	28 15.1 95 31	149.0	7
8	31 15.8 95 33	146.7	30 47.4 95 33	146.9	30 19.0 95 32	147.1	29 50.6 95 32	147.2	29 22.1 95 32	147.4	28 53.7 95 32	147.6	28 25.2 95 32	147.8	27 56.7 95 32	148.0	8
9	30 56.2 94 34	145.6	30 27.9 94 34	145.8	29 59.6 94 33	146.0	29 31.2 94 33	146.2	29 02.9 95 33	146.3	28 34.5 95 33	146.5	28 06.1 95 33	146.7	27 37.7 95 33	146.9	9
30	30 36.0 94 35	144.5	30 07.8 94 34	144.7	29 39.6 94 34	144.9	29 11.3 94 34	145.1	28 43.1 94 34	145.3	28 14.8 94 34	145.5	27 46.5 94 34	145.6	27 18.2 94 33	145.8	30
1	30 15.2 94 35	143.4	29 47.1 94 35	143.6	29 19.0 94 35	143.8	28 50.9 94 35	144.0	28 22.7 94 35	144.2	27 54.5 94 35	144.4	27 26.3 94 34	144.6	26 58.1 94 34	144.8	1
2	29 53.9 93 36	142.3	29 25.9 93 36	142.5	28 57.9 93 36	142.7	28 29.9 94 36	142.9	28 01.8 94 36	143.1	27 33.7 94 36	143.3	27 05.6 94 35	143.5	26 37.5 94 35	143.7	2
3	29 32.1 93 37	141.2	29 04.2 93 37	141.5	28 36.3 93 37	141.7	28 08.3 93 37	141.9	27 40.4 93 37	142.1	27 12.4 93 36	142.3	26 44.4 93 36	142.5	26 16.4 93 36	142.7	3
4	29 09.8 93 38	140.2	28 42.0 93 38	140.4	28 14.2 93 38	140.6	27 46.3 93 38	140.8	27 18.4 93 37	141.0	26 50.6 93 37	141.2	26 22.7 93 37	141.4	25 54.7 93 37	141.6	4
35	28 46.9 92 39	139.1	28 19.2 92 39	139.3	27 51.5 92 39	139.6	27 23.8 93 38	139.8	26 56.0 93 38	140.0	26 28.2 93 38	140.2	26 00.4 93 38	140.4	25 32.6 93 38	140.6	35
6	28 23.6 92 40	138.1	27 56.0 92 40	138.3	27 28.4 92 39	138.5	27 00.8 92 39	138.7	26 33.1 92 39	139.0	26 05.4 92 39	139.2	25 37.7 92 39	139.4	25 10.0 92 38	139.6	6
7	27 59.8 92 40	137.0	27 32.3 92 40	137.3	27 04.8 92 40	137.5	26 37.3 92 40	137.7	26 09.7 92 40	137.9	25 42.1 92 40	138.1	25 14.5 92 39	138.4	24 46.9 92 39	138.6	7
8	27 35.6 91 41	136.0	27 08.2 91 41	136.2	26 40.7 91 41	136.5	26 13.3 92 41	136.7	25 45.8 92 41	136.9	25 18.4 92 40	137.1	24 50.9 92 40	137.3	24 23.3 92 40	137.6	8
9	27 10.8 91 42	135.0	26 43.5 91 42	135.2	26 16.2 91 42	135.4	25 48.9 91 41	135.7	25 21.5 91 41	135.9	24 54.1 91 41	136.1	24 26.7 91 41	136.3	23 59.3 91 41	136.6	9
40	26 45.7 91 43	134.0	26 18.5 91 42	134.2	25 51.2 91 42	134.4	25 24.0 91 42	134.7	24 56.8 91 42	134.9	24 29.5 91 42	135.1	24 02.2 91 42	135.3	23 34.8 91 42	135.6	40
1	26 20.1 90 43	132.9	25 53.0 90 43	133.2	25 25.8 90 43	133.4	24 58.7 90 43	133.7	24 31.5 91 43	133.9	24 04.4 91 43	134.1	23 37.2 91 42	134.4	23 09.9 91 42	134.6	1
2	25 54.0 90 44	131.9	25 27.0 90 44	132.2	25 00.0 90 44	132.4	24 33.0 90 44	132.7	24 05.9 90 43	132.9	23 38.8 90 43	133.1	23 11.7 90 43	133.4	22 44.6 90 43	133.6	2
3	25 27.6 90 45	130.9	25 00.7 90 45	131.2	24 33.8 90 44	131.4	24 06.8 90 44	131.7	23 39.9 90 44	131.9	23 12.9 90 44	132.2	22 45.9 90 44	132.4	22 18.9 90 44	132.6	3
4	25 00.8 89 45	130.0	24 34.0 89 45	130.2	24 07.1 89 45	130.4	23 40.3 90 45	130.7	23 13.4 90 45	130.9	22 46.5 90 45	131.2	22 19.6 90 44	131.4	21 52.7 90 44	131.7	4
45	24 33.5 89 46	129.0	24 06.8 89 46	129.2	23 40.1 89 46	129.5	23 13.4 89 46	129.7	22 46.6 89 45	130.0	22 19.8 89 45	130.2	21 53.0 89 45	130.5	21 26.2 89 45	130.7	45
6	24 05.9 89 47	128.0	23 39.3 89 46	128.3	23 12.7 89 46	128.5	22 46.0 89 46	128.8	22 19.4 89 46	129.0	21 52.7 89 46	129.2	21 26.0 89 46	129.5	20 59.2 89 46	129.7	6
7	23 37.9 88 47	127.0	23 11.4 88 47	127.3	22 44.9 88 47	127.5	22 18.4 89 47	127.8	21 51.8 89 47	128.0	21 25.2 89 46	128.3	20 58.6 89 46	128.5	20 31.9 89 46	128.8	7
8	23 09.6 88 48	126.1	22 43.2 88 48	126.3	22 16.8 88 47	126.6	21 50.3 88 47	126.8	21 23.8 88 47	127.1	20 57.3 88 47	127.3	20 30.8 88 47	127.6	20 04.3 89 47	127.8	8
9	22 40.9 88 48	125.1	22 14.6 88 48	125.4	21 48.3 88 48	125.6	21 21.9 88 48	125.9	20 55.5 88 48	126.1	20 29.1 88 48	126.4	20 02.7 88 47	126.7	19 36.2 88 47	126.9	9
50	22 11.9 87 49	124.2	21 45.7 87 49	124.4	21 19.5 88 49	124.7	20 53.2 88 48	125.0	20 26.9 88 48	125.2	20 00.6 88 48	125.5	19 34.2 88 48	125.7	19 07.9 88 48	126.0	50
1	21 42.6 87 49	123.2	21 16.4 87 49	123.5	20 50.3 87 49	123.8	20 24.1 87 49	124.0	19 57.9 87 49	124.3	19 31.7 87 49	124.5	19 05.4 88 49	124.8	18 39.1 88 48	125.0	1
2	21 12.9 87 50	122.3	20 46.9 87 50	122.6	20 20.8 87 50	122.8	19 54.7 87 50	123.1	19 28.6 87 49	123.4	19 02.5 87 49	123.6	18 36.3 87 49	123.9	18 10.1 87 49	124.1	2
3	20 43.0 86 50	121.4	20 17.0 87 50	121.6	19 51.0 87 50	121.9	19 25.0 87 50	122.2	18 59.0 87 50	122.4	18 32.9 87 50	122.7	18 06.9 87 50	123.0	17 40.8 87 49	123.2	3
4	20 12.7 86 51	120.4	19 46.8 86 51	120.7	19 20.9 86 51	121.0	18 55.0 86 50	121.2	18 29.1 87 50	121.5	18 03.1 87 50	121.8	17 37.1 87 50	122.0	17 11.1 87 50	122.3	4
55	19 42.2 86 51	119.5	19 16.4 86 51	119.8	18 50.6 86 51	120.1	18 24.7 86 51	120.3	17 58.9 86 51	120.6	17 33.0 86 51	120.9	17 07.1 86 51	121.1	16 41.1 86 50	121.4	55
6	19 11.3 86 52	118.6	18 45.6 86 52	118.9	18 19.9 86 52	119.2	17 54.1 86 51	119.4	17 28.4 86 51	119.7	17 02.6 86 51	120.0	16 36.7 86 51	120.2	16 10.9 86 51	120.5	6
7	18 40.3 85 52	117.7	18 14.6 85 52	118.0	17 49.0 86 52	118.3	17 23.3 86 52	118.5	16 57.6 86 52	118.8	16 31.9 86 52	119.1	16 06.1 86 51	119.3	15 40.4 86 51	119.6	7
8	18 08.9 85 53	116.8	17 43.3 85 53	117.1	17 17.8 85 52	117.4	16 52.2 85 52	117.6	16 26.6 85 52	117.9	16 00.9 86 52	118.2	15 35.3 86 52	118.5	15 09.6 86 52	118.7	8
9	17 37.3 85 53	115.9	17 11.8 85 53	116.2	16 46.3 85 53	116.5	16 20.8 85 53	116.8	15 55.3 85 53	117.0	15 29.7 85 52	117.3	15 04.1 85 52	117.6	14 38.5 85 52	117.8	9
60	17 05.5 85 53	115.0	16 40.1 85 53	115.3	16 14.6 85 53	115.6	15 49.2 85 53	115.9	15 23.7 85 53	116.1	14 58.2 85 53	116.4	14 32.7 85 53	116.7	14 07.2 85 53	117.0	60
1	16 33.4 84 54	114.2	16 08.1 84 54	114.4	15 42.7 85 54	114.7	15 17.3 85 53	115.0	14 51.9 85 53	115.3	14 26.5 85 53	115.5	14 01.1 85 53	115.8	13 35.6 85 53	116.1	1
2	16 01.1 84 54	113.3	15 35.9 84 54	113.6	15 10.6 84 54	113.8	14 45.3 84 54	114.1	14 19.9 84 54	114.4	13 54.6 85 54	114.7	13 29.2 85 53	114.9	13 03.9 85 53	115.2	2
3	15 28.6 84 55	112.4	15 03.4 84 54	112.7	14 38.2 84 54	113.0	14 13.0 84 54	113.2	13 47.7 84 54	113.5	13 22.4 84 54	113.8	12 57.1 84 54	114.1	12 31.8 84 54	114.3	3
4	14 55.9 84 55	111.5	14 30.8 84 55	111.8	14 05.6 84 55	112.1	13 40.5 84 54	112.4	13 15.3 84 54	112.7	12 50.1 84 54	112.9	12 24.8 84 54	113.2	11 59.6 84 54	113.5	4
65	14 23.0 84 55	110.7	13 57.9 84 55	111.0	13 32.9 84 55	111.2	13 07.7 84 55	111.5	12 42.6 84 55	111.8	12 17.5 84 55	112.1	11 52.3 84 55	112.4	11 27.2 84 54	112.6	65
6	13 49.9 83 55	109.8	13 24.9 83 55	110.1	12 59.9 83 55	110.4	12 34.8 84 55	110.7	12 09.8 84 55	110.9	11 44.7 84 55	111.2	11 19.6 84 55	111.5	10 54.5 84 55	111.8	6
7	13 16.6 83 56	109.0	12 51.7 83 56	109.2	12 26.7 83 56	109.5	12 01.8 83 55	109.8	11 36.8 83 55	110.1	11 11.7 83 55	110.4	10 46.7 83 55	110.7	10 21.7 84 55	110.9	7
8	12 43.2 83 56	108.1	12 18.3 83 56	108.4	11 53.4 83 56	108.7	11 28.5 83 56	109.0	11 03.5 83 56	109.2	10 38.6 83 56	109.5	10 13.6 83 55	109.8	9 48.6 83 55	110.1	8
9	12 09.6 83 56	107.3	11 44.8 83 56	107.5	11 19.9 83 56	107.8	10 55.0 83 56	108.1	10 30.2 83 56	108.4	10 05.3 83 56	108.7	9 40.3 83 56	109.0	9 15.4 83 56	109.2	9
70	11 35.8 83 56	106.4	11 11.1 83 56	106.7	10 46.3 83 56	107.0	10 21.4 83 56	107.3	9 56.6 83 56	107.6	9 31.8 83 56	107.8	9 06.9 83 56	108.1	8 42.0 83 56	108.4	70
1	11 01.9 82 57	105.6	10 37.2 82 57	105.9	10 12.5 83 57	106.1	9 47.7 83 56	106.4	9 22.9 83 56	106.7	8 58.1 83 56	107.0	8 33.3 83 56	107.3	8 08.5 83 56	107.6	1
2	10 27.9 82 57	104.7	10 03.2 82 57	105.0	9 38.5 82 57	105.3	9 13.8 82 57	105.6	8 49.1 82 57	105.9	8 24.3 83 57	106.2	7 59.6 83 56	106.4	7 34.8 83 56	106.7	2
3	9 53.7 82 57	103.9	9 29.1 82 57	104.2	9 04.4 82 57	104.5	8 39.8 82 57	104.8	8 15.1 82 57	105.0	7 50.4 82 57	105.3	7 25.7 82 57	105.6	7 01.0 82 57	105.9	3
4	9 19.4 82 57	103.1	8 54.8 82 57	103.4	8 30.2 82 57	103.6	8 05.6 82 57	103.9	7 40.9 82 57	104.2	7 16.3 82 57	104.5	6 51.6 82 57	104.8	6 27.0 82 57	105.1	4
75	8 45.0 82 58	102.2	8 20.5 82 57	102.5	7 55.9 82 57	102.8	7 31.3 82 57	103.1	7 06.7 82 57	103.4	6 42.1 82 57	103.7	6 17.5 82 57	104.0	5 52.8 82 57	104.3	75
6	8 10.5 82 58	101.4	7 46.0 82 58	101.7	7 21.4 82 58	102.0	6 56.9 82 58	102.3	6 32.3 82 57	102.6	6 07.8 82 57	102.9	5 43.2 82 57	103.1	5 18.6 82 57	103.4	6
7	7 35.9 82 58	100.6	7 11.4 82 58	100.9	6 46.9 82 58	101.2	6 22.4 82 58	101.5	5 57.9 82 58	101.7	5 33.3 82 58	102.0	5 08.8 82 58	102.3			7
8	7 01.2 82 58	99.8	6 36.7 82 58	100.0	6 12.2 82 58	100.3	5 47.8 82 58	100.6	5 23.3 82 58	100.9							8
9	6 26.4 81 58	98.9	6 01.9 81 58	99.2	5 37.5 81 58	99.5	5 13.1 82 58	99.8									9
80	5 51.5 81 58	98.1	5 27.1 81 58	98.4	5 02.7 81 58	98.7											80
1	5 16.5 81 58	97.3															1

Digitized by Google

Lat. 54°

H.A.	4° 00′ Alt.		Az.	4° 30′ Alt.		Az.	5° 00′ Alt.		Az.	5° 30′ Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	40 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	41 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0
1	39 59.6	1.0 02	178.7	40 29.6	1.0 02	178.7	40 59.6	1.0 02	178.7	41 29.6	1.0 02	178.7
2	39 58.4	1.0 03	177.4	40 28.4	1.0 03	177.4	40 58.4	1.0 03	177.4	41 28.4	1.0 03	177.3
3	39 56.4	1.0 05	176.1	40 26.4	1.0 05	176.1	40 56.3	1.0 05	176.0	41 26.3	1.0 05	176.0
4	39 53.6	1.0 06	174.8	40 23.6	1.0 06	174.8	40 53.5	1.0 06	174.7	41 23.5	1.0 06	174.7
05	39 50.0	1.0 07	173.5	40 19.9	1.0 07	173.5	40 49.9	1.0 07	173.4	41 19.8	1.0 07	173.4
6	39 45.6	1.0 09	172.2	40 15.5	1.0 09	172.2	40 45.4	1.0 09	172.1	41 15.3	1.0 09	172.0
7	39 40.4	1.0 10	170.9	40 10.3	1.0 10	170.9	40 40.2	1.0 10	170.8	41 10.0	1.0 10	170.7
8	39 34.5	99 11	169.6	40 04.3	99 11	169.6	40 34.1	99 11	169.5	41 04.0	99 11	169.4
9	39 27.7	99 13	168.3	39 57.5	99 13	168.3	40 27.3	99 13	168.2	40 57.1	99 13	168.1
10	39 20.2	99 14	167.1	39 50.0	99 14	167.0	40 19.7	99 14	166.9	40 49.4	99 14	166.8
1	39 11.9	99 15	165.8	39 41.6	99 15	165.7	40 11.3	99 15	165.6	40 41.0	99 15	165.5
2	39 02.9	99 16	164.5	39 32.5	99 16	164.4	40 02.1	99 17	164.3	40 31.7	99 17	164.2
3	38 53.1	99 18	163.2	39 22.7	99 18	163.1	39 52.2	99 18	163.0	40 21.8	98 18	162.9
4	38 42.6	98 19	162.0	39 12.1	98 19	161.9	39 41.5	98 19	161.7	40 11.0	98 19	161.6
15	38 31.3	98 20	160.7	39 00.7	98 20	160.6	39 30.1	98 20	160.5	39 59.5	98 20	160.4
6	38 19.3	98 21	159.5	38 48.6	98 21	159.4	39 18.0	98 21	159.2	39 47.3	98 22	159.1
7	38 06.6	98 22	158.2	38 35.8	98 23	158.1	39 05.1	98 23	158.0	39 34.4	97 23	157.8
8	37 53.1	97 24	157.0	38 22.3	97 24	156.9	38 51.5	97 24	156.7	39 20.7	97 24	156.6
9	37 39.0	97 25	155.8	38 08.1	97 25	155.6	38 37.2	97 25	155.5	39 06.3	97 25	155.3
20	37 24.2	97 26	154.6	37 53.2	97 26	154.4	38 22.2	97 26	154.2	38 51.2	97 26	154.1
1	37 08.7	96 27	153.4	37 37.7	96 27	153.2	38 06.6	96 27	153.0	38 35.5	96 27	152.8
2	36 52.6	96 28	152.2	37 21.4	96 28	152.0	37 50.2	96 28	151.8	38 19.0	96 28	151.6
3	36 35.8	96 29	151.0	37 04.5	96 29	150.8	37 33.2	96 29	150.6	38 02.0	96 30	150.4
4	36 18.3	95 30	149.8	36 47.0	95 30	149.6	37 15.6	95 30	149.4	37 44.2	95 31	149.2
25	36 00.3	95 31	148.6	36 28.8	95 31	148.4	36 57.3	95 32	148.2	37 25.8	95 32	148.0
6	35 41.6	95 32	147.4	36 10.0	95 32	147.2	36 38.5	95 32	147.0	37 06.9	95 33	146.8
7	35 22.3	94 33	146.3	35 50.6	94 33	146.1	36 19.0	94 34	145.9	36 47.3	94 34	145.6
8	35 02.4	94 34	145.1	35 30.7	94 34	144.9	35 58.9	94 34	144.7	36 27.1	94 35	144.5
9	34 42.0	94 35	144.0	35 10.1	94 35	143.8	35 38.2	94 35	143.5	36 06.3	94 36	143.3
30	34 20.9	93 36	142.8	34 49.0	93 36	142.6	35 17.0	93 36	142.4	35 44.9	93 36	142.2
1	33 59.4	93 37	141.7	34 27.3	93 37	141.5	34 55.2	93 37	141.3	35 23.0	93 37	141.0
2	33 37.2	93 38	140.6	34 05.0	93 38	140.4	34 32.8	93 38	140.1	35 00.6	92 38	139.9
3	33 14.6	92 39	139.5	33 42.3	92 39	139.3	34 10.0	92 39	139.0	34 37.6	92 39	138.8
4	32 51.4	92 39	138.4	33 19.0	92 40	138.2	33 46.6	92 40	137.9	34 14.1	92 40	137.7
35	32 27.7	92 40	137.3	32 55.2	92 40	137.1	33 22.7	91 41	136.8	33 50.1	91 41	136.6
6	32 03.6	91 41	136.2	32 31.0	91 41	136.0	32 58.3	91 41	135.7	33 25.6	91 42	135.5
7	31 39.0	91 42	135.2	32 06.2	91 42	134.9	32 33.5	91 42	134.7	33 00.7	91 42	134.4
8	31 13.8	91 43	134.1	31 41.0	91 43	133.8	32 08.2	90 43	133.6	32 35.3	90 43	133.3
9	30 48.3	90 43	133.0	31 15.4	90 44	132.8	31 42.4	90 44	132.5	32 09.4	90 44	132.3
40	30 22.3	90 44	132.0	30 49.3	90 44	131.7	31 16.2	90 44	131.5	31 43.1	90 45	131.2
1	29 55.9	90 45	131.0	30 22.7	89 45	130.7	30 49.5	89 45	130.4	31 16.3	89 45	130.2
2	29 29.0	89 45	129.9	29 55.8	89 46	129.7	30 22.5	89 46	129.4	30 49.2	89 46	129.1
3	29 01.8	89 46	128.9	29 28.4	89 46	128.7	29 55.1	89 46	128.4	30 21.6	89 47	128.1
4	28 34.2	89 47	127.9	29 00.7	88 47	127.6	29 27.2	88 47	127.4	29 53.7	88 47	127.1
45	28 06.1	88 47	126.9	28 32.6	88 47	126.6	28 59.0	88 48	126.4	29 25.4	88 48	126.1
6	27 37.8	88 48	125.9	28 04.1	88 48	125.6	28 30.4	88 48	125.4	28 56.7	88 48	125.1
7	27 09.0	88 48	124.9	27 35.3	87 49	124.7	28 01.5	87 49	124.4	28 27.7	87 49	124.1
8	26 39.9	87 49	123.9	27 06.1	87 49	123.7	27 32.2	87 49	123.4	27 58.3	87 50	123.1
9	26 10.5	87 50	123.0	26 36.6	87 50	122.7	27 02.6	87 50	122.4	27 28.6	87 50	122.1
50	25 40.8	87 50	122.0	26 06.7	87 50	121.7	26 32.7	86 50	121.5	26 58.6	86 51	121.2
1	25 10.7	86 51	121.1	25 36.6	86 51	120.8	26 02.4	86 51	120.5	26 28.3	86 51	120.2
2	24 40.3	86 51	120.1	25 06.1	86 51	119.8	25 31.9	86 51	119.5	25 57.6	86 52	119.3
3	24 09.7	86 52	119.2	24 35.4	86 52	118.9	25 01.1	86 52	118.6	25 26.7	85 52	118.3
4	23 38.8	85 52	118.2	24 04.4	85 52	118.0	24 30.0	85 52	117.7	24 55.5	85 52	117.4
55	23 07.6	85 52	117.3	23 33.1	85 53	117.0	23 58.6	85 53	116.7	24 24.1	85 53	116.4
6	22 36.1	85 53	116.4	23 01.6	85 53	116.1	23 27.0	85 53	115.8	23 52.4	85 53	115.5
7	22 04.4	85 53	115.5	22 29.8	85 53	115.2	22 55.1	84 54	114.9	23 20.4	84 54	114.6
8	21 32.4	84 54	114.6	21 57.7	84 54	114.3	22 23.0	84 54	114.0	22 48.3	84 54	113.7
9	21 00.2	84 54	113.7	21 25.5	84 54	113.4	21 50.7	84 54	113.1	22 15.9	84 54	112.8
60	20 27.8	84 54	112.8	20 53.0	84 54	112.5	21 18.1	84 55	112.2	21 43.2	84 55	111.9
1	19 55.2	84 55	111.9	20 20.3	84 55	111.6	20 45.4	84 55	111.3	21 10.4	83 55	111.0
2	19 22.4	84 55	111.0	19 47.4	83 55	110.7	20 12.4	83 55	110.4	20 37.4	83 55	110.1
3	18 49.3	83 55	110.1	19 14.3	83 55	109.8	19 39.3	83 56	109.5	20 04.2	83 56	109.2
4	18 16.1	83 56	109.2	18 41.0	83 56	108.9	19 05.9	83 56	108.6	19 30.8	83 56	108.3
65	17 42.7	83 56	108.4	18 07.6	83 56	108.1	18 32.4	83 56	107.8	18 57.2	83 56	107.5
6	17 09.2	83 56	107.5	17 34.0	83 56	107.2	17 58.8	83 56	106.9	18 23.5	82 56	106.6
7	16 35.5	83 56	106.6	17 00.2	82 57	106.3	17 24.9	82 57	106.0	17 49.6	92 57	105.7
8	16 01.6	82 57	105.8	16 26.3	82 57	105.5	16 51.0	82 57	105.2	17 15.6	82 57	104.9
9	15 27.6	82 57	104.9	15 52.2	82 57	104.6	16 16.9	82 57	104.3	16 41.5	82 57	104.0
70	14 53.5	82 57	104.1	15 18.1	82 57	103.8	15 42.6	82 57	103.5	16 07.2	82 57	103.2
1	14 19.2	82 57	103.2	14 43.7	82 57	102.9	15 08.3	82 57	102.6	15 32.8	82 58	102.3
2	13 44.8	82 58	102.4	14 09.3	82 58	102.1	14 33.8	82 58	101.8	14 58.3	82 58	101.5
3	13 10.3	82 58	101.6	13 34.8	82 58	101.3	13 59.2	82 58	101.0	14 23.7	81 58	100.7
4	12 35.7	82 58	100.7	13 00.1	81 58	100.4	13 24.6	81 58	100.1	13 49.0	81 58	99.8
75	12 01.0	81 58	99.9	12 25.4	81 58	99.6	12 49.8	81 58	99.3	13 14.2	81 58	99.0
6	11 26.2	81 58	99.1	11 50.6	81 58	98.8	12 15.0	81 58	98.5	12 39.3	81 58	98.2
7	10 51.3	81 58	98.2	11 15.7	81 58	97.9	11 40.0	81 58	97.6	12 04.4	81 58	97.3
8	10 16.4	81 58	97.4	10 40.7	81 58	97.1	11 05.1	81 58	96.8	11 29.4	81 58	96.5
9	9 41.4	81 58	96.6	10 05.7	81 58	96.3	10 30.0	81 58	96.0	10 54.3	81 59	95.7
80	9 06.3	81 59	95.8	9 30.6	81 59	95.5	9 54.9	81 59	95.2	10 19.2	81 59	94.9
1	8 31.2	81 59	94.9	8 55.5	81 59	94.6	9 19.8	81 59	94.3	9 44.0	81 59	94.1
2	7 56.1	81 59	94.1	8 20.3	81 59	93.8	8 44.6	81 59	93.5	9 08.8	81 59	93.2
3	7 20.9	81 59	93.3	7 45.1	81 59	93.0	8 09.4	81 59	92.7	8 33.6	81 59	92.4
4	6 45.6	81 59	92.5	7 09.9	81 59	92.2	7 34.1	81 59	91.9	7 58.4	81 59	91.6
85	6 10.4	81 59	91.7	6 34.6	81 59	91.4	6 58.9	81 59	91.1	7 23.1	81 59	90.8
6	5 35.1	81 59	90.9	5 59.4	81 59	90.6	6 23.6	81 59	90.3	6 47.8	81 59	90.0
7				5 24.1	81 59	89.8	5 48.3	81 59	89.5	6 12.6	81 59	89.2
8							5 13.1	81 59	88.7	5 37.3	81 59	88.4
9										5 02.1	81 59	87.6
90												

H.A.	6° 00′ Alt.		Az.	6° 30′ Alt.		Az.	7° 00′ Alt.		Az.	7° 30′ Alt.		Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	42 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	00
1	41 59.6	1.0 02	178.7	42 29.6	1.0 02	178.7	42 59.6	1.0 02	178.6	43 29.6	1.0 02	178.6	1
2	41 58.4	1.0 03	177.3	42 28.3	1.0 03	177.3	42 58.3	1.0 03	177.3	43 28.3	1.0 04	177.3	2
3	41 56.3	1.0 05	176.0	42 26.3	1.0 05	176.0	42 56.2	1.0 05	175.9	43 26.2	1.0 05	175.9	3
4	41 53.4	1.0 06	174.7	42 23.4	1.0 06	174.6	42 53.3	1.0 06	174.6	43 23.3	1.0 06	174.5	4
05	41 49.7	1.0 08	173.3	42 19.7	1.0 08	173.3	42 49.6	1.0 08	173.2	43 19.5	1.0 08	173.2	05
6	41 45.2	1.0 09	172.0	42 15.1	1.0 09	171.9	42 45.0	1.0 09	171.9	43 14.9	1.0 09	171.8	6
7	41 39.9	1.0 10	170.7	42 09.8	1.0 10	170.6	42 39.6	1.0 10	170.5	43 09.5	1.0 10	170.5	7
8	41 33.8	99 12	169.3	42 03.6	99 12	169.3	42 33.4	99 12	169.2	43 03.2	99 12	169.1	8
9	41 26.8	99 13	168.0	41 56.6	99 13	167.9	42 26.4	99 13	167.9	42 56.2	99 13	167.8	9
10	41 19.1	99 14	166.7	41 48.9	99 14	166.6	42 18.6	99 14	166.5	42 48.3	99 14	166.4	10
1	41 10.6	99 15	165.4	41 40.3	99 16	165.3	42 10.0	99 16	165.2	42 39.6	99 16	165.1	1
2	41 01.4	99 17	164.1	41 31.0	99 17	164.0	42 00.6	99 17	163.9	42 30.1	99 17	163.8	2
3	40 51.3	98 18	162.8	41 20.8	98 18	162.7	41 50.4	98 18	162.6	42 19.9	98 18	162.4	3
4	40 40.5	98 19	161.5	41 10.0	98 19	161.4	41 39.4	98 20	161.3	42 08.9	98 20	161.1	4
15	40 28.9	98 20	160.2	40 58.3	98 21	160.1	41 27.7	98 21	160.0	41 57.1	98 21	159.8	15
6	40 16.6	98 22	158.9	40 45.9	98 22	158.8	41 15.2	98 22	158.7	41 44.5	98 22	158.5	6
7	40 03.6	97 23	157.7	40 32.8	97 23	157.5	41 02.0	97 23	157.4	41 31.2	97 23	157.2	7
8	39 49.8	97 24	156.4	40 19.0	97 24	156.3	40 48.1	97 24	156.1	41 17.2	97 25	155.9	8
9	39 35.4	97 25	155.2	40 04.4	97 25	155.0	40 33.5	97 26	154.8	41 02.5	97 26	154.7	9
20	39 20.2	97 26	153.9	39 49.2	97 27	153.7	40 18.1	96 27	153.6	40 47.0	96 27	153.4	20
1	39 04.4	96 28	152.7	39 33.2	96 28	152.5	40 02.1	96 28	152.3	40 30.9	96 28	152.1	1
2	38 47.8	96 29	151.4	39 16.6	96 29	151.3	39 45.3	96 29	151.1	40 14.1	96 29	150.9	2
3	38 30.6	96 30	150.2	38 59.3	96 30	150.0	39 28.0	95 30	149.8	39 56.6	95 30	149.7	3
4	38 12.8	95 31	149.0	38 41.4	95 31	148.8	39 09.9	95 31	148.6	39 38.4	95 31	148.4	4
25	37 54.3	95 32	147.8	38 22.8	95 32	147.6	38 51.2	95 32	147.4	39 19.7	95 32	147.2	25
6	37 35.2	95 33	146.6	38 03.6	94 33	146.4	38 31.9	94 33	146.2	39 00.2	94 33	146.0	6
7	37 15.5	94 34	145.4	37 43.8	94 34	145.2	38 12.0	94 34	145.0	38 40.2	94 34	144.8	7
8	36 55.2	94 35	144.3	37 23.4	94 35	144.0	37 51.5	94 35	143.8	38 19.6	94 35	143.6	8
9	36 34.3	93 36	143.1	37 02.4	93 36	142.9	37 30.4	93 36	142.7	37 58.4	93 36	142.4	9
30	36 12.9	93 37	142.0	36 40.8	93 37	141.7	37 08.7	93 37	141.5	37 36.6	93 37	141.3	30
1	35 50.9	93 38	140.8	36 18.7	93 38	140.6	36 46.5	93 38	140.3	37 14.2	92 38	140.1	1
2	35 28.3	92 38	139.7	35 56.0	92 39	139.4	36 23.7	92 39	139.2	36 51.3	92 39	139.0	2
3	35 05.2	92 39	138.6	35 32.8	92 40	138.3	36 00.4	92 40	138.1	36 27.9	92 40	137.8	3
4	34 41.6	92 40	137.4	35 09.1	92 40	137.2	35 36.6	91 41	136.9	36 04.0	91 41	136.7	4
35	34 17.5	91 41	136.3	34 44.9	91 41	136.1	35 12.2	91 41	135.8	35 39.6	91 42	135.6	35
6	33 52.9	91 42	135.2	34 20.2	91 42	135.0	34 47.4	91 42	134.7	35 14.6	91 42	134.5	6
7	33 27.9	91 43	134.2	33 55.0	90 43	133.9	34 22.1	90 43	133.6	34 49.2	90 43	133.4	7
8	33 02.3	90 43	133.1	33 29.4	90 43	132.8	33 56.4	90 44	132.6	34 23.4	90 44	132.3	8
9	32 36.4	90 44	132.0	33 03.3	90 44	131.8	33 30.2	90 44	131.5	33 57.1	90 45	131.2	9
40	32 09.9	89 45	131.0	32 36.8	89 45	130.7	33 03.6	89 45	130.4	33 30.3	89 45	130.2	40
1	31 43.1	89 45	129.9	32 09.8	89 46	129.6	32 36.5	89 46	129.4	33 03.2	89 46	129.1	1
2	31 15.8	89 46	128.9	31 42.5	89 46	128.6	32 09.0	89 46	128.3	32 35.6	88 47	128.1	2
3	30 48.2	88 47	127.8	31 14.7	88 47	127.6	31 41.2	88 47	127.3	32 07.6	88 47	127.0	3
4	30 20.1	88 47	126.8	30 46.6	88 48	126.6	31 12.9	88 48	126.3	31 39.3	88 48	126.0	4
45	29 51.7	88 48	125.8	30 18.0	88 48	125.5	30 44.3	88 48	125.3	31 10.6	87 48	125.0	45
6	29 23.0	87 49	124.8	29 49.2	87 49	124.5	30 15.3	87 49	124.3	30 41.5	87 49	124.0	6
7	28 53.8	87 49	123.8	29 19.9	87 49	123.5	29 46.0	87 49	123.3	30 12.1	87 50	123.0	7
8	28 24.4	87 50	122.8	28 50.4	87 50	122.6	29 16.4	87 50	122.3	29 42.3	86 50	122.0	8
9	27 54.6	86 50	121.9	28 20.5	86 50	121.6	28 46.4	86 50	121.3	29 12.2	86 51	121.0	9
50	27 24.5	86 51	120.9	27 50.3	86 51	120.6	28 16.1	86 51	120.3	28 41.9	86 51	120.0	50
1	26 54.0	86 51	119.9	27 19.8	86 51	119.6	27 45.5	86 51	119.3	28 11.2	86 52	119.1	1
2	26 23.3	86 52	119.0	26 49.0	85 52	118.7	27 14.6	85 52	118.4	27 40.2	85 52	118.1	2
3	25 52.3	85 52	118.0	26 17.9	85 52	117.7	26 43.4	85 52	117.4	27 09.0	85 53	117.1	3
4	25 21.1	85 53	117.1	25 46.6	85 53	116.8	26 12.0	85 53	116.5	26 37.4	85 53	116.2	4
55	24 49.5	85 53	116.2	25 15.0	85 53	115.9	25 40.3	85 53	115.6	26 05.7	84 53	115.3	55
6	24 17.8	85 53	115.2	24 43.1	84 54	114.9	25 08.4	84 54	114.6	25 33.7	84 54	114.3	6
7	23 45.7	84 54	114.3	24 11.0	84 54	114.0	24 36.2	84 54	113.7	25 01.4	84 54	113.4	7
8	23 13.5	84 54	113.4	23 38.7	84 54	113.1	24 03.8	84 54	112.8	24 28.9	84 54	112.5	8
9	22 41.0	84 54	112.5	23 06.1	84 55	112.2	23 31.2	84 55	111.9	23 56.2	83 55	111.6	9
60	22 08.3	84 55	111.6	22 33.4	83 55	111.3	22 58.4	83 55	111.0	23 23.4	83 55	110.7	60
1	21 35.4	83 55	110.7	22 00.4	83 55	110.4	22 25.4	83 55	110.1	22 50.3	83 55	109.8	1
2	21 02.3	83 55	109.8	21 27.3	83 56	109.5	21 52.1	83 56	109.2	22 17.0	83 56	108.9	2
3	20 29.1	83 56	108.9	20 53.9	83 56	108.6	21 18.7	83 56	108.3	21 43.5	83 56	108.0	3
4	19 55.6	83 56	108.0	20 20.4	83 56	107.7	20 45.2	83 56	107.4	21 09.9	82 56	107.1	4
65	19 22.0	83 56	107.2	19 46.7	82 56	106.9	20 11.5	82 56	106.6	20 36.1	82 57	106.3	65
6	18 48.2	82 57	106.3	19 12.9	82 57	106.0	19 37.6	82 57	105.7	20 02.2	82 57	105.4	6
7	18 14.3	82 57	105.4	18 39.0	82 57	105.1	19 03.6	82 57	104.8	19 28.1	82 57	104.5	7
8	17 40.2	82 57	104.6	18 04.8	82 57	104.3	18 29.4	82 57	104.0	18 53.9	82 57	103.7	8
9	17 06.1	82 57	103.7	17 30.6	82 57	103.4	17 55.1	82 57	103.1	18 19.6	82 57	102.8	9
70	16 31.7	82 57	102.9	16 56.2	82 57	102.6	17 20.7	82 58	102.3	17 45.2	81 58	102.0	70
1	15 57.3	82 58	102.0	16 21.8	82 58	101.7	16 46.2	81 58	101.4	17 10.6	81 58	101.1	1
2	15 22.8	81 58	101.2	15 47.2	81 58	100.9	16 11.6	81 58	100.6	16 36.0	81 58	100.3	2
3	14 48.1	81 58	100.4	15 12.5	81 58	100.1	15 36.9	81 58	99.8	16 01.2	81 58	99.4	3
4	14 13.4	81 58	99.5	14 37.7	81 58	99.2	15 02.1	81 58	98.9	15 26.4	81 58	98.6	4
75	13 38.5	81 58	98.7	14 02.9	81 58	98.4	14 27.2	81 58	98.1	14 51.5	81 58	97.8	75
6	13 03.6	81 58	97.9	13 28.0	81 58	97.6	13 52.2	81 58	97.3	14 16.5	81 58	97.0	6
7	12 28.7	81 58	97.0	12 53.0	81 58	96.7	13 17.2	81 58	96.4	13 41.5	81 58	96.1	7
8	11 53.6	81 58	96.2	12 17.9	81 59	95.9	12 42.2	81 59	95.6	13 06.4	81 59	95.3	8
9	11 18.6	81 59	95.4	11 42.8	81 59	95.1	12 07.0	81 59	94.8	12 31.2	81 59	94.5	9
80	10 43.4	81 59	94.6	11 07.7	81 59	94.3	11 31.9	81 59	94.0	11 56.1	81 59	93.7	80
1	10 08.3	81 59	93.8	10 32.5	81 59	93.5	10 56.7	81 59	93.2	11 20.9	81 59	92.9	1
2	9 33.0	81 59	92.9	9 57.3	81 59	92.6	10 21.4	81 59	92.3	10 45.6	81 59	92.0	2
3	8 57.8	81 59	92.1	9 22.0	81 59	91.8	9 46.2	81 59	91.5	10 10.4	81 59	91.2	3
4	8 22.6	81 59	91.3	8 46.8	81 59	91.0	9 10.9	81 59	90.7	9 35.1	81 59	90.4	4
85	7 47.3	81 59	90.5	8 11.5	81 59	90.2	8 35.7	81 59	89.9	8 59.8	81 59	89.6	85
6	7 12.0	81 59	89.7	7 36.2	81 59	89.4	8 00.4	81 59	89.1	8 24.6	81 59	88.8	6
7	6 36.8	81 59	88.9	7 01.0	81 59	88.6	7 25.2	81 59	88.3	7 49.3	81 59	88.0	7
8	6 01.5	81 59	88.1	6 25.7	81 59	87.8	6 49.9	81 59	87.5	7 14.1	81 59	87.2	8
9	5 26.3	81 59	87.3	5 50.5	81 59	87.0	6 14.7	81 59	86.7	6 38.9	81 59	86.4	9
90				5 15.3	81 59	86.2	5 39.5	81 59	85.9	6 03.7	81 59	85.6	90

Digitized by Google

Lat. 54°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	32 00.0	1.0 01	180.0	31 30.0	1.0 01	180.0	31 00.0	1.0 01	180.0	30 30.0	1.0 01	180.0	30 00.0	1.0 01	180.0	29 30.0	1.0 01	180.0	29 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	00
1	31 59.6	1.0 02	178.8	31 29.6	1.0 02	178.8	30 59.6	1.0 02	178.8	30 29.6	1.0 02	178.8	29 59.6	1.0 02	178.9	29 29.6	1.0 02	178.9	28 59.7	1.0 02	178.9	28 29.7	1.0 02	178.9	1
2	31 58.6	1.0 03	177.6	31 28.6	1.0 03	177.7	30 58.6	1.0 03	177.7	30 28.6	1.0 03	177.7	29 58.6	1.0 03	177.7	29 28.6	1.0 03	177.7	28 58.6	1.0 03	177.7	28 28.6	1.0 03	177.7	2
3	31 56.7	1.0 04	176.5	31 26.8	1.0 04	176.5	30 56.8	1.0 04	176.5	30 26.8	1.0 04	176.5	29 56.8	1.0 04	176.6	29 26.8	1.0 04	176.6	28 56.9	1.0 04	176.6	28 26.9	1.0 04	176.6	3
4	31 54.2	1.0 05	175.3	31 24.2	1.0 05	175.3	30 54.3	1.0 05	175.4	30 24.3	1.0 05	175.4	29 54.3	1.0 05	175.4	29 24.4	1.0 05	175.4	28 54.4	1.0 05	175.5	28 24.4	1.0 05	175.5	4
05	31 51.0	1.0 07	174.1	31 21.0	1.0 07	174.2	30 51.1	1.0 07	174.2	30 21.1	1.0 06	174.2	29 51.2	1.0 06	174.3	29 21.2	1.0 06	174.3	28 51.3	1.0 06	174.3	28 21.3	1.0 06	174.4	05
6	31 47.0	1.0 08	173.0	31 17.1	1.0 08	173.0	30 47.2	1.0 08	173.0	30 17.2	1.0 08	173.1	29 47.3	1.0 08	173.1	29 17.4	1.0 08	173.2	28 47.5	1.0 08	173.2	28 17.5	1.0 07	173.2	6
7	31 42.3	1.0 09	171.8	31 12.4	1.0 09	171.8	30 42.5	1.0 09	171.9	30 12.6	1.0 09	171.9	29 42.7	1.0 09	172.0	29 12.8	1.0 09	172.0	28 42.9	1.0 09	172.1	28 13.0	1.0 09	172.1	7
8	31 36.9	1.0 10	170.6	31 07.1	1.0 10	170.7	30 37.2	1.0 10	170.7	30 07.3	1.0 10	170.8	29 37.5	1.0 10	170.8	29 07.6	1.0 10	170.9	28 37.7	1.0 10	170.9	28 07.9	1.0 10	171.0	8
9	31 30.8	99 11	169.5	31 01.0	99 11	169.5	30 31.2	99 11	169.6	30 01.3	99 11	169.6	29 31.5	99 11	169.7	29 01.7	99 11	169.8	28 31.8	99 11	169.8	28 02.0	99 11	169.9	9
10	31 24.0	99 12	168.3	30 54.2	99 12	168.4	30 24.4	99 12	168.4	29 54.6	99 12	168.5	29 24.9	99 12	168.6	28 55.1	99 12	168.6	28 25.3	99 12	168.7	27 55.5	99 12	168.8	10
1	31 16.5	99 14	167.1	30 46.8	99 14	167.2	30 17.0	99 14	167.3	29 47.3	99 13	167.4	29 17.5	99 13	167.4	28 47.8	99 13	167.5	28 18.0	99 13	167.6	27 48.3	99 13	167.7	1
2	31 08.3	99 15	166.0	30 38.6	99 15	166.1	30 08.9	99 15	166.1	29 39.2	99 15	166.2	29 09.5	99 14	166.3	28 39.8	99 14	166.4	28 10.1	99 14	166.5	27 40.4	99 14	166.5	2
3	30 59.4	99 16	164.8	30 29.8	99 16	164.9	30 00.1	99 16	165.0	29 30.5	99 16	165.1	29 00.8	99 16	165.2	28 31.2	99 16	165.3	28 01.5	99 15	165.3	27 31.8	99 15	165.4	3
4	30 49.8	99 17	163.7	30 20.3	99 17	163.8	29 50.7	99 17	163.9	29 21.1	99 17	164.0	28 51.5	99 17	164.1	28 21.9	99 17	164.1	27 52.2	99 16	164.2	27 22.6	99 16	164.3	4
15	30 39.6	98 18	162.5	30 10.1	98 18	162.6	29 40.5	98 18	162.7	29 11.0	98 18	162.8	28 41.4	98 18	162.9	28 11.9	98 18	163.0	27 42.3	99 18	163.1	27 12.8	99 18	163.2	15
6	30 28.7	98 19	161.4	29 59.2	98 19	161.5	29 29.7	98 19	161.6	29 00.3	98 19	161.7	28 30.8	98 19	161.8	28 01.3	98 19	161.9	27 31.8	98 19	162.0	27 02.3	98 19	162.1	6
7	30 17.1	98 20	160.3	29 47.7	98 20	160.4	29 18.3	98 20	160.5	28 48.9	98 20	160.6	28 19.4	98 20	160.7	27 50.0	98 20	160.8	27 20.6	98 20	160.9	26 51.1	98 20	161.0	7
8	30 04.8	98 21	159.1	29 35.5	98 21	159.3	29 06.2	98 21	159.4	28 36.8	98 21	159.5	28 07.5	98 21	159.6	27 38.1	98 21	159.7	27 08.7	98 21	159.8	26 39.4	98 21	160.0	8
9	29 52.0	98 23	158.0	29 22.7	98 22	158.1	28 53.4	98 22	158.3	28 24.2	98 22	158.4	27 54.9	98 22	158.5	27 25.6	98 22	158.6	26 56.3	98 22	158.7	26 27.0	98 22	158.9	9
20	29 38.4	97 24	156.9	29 09.2	97 23	157.0	28 40.0	97 23	157.2	28 10.8	97 23	157.3	27 41.6	97 23	157.4	27 12.4	97 23	157.5	26 43.2	97 23	157.7	26 13.9	97 23	157.8	20
1	29 24.3	97 25	155.8	28 55.2	97 24	155.9	28 26.0	97 24	156.0	27 56.9	97 24	156.2	27 27.8	97 24	156.3	26 58.6	97 24	156.5	26 29.5	97 24	156.6	26 00.3	97 24	156.7	1
2	29 09.5	97 26	154.7	28 40.5	97 26	154.8	28 11.4	97 25	155.0	27 42.4	97 25	155.1	27 13.3	97 25	155.2	26 44.2	97 25	155.4	26 15.2	97 25	155.5	25 46.1	97 25	155.6	2
3	28 54.1	96 27	153.6	28 25.1	97 27	153.7	27 56.2	97 26	153.9	27 27.2	97 26	154.0	26 58.2	97 26	154.2	26 29.2	97 26	154.3	26 00.2	97 26	154.4	25 31.2	97 26	154.6	3
4	28 38.1	96 28	152.5	28 09.2	96 28	152.6	27 40.3	96 27	152.8	27 11.5	96 27	152.9	26 42.5	96 27	153.1	26 13.6	96 27	153.2	25 44.7	96 27	153.4	25 15.8	96 27	153.5	4
25	28 21.5	96 29	151.4	27 52.7	96 28	151.5	27 23.9	96 28	151.7	26 55.1	96 28	151.8	26 26.3	96 28	152.0	25 57.5	96 28	152.2	25 28.6	96 28	152.3	24 59.8	96 28	152.5	25
6	28 04.3	96 30	150.3	27 35.6	96 29	150.5	27 06.9	96 29	150.6	26 38.2	96 29	150.8	26 09.4	96 29	150.9	25 40.7	96 29	151.1	25 11.9	96 29	151.3	24 43.2	96 29	151.4	6
7	27 46.5	95 31	149.2	27 17.9	95 30	149.4	26 49.3	95 30	149.6	26 20.7	95 30	149.7	25 52.0	96 30	149.9	25 23.4	96 30	150.0	24 54.7	96 30	150.2	24 26.0	96 30	150.4	7
8	27 28.2	95 31	148.1	26 59.7	95 31	148.3	26 31.2	95 31	148.5	26 02.6	95 31	148.7	25 34.1	95 31	148.8	25 05.5	95 31	149.0	24 36.9	95 31	149.2	24 08.3	95 30	149.3	8
9	27 09.3	95 32	147.1	26 40.9	95 32	147.3	26 12.4	95 32	147.4	25 44.0	95 32	147.6	25 15.5	95 32	147.8	24 47.0	95 32	148.0	24 18.6	95 31	148.1	23 50.1	95 31	148.3	9
30	26 49.9	94 33	146.0	26 21.5	94 33	146.2	25 53.2	95 33	146.4	25 24.8	95 33	146.6	24 56.5	95 33	146.7	24 28.1	95 33	146.9	23 59.7	95 32	147.1	23 31.3	95 32	147.3	30
1	26 29.9	94 34	145.0	26 01.6	94 34	145.2	25 33.4	94 34	145.3	25 05.1	94 34	145.5	24 36.8	94 34	145.7	24 08.6	94 33	145.9	23 40.2	94 33	146.1	23 11.9	94 33	146.3	1
2	26 09.4	94 35	143.9	25 41.2	94 35	144.1	25 13.1	94 35	144.3	24 44.9	94 35	144.5	24 16.7	94 34	144.7	23 48.5	94 34	144.9	23 20.3	94 34	145.1	22 52.1	94 34	145.2	2
3	25 48.4	93 36	142.9	25 20.3	94 36	143.1	24 52.2	94 36	143.3	24 24.2	94 35	143.5	23 56.1	94 35	143.7	23 28.0	94 35	143.8	22 59.8	94 35	144.0	22 31.7	94 35	144.2	3
4	25 26.8	93 37	141.8	24 58.9	93 37	142.0	24 30.9	93 36	142.2	24 02.9	93 36	142.4	23 34.9	93 36	142.6	23 06.9	93 36	142.8	22 38.9	93 36	143.0	22 10.8	93 36	143.2	4
35	25 04.8	93 38	140.8	24 36.9	93 37	141.0	24 09.1	93 37	141.2	23 41.2	93 37	141.4	23 13.3	93 37	141.6	22 45.4	93 37	141.8	22 17.4	93 37	142.0	21 49.5	93 36	142.2	35
6	24 42.3	92 38	139.8	24 14.5	93 38	140.0	23 46.7	93 38	140.2	23 18.9	93 38	140.4	22 51.1	93 38	140.6	22 23.3	93 38	140.8	21 55.5	93 37	141.0	21 27.6	93 37	141.2	6
7	24 19.3	92 39	138.8	23 51.6	92 39	139.0	23 23.9	92 39	139.2	22 56.2	92 39	139.4	22 28.5	92 38	139.6	22 00.8	92 38	139.8	21 33.1	92 38	140.0	21 05.3	93 38	140.2	7
8	23 55.8	92 40	137.8	23 28.2	92 40	138.0	23 00.7	92 40	138.2	22 33.1	92 39	138.4	22 05.5	92 39	138.6	21 37.8	92 39	138.8	21 10.2	92 39	139.1	20 42.5	92 39	139.3	8
9	23 31.9	91 41	136.8	23 04.4	92 40	137.0	22 36.9	92 40	137.2	22 09.4	92 40	137.4	21 41.9	92 40	137.7	21 14.4	92 40	137.9	20 46.9	92 40	138.1	20 19.3	92 39	138.3	9
40	23 07.5	91 41	135.8	22 40.1	91 41	136.0	22 12.8	91 41	136.2	21 45.4	91 41	136.5	21 18.0	91 41	136.7	20 50.5	91 41	136.9	20 23.1	92 40	137.1	19 55.6	92 40	137.3	40
1	22 42.7	91 42	134.8	22 15.4	91 42	135.0	21 48.2	91 42	135.3	21 20.9	91 42	135.5	20 53.5	91 41	135.7	20 26.2	91 41	135.9	19 58.9	91 41	136.1	19 31.5	91 41	136.4	1
2	22 17.5	91 43	133.8	21 50.3	91 43	134.1	21 23.1	91 42	134.3	20 55.9	91 42	134.5	20 28.7	91 42	134.7	20 01.5	91 42	135.0	19 34.2	91 42	135.2	19 06.9	91 42	135.4	2
3	21 51.8	90 43	132.9	21 24.7	90 43	133.1	20 57.7	90 43	133.3	20 30.6	90 43	133.5	20 03.4	90 43	133.8	19 36.3	90 43	134.0	19 09.1	91 42	134.2	18 42.0	91 42	134.5	3
4	21 25.8	90 44	131.9	20 58.8	90 44	132.1	20 31.8	90 44	132.4	20 04.8	90 44	132.6	19 37.8	90 43	132.8	19 10.7	90 43	133.1	18 43.7	90 43	133.3	18 16.6	90 43	133.5	4
45	20 59.3	90 45	130.9	20 32.4	90 45	131.2	20 05.5	90 44	131.4	19 38.6	90 44	131.6	19 11.7	90 44	131.9	18 44.8	90 44	132.1	18 17.8	90 44	132.3	17 50.8	90 44	132.6	45
6	20 32.5	89 45	130.0	20 05.7	89 45	130.2	19 38.9	89 45	130.5	19 12.1	89 45	130.7	18 45.2	89 45	130.9	18 18.4	90 45	131.2	17 51.5	90 44	131.4	17 24.6	90 44	131.6	6
7	20 05.3	89 46	129.0	19 38.6	89 46	129.3	19 11.9	89 46	129.5	18 45.2	89 46	129.8	18 18.4	89 45	130.0	17 51.7	89 45	130.2	17 24.9	89 45	130.5	16 58.1	89 45	130.7	7
8	19 37.7	89 47	128.1	19 11.1	89 46	128.3	18 44.5	89 46	128.6	18 17.9	89 46	128.8	17 51.2	89 46	129.1	17 24.5	89 46	129.3	16 57.9	89 46	129.5	16 31.2	89 45	129.8	8
9	19 09.7	88 47	127.2	18 43.3	88 47	127.4	18 16.7	88 47	127.6	17 50.2	88 47	127.9	17 23.7	89 47	128.1	16 57.1	89 46	128.4	16 30.5	89 46	128.6	16 03.9	89 46	128.9	9
50	18 41.5	88 48	126.2	18 15.1	88 48	126.5	17 48.6	88 47	126.7	17 22.2	88 47	127.0	16 55.7	88 47	127.2	16 29.3	88 47	127.5	16 02.8	88 47	127.7	15 36.3	88 47	127.9	50
1	18 12.9	88 48	125.3	17 46.5	88 48	125.6	17 20.2	88 48	125.8	16 53.9	88 48	126.1	16 27.5	88 48	126.3	16 01.1	88 48	126.5	15 34.7	88 47	126.8	15 08.3	88 47	127.0	1
2	17 43.9	87 49	124.4	17 17.7	87 49	124.6	16 51.4	88 48	124.9	16 25.2	88 48	125.1	15 58.9	88 48	125.4	15 32.6	88 48	125.6	15 06.3	88 48	125.9	14 40.0	88 48	126.1	2
3	17 14.6	87 49	123.5	16 48.5	87 49	123.7	16 22.4	87 49	124.0	15 56.2	87 49	124.2	15 30.0	87 49	124.5	15 03.8	87 49	124.7	14 37.6	87 48	125.0	14 11.3	87 48	125.2	3
4	16 45.1	87 50	122.6	16 19.0	87 50	122.8	15 53.0	87 50	123.1	15 26.9	87 49	123.3	15 00.8	87 49	123.6	14 34.6	87 49	123.8	14 08.5	87 49	124.1	13 42.4	87 49	124.3	4
55	16 15.2	87 50	121.7	15 49.2	87 50	121.9	15 23.3	87 50	122.2	14 57.3	87 50	122.4	14 31.2	87 50	122.7	14 05.2	87 50	123.0	13 39.1	87 49	123.2	13 13.1	87 49	123.5	55
6	15 45.0	86 51	120.8	15 19.2	86 51	121.0	14 53.3	86 50	121.3	14 27.3	86 50	121.5	14 01.4	86 50	121.8	13 35.5	87 50	122.1	13 09.5	87 50	122.3	12 43.5	87 50	122.6	6
7	15 14.6	86 51	119.9	14 48.8	86 51	120.1	14 23.0	86 51	120.4	13 57.1	86 51	120.7	13 31.3	86 51	120.9	13 05.4	86 51	121.2	12 39.5	86 50	121.4	12 13.7	86 50	121.7	7
8	14 43.9	86 52	119.0	14 18.2	86 52	119.3	13 52.4	86 51	119.5	13 26.7	86 51	119.8	13 00.9	86 51	120.0	12 35.1	86 51	120.3	12 09.3	86 51	120.6	11 43.5	86 51	120.8	8
9	14 12.9	85 52	118.1	13 47.3	85 52	118.4	13 21.6	86 52	118.6	12 55.9	86 52	118.9	12 30.2	86 52	119.2	12 04.5	86 51	119.4	11 38.8	86 51	119.7	11 13.1	86 51	120.0	9
60	13 41.7	85 52	117.2	13 16.1	85 52	117.5	12 50.5	85 52	117.8	12 24.9	85 52	118.0	11 59.3	85 52	118.3	11 33.7	85 52	118.6	11 08.1	85 52	118.8	10 42.4	86 52	119.1	60
1	13 10.2	85 53	116.4	12 44.7	85 53	116.6	12 19.2	85 53	116.9	11 53.7	85 52	117.2	11 28.1	85 52	117.4	11 02.6	85 52	117.7	10 37.0	85 52	118.0	10 11.5	85 52	118.2	1
2	12 38.5	85 53	115.5	12 13.0	85 53	115.8	11 47.6	85 53	116.0	11 22.2	85 53	116.3	10 56.7	85 53	116.6	10 31.2	85 53	116.8	10 05.8	85 52	117.1	9 40.3	85 52	117.4	2
3	12 06.5	84 54	114.6	11 41.2	84 54	114.9	11 15.8	85 53	115.2	10 50.4	85 53	115.4	10 25.1	85 53	115.7	9 59.7	85 53	116.0	9 34.2	85 53	116.3	9 08.8	85 53	116.5	3
4	11 34.3	84 54	113.8	11 09.1	84 54	114.0	10 43.8	84 54	114.3	10 18.5	84 54	114.6	9 53.2	84 54	114.9	9 27.8	84 53	115.1	9 02.5	84 53	115.4	8 37.1	85 53	115.7	4
65	11 02.0	84 54	112.9	10 36.8	84 54	113.2	10 11.5	84 54	113.5	9 46.3	84 54	113.7	9 21.1	84 54	114.0	8 55.8	84 54	114.3	8 30.5	84 54	114.6	8 05.3	84 54	114.8	65
6	10 29.4	84 55	112.1	10 04.2	84 55	112.3	9 39.1	84 54	112.6	9 13.9	84 54	112.9	8 48.7	84 54	113.2	8 23.6	84 54	113.4	7 58.3	84 54	113.7	7 33.1	84 54	114.0	6
7	9 56.6	84 55	111.2	9 31.5	84 55	111.5	9 06.4	84 55	111.8	8 41.3	84 55	112.0	8 16.2	84 55	112.3	7 51.1	84 54	112.6	7 26.0	84 54	112.9	7 00.8	84 54	113.1	7
8	9 23.6	83 55	110.4	8 58.6	83 55	110.6	8 33.6	83 55	110.9	8 08.5	83 55	111.2	7 43.5	84 55	111.5	7 18.4	84 55	111.8	6 53.4	84 55	112.0	6 28.3	84 55	112.3	8
9	8 50.5	83 56	109.5	8 25.5	83 55	109.8	8 00.5	83 55	110.1	7 35.6	83 55	110.4	7 10.6	83 55	110.6	6 45.6	83 55	110.9	6 20.6	83 55	111.2	5 55.6	83 55	111.5	9
70	8 17.1	83 56	108.7	7 52.2	83 56	109.0	7 27.3	83 56	109.2	7 02.4	83 56	109.5	6 37.5	83 55	109.8	6 12.6	83 55	110.1	5 47.6	83 55	110.4	5 22.6	83 55	110.6	70
1	7 43.7	83 56	107.8	7 18.8	83 56	108.1	6 54.0	83 56	108.4	6 29.1	83 56	108.7	6 04.2	83 56	109.0	5 39.3	83 56	109.3	5 14.5	83 56	109.5				1
2	7 10.0	83 56	107.0	6 45.2	83 56	107.3	6 20.4	83 56	107.6	5 55.6	83 56	107.9	5 30.8	83 56	108.2	5 06.0	83 56	108.4							2
3	6 36.2	82 57	106.2	6 11.5	82 56	106.5	5 46.7	83 56	106.8	5 22.0	83 56	107.0													3
4	6 02.3	82 57	105.4	5 37.6	82 57	105.6	5 12.9	82 57	105.9																4
75	5 28.2	82 57	104.5	5 03.6	82 57	104.8																			75

Lat. 55°

Lat. 56°

Lat. 57°

Lat. 58°

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91																			5 04.3	81 59	85.1	5 28.6	81 58	84.8	91

Digitized by Google

Lat. 54°

H.A.	8° 00′ Alt.	Δd Δt	Az.	8° 30′ Alt.	Δd Δt	Az.	9° 00′ Alt.	Δd Δt	Az.	9° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	44 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0
1	43 59.6	1.0 02	178.6	44 29.6	1.0 02	178.6	44 59.6	1.0 02	178.6	45 29.6	1.0 02	178.6
2	43 58.3	1.0 04	177.2	44 28.3	1.0 04	177.2	44 58.3	1.0 04	177.2	45 28.3	1.0 04	177.2
3	43 56.2	1.0 05	175.9	44 26.2	1.0 05	175.8	44 56.1	1.0 05	175.8	45 26.1	1.0 05	175.8
4	43 53.2	1.0 06	174.5	44 23.2	1.0 06	174.5	44 53.1	1.0 06	174.4	45 23.1	1.0 06	174.4
05	43 49.4	1.0 08	173.1	44 19.4	1.0 08	173.1	44 49.3	1.0 08	173.0	45 19.2	1.0 08	173.0
6	43 44.8	1.0 09	171.8	44 14.7	1.0 09	171.7	44 44.6	1.0 09	171.6	45 14.5	1.0 09	171.6
7	43 39.3	1.0 10	170.4	44 09.2	1.0 11	170.3	44 39.0	99 11	170.3	45 08.9	99 11	170.2
8	43 33.0	99 12	169.0	44 02.8	99 12	169.0	44 32.6	99 12	168.9	45 02.4	99 12	168.8
9	43 25.9	99 13	167.7	43 55.7	99 13	167.6	44 25.4	99 13	167.5	44 55.2	99 14	167.4
10	43 18.0	99 15	166.3	43 47.7	99 15	166.2	44 17.4	99 15	166.1	44 47.1	99 15	166.0
1	43 09.3	99 16	165.0	43 38.9	99 16	164.9	44 08.5	99 16	164.8	44 38.2	99 16	164.7
2	42 59.7	99 17	163.7	43 29.3	99 17	163.5	43 58.9	99 17	163.4	44 28.4	99 18	163.3
3	42 49.4	98 18	162.3	43 18.9	98 19	162.2	43 48.4	98 19	162.1	44 17.9	98 19	161.9
4	42 38.3	98 20	161.0	43 07.7	98 20	160.9	43 37.2	98 20	160.7	44 06.6	98 20	160.6
15	42 26.4	98 21	159.7	42 55.8	98 21	159.5	43 25.1	98 21	159.4	43 54.5	98 21	159.2
6	42 13.8	98 22	158.4	42 43.1	98 22	158.2	43 12.3	97 23	158.1	43 41.6	97 23	157.9
7	42 00.4	97 24	157.1	42 29.6	97 24	156.9	42 58.8	97 24	156.8	43 27.9	97 24	156.6
8	41 46.3	97 25	155.8	42 15.4	97 25	155.6	42 44.5	97 25	155.4	43 13.6	97 25	155.3
9	41 31.5	97 26	154.5	42 00.5	97 26	154.3	42 29.5	97 26	154.1	42 58.4	97 26	154.0
20	41 16.0	96 27	153.2	41 44.9	96 27	153.0	42 13.7	96 27	152.9	42 42.6	96 28	152.7
1	40 59.7	96 28	152.0	41 28.5	96 28	151.8	41 57.3	96 29	151.6	42 26.1	96 29	151.4
2	40 42.8	96 29	150.7	41 11.5	96 30	150.5	41 40.2	96 30	150.3	42 08.8	95 30	150.1
3	40 25.2	95 30	149.5	40 53.8	95 31	149.3	41 22.4	95 31	149.1	41 50.9	95 31	148.8
4	40 07.0	95 31	148.2	40 35.4	95 32	148.0	41 03.9	95 32	147.8	41 32.3	95 32	147.6
25	39 48.1	95 33	147.0	40 16.4	95 33	146.8	40 44.8	94 33	146.6	41 13.1	94 33	146.3
6	39 28.5	94 34	145.8	39 56.8	94 34	145.6	40 25.0	94 34	145.3	40 53.3	94 34	145.1
7	39 08.4	94 35	144.6	39 36.6	94 35	144.4	40 04.7	94 35	144.1	40 32.8	94 35	143.9
8	38 47.7	94 36	143.4	39 15.7	93 36	143.2	39 43.7	93 36	142.9	40 11.7	93 36	142.7
9	38 26.3	93 36	142.2	38 54.3	93 37	142.0	39 22.2	93 37	141.7	39 50.0	93 37	141.5
30	38 04.4	93 37	141.0	38 32.2	93 38	140.8	39 00.0	93 38	140.5	39 27.8	92 38	140.3
1	37 42.0	92 38	139.9	38 09.7	92 39	139.6	38 37.3	92 39	139.4	39 05.0	92 39	139.1
2	37 19.0	92 39	138.7	37 46.6	92 39	138.5	38 14.1	92 40	138.2	38 41.6	92 40	138.0
3	36 55.4	92 40	137.6	37 22.9	92 40	137.3	37 50.4	91 40	137.1	38 17.8	91 41	136.8
4	36 31.4	91 41	136.4	36 58.7	91 41	136.2	37 26.1	91 41	135.9	37 53.4	91 42	135.7
35	36 06.8	91 42	135.3	36 34.1	91 42	135.1	37 01.3	91 42	134.8	37 28.5	91 42	134.5
6	35 41.8	90 43	134.2	36 08.9	90 43	134.0	36 36.0	90 43	133.7	37 03.1	90 43	133.4
7	35 16.3	90 43	133.1	35 43.3	90 43	132.9	36 10.3	90 44	132.6	36 37.2	90 44	132.3
8	34 50.3	90 44	132.0	35 17.2	90 44	131.8	35 44.1	90 44	131.5	36 10.9	89 45	131.2
9	34 23.9	89 45	131.0	34 50.7	89 45	130.7	35 17.5	89 45	130.4	35 44.2	89 45	130.1
40	33 57.0	89 45	129.9	34 23.7	89 46	129.6	34 50.4	89 46	129.3	35 17.0	89 46	129.0
1	33 29.8	89 46	128.8	33 56.4	89 46	128.5	34 22.9	88 46	128.3	34 49.4	88 47	128.0
2	33 02.1	88 47	127.8	33 28.6	88 47	127.5	33 55.0	88 47	127.2	34 21.4	88 47	126.9
3	32 34.0	88 47	126.7	33 00.4	88 48	126.5	33 26.7	88 48	126.2	33 53.0	88 48	125.9
4	32 05.6	88 48	125.7	32 31.9	87 48	125.4	32 58.1	87 48	125.1	33 24.3	87 49	124.8
45	31 36.8	87 49	124.7	32 02.9	87 49	124.4	32 29.1	87 49	124.1	32 55.1	87 49	123.8
6	31 07.6	87 49	123.7	31 33.7	87 49	123.4	31 59.7	87 50	123.1	32 25.7	87 50	122.8
7	30 38.1	87 50	122.7	31 04.0	86 50	122.4	31 30.0	86 50	122.1	31 55.9	86 50	121.8
8	30 08.2	86 50	121.7	30 34.1	86 50	121.4	30 59.9	86 51	121.1	31 25.7	86 51	120.8
9	29 38.1	86 51	120.7	30 03.8	86 51	120.4	30 29.6	86 51	120.1	30 55.3	86 51	119.8
50	29 07.6	86 51	119.7	29 33.3	86 51	119.4	29 58.9	85 52	119.1	30 24.5	85 52	118.8
1	28 36.8	85 52	118.8	29 02.4	85 52	118.5	29 28.0	85 52	118.2	29 53.5	85 52	117.9
2	28 05.8	85 52	117.8	28 31.3	85 52	117.5	28 56.7	85 52	117.2	29 22.2	85 53	116.9
3	27 34.4	85 53	116.8	27 59.8	85 53	116.5	28 25.2	85 53	116.2	28 50.6	84 53	115.9
4	27 02.8	85 53	115.9	27 28.2	84 53	115.6	27 53.5	84 53	115.3	28 18.7	84 53	115.0
55	26 31.0	84 54	115.0	26 56.2	84 54	114.7	27 21.5	84 54	114.4	27 46.7	84 54	114.1
6	25 58.9	84 54	114.0	26 24.1	84 54	113.7	26 49.2	84 54	113.4	27 14.3	84 54	113.1
7	25 26.6	84 54	113.1	25 51.7	84 54	112.8	26 16.8	84 54	112.5	26 41.8	83 55	112.2
8	24 54.0	84 55	112.2	25 19.1	83 55	111.9	25 44.1	83 55	111.6	26 09.0	83 55	111.3
9	24 21.3	83 55	111.3	24 46.2	83 55	111.0	25 11.2	83 55	110.7	25 36.1	83 55	110.4
60	23 48.3	83 55	110.4	24 13.2	83 55	110.1	24 38.1	83 55	109.8	25 02.9	83 56	109.5
1	23 15.2	83 56	109.5	23 40.0	83 56	109.2	24 04.8	83 56	108.9	24 29.6	83 56	108.6
2	22 41.8	83 56	108.6	23 06.6	83 56	108.3	23 31.4	82 56	108.0	23 56.1	82 56	107.7
3	22 08.3	82 56	107.7	22 33.0	82 56	107.4	22 57.7	82 56	107.1	23 22.4	82 56	106.8
4	21 34.6	82 56	106.8	21 59.3	82 56	106.5	22 23.9	82 57	106.2	22 48.5	82 57	105.9
65	21 00.8	82 57	106.0	21 25.4	82 57	105.7	21 50.0	82 57	105.4	22 14.6	82 57	105.0
6	20 26.8	82 57	105.1	20 51.4	82 57	104.8	21 15.9	82 57	104.5	21 40.4	82 57	104.2
7	19 52.7	82 57	104.2	20 17.2	82 57	103.9	20 41.7	82 57	103.6	21 06.2	81 57	103.3
8	19 18.5	82 57	103.4	19 42.9	82 57	103.1	20 07.4	81 57	102.8	20 31.8	81 57	102.4
9	18 44.1	82 57	102.5	19 08.5	81 58	102.2	19 32.9	81 58	101.9	19 57.3	81 58	101.6
70	18 09.6	81 58	101.7	18 34.0	81 58	101.4	18 58.4	81 58	101.1	19 22.7	81 58	100.7
1	17 35.0	81 58	100.8	17 59.4	81 58	100.5	18 23.7	81 58	100.2	18 48.0	81 58	99.9
2	17 00.3	81 58	100.0	17 24.6	81 58	99.7	17 48.9	81 58	99.4	18 13.2	81 58	99.1
3	16 25.5	81 58	99.1	16 49.8	81 58	98.8	17 14.1	81 58	98.5	17 38.3	81 58	98.2
4	15 50.7	81 58	98.3	16 15.0	81 58	98.0	16 39.2	81 58	97.7	17 03.4	81 58	97.4
75	15 15.8	81 58	97.5	15 40.0	81 58	97.2	16 04.2	81 58	96.9	16 28.4	81 58	96.6
6	14 40.8	81 58	96.6	15 05.0	81 58	96.3	15 29.2	81 58	96.0	15 53.3	81 59	95.7
7	14 05.7	81 59	95.8	14 29.9	81 59	95.5	14 54.1	81 59	95.2	15 18.2	80 59	94.9
8	13 30.6	81 59	95.0	13 54.8	81 59	94.7	14 18.9	80 59	94.4	14 43.1	80 59	94.1
9	12 55.4	81 59	94.2	13 19.6	81 59	93.9	13 43.7	80 59	93.6	14 07.9	80 59	93.3
80	12 20.2	81 59	93.4	12 44.4	80 59	93.1	13 08.5	80 59	92.8	13 32.6	80 59	92.4
1	11 45.0	81 59	92.5	12 09.2	80 59	92.2	12 33.3	80 59	91.9	12 57.4	80 59	91.6
2	11 09.8	80 59	91.7	11 33.9	80 59	91.4	11 58.0	80 59	91.1	12 22.1	80 59	90.8
3	10 34.5	80 59	90.9	10 58.7	80 59	90.6	11 22.8	80 59	90.3	11 46.9	80 59	90.0
4	9 59.3	80 59	90.1	10 23.4	80 59	89.8	10 47.5	80 59	89.5	11 11.6	80 59	89.2
85	9 24.0	80 59	89.3	9 48.1	80 59	89.0	10 12.2	80 59	88.7	10 36.4	80 59	88.4
6	8 48.7	80 59	88.5	9 12.9	80 59	88.2	9 37.0	80 59	87.9	10 01.1	80 59	87.6
7	8 13.5	81 59	87.7	8 37.6	80 59	87.4	9 01.8	80 59	87.1	9 25.9	80 59	86.8
8	7 38.3	81 59	86.9	8 02.4	81 59	86.6	8 26.6	80 59	86.3	8 50.7	80 59	86.0
9	7 03.1	81 59	86.1	7 27.2	81 59	85.8	7 51.4	81 59	85.5	8 15.5	80 59	85.2
90	6 27.9	81 59	85.3	6 52.1	81 58	85.0	7 16.2	81 58	84.7	7 40.4	81 58	84.4

10° 00′ Alt.	Δd Δt	Az.	10° 30′ Alt.	Δd Δt	Az.	11° 00′ Alt.	Δd Δt	Az.	11° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
46 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0	47 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	00
45 59.6	1.0 02	178.6	46 29.6	1.0 02	178.6	46 59.6	1.0 02	178.6	47 29.6	1.0 02	178.5	1
45 58.3	1.0 04	177.2	46 28.2	1.0 04	177.1	46 58.2	1.0 04	177.1	47 28.2	1.0 04	177.1	2
45 56.1	1.0 05	175.8	46 26.0	1.0 05	175.7	46 56.0	1.0 05	175.7	47 26.0	1.0 05	175.7	3
45 53.0	1.0 07	174.3	46 23.0	1.0 07	174.3	46 52.9	1.0 07	174.3	47 22.9	1.0 07	174.2	4
45 49.1	1.0 08	172.9	46 19.0	1.0 08	172.9	46 49.0	1.0 08	172.8	47 18.9	1.0 08	172.8	05
45 44.3	1.0 09	171.5	46 14.2	1.0 09	171.5	46 44.1	1.0 10	171.4	47 14.0	1.0 10	171.3	6
45 38.7	99 11	170.1	46 08.6	99 11	170.0	46 38.4	99 11	170.0	47 08.2	99 11	169.9	7
45 32.2	99 12	168.7	46 02.0	99 12	168.6	46 31.8	99 12	168.5	47 01.6	99 12	168.5	8
45 24.9	99 14	167.3	45 54.7	99 14	167.2	46 24.4	99 14	167.1	46 54.1	99 14	167.0	9
45 16.8	99 15	165.9	45 46.4	99 15	165.8	46 16.1	99 15	165.7	46 45.8	99 15	165.6	10
45 07.8	99 16	164.6	45 37.4	99 16	164.4	46 07.0	99 17	164.3	46 36.6	99 17	164.2	1
44 58.0	98 18	163.2	45 27.5	98 18	163.1	45 57.1	98 18	162.9	46 26.6	98 18	162.8	2
44 47.4	98 19	161.8	45 16.8	98 19	161.7	45 46.3	98 19	161.5	46 15.8	98 19	161.4	3
44 36.0	98 20	160.5	45 05.4	98 20	160.3	45 34.7	98 21	160.2	46 04.1	98 21	160.0	4
44 23.8	98 22	159.1	44 53.1	98 22	159.0	45 22.4	98 22	158.8	45 51.7	98 22	158.6	15
44 10.8	97 23	157.8	44 40.0	97 23	157.6	45 09.2	97 23	157.4	45 38.4	97 23	157.3	6
43 57.1	97 24	156.4	44 26.2	97 24	156.3	44 55.3	97 24	156.1	45 24.4	97 25	155.9	7
43 42.6	97 25	155.1	44 11.6	97 26	154.9	44 40.6	97 26	154.7	45 09.6	97 26	154.6	8
43 27.4	96 27	153.8	43 56.3	96 27	153.6	44 25.2	96 27	153.4	44 54.1	96 27	153.2	9
43 11.5	96 28	152.5	43 40.3	96 28	152.3	44 09.1	96 28	152.1	44 37.9	96 28	151.9	20
42 54.8	96 29	151.2	43 23.5	96 29	151.0	43 52.2	96 29	150.8	44 20.9	96 29	150.6	1
42 37.5	95 30	149.9	43 06.1	95 30	149.7	43 34.7	95 30	149.5	44 03.2	95 31	149.3	2
42 19.4	95 31	148.6	42 48.0	95 31	148.4	43 16.4	95 32	148.2	43 44.9	95 32	148.0	3
42 00.8	95 32	147.4	42 29.2	95 32	147.2	42 57.5	95 33	146.9	43 25.9	94 33	146.7	4
41 41.4	94 33	146.1	42 09.7	94 33	145.9	42 38.0	94 34	145.7	43 06.2	94 34	145.4	25
41 21.5	94 34	144.9	41 49.6	94 34	144.7	42 17.8	94 35	144.4	42 45.9	94 35	144.2	6
41 00.9	94 35	143.7	41 28.9	93 36	143.4	41 56.9	93 36	143.2	42 24.9	93 36	142.9	7
40 39.7	93 36	142.4	41 07.6	93 37	142.2	41 35.5	93 37	142.0	42 03.4	93 37	141.7	8
40 17.9	93 37	141.2	40 45.7	93 37	141.0	41 13.5	93 38	140.7	41 41.2	92 38	140.5	9
39 55.5	92 38	140.1	40 23.2	92 38	139.8	40 50.9	92 39	139.5	41 18.5	92 39	139.3	30
39 32.6	92 39	138.9	40 00.2	92 39	138.6	40 27.7	92 40	138.4	40 55.2	92 40	138.1	1
39 09.1	92 40	137.7	39 36.6	91 40	137.4	40 04.0	91 40	137.2	40 31.4	91 41	136.9	2
38 45.1	91 41	136.5	39 12.5	91 41	136.3	39 39.8	91 41	136.0	40 07.0	91 41	135.7	3
38 20.6	91 42	135.4	38 47.8	91 42	135.1	39 15.0	91 42	134.9	39 42.2	90 42	134.6	4
37 55.6	90 42	134.3	38 22.7	90 43	134.0	38 49.8	90 43	133.7	39 16.8	90 43	133.4	35
37 30.1	90 43	133.1	37 57.1	90 43	132.9	38 24.0	90 44	132.6	38 51.0	90 44	132.3	6
37 04.2	90 44	132.0	37 31.0	90 44	131.8	37 57.9	89 44	131.5	38 24.6	89 45	131.2	7
36 37.7	89 45	130.9	37 04.5	89 45	130.6	37 31.2	89 45	130.4	37 57.9	89 45	130.1	8
36 10.9	89 46	129.8	36 37.5	89 46	129.6	37 04.1	89 46	129.3	37 30.7	88 46	129.0	9
35 43.6	89 46	128.8	36 10.1	88 46	128.5	36 36.6	88 47	128.2	37 03.0	88 47	127.9	40
35 15.9	88 47	127.7	35 42.3	88 47	127.4	36 08.7	88 47	127.1	36 35.0	88 47	126.8	1
34 47.8	88 48	126.6	35 14.1	88 48	126.3	35 40.4	87 48	126.0	36 06.6	87 48	125.7	2
34 19.3	87 48	125.6	34 45.5	87 48	125.3	35 11.6	87 48	125.0	35 37.8	87 49	124.7	3
33 50.4	87 49	124.6	34 16.5	87 49	124.3	34 42.6	87 49	124.0	35 08.6	87 49	123.6	4
33 21.2	87 49	123.5	33 47.2	87 49	123.2	34 13.1	86 50	122.9	34 39.1	86 50	122.6	45
32 51.6	86 50	122.5	33 17.5	86 50	122.2	33 43.4	86 50	121.9	34 09.2	86 50	121.6	6
32 21.7	86 50	121.5	32 47.5	86 51	121.2	33 13.3	86 51	120.9	33 39.0	86 51	120.6	7
31 51.5	86 51	120.5	32 17.2	86 51	120.2	32 42.8	85 51	119.9	33 08.5	85 51	119.6	8
31 20.9	85 51	119.5	31 46.5	85 52	119.2	32 12.1	85 52	118.9	32 37.6	85 52	118.6	9
30 50.1	85 52	118.5	31 15.6	85 52	118.2	31 41.1	85 52	117.9	32 06.5	85 52	117.6	50
30 19.0	85 52	117.6	30 44.4	85 52	117.2	31 09.8	85 53	116.9	31 35.1	84 53	116.6	1
29 47.6	85 53	116.6	30 12.9	84 53	116.3	30 38.2	84 53	116.0	31 03.5	84 53	115.7	2
29 15.9	84 53	115.6	29 41.2	84 53	115.3	30 06.4	84 53	115.0	30 31.6	84 54	114.7	3
28 44.0	84 54	114.7	29 09.2	84 54	114.4	29 34.3	84 54	114.1	29 59.4	84 54	113.7	4
28 11.8	84 54	113.7	28 36.9	84 54	113.4	29 02.0	83 54	113.1	29 27.0	83 54	112.8	55
27 39.4	84 54	112.8	28 04.4	83 54	112.5	28 29.4	83 55	112.2	28 54.4	83 55	111.9	6
27 06.8	83 55	111.9	27 31.8	83 55	111.6	27 56.7	83 55	111.3	28 21.5	83 55	110.9	7
26 34.0	83 55	111.0	26 58.9	83 55	110.7	27 23.7	83 55	110.3	27 48.5	83 55	110.0	8
26 00.9	83 55	110.1	26 25.8	83 55	109.7	26 50.5	83 56	109.4	27 15.3	82 56	109.1	9
25 27.7	83 56	109.2	25 52.5	82 56	108.8	26 17.2	82 56	108.5	26 41.9	82 56	108.2	60
24 54.3	82 56	108.3	25 19.0	82 56	107.9	25 43.7	82 56	107.6	26 08.3	82 56	107.3	1
24 20.7	82 56	107.4	24 45.4	82 56	107.1	25 10.0	82 56	106.7	25 34.5	82 56	106.4	2
23 47.0	82 56	106.5	24 11.6	82 57	106.2	24 36.1	82 57	105.9	25 00.6	82 57	105.5	3
23 13.1	82 57	105.6	23 37.6	82 57	105.3	24 02.1	82 57	105.0	24 26.6	81 57	104.7	4
22 39.1	82 57	104.7	23 03.5	82 57	104.4	23 28.0	81 57	104.1	23 52.4	81 57	103.8	65
22 04.9	81 57	103.9	22 29.3	81 57	103.5	22 53.7	81 57	103.2	23 18.1	81 57	102.9	6
21 30.6	81 57	103.0	21 55.0	81 57	102.7	22 19.3	81 58	102.4	22 43.6	81 58	102.1	7
20 56.2	81 58	102.1	21 20.5	81 58	101.8	21 44.8	81 58	101.5	22 09.1	81 58	101.2	8
20 21.6	81 58	101.3	20 45.9	81 58	101.0	21 10.2	81 58	100.7	21 34.5	81 58	100.3	9
19 47.0	81 58	100.4	20 11.3	81 58	100.1	20 35.5	81 58	99.8	20 59.7	81 58	99.5	70
19 12.3	81 58	99.6	19 36.5	81 58	99.3	20 00.7	81 58	99.0	20 24.9	81 58	98.6	1
18 37.5	81 58	98.7	19 01.7	81 58	98.4	19 25.8	81 58	98.1	19 50.0	80 58	97.8	2
18 02.6	81 58	97.9	18 26.7	81 58	97.6	18 50.9	80 58	97.3	19 15.0	80 58	97.0	3
17 27.6	81 58	97.1	17 51.8	80 58	96.8	18 15.9	80 58	96.5	18 40.0	80 58	96.1	4
16 52.6	80 58	96.2	17 16.7	80 58	95.9	17 40.8	80 59	95.6	18 04.9	80 59	95.3	75
16 17.5	80 59	95.4	16 41.6	80 59	95.1	17 05.7	80 59	94.8	17 29.7	80 59	94.5	6
15 42.4	80 59	94.6	16 06.5	80 59	94.3	16 30.5	80 59	94.0	16 54.6	80 59	93.7	7
15 07.2	80 59	93.8	15 31.3	80 59	93.5	15 55.3	80 59	93.2	16 19.4	80 59	92.8	8
14 32.0	80 59	93.0	14 56.0	80 59	92.7	15 20.1	80 59	92.3	15 44.1	80 59	92.0	9
13 56.7	80 59	92.1	14 20.8	80 59	91.8	14 44.9	80 59	91.5	15 08.9	80 59	91.2	80
13 21.5	80 59	91.3	13 45.6	80 59	91.0	14 09.6	80 59	90.7	14 33.6	80 59	90.4	1
12 46.2	80 59	90.5	13 10.3	80 59	90.2	13 34.3	80 59	89.9	13 58.3	80 59	89.6	2
12 11.0	80 59	89.7	12 35.0	80 59	89.4	12 59.1	80 59	89.1	13 23.1	80 59	88.8	3
11 35.7	80 59	88.9	11 59.8	80 59	88.6	12 23.8	80 59	88.3	12 47.8	80 59	88.0	4
11 00.4	80 59	88.1	11 24.5	80 59	87.8	11 48.6	80 59	87.5	12 12.6	80 59	87.2	85
10 25.2	80 59	87.3	10 49.3	80 59	87.0	11 13.3	80 59	86.7	11 37.4	80 59	86.4	6
9 50.0	80 59	86.5	10 14.1	80 59	86.2	10 38.1	80 59	85.9	11 02.2	80 59	85.6	7
9 14.8	80 59	85.7	9 38.9	80 59	85.4	10 03.0	80 59	85.1	10 27.1	80 58	84.8	8
8 39.7	80 58	84.9	9 03.8	80 58	84.6	9 27.9	80 58	84.3	9 52.0	80 58	84.0	9
8 04.6	80 58	84.1	8 28.7	80 58	83.8	8 52.8	80 58	83.5	9 16.9	80 58	83.2	90

Digitized by Google

Lat. 54°

H.A.	8° 00′ Alt.	Az.	8° 30′ Alt.	Az.	9° 00′ Alt.	Az.	9° 30′ Alt.	Az.	10° 00′ Alt.	Az.	10° 30′ Alt.	Az.	11° 00′ Alt.	Az.	11° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	28 00.0 1.0 01	180.0	27 30.0 1.0 01	180.0	27 00.0 1.0 01	180.0	26 30.0 1.0 01	180.0	26 00.0 1.0 01	180.0	25 30.0 1.0 01	180.0	25 00.0 1.0 01	180.0	24 30.0 1.0 01	180.0	00
1	27 59.7 1.0 02	178.9	27 29.7 1.0 02	178.9	26 59.7 1.0 02	178.9	26 29.7 1.0 02	178.9	25 59.7 1.0 02	178.9	25 29.7 1.0 02	178.9	24 59.7 1.0 02	178.9	24 29.7 1.0 02	178.9	1
2	27 58.6 1.0 03	177.8	27 28.6 1.0 03	177.8	26 58.6 1.0 03	177.8	26 28.6 1.0 03	177.8	25 58.7 1.0 03	177.8	25 28.7 1.0 03	177.8	24 58.7 1.0 03	177.8	24 28.7 1.0 03	177.8	2
3	27 56.9 1.0 04	176.6	27 26.9 1.0 04	176.7	26 56.9 1.0 04	176.7	26 26.9 1.0 04	176.7	25 57.0 1.0 04	176.7	25 27.0 1.0 04	176.7	24 57.0 1.0 04	176.8	24 27.0 1.0 04	176.8	3
4	27 54.5 1.0 05	175.5	27 24.5 1.0 05	175.5	26 54.5 1.0 05	175.6	26 24.6 1.0 05	175.6	25 54.6 1.0 05	175.6	25 24.6 1.0 05	175.6	24 54.7 1.0 05	175.7	24 24.7 1.0 05	175.7	4
05	27 51.4 1.0 06	174.4	27 21.4 1.0 06	174.4	26 51.5 1.0 06	174.5	26 21.5 1.0 06	174.5	25 51.6 1.0 06	174.5	25 21.6 1.0 06	174.6	24 51.7 1.0 06	174.6	24 21.7 1.0 06	174.6	05
6	27 47.6 1.0 07	173.3	27 17.7 1.0 07	173.3	26 47.7 1.0 07	173.4	26 17.8 1.0 07	173.4	25 47.9 1.0 07	173.4	25 18.0 1.0 07	173.5	24 48.0 1.0 07	173.5	24 18.1 1.0 07	173.5	6
7	27 43.1 1.0 09	172.2	27 13.2 1.0 09	172.2	26 43.3 1.0 08	172.3	26 13.4 1.0 08	172.3	25 43.5 1.0 08	172.3	25 13.6 1.0 08	172.4	24 43.7 1.0 08	172.4	24 13.8 1.0 08	172.5	7
8	27 38.0 1.0 10	171.1	27 08.1 1.0 10	171.1	26 38.2 1.0 10	171.2	26 08.4 1.0 10	171.2	25 38.5 1.0 09	171.3	25 08.6 1.0 09	171.3	24 38.7 1.0 09	171.4	24 08.9 1.0 09	171.4	8
9	27 32.2 99 11	169.9	27 02.3 99 11	170.0	26 32.5 99 11	170.1	26 02.6 99 11	170.1	25 32.8 99 11	170.2	25 03.0 99 11	170.2	24 33.1 99 10	170.3	24 03.3 99 10	170.3	9
10	27 25.7 99 12	168.8	26 55.9 99 12	168.9	26 26.1 99 12	169.0	25 56.2 99 12	169.0	25 26.4 99 12	169.1	24 56.6 99 12	169.1	24 26.8 99 12	169.2	23 57.0 99 12	169.3	10
1	27 18.5 99 13	167.7	26 48.7 99 13	167.8	26 19.0 99 13	167.9	25 49.2 99 13	167.9	25 19.4 99 13	168.0	24 49.7 99 13	168.1	24 19.9 99 13	168.1	23 50.1 99 13	168.2	1
2	27 10.7 99 14	166.6	26 40.9 99 14	166.7	26 11.2 99 14	166.8	25 41.5 99 14	166.8	25 11.8 99 14	166.9	24 42.1 99 14	167.0	24 12.3 99 14	167.1	23 42.6 99 14	167.1	2
3	27 02.2 99 15	165.5	26 32.5 99 15	165.6	26 02.8 99 15	165.7	25 33.2 99 15	165.8	25 03.5 99 15	165.8	24 33.8 99 15	165.9	24 04.1 99 15	166.0	23 34.4 99 15	166.1	3
4	26 53.0 99 16	164.4	26 23.4 99 16	164.5	25 53.8 99 16	164.6	25 24.2 99 16	164.7	24 54.5 99 16	164.8	24 24.9 99 16	164.9	23 55.3 99 16	164.9	23 25.6 99 16	165.0	4
15	26 43.2 99 17	163.3	26 13.7 99 17	163.4	25 44.1 99 17	163.5	25 14.5 99 17	163.6	24 45.0 99 17	163.7	24 15.4 99 17	163.8	23 45.8 99 17	163.9	23 16.2 99 17	164.0	15
6	26 32.8 98 18	162.2	26 03.3 98 18	162.3	25 33.8 98 18	162.4	25 04.3 98 18	162.5	24 34.7 98 18	162.6	24 05.2 98 18	162.7	23 35.7 98 18	162.8	23 06.2 98 18	162.9	6
7	26 21.7 98 20	161.1	25 52.3 98 19	161.3	25 22.8 98 19	161.4	24 53.4 98 19	131.5	24 23.9 98 19	161.6	23 54.4 98 19	161.7	23 25.0 98 19	161.8	22 55.5 98 19	161.9	7
8	26 10.0 98 21	160.1	25 40.6 98 20	160.2	25 11.2 98 20	160.3	24 41.8 98 20	160.4	24 12.4 98 20	160.5	23 43.0 98 20	160.6	23 13.6 98 20	160.7	22 44.2 98 20	160.8	8
9	25 57.7 98 22	159.0	25 28.3 98 21	159.1	24 59.0 98 21	159.2	24 29.7 98 21	159.3	24 00.4 98 21	159.5	23 31.0 98 21	159.6	23 01.7 98 21	159.7	22 32.3 98 21	159.8	9
20	25 44.7 97 23	157.9	25 15.5 97 22	158.0	24 46.2 98 22	158.2	24 17.0 98 22	158.3	23 47.7 98 22	158.4	23 18.4 98 22	158.5	22 49.1 98 22	158.6	22 19.9 98 22	158.8	20
1	25 31.1 97 24	156.8	25 02.0 97 24	157.0	24 32.8 97 23	157.1	24 03.6 97 23	157.2	23 34.4 97 23	157.4	23 05.2 97 23	157.5	22 36.0 97 23	157.6	22 06.8 97 23	157.7	1
2	25 17.0 97 25	155.8	24 47.9 97 24	155.9	24 18.8 97 24	156.0	23 49.7 97 24	156.2	23 20.5 97 24	156.3	22 51.4 97 24	156.4	22 22.3 97 24	156.6	21 53.1 97 24	156.7	2
3	25 02.2 97 26	154.7	24 33.2 97 25	154.9	24 04.2 97 25	155.0	23 35.1 97 25	155.1	23 06.1 97 25	155.3	22 37.0 97 25	155.4	22 08.0 97 25	155.5	21 38.9 97 25	155.7	3
4	24 46.9 96 27	153.7	24 17.9 96 26	153.8	23 49.0 97 26	154.0	23 20.0 97 26	154.1	22 51.0 97 26	154.2	22 22.0 97 26	154.4	21 53.1 97 26	154.5	21 24.1 97 26	154.7	4
25	24 30.9 96 28	152.6	24 02.1 96 27	152.8	23 33.2 96 27	152.9	23 04.3 96 27	153.1	22 35.4 96 27	153.2	22 06.5 96 27	153.4	21 37.6 96 27	153.5	21 08.7 96 27	153.6	25
6	24 14.4 96 28	151.6	23 45.6 96 28	151.7	23 16.8 96 28	151.9	22 48.0 96 28	152.0	22 19.2 96 28	152.2	21 50.4 96 28	152.3	21 21.6 96 28	152.5	20 52.8 96 27	152.6	6
7	23 57.3 96 29	150.5	23 28.6 96 29	150.7	22 59.9 96 29	150.8	22 31.2 96 29	151.0	22 02.5 96 29	151.2	21 33.8 96 29	151.3	21 05.0 96 29	151.5	20 36.3 96 28	151.6	7
8	23 39.7 95 30	149.5	23 11.1 95 30	149.7	22 42.5 95 30	149.8	22 13.9 95 30	150.0	21 45.2 95 30	150.1	21 16.6 96 30	150.3	20 47.9 96 29	150.5	20 19.2 96 29	150.6	8
9	23 21.5 95 31	148.5	22 53.0 95 31	148.6	22 24.5 95 31	148.8	21 55.9 95 31	149.0	21 27.4 95 31	149.1	20 58.8 95 30	149.3	20 30.2 95 30	149.5	20 01.7 95 30	149.6	9
30	23 02.8 95 32	147.4	22 34.4 95 32	147.6	22 06.0 95 32	147.8	21 37.5 95 32	148.0	21 09.0 95 31	148.1	20 40.6 95 31	148.3	20 12.1 95 31	148.5	19 43.6 95 31	148.6	30
1	22 43.6 94 33	146.4	22 15.2 94 33	146.6	21 46.9 95 33	146.8	21 18.5 95 32	147.0	20 50.2 95 32	147.1	20 21.8 95 32	147.3	19 53.4 95 32	147.5	19 25.0 95 32	147.6	1
2	22 23.8 94 34	145.4	21 55.6 94 34	145.6	21 27.3 94 33	145.8	20 59.0 94 33	146.0	20 30.8 94 33	146.1	20 02.5 94 33	146.3	19 34.1 94 33	146.5	19 05.8 94 33	146.7	2
3	22 03.6 94 35	144.4	21 35.4 94 34	144.6	21 07.2 94 34	144.8	20 39.0 94 34	145.0	20 10.9 94 34	145.1	19 42.6 94 34	145.3	19 14.4 94 34	145.5	18 46.2 94 34	145.7	3
4	21 42.8 94 35	143.4	21 14.7 94 35	143.6	20 46.6 94 35	143.8	20 18.6 94 35	144.0	19 50.5 94 35	144.2	19 22.3 94 35	144.4	18 54.2 94 35	144.5	18 26.1 94 34	144.7	4
35	21 21.5 93 36	142.4	20 53.6 93 36	142.6	20 25.6 93 36	142.8	19 57.6 93 36	143.0	19 29.6 93 36	143.2	19 01.5 93 35	143.4	18 33.5 93 35	143.6	18 05.5 93 35	143.8	35
6	20 59.8 93 37	141.4	20 31.9 93 37	141.6	20 04.0 93 37	141.8	19 36.1 93 37	142.0	19 08.2 93 36	142.2	18 40.3 93 36	142.4	18 12.3 93 36	142.6	17 44.4 93 36	142.8	6
7	20 37.6 93 38	140.4	20 09.8 93 38	140.6	19 42.0 93 38	140.8	19 14.2 93 37	141.0	18 46.3 93 37	141.2	18 18.5 93 37	141.4	17 50.7 93 37	141.6	17 22.8 93 37	141.8	7
8	20 14.9 92 39	139.5	19 47.2 92 38	139.7	19 19.5 92 38	139.9	18 51.8 92 38	140.1	18 24.0 92 38	140.3	17 56.3 92 38	140.5	17 28.6 93 38	140.7	17 00.8 93 37	140.9	8
9	19 51.7 92 39	138.5	19 24.1 92 39	138.7	18 56.5 92 39	138.9	18 28.9 92 39	139.1	18 01.3 92 39	139.3	17 33.6 92 39	139.5	17 06.0 92 38	139.7	16 38.3 92 38	139.9	9
40	19 28.1 92 40	137.5	19 00.6 92 40	137.7	18 33.1 92 40	138.0	18 05.6 92 40	138.2	17 38.1 92 39	138.4	17 10.5 92 39	138.6	16 43.0 92 39	138.8	16 15.4 92 39	139.0	40
1	19 04.1 91 41	136.6	18 36.7 91 41	136.8	18 09.3 91 40	137.0	17 41.9 91 40	137.2	17 14.4 91 40	137.4	16 47.0 92 40	137.6	16 19.5 92 40	137.9	15 52.0 92 40	138.1	1
2	18 39.6 91 41	135.6	18 12.3 91 41	135.8	17 45.0 91 41	136.1	17 17.7 91 41	136.3	16 50.4 91 41	136.5	16 23.0 91 41	136.7	15 55.6 91 40	136.9	15 28.3 91 40	137.1	2
3	18 14.8 91 42	134.7	17 47.6 91 42	134.9	17 20.4 91 42	135.1	16 53.1 91 42	135.3	16 25.9 91 42	135.6	15 58.6 91 41	135.8	15 31.3 91 41	136.0	15 04.0 91 41	136.2	3
4	17 49.5 90 43	133.7	17 22.4 90 43	134.0	16 55.3 90 42	134.2	16 28.1 90 42	134.4	16 01.0 91 42	134.6	15 33.8 91 42	134.8	15 06.6 91 42	135.1	14 39.4 91 42	135.3	4
45	17 23.8 90 43	132.8	16 56.8 90 43	133.0	16 29.8 90 43	133.2	16 02.7 90 43	133.5	15 35.7 90 43	133.7	15 08.6 90 43	133.9	14 41.5 90 42	134.1	14 14.4 90 42	134.4	45
6	16 57.7 90 44	131.9	16 30.8 90 44	132.1	16 03.9 90 44	132.3	15 36.9 90 44	132.6	15 10.0 90 43	132.8	14 43.0 90 43	133.0	14 16.0 90 43	133.2	13 49.0 90 43	133.5	6
7	16 31.3 89 45	130.9	16 04.5 89 45	131.2	15 37.6 89 44	131.4	15 10.8 90 44	131.6	14 43.9 90 44	131.9	14 17.0 90 44	132.1	13 50.1 90 44	132.3	13 23.2 90 44	132.6	7
8	16 04.5 89 45	130.0	15 37.7 89 45	130.3	15 11.0 89 45	130.5	14 44.2 89 45	130.7	14 17.5 89 45	131.0	13 50.7 89 45	131.2	13 23.9 89 44	131.4	12 57.1 89 44	131.6	8
9	15 37.3 89 46	129.1	15 10.6 89 46	129.3	14 44.0 89 46	129.6	14 17.3 89 45	129.8	13 50.6 89 45	130.1	13 23.9 89 45	130.3	12 57.2 89 45	130.5	12 30.5 89 45	130.8	9
50	15 09.7 88 46	128.2	14 43.2 89 46	128.4	14 16.6 89 46	128.7	13 50.1 89 46	128.9	13 23.5 89 46	129.2	12 56.9 89 46	129.4	12 30.3 89 46	129.6	12 03.6 89 45	129.9	50
1	14 41.8 88 47	127.3	14 15.4 88 47	127.5	13 48.9 88 47	127.8	13 22.4 88 47	128.0	12 55.9 88 46	128.3	12 29.4 88 46	128.5	12 02.9 88 46	128.7	11 36.4 88 46	129.0	1
2	14 13.6 88 48	126.4	13 47.2 88 47	126.6	13 20.9 88 47	126.9	12 54.5 88 47	127.1	12 28.1 88 47	127.4	12 01.7 88 47	127.6	11 35.2 88 47	127.8	11 08.8 88 47	128.1	2
3	13 45.1 88 48	125.5	13 18.8 88 48	125.7	12 52.5 88 48	126.0	12 26.2 88 48	126.2	11 59.9 88 48	126.5	11 33.6 88 47	126.7	11 07.2 88 47	127.0	10 40.9 88 47	127.2	3
4	13 16.2 87 49	124.6	12 50.0 87 48	124.9	12 23.8 87 48	125.1	11 57.6 87 48	125.3	11 31.4 87 48	125.6	11 05.1 87 48	125.8	10 38.9 88 48	126.1	10 12.6 88 48	126.3	4
55	12 47.0 87 49	123.7	12 20.9 87 49	124.0	11 54.8 87 49	124.2	11 28.7 87 49	124.5	11 02.5 87 49	124.7	10 36.4 87 48	125.0	10 10.2 87 48	125.2	9 44.1 87 48	125.5	55
6	12 17.5 87 50	122.8	11 51.5 87 49	123.1	11 25.5 87 49	123.3	10 59.4 87 49	123.6	10 33.4 87 49	123.8	10 07.3 87 49	124.1	9 41.3 87 49	124.4	9 15.2 87 49	124.6	6
7	11 47.7 86 50	122.0	11 21.8 86 50	122.2	10 55.9 86 50	122.5	10 29.9 87 50	122.7	10 04.0 87 50	123.0	9 38.0 87 49	123.2	9 12.0 87 49	123.5	8 46.0 87 49	123.7	7
8	11 17.7 86 51	121.1	10 51.8 86 50	121.3	10 26.0 86 50	121.6	10 00.1 86 50	121.9	9 34.2 86 50	122.1	9 08.3 86 50	122.4	8 42.4 86 50	122.6	8 16.5 86 50	122.9	8
9	10 47.3 86 51	120.2	10 21.6 86 51	120.5	9 55.8 86 51	120.7	9 30.0 86 51	121.0	9 04.2 86 50	121.3	8 38.4 86 50	121.5	8 12.6 86 50	121.8	7 46.8 86 50	122.0	9
60	10 16.7 86 51	119.4	9 51.1 86 51	119.6	9 25.4 86 51	119.9	8 59.7 86 51	120.1	8 33.9 86 51	120.4	8 08.2 86 51	120.7	7 42.5 86 51	120.9	7 16.7 86 50	121.2	60
1	9 45.9 85 52	118.5	9 20.3 85 52	118.8	8 54.7 85 52	119.0	8 29.0 85 52	119.3	8 03.4 85 51	119.6	7 37.7 85 51	119.8	7 12.1 86 51	120.1	6 46.4 86 51	120.3	1
2	9 14.7 85 52	117.6	8 49.2 85 52	117.9	8 23.7 85 52	118.2	7 58.1 85 52	118.4	7 32.6 85 52	118.7	7 07.0 85 52	119.0	6 41.4 85 52	119.2	6 15.9 85 51	119.5	2
3	8 43.4 85 53	116.8	8 17.9 85 53	117.1	7 52.5 85 52	117.3	7 27.0 85 52	117.6	7 01.5 85 52	117.9	6 36.0 85 52	118.1	6 10.5 85 52	118.4	5 45.0 85 52	118.7	3
4	8 11.8 85 53	115.9	7 46.4 85 53	116.2	7 21.0 85 53	116.5	6 55.6 85 53	116.7	6 30.2 85 53	117.0	6 04.8 85 52	117.3	5 39.4 85 52	117.6	5 14.0 85 52	117.8	4
65	7 40.0 84 53	115.1	7 14.7 84 53	115.4	6 49.3 84 53	115.6	6 24.0 84 53	115.9	5 58.7 84 53	116.2	5 33.4 84 53	116.4	5 08.0 84 53	116.7			65
6	7 07.9 84 54	114.3	6 42.7 84 54	114.5	6 17.4 84 54	114.8	5 52.2 84 53	115.1	5 26.9 84 54	115.3	5 01.7 84 53	115.6					6
7	6 35.7 84 54	113.4	6 10.5 84 54	113.7	5 45.3 84 54	114.0	5 20.1 84 54	114.2									7
8	6 03.2 84 54	112.6	5 38.1 84 54	112.9	5 13.0 84 54	113.1											8
9	5 30.5 83 55	111.8	5 05.5 83 55	112.0													9

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′ Alt.	Az.	8° 30′ Alt.	Az.	9° 00′ Alt.	Az.	9° 30′ Alt.	Az.	10° 00′ Alt.	Az.	10° 30′ Alt.	Az.	11° 00′ Alt.	Az.	11° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	5 52.8 81 58	84.5	6 17.0 81 58	84.2	6 41.2 81 58	83.9	7 05.3 81 58	83.6	7 29.5 81 58	83.3	7 53.7 80 58	83.0	8 17.8 80 58	82.7	8 41.9 80 58	82.4	91
2	5 17.7 81 58	83.7	5 41.9 81 58	83.4	6 06.1 81 58	83.1	6 30.3 81 58	82.8	6 54.5 81 58	82.5	7 18.7 81 58	82.2	7 42.8 81 58	81.9	8 07.0 80 58	81.6	2
3			5 06.9 81 58	82.6	5 31.1 81 58	82.3	5 55.4 81 58	82.0	6 19.6 81 58	81.7	6 43.8 81 58	81.4	7 08.0 81 58	81.1	7 32.2 81 58	80.8	3
4							5 20.5 81 58	81.2	5 44.7 81 58	80.9	6 08.9 81 58	80.6	6 33.2 81 58	80.3	6 57.4 81 58	80.0	4
95									5 09.9 81 58	80.1	5 34.2 81 58	79.8	5 58.4 81 58	79.5	6 22.7 81 58	79.2	95
6													5 23.8 81 58	78.7	5 48.1 81 58	78.4	6
7															5 13.6 81 57	77.6	7

Digitized by Google

Lat. 54°

H.A.	12° 00′				12° 30′				13° 00′				13° 30′			
	Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.
°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°
00	48 00.0	1.0	01	180.0	48 30.0	1.0	01	180.0	49 00.0	1.0	01	180.0	49 30.0	1.0	01	180.0
1	47 59.6	1.0	02	178.5	48 29.5	1.0	02	178.5	48 59.5	1.0	02	178.5	49 29.5	1.0	02	178.5
2	47 58.2	1.0	04	177.1	48 28.2	1.0	04	177.1	48 58.2	1.0	04	177.0	49 28.2	1.0	04	177.0
3	47 56.0	1.0	05	175.6	48 25.9	1.0	05	175.6	48 55.9	1.0	05	175.5	49 25.9	1.0	05	175.5
4	47 52.8	1.0	07	174.2	48 22.8	1.0	07	174.1	48 52.7	1.0	07	174.1	49 22.6	1.0	07	174.0
05	47 48.8	1.0	08	172.7	48 18.7	1.0	08	172.6	48 48.6	1.0	08	172.6	49 18.5	1.0	08	172.5
6	47 43.9	1.0	10	171.3	48 13.7	1.0	10	171.2	48 43.6	1.0	10	171.1	49 13.5	1.0	10	171.0
7	47 38.1	99	11	169.8	48 07.9	99	11	169.7	48 37.7	99	11	169.6	49 07.5	99	11	169.6
8	47 31.4	99	13	168.4	48 01.2	99	13	168.3	48 30.9	99	13	168.2	49 00.7	99	13	168.1
9	47 23.8	99	14	166.9	47 53.6	99	14	166.8	48 23.3	99	14	166.7	48 53.0	99	14	166.6
10	47 15.4	99	15	165.5	47 45.1	99	16	165.4	48 14.7	99	16	165.3	48 44.4	99	16	165.2
1	47 06.2	99	17	164.1	47 35.8	99	17	164.0	48 05.4	99	17	163.8	48 34.9	99	17	163.7
2	46 56.1	98	18	162.7	47 25.6	98	18	162.5	47 55.1	98	18	162.4	48 24.6	98	19	162.3
3	46 45.2	98	20	161.3	47 14.6	98	20	161.1	47 44.0	98	20	161.0	48 13.5	98	20	160.8
4	46 33.5	98	21	159.9	47 02.8	98	21	159.7	47 32.1	98	21	159.6	48 01.5	98	21	159.4
15	46 20.9	98	22	158.5	46 50.2	97	22	158.3	47 19.4	97	23	158.2	47 48.6	97	23	158.0
6	46 07.6	97	24	157.1	46 36.8	97	24	156.9	47 05.9	97	24	156.8	47 35.0	97	24	156.6
7	45 53.5	97	25	155.7	46 22.6	97	25	155.6	46 51.6	97	25	155.4	47 20.6	97	25	155.2
8	45 38.6	97	26	154.4	46 07.6	97	26	154.2	46 36.5	96	26	154.0	47 05.4	96	27	153.8
9	45 23.0	96	27	153.0	45 51.9	96	27	152.8	46 20.7	96	28	152.6	46 49.5	96	28	152.4
20	45 06.6	96	28	151.7	45 35.4	96	29	151.5	46 04.1	96	29	151.3	46 32.8	96	29	151.1
1	44 49.6	95	30	150.4	45 18.2	95	30	150.2	45 46.8	95	30	150.0	46 15.4	95	30	149.7
2	44 31.8	95	31	149.1	45 00.3	95	31	148.9	45 28.8	95	31	148.6	45 57.3	95	31	148.4
3	44 13.3	95	32	147.8	44 41.7	95	32	147.5	45 10.1	95	32	147.3	45 38.4	94	32	147.1
4	43 54.2	94	33	146.5	44 22.5	94	33	146.3	44 50.7	94	33	146.0	45 18.9	94	34	145.8
25	43 34.4	94	34	145.2	44 02.5	94	34	145.0	44 30.7	94	34	144.7	44 58.8	94	35	144.5
6	43 13.9	94	35	143.9	43 42.0	93	35	143.7	44 10.0	93	36	143.5	44 38.0	93	36	143.2
7	42 52.9	93	36	142.7	43 20.8	93	36	142.4	43 48.7	93	37	142.2	44 16.5	93	37	141.9
8	42 31.2	93	37	141.5	42 59.0	93	37	141.2	43 26.8	92	38	140.9	43 54.5	92	38	140.7
9	42 08.9	92	38	140.2	42 36.6	92	38	140.0	43 04.2	92	38	139.7	43 31.9	92	39	139.4
30	41 46.1	92	39	139.0	42 13.6	92	39	138.8	42 41.2	92	39	138.5	43 08.6	92	40	138.2
1	41 22.7	92	40	137.8	41 50.1	91	40	137.6	42 17.5	91	40	137.3	42 44.9	91	41	137.0
2	40 58.7	91	41	136.6	41 26.0	91	41	136.4	41 53.3	91	41	136.1	42 20.5	91	41	135.8
3	40 34.3	91	42	135.5	41 01.4	91	42	135.2	41 28.6	90	42	134.9	41 55.7	90	42	134.6
4	40 09.3	90	42	134.3	40 36.3	90	43	134.0	41 03.4	90	43	133.7	41 30.3	90	43	133.4
35	39 43.8	90	43	133.2	40 10.7	90	43	132.9	40 37.6	90	44	132.6	41 04.5	89	44	132.3
6	39 17.8	89	44	132.0	39 44.6	89	44	131.7	40 11.4	89	44	131.4	40 38.2	89	45	131.1
7	38 51.4	89	45	130.9	39 18.1	89	45	130.6	39 44.8	89	45	130.3	40 11.4	89	45	130.0
8	38 24.5	89	46	129.8	38 51.1	89	46	129.5	39 17.6	88	46	129.2	39 44.1	88	46	128.9
9	37 57.2	88	46	128.7	38 23.7	88	46	128.4	38 50.1	88	47	128.1	39 16.5	88	47	127.8
40	37 29.4	88	47	127.6	37 55.8	88	47	127.3	38 22.1	88	47	127.0	38 48.4	87	47	126.7
1	37 01.3	88	48	126.5	37 27.5	87	48	126.2	37 53.7	87	48	125.9	38 19.9	87	48	125.6
2	36 32.8	87	48	125.4	36 58.9	87	48	125.1	37 25.0	87	49	124.8	37 51.0	87	49	124.5
3	36 03.8	87	49	124.4	36 29.9	87	49	124.1	36 55.8	87	49	123.8	37 21.8	86	49	123.4
4	35 34.6	86	49	123.3	36 00.5	86	50	123.0	36 26.4	86	50	122.7	36 52.2	86	50	122.4
45	35 04.9	86	50	122.3	35 30.7	86	50	122.0	35 56.5	86	50	121.7	36 22.2	86	50	121.4
6	34 34.9	86	50	121.3	35 00.7	86	51	121.0	35 26.3	85	51	120.7	35 52.0	85	51	120.3
7	34 04.6	85	51	120.3	34 30.3	85	51	120.0	34 55.8	85	51	119.6	35 21.4	85	52	119.3
8	33 34.0	85	52	119.3	33 59.6	85	52	118.9	34 25.0	85	52	118.6	34 50.5	85	52	118.3
9	33 03.1	85	52	118.3	33 28.5	85	52	118.0	33 53.9	85	52	117.6	34 19.3	84	52	117.3
50	32 31.9	85	52	117.3	32 57.3	84	53	117.0	33 22.5	84	53	116.6	33 47.8	84	53	116.3
1	32 00.4	84	53	116.3	32 25.7	84	53	116.0	32 50.9	84	53	115.7	33 16.0	84	53	115.3
2	31 28.7	84	53	115.3	31 53.9	84	53	115.0	32 19.0	84	54	114.7	32 44.0	83	54	114.4
3	30 56.7	84	54	114.4	31 21.8	84	54	114.1	31 46.8	83	54	113.7	32 11.8	83	54	113.4
4	30 24.4	83	54	113.4	30 49.4	83	54	113.1	31 14.4	83	54	112.8	31 39.3	83	54	112.5
55	29 52.0	83	54	112.5	30 16.9	83	55	112.2	30 41.8	83	55	111.8	31 06.6	83	55	111.5
6	29 19.3	83	55	111.6	29 44.1	83	55	111.2	30 08.9	83	55	110.9	30 33.7	82	55	110.6
7	28 46.4	83	55	110.6	29 11.2	83	55	110.3	29 35.9	82	55	110.0	30 00.6	82	56	109.7
8	28 13.3	82	55	109.7	28 38.0	82	56	109.4	29 02.7	82	56	109.1	29 27.3	82	56	108.7
9	27 40.0	82	56	108.8	28 04.6	82	56	108.5	28 29.2	82	56	108.1	28 53.8	82	56	107.8
60	27 06.5	82	56	107.9	27 31.1	82	56	107.6	27 55.6	82	56	107.2	28 20.1	82	56	106.9
1	26 32.9	82	56	107.0	26 57.4	82	56	106.7	27 21.9	82	57	106.3	27 46.3	81	57	106.0
2	25 59.0	82	57	106.1	26 23.5	82	57	105.8	26 48.0	81	57	105.5	27 12.3	81	57	105.1
3	25 25.1	81	57	105.2	25 49.5	81	57	104.9	26 13.9	81	57	104.6	26 38.2	81	57	104.2
4	24 51.0	81	57	104.3	25 15.4	81	57	104.0	25 39.7	81	57	103.7	26 04.0	81	57	103.4
65	24 16.8	81	57	103.5	24 41.1	81	57	103.1	25 05.4	81	57	102.8	25 29.6	81	57	102.5
6	23 42.4	81	57	102.6	24 06.7	81	58	102.3	24 30.9	81	58	102.0	24 55.1	81	58	101.6
7	23 07.9	81	58	101.7	23 32.2	81	58	101.4	23 56.4	81	58	101.1	24 20.5	80	58	100.8
8	22 33.3	81	58	100.9	22 57.5	81	58	100.6	23 21.7	80	58	100.2	23 45.8	80	58	99.9
9	21 58.7	81	58	100.0	22 22.8	80	58	99.7	22 46.9	80	58	99.4	23 11.0	80	58	99.1
70	21 23.9	81	58	99.2	21 48.0	80	58	98.9	22 12.1	80	58	98.5	22 36.2	80	58	98.2
1	20 49.0	80	58	98.3	21 13.1	80	58	98.0	21 37.2	80	58	97.7	22 01.2	80	58	97.4
2	20 14.1	80	58	97.5	20 38.2	80	58	97.2	21 02.2	80	58	96.9	21 26.2	80	58	96.5
3	19 39.1	80	58	96.7	20 03.2	80	58	96.3	20 27.2	80	58	96.0	20 51.2	80	59	95.7
4	19 04.0	80	58	95.8	19 28.1	80	59	95.5	19 52.1	80	59	95.2	20 16.0	80	59	94.9
75	18 28.9	80	59	95.0	18 52.9	80	59	94.7	19 16.9	80	59	94.4	19 40.9	80	59	94.0
6	17 53.8	80	59	94.2	18 17.8	80	59	93.9	18 41.7	80	59	93.5	19 05.7	80	59	93.2
7	17 18.6	80	59	93.4	17 42.6	80	59	93.0	18 06.5	80	59	92.7	18 30.5	80	59	92.4
8	16 43.4	80	59	92.5	17 07.3	80	59	92.2	17 31.3	80	59	91.9	17 55.2	80	59	91.6
9	16 08.1	80	59	91.7	16 32.1	80	59	91.4	16 56.0	80	59	91.1	17 20.0	80	59	90.8
80	15 32.9	80	59	90.9	15 56.8	80	59	90.6	16 20.8	80	59	90.3	16 44.7	80	59	90.0
1	14 57.6	80	59	90.1	15 21.6	80	59	89.8	15 45.5	80	59	89.5	16 09.4	80	59	89.2
2	14 22.3	80	59	89.3	14 46.3	80	59	89.0	15 10.2	80	59	88.7	15 34.2	80	59	88.4
3	13 47.1	80	59	88.5	14 11.0	80	59	88.2	14 35.0	80	59	87.9	14 58.9	80	59	87.5
4	13 11.8	80	59	87.7	13 35.8	80	59	87.4	13 59.8	80	59	87.1	14 23.7	80	59	86.7
85	12 36.6	80	59	86.9	13 00.6	80	59	86.6	13 24.6	80	59	86.3	13 48.5	80	59	85.9
6	12 01.4	80	59	86.1	12 25.4	80	59	85.8	12 49.4	80	59	85.5	13 13.3	80	59	85.1
7	11 26.2	80	59	85.3	11 50.2	80	59	85.0	12 14.2	80	58	84.7	12 38.2	80	58	84.4
8	10 51.1	80	58	84.5	11 15.1	80	58	84.2	11 39.2	80	58	83.9	12 03.1	80	58	83.6
9	10 16.0	80	58	83.7	10 40.1	80	58	83.4	11 04.1	80	58	83.1	11 28.1	80	58	82.8
90	9 41.0	80	58	82.9	10 05.1	80	58	82.6	10 29.1	80	58	82.3	10 53.2	80	58	82.0

14° 00′				14° 30′				15° 00′				15° 30′				H.A.
Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.	
° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	°
50 00.0	1.0	01	180.0	50 30.0	1.0	01	180.0	51 00.0	1.0	01	180.0	51 30.0	1.0	01	180.0	00
49 59.5	1.0	02	178.5	50 29.5	1.0	02	178.5	50 59.5	1.0	02	178.5	51 29.5	1.0	02	178.5	1
49 58.1	1.0	04	177.0	50 28.1	1.0	04	177.0	50 58.1	1.0	04	176.9	51 28.1	1.0	04	176.9	2
49 55.8	1.0	05	175.5	50 25.8	1.0	05	175.4	50 55.8	1.0	06	175.4	51 25.7	1.0	06	175.4	3
49 52.6	1.0	07	174.0	50 22.5	1.0	07	173.9	50 52.5	1.0	07	173.9	51 22.4	1.0	07	173.8	4
49 48.4	1.0	08	172.5	50 18.3	1.0	09	172.4	50 48.2	1.0	09	172.3	51 18.1	1.0	09	172.3	05
49 43.3	1.0	10	171.0	50 13.2	1.0	10	170.9	50 43.1	1.0	10	170.8	51 12.9	1.0	10	170.7	6
49 37.4	99	11	169.5	50 07.2	99	12	169.4	50 37.0	99	12	169.3	51 06.8	99	12	169.2	7
49 30.5	99	13	168.0	50 00.2	99	13	167.9	50 30.0	99	13	167.8	50 59.7	99	13	167.7	8
49 22.7	99	14	166.5	49 52.4	99	15	166.4	50 22.1	99	15	166.3	50 51.8	99	15	166.2	9
49 14.0	99	16	165.0	49 43.7	99	16	164.9	50 13.3	99	16	164.8	50 42.9	99	16	164.7	10
49 04.5	99	17	163.6	49 34.0	98	17	163.5	50 03.6	98	18	163.3	50 33.1	98	18	163.2	1
48 54.1	98	19	162.1	49 23.6	98	19	162.0	49 53.0	98	19	161.8	50 22.5	98	19	161.7	2
48 42.8	98	20	160.7	49 12.2	98	20	160.5	49 41.6	98	20	160.4	50 11.0	98	21	160.2	3
48 30.8	98	22	159.2	49 00.1	98	22	159.1	49 29.3	98	22	158.9	49 58.6	98	22	158.7	4
48 17.9	97	23	157.8	48 47.1	97	23	157.6	49 16.2	97	23	157.5	49 45.4	97	23	157.3	15
48 04.1	97	24	156.4	48 33.2	97	24	156.2	49 02.3	97	25	156.0	49 31.4	97	25	155.8	6
47 49.6	97	25	155.0	48 18.6	97	26	154.8	48 47.6	97	26	154.6	49 16.5	96	26	154.4	7
47 34.3	96	27	153.6	48 03.2	96	27	153.4	48 32.1	96	27	153.2	49 00.9	96	27	153.0	8
47 18.3	96	28	152.2	47 47.1	96	28	152.0	48 15.8	96	28	151.8	48 44.5	96	29	151.6	9
47 01.5	96	29	150.9	47 30.1	95	29	150.6	47 58.8	95	30	150.4	48 27.4	95	30	150.2	20
46 44.0	95	30	149.5	47 12.5	95	31	149.3	47 41.0	95	31	149.1	48 09.5	95	31	148.8	1
46 25.7	95	32	148.2	46 54.1	95	32	147.9	47 22.5	95	32	147.7	47 50.9	94	32	147.5	2
46 06.8	94	33	146.8	46 35.1	94	33	146.6	47 03.3	94	33	146.4	47 31.5	94	33	146.1	3
45 47.1	94	34	145.5	46 15.3	94	34	145.3	46 43.4	94	34	145.0	47 11.5	94	34	144.8	4
45 26.9	94	35	144.2	45 54.9	93	35	144.0	46 22.9	93	35	143.7	46 50.9	93	36	143.5	25
45 05.9	93	36	142.9	45 33.8	93	36	142.7	46 01.7	93	36	142.4	46 29.6	93	37	142.2	6
44 44.4	93	37	141.7	45 12.1	93	37	141.4	45 39.9	92	37	141.1	46 07.6	92	38	140.9	7
44 22.2	92	38	140.4	44 49.8	92	38	140.1	45 17.5	92	38	139.9	45 45.0	92	39	139.6	8
43 59.4	92	39	139.2	44 26.9	92	39	138.9	44 54.4	92	39	138.6	45 21.9	91	40	138.3	9
43 36.1	91	40	137.9	44 03.5	91	40	137.7	44 30.8	91	40	137.4	44 58.1	91	40	137.1	30
43 12.2	91	41	136.7	43 39.4	91	41	136.4	44 06.7	91	41	136.1	44 33.8	91	41	135.8	1
42 47.7	91	42	135.5	43 14.9	90	42	135.2	43 42.0	90	42	134.9	44 09.0	90	42	134.6	2
42 22.8	90	42	134.3	42 49.8	90	43	134.0	43 16.7	90	43	133.7	43 43.7	90	43	133.4	3
41 57.3	90	43	133.1	42 24.2	90	43	132.8	42 51.0	89	44	132.5	43 17.8	89	44	132.2	4
41 31.3	89	44	132.0	41 58.1	89	44	131.7	42 24.8	89	44	131.4	42 51.4	89	45	131.1	35
41 04.8	89	45	130.8	41 31.5	89	45	130.5	41 58.1	89	45	130.2	42 24.6	88	45	129.9	6
40 37.9	88	46	129.7	41 04.5	88	46	129.4	41 30.9	88	46	129.1	41 57.3	88	46	128.8	7
40 10.6	88	46	128.6	40 37.0	88	46	128.3	41 03.3	88	47	127.9	41 29.6	88	47	127.6	8
39 42.8	88	47	127.5	40 09.1	88	47	127.1	40 35.3	87	47	126.8	41 01.5	87	48	126.5	9
39 14.6	87	48	126.4	39 40.8	87	48	126.0	40 06.9	87	48	125.7	40 32.9	87	48	125.4	40
38 46.0	87	48	125.3	39 12.0	87	48	125.0	39 38.0	87	49	124.6	40 04.0	86	49	124.3	1
38 17.0	87	49	124.2	38 42.9	86	49	123.9	39 08.8	86	49	123.6	39 34.7	86	49	123.2	2
37 47.7	86	50	123.1	38 13.5	86	50	122.8	38 39.3	86	50	122.5	39 05.0	86	50	122.2	3
37 18.0	86	50	122.1	37 43.7	86	50	121.8	38 09.3	85	50	121.4	38 34.9	85	51	121.1	4
36 47.9	85	51	121.0	37 13.5	85	51	120.7	37 39.1	85	51	120.4	38 04.6	85	51	120.0	45
36 17.5	85	51	120.0	36 43.0	85	51	119.7	37 08.5	85	52	119.4	37 33.9	85	52	119.0	6
35 46.8	85	52	119.0	36 12.2	85	52	118.7	36 37.6	84	52	118.3	37 02.9	84	52	118.0	7
35 15.8	84	52	118.0	35 41.1	84	52	117.7	36 06.4	84	52	117.3	36 31.6	84	53	117.0	8
34 44.5	84	53	117.0	35 09.8	84	53	116.7	35 34.9	84	53	116.3	36 00.1	84	53	116.0	9
34 13.0	84	53	116.0	34 38.1	84	53	115.7	35 03.2	84	53	115.3	35 28.2	83	54	115.0	50
33 41.1	84	53	115.0	34 06.2	83	54	114.7	34 31.2	83	54	114.3	34 56.1	83	54	114.0	1
33 09.1	83	54	114.0	33 34.0	83	54	113.7	33 58.9	83	54	113.4	34 23.8	83	54	113.0	2
32 36.7	83	54	113.1	33 01.6	83	54	112.7	33 26.4	83	54	112.4	33 51.2	82	55	112.1	3
32 04.2	83	55	112.1	32 29.0	83	55	111.8	32 53.7	82	55	111.5	33 18.4	82	55	111.1	4
31 31.4	83	55	111.2	31 56.1	82	55	110.9	32 20.8	82	55	110.5	32 45.4	82	55	110.2	55
30 58.4	82	55	110.3	31 23.1	82	55	109.9	31 47.7	82	56	109.6	32 12.2	82	56	109.2	6
30 25.2	82	56	109.3	30 49.8	82	56	109.0	31 14.4	82	56	108.7	31 38.8	82	56	108.3	7
29 51.8	82	56	108.4	30 16.4	82	56	108.1	30 40.8	81	56	107.7	31 05.3	81	56	107.4	8
29 18.3	82	56	107.5	29 42.8	81	56	107.2	30 07.2	81	56	106.8	30 31.5	81	56	106.5	9
28 44.6	81	56	106.6	29 09.0	81	57	106.3	29 33.3	81	57	105.9	29 57.6	81	57	105.6	60
28 10.7	81	57	105.7	28 35.0	81	57	105.4	28 59.3	81	57	105.0	29 23.6	81	57	104.7	1
27 36.7	81	57	104.8	28 01.0	81	57	104.5	28 25.2	81	57	104.1	28 49.4	81	57	103.8	2
27 02.5	81	57	103.9	27 26.8	81	57	103.6	27 50.9	81	57	103.2	28 15.1	80	57	102.9	3
26 28.2	81	57	103.0	26 52.4	81	57	102.7	27 16.6	80	58	102.4	27 40.7	80	58	102.0	4
25 53.8	81	58	102.2	26 17.9	80	58	101.8	26 42.1	80	58	101.5	27 06.1	80	58	101.2	65
25 19.3	80	58	101.3	25 43.4	80	58	101.0	26 07.4	80	58	100.6	26 31.5	80	58	100.3	6
24 44.6	80	58	100.4	25 08.7	80	58	100.1	25 32.7	80	58	99.8	25 56.7	80	58	99.4	7
24 09.9	80	58	99.6	24 33.9	80	58	99.3	24 57.9	80	58	98.9	25 21.9	80	58	98.6	8
23 35.1	80	58	98.7	23 59.1	80	58	98.4	24 23.1	80	58	98.1	24 47.0	80	58	97.7	9
23 00.2	80	58	97.9	23 24.2	80	58	97.6	23 48.1	80	58	97.2	24 12.0	80	58	96.9	70
22 25.2	80	58	97.0	22 49.2	80	58	96.7	23 13.1	80	58	96.4	23 37.0	80	58	96.1	1
21 50.2	80	58	96.2	22 14.1	80	58	95.9	22 38.0	80	59	95.6	23 01.9	79	59	95.2	2
21 15.1	80	59	95.4	21 39.0	80	59	95.1	22 02.9	80	59	94.7	22 26.7	79	59	94.4	3
20 40.0	80	59	94.5	21 03.9	80	59	94.2	21 27.7	79	59	93.9	21 51.5	79	59	93.6	4
20 04.8	80	59	93.7	20 28.7	80	59	93.4	20 52.5	79	59	93.1	21 16.3	79	59	92.7	75
19 29.6	80	59	92.9	19 53.5	80	59	92.6	20 17.3	79	59	92.3	20 41.1	79	59	91.9	6
18 54.4	80	59	92.1	19 18.2	79	59	91.8	19 42.0	79	59	91.4	20 05.8	79	59	91.1	7
18 19.1	80	59	91.3	18 43.0	79	59	90.9	19 06.8	79	59	90.6	19 30.6	79	59	90.3	8
17 43.8	80	59	90.5	18 07.7	79	59	90.1	18 31.5	79	59	89.8	18 55.3	79	59	89.5	9
17 08.6	80	59	89.6	17 32.4	79	59	89.3	17 56.2	79	59	89.0	18 20.0	79	59	88.7	80
16 33.3	80	59	88.8	16 57.2	79	59	88.5	17 21.0	79	59	88.2	17 44.8	79	59	87.9	1
15 58.1	80	59	88.0	16 21.9	79	59	87.7	16 45.8	79	59	87.4	17 09.6	79	59	87.1	2
15 22.8	80	59	87.2	15 46.7	80	59	86.9	16 10.5	79	59	86.6	16 34.3	79	59	86.3	3
14 47.6	80	59	86.4	15 11.5	80	59	86.1	15 35.3	79	59	85.8	15 59.2	79	59	85.5	4
14 12.4	80	59	85.6	14 36.3	80	59	85.3	15 00.2	80	58	85.0	15 24.0	79	58	84.7	85
13 37.3	80	59	84.8	14 01.2	80	58	84.5	14 25.1	80	58	84.2	14 48.9	80	58	83.9	6
13 02.2	80	58	84.0	13 26.1	80	58	83.7	13 50.0	80	58	83.4	14 13.9	80	58	83.1	7
12 27.1	80	58	83.2	12 51.1	80	58	82.9	13 15.0	80	58	82.6	13 38.9	80	58	82.3	8
11 52.1	80	58	82.5	12 16.1	80	58	82.1	12 40.1	80	58	81.8	13 04.0	80	58	81.5	9
11 17.2	80	58	81.7	11 41.2	80	58	81.4	12 05.2	80	58	81.1	12 29.2	80	58	80.7	90

Digitized by Google

Lat. 54°

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	24 00.0	1.0	01	180.0	23 30.0	1.0	01	180.0	23 00.0	1.0	01	180.0	22 30.0	1.0	01	180.0	22 00.0	1.0	01	180.0	21 30.0	1.0	01	180.0	21 00.0	1.0	01	180.0	20 30.0	1.0	01	180.0	00
1	23 59.7	1.0	02	178.9	23 29.7	1.0	02	178.9	22 59.7	1.0	02	178.9	22 29.7	1.0	02	178.9	21 59.7	1.0	02	179.0	21 29.7	1.0	02	179.0	20 59.7	1.0	02	179.0	20 29.7	1.0	02	179.0	1
2	23 58.7	1.0	03	177.9	23 28.7	1.0	03	177.9	22 58.7	1.0	03	177.9	22 28.7	1.0	03	177.9	21 58.7	1.0	03	177.9	21 28.7	1.0	03	177.9	20 58.7	1.0	03	177.9	20 28.7	1.0	03	177.9	2
3	23 57.0	1.0	04	176.8	23 27.1	1.0	04	176.8	22 57.1	1.0	04	176.8	22 27.1	1.0	04	176.8	21 57.1	1.0	04	176.9	21 27.1	1.0	04	176.9	20 57.1	1.0	04	176.9	20 27.2	1.0	04	176.9	3
4	23 54.7	1.0	05	175.7	23 24.8	1.0	05	175.7	22 54.8	1.0	05	175.8	22 24.8	1.0	05	175.8	21 54.9	1.0	05	175.8	21 24.9	1.0	05	175.8	20 54.9	1.0	05	175.9	20 24.9	1.0	05	175.9	4
05	23 51.8	1.0	06	174.7	23 21.8	1.0	06	174.7	22 51.9	1.0	06	174.7	22 21.9	1.0	06	174.7	21 52.0	1.0	06	174.8	21 22.0	1.0	06	174.8	20 52.0	1.0	06	174.8	20 22.1	1.0	06	174.9	05
6	23 48.2	1.0	07	173.6	23 18.2	1.0	07	173.6	22 48.3	1.0	07	173.7	22 18.4	1.0	07	173.7	21 48.4	1.0	07	173.7	21 18.5	1.0	07	173.8	20 48.6	1.0	07	173.8	20 18.6	1.0	07	173.8	6
7	23 43.9	1.0	08	172.5	23 14.0	1.0	08	172.6	22 44.1	1.0	08	172.6	22 14.2	1.0	08	172.6	21 44.3	1.0	08	172.7	21 14.3	1.0	08	172.7	20 44.4	1.0	08	172.8	20 14.5	1.0	08	172.8	7
8	23 39.0	1.0	09	171.5	23 09.1	1.0	09	171.5	22 39.2	1.0	09	171.6	22 09.3	1.0	09	171.6	21 39.4	1.0	09	171.6	21 09.6	1.0	09	171.7	20 39.7	1.0	09	171.7	20 09.8	1.0	09	171.8	8
9	23 33.4	1.0	10	170.4	23 03.6	1.0	10	170.4	22 33.7	1.0	10	170.5	22 03.9	1.0	10	170.6	21 34.0	1.0	10	170.6	21 04.2	1.0	10	170.7	20 34.3	1.0	10	170.7	20 04.4	1.0	10	170.8	9
10	23 27.2	99	11	169.3	22 57.4	99	11	169.4	22 27.6	99	11	169.5	21 57.8	99	11	169.5	21 27.9	99	11	169.6	20 58.1	99	11	169.6	20 28.3	99	11	169.7	19 58.5	99	11	169.7	10
1	23 20.4	99	12	168.3	22 50.6	99	12	168.3	22 20.8	99	12	168.4	21 51.0	99	12	168.5	21 21.2	99	12	168.5	20 51.5	99	12	168.6	20 21.7	99	12	168.7	19 51.9	99	12	168.7	1
2	23 12.9	99	14	167.2	22 43.1	99	13	167.3	22 13.4	99	13	167.4	21 43.7	99	13	167.4	21 13.9	99	13	167.5	20 44.2	99	13	167.6	20 14.4	99	13	167.6	19 44.7	99	13	167.7	2
3	23 04.7	99	15	166.2	22 35.1	99	14	166.2	22 05.4	99	14	166.3	21 35.7	99	14	166.4	21 06.0	99	14	166.5	20 36.3	99	14	166.5	20 06.6	99	14	166.6	19 36.9	99	14	166.7	3
4	22 56.0	99	16	165.1	22 26.4	99	16	165.2	21 56.7	99	15	165.3	21 27.1	99	15	165.4	20 57.4	99	15	165.4	20 27.8	99	15	165.5	19 58.1	99	15	165.6	19 28.5	99	15	165.7	4
15	22 46.6	99	17	164.1	22 17.0	99	17	164.2	21 47.4	99	16	164.2	21 17.8	99	16	164.3	20 48.2	99	16	164.4	20 18.6	99	16	164.5	19 49.0	99	16	164.6	19 19.4	99	16	164.7	15
6	22 36.6	98	18	163.0	22 07.1	98	18	163.1	21 37.6	98	17	163.2	21 08.0	98	17	163.3	20 38.5	98	17	163.4	20 08.9	98	17	163.5	19 39.4	99	17	163.6	19 09.8	99	17	163.7	6
7	22 26.0	98	19	162.0	21 56.5	98	19	162.1	21 27.1	98	18	162.2	20 57.6	98	18	162.3	20 28.1	98	18	162.4	19 58.6	98	18	162.5	19 29.1	98	18	162.6	18 59.6	98	18	162.7	7
8	22 14.8	98	20	160.9	21 45.4	98	20	161.0	21 16.0	98	19	161.1	20 46.5	98	19	161.3	20 17.1	98	19	161.4	19 47.7	98	19	161.5	19 18.2	98	19	161.6	18 48.8	98	19	161.7	8
9	22 03.0	98	21	159.9	21 33.6	98	21	160.0	21 04.3	98	20	160.1	20 34.9	98	20	160.2	20 05.5	98	20	160.3	19 36.2	98	20	160.5	19 06.8	98	20	160.6	18 37.4	98	20	160.7	9
20	21 50.6	98	22	158.9	21 21.3	98	22	159.0	20 52.0	98	21	159.1	20 22.7	98	21	159.2	19 53.4	98	21	159.3	19 24.1	98	21	159.4	18 54.8	98	21	159.6	18 25.4	98	21	159.7	20
1	21 37.6	97	23	157.8	21 08.3	97	23	158.0	20 39.1	97	22	158.1	20 09.9	97	22	158.2	19 40.7	97	22	158.3	19 11.4	97	22	158.4	18 42.2	97	22	158.6	18 12.9	98	22	158.7	1
2	21 24.0	97	24	156.8	20 54.8	97	24	157.0	20 25.7	97	23	157.1	19 56.5	97	23	157.2	19 27.3	97	23	157.3	18 58.2	97	23	157.4	18 29.0	97	23	157.6	17 59.8	97	23	157.7	2
3	21 09.8	97	25	155.8	20 40.7	97	24	155.9	20 11.7	97	24	156.1	19 42.6	97	24	156.2	19 13.5	97	24	156.3	18 44.4	97	24	156.5	18 15.3	97	24	156.6	17 46.1	97	24	156.7	3
4	20 55.1	97	26	154.8	20 26.1	97	25	154.9	19 57.1	97	25	155.1	19 28.0	97	25	155.2	18 59.0	97	25	155.3	18 30.0	97	25	155.5	18 01.0	97	25	155.6	17 31.9	97	25	155.7	4
25	20 39.8	96	26	153.8	20 10.8	96	26	153.9	19 41.9	96	26	154.1	19 13.0	96	26	154.2	18 44.0	96	26	154.3	18 15.1	97	26	154.5	17 46.1	97	26	154.6	17 17.2	97	26	154.8	25
6	20 23.9	96	27	152.8	19 55.1	96	27	152.9	19 26.2	96	27	153.1	18 57.4	96	27	153.2	18 28.5	96	27	153.4	17 59.6	96	27	153.5	17 30.7	96	27	153.6	17 01.8	96	26	153.8	6
7	20 07.5	96	28	151.8	19 38.7	96	28	151.9	19 10.0	96	28	152.1	18 41.2	96	28	152.2	18 12.4	96	28	152.4	17 43.6	96	28	152.5	17 14.8	96	27	152.7	16 46.0	96	27	152.8	7
8	19 50.6	96	29	150.8	19 21.9	96	29	150.9	18 53.2	96	29	151.1	18 24.5	96	29	151.2	17 55.8	96	29	151.4	17 27.1	96	28	151.5	16 58.3	96	28	151.7	16 29.6	96	28	151.8	8
9	19 33.1	95	30	149.8	19 04.5	95	30	149.9	18 35.9	95	30	150.1	18 07.3	95	30	150.3	17 38.6	95	29	150.4	17 10.0	95	29	150.6	16 41.4	95	29	150.7	16 12.7	95	29	150.9	9
30	19 15.1	95	31	148.8	18 46.6	95	31	149.0	18 18.0	95	31	149.1	17 49.5	95	30	149.3	17 21.0	95	30	149.5	16 52.4	95	30	149.6	16 23.9	95	30	149.8	15 55.3	95	30	149.9	30
1	18 56.5	95	32	147.8	18 28.1	95	32	148.0	17 59.7	95	31	148.2	17 31.2	95	31	148.3	17 02.8	95	31	148.5	16 34.3	95	31	148.7	16 05.9	95	31	148.8	15 37.4	95	31	149.0	1
2	18 37.5	94	33	146.8	18 09.2	94	32	147.0	17 40.8	95	32	147.2	17 12.5	95	32	147.4	16 44.1	95	32	147.5	16 15.7	95	32	147.7	15 47.3	95	32	147.9	15 19.0	95	32	148.0	2
3	18 18.0	94	33	145.9	17 49.7	94	33	146.0	17 21.5	94	33	146.2	16 53.2	94	33	146.4	16 24.9	94	33	146.6	15 56.6	94	33	146.7	15 28.3	94	32	146.9	15 00.0	94	32	147.1	3
4	17 57.9	94	34	144.9	17 29.8	94	34	145.1	17 01.6	94	34	145.3	16 33.4	94	34	145.4	16 05.2	94	34	145.6	15 37.0	94	33	145.8	15 08.8	94	33	146.0	14 40.6	94	33	146.1	4
35	17 37.4	94	35	143.9	17 09.3	94	35	144.1	16 41.3	94	35	144.3	16 13.2	94	35	144.5	15 45.1	94	34	144.7	15 17.0	94	34	144.9	14 48.9	94	34	145.0	14 20.7	94	34	145.2	35
6	17 16.4	93	36	143.0	16 48.4	93	36	143.2	16 20.5	93	35	143.4	15 52.5	93	35	143.5	15 24.5	93	35	143.7	14 56.4	93	35	143.9	14 28.4	93	35	144.1	14 00.4	93	35	144.3	6
7	16 54.9	93	37	142.0	16 27.1	93	36	142.2	15 59.2	93	36	142.4	15 31.3	93	36	142.6	15 03.4	93	36	142.8	14 35.4	93	36	143.0	14 07.5	93	36	143.2	13 39.6	93	35	143.4	7
8	16 33.0	93	37	141.1	16 05.2	93	37	141.3	15 37.4	93	37	141.5	15 09.6	93	37	141.7	14 41.8	93	37	141.9	14 14.0	93	37	142.1	13 46.1	93	36	142.2	13 18.3	93	36	142.4	8
9	16 10.6	92	38	140.1	15 42.9	92	38	140.3	15 15.2	92	38	140.5	14 47.5	92	38	140.7	14 19.8	92	37	140.9	13 52.1	92	37	141.1	13 24.3	92	37	141.3	12 56.6	93	37	141.5	9
40	15 47.8	92	39	139.2	15 20.2	92	39	139.4	14 52.6	92	33	139.6	14 25.0	92	38	139.8	13 57.4	92	38	140.0	13 29.7	92	38	140.2	13 02.1	92	38	140.4	12 34.4	92	38	140.6	40
1	15 24.5	92	39	138.3	14 57.0	92	39	138.5	14 29.5	92	39	138.7	14 02.0	92	39	138.9	13 34.5	92	39	139.1	13 06.9	92	39	139.3	12 39.4	92	39	139.5	12 11.8	92	38	139.7	1
2	15 00.9	91	40	137.3	14 33.5	91	40	137.6	14 06.0	91	40	137.8	13 38.6	91	40	138.0	13 11.2	91	40	138.2	12 43.7	92	39	138.4	12 16.3	92	39	138.6	11 48.8	92	39	138.8	2
3	14 36.8	91	41	136.4	14 09.4	91	41	136.6	13 42.1	91	41	136.8	13 14.8	91	40	137.1	12 47.4	91	40	137.3	12 20.1	91	40	137.5	11 52.7	91	40	137.7	11 25.4	91	40	137.9	3
4	14 12.2	91	42	135.5	13 45.0	91	41	135.7	13 17.8	91	41	135.9	12 50.6	91	41	136.1	12 23.3	91	41	136.4	11 56.1	91	41	136.6	11 28.8	91	41	136.8	11 01.5	91	40	137.0	4
45	13 47.3	90	42	134.6	13 20.2	90	42	134.8	12 53.1	90	42	135.0	12 25.9	90	42	135.2	11 58.8	91	42	135.5	11 31.6	91	41	135.7	11 04.4	91	41	135.9	10 37.3	91	41	136.1	45
6	13 22.0	90	43	133.7	12 55.0	90	43	133.9	12 27.9	90	43	134.1	12 00.9	90	42	134.3	11 33.8	90	42	134.6	11 06.8	90	42	134.8	10 39.7	90	42	135.0	10 12.6	90	42	135.2	6
7	12 56.3	90	43	132.8	12 29.4	90	43	133.0	12 02.4	90	43	133.2	11 35.5	90	43	133.5	11 08.5	90	43	133.7	10 41.6	90	43	133.9	10 14.6	90	42	134.1	9 47.6	90	42	134.3	7
8	12 30.2	89	44	131.9	12 03.4	89	44	132.1	11 36.6	90	44	132.3	11 09.7	90	44	132.6	10 42.8	90	43	132.8	10 16.0	90	43	133.0	9 49.1	90	43	133.2	9 22.2	90	43	133.5	8
9	12 03.8	89	45	131.0	11 37.1	89	44	131.2	11 10.3	89	44	131.4	10 43.5	89	44	131.7	10 16.8	89	44	131.9	9 50.0	89	44	132.1	9 23.2	89	44	132.4	8 56.4	89	44	132.6	9
50	11 37.0	89	45	130.1	11 10.3	89	45	130.3	10 43.7	89	45	130.6	10 17.0	89	45	130.8	9 50.3	89	45	131.0	9 23.6	89	44	131.3	8 57.0	89	44	131.5	8 30.2	89	44	131.7	50
1	11 09.8	88	46	129.2	10 43.3	89	46	129.4	10 16.7	89	46	129.7	9 50.1	89	45	129.9	9 23.6	89	45	130.2	8 57.0	89	45	130.4	8 30.4	89	45	130.6	8 03.7	89	45	130.9	1
2	10 42.3	88	46	128.3	10 15.9	88	46	128.6	9 49.4	88	46	128.8	9 22.9	88	46	129.0	8 56.4	88	46	129.3	8 29.9	88	46	129.5	8 03.4	88	45	129.8	7 36.9	88	45	130.0	2
3	10 14.5	88	47	127.5	9 48.1	88	47	127.7	9 21.8	88	47	127.9	8 55.4	88	46	128.2	8 29.0	88	46	128.4	8 02.6	88	46	128.7	7 36.1	88	46	128.9	7 09.7	88	46	129.1	3
4	9 46.4	88	47	126.6	9 20.1	88	47	126.8	8 53.8	88	47	127.1	8 27.5	88	47	127.3	8 01.2	88	47	127.6	7 34.9	88	47	127.8	7 08.5	88	47	128.0	6 42.2	88	46	128.3	4
55	9 17.9	87	48	125.7	8 51.7	87	48	126.0	8 25.5	87	48	126.2	7 59.3	87	48	126.5	7 33.1	87	47	126.7	7 06.8	87	47	126.9	6 40.6	87	47	127.2	6 14.3	87	47	127.4	55
6	8 49.1	87	48	124.9	8 23.0	87	48	125.1	7 56.9	87	48	125.4	7 30.8	87	48	125.6	7 04.6	87	48	125.8	6 38.5	87	48	126.1	6 12.3	87	48	126.3	5 46.2	87	47	126.6	6
7	8 20.0	87	49	124.0	7 54.0	87	49	124.2	7 28.0	87	49	124.5	7 01.9	87	49	124.7	6 35.9	87	48	125.0	6 09.8	87	48	125.2	5 43.8	87	48	125.5	5 17.7	87	48	125.7	7
8	7 50.6	86	49	123.1	7 24.7	86	49	123.4	6 58.7	86	49	123.6	6 32.8	87	49	123.9	6 06.8	87	49	124.2	5 40.9	87	49	124.4	5 14.9	87	49	124.7					8
9	7 20.9	86	50	122.3	6 55.1	86	50	122.5	6 29.2	86	50	122.8	6 03.4	86	50	123.1	5 37.5	86	49	123.3	5 11.6	86	49	123.6									9
60	6 51.0	86	50	121.4	6 25.2	86	50	121.7	5 59.5	86	50	122.0	5 33.7	86	50	122.2	5 07.9	86	50	122.5													60
1	6 20.8	86	51	120.6	5 55.1	86	51	120.9	5 29.4	86	51	121.1	5 03.7	86	50	121.4																	1
2	5 50.3	85	51	119.8	5 24.7	85	51	120.0																									2
3	5 19.5	85	52	118.9																													3

Lat. 55°

Lat. 56°

Lat. 57

Lat. 58

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	9 06.0	80	58	82.1	9 30.1	80	58	81.8	9 54.2	80	58	81.5	10 18.3	80	58	81.2	10 42.3	80	58	80.9	11 06.4	80	58	80.6	11 30.4	80	58	80.3	11 54.4	80	58	80.0	91
2	8 31.1	80	58	81.3	8 55.3	80	58	81.0	9 19.4	80	58	80.7	9 43.5	80	58	80.4	10 07.6	80	58	80.1	10 31.6	80	58	79.8	10 55.7	80	58	79.5	11 19.7	80	58	79.2	2
3	7 56.3	81	58	80.5	8 20.5	81	58	80.2	8 44.6	80	58	79.9	9 08.8	80	58	79.6	9 32.9	80	58	79.3	9 57.0	80	58	79.0	10 21.0	80	58	78.7	10 45.1	80	58	78.4	3
4	7 21.6	81	58	79.7	7 45.8	81	58	79.4	8 09.9	81	58	79.1	8 34.1	81	58	78.8	8 58.3	80	58	78.5	9 22.4	80	57	78.2	9 46.5	80	57	77.9	10 10.6	80	57	77.6	4
95	6 46.9	81	58	78.9	7 11.2	81	58	78.6	7 35.4	81	57	78.3	7 59.6	81	57	78.0	8 23.8	81	57	77.7	8 47.9	81	57	77.4	9 12.1	81	57	77.1	9 36.2	80	57	76.8	95
6	6 12.4	81	57	78.1	6 36.6	81	57	77.8	7 00.9	81	57	77.5	7 25.1	81	57	77.2	7 49.3	81	57	76.9	8 13.6	81	57	76.6	8 37.8	81	57	76.3	9 02.0	81	57	76.0	6
7	5 37.9	81	57	77.3	6 02.2	81	57	77.0	6 26.5	81	57	76.7	6 50.8	81	57	76.4	7 15.1	81	57	76.1	7 39.3	81	57	75.8	8 03.6	81	57	75.5	8 27.8	81	57	75.2	7
8	5 03.6	81	57	76.5	5 27.9	81	57	76.2	5 52.2	81	57	75.9	6 16.6	81	57	75.6	6 40.9	81	57	75.3	7 05.2	81	57	75.0	7 29.5	81	57	74.7	7 53.7	81	57	74.4	8
9									5 18.1	81	57	75.1	5 42.5	81	57	74.8	6 06.8	81	57	74.5	6 31.2	81	56	74.2	6 55.5	81	56	74.0	7 19.8	81	56	73.7	9
100													5 08.5	81	56	74.0	5 32.9	81	56	73.8	5 57.3	81	56	73.5	6 21.7	81	56	73.2	6 46.1	81	56	72.9	100
1																					5 23.6	81	56	72.7	5 48.0	81	56	72.4	6 12.4	81	56	72.1	1
																									5 14.5	82	56	71.6	5 39.0	82	56	71.3	2
																													5 05.6	82	55	70.5	3

Digitized by Google

Lat. 54°

H.A.	16° 00′ Alt.	Az.	16° 30′ Alt.	Az.	17° 00′ Alt.	Az.	17° 30′ Alt.	Az.	18° 00′ Alt.	Az.	18° 30′ Alt.	Az.	19° 00′ Alt.	Az.	19° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	52 00.0 1.0 01	180.0	52 30.0 1.0 01	180.0	53 00.0 1.0 01	180.0	53 30.0 1.0 01	180.0	54 00.0 1.0 01	180.0	54 30.0 1.0 01	180.0	55 00.0 1.0 01	180.0	55 30.0 1.0 01	180.0	00
1	51 59.5 1.0 02	178.4	52 29.5 1.0 02	178.4	52 59.5 1.0 02	178.4	53 29.5 1.0 02	178.4	53 59.5 1.0 02	178.4	54 29.5 1.0 03	178.4	54 59.5 1.0 03	178.4	55 29.5 1.0 03	178.3	1
2	51 58.1 1.0 04	176.9	52 28.1 1.0 04	176.9	52 58.0 1.0 04	176.8	53 28.0 1.0 04	176.8	53 58.0 1.0 04	176.8	54 28.0 1.0 04	176.7	54 58.0 1.0 04	176.7	55 28.0 1.0 04	176.7	2
3	51 55.7 1.0 06	175.3	52 25.6 1.0 06	175.3	52 55.6 1.0 06	175.2	53 25.6 1.0 06	175.2	53 55.5 1.0 06	175.2	54 25.5 1.0 06	175.1	54 55.4 1.0 06	175.1	55 25.4 1.0 06	175.0	3
4	51 52.3 1.0 07	173.8	52 22.3 1.0 07	173.7	52 52.2 1.0 07	173.7	53 22.1 1.0 07	173.6	53 52.0 1.0 07	173.5	54 22.0 1.0 07	173.5	54 51.9 1.0 08	173.4	55 21.8 1.0 08	173.4	4
05	51 48.0 1.0 09	172.2	52 17.9 1.0 09	172.1	52 47.8 1.0 09	172.1	53 17.7 1.0 09	172.0	53 47.6 1.0 09	171.9	54 17.5 1.0 09	171.9	54 47.4 1.0 09	171.8	55 17.2 1.0 09	171.7	05
6	51 42.8 1.0 10	170.7	52 12.6 99 10	170.6	52 42.5 99 10	170.5	53 12.3 99 11	170.4	53 42.2 99 11	170.3	54 12.0 99 11	170.2	54 41.8 99 11	170.2	55 11.6 99 11	170.1	6
7	51 36.6 99 12	169.1	52 06.4 99 12	169.0	52 36.2 99 12	168.9	53 06.0 99 12	168.8	53 35.7 99 12	168.7	54 05.5 99 12	168.6	54 35.3 99 12	168.5	55 05.1 99 13	168.4	7
8	51 29.5 99 13	167.6	51 59.2 99 14	167.5	52 28.9 99 14	167.4	52 58.7 99 14	167.3	53 28.4 99 14	167.2	53 58.1 99 14	167.0	54 27.8 99 14	166.9	54 57.5 99 14	166.8	8
9	51 21.4 99 15	166.1	51 51.1 99 15	165.9	52 20.8 99 15	165.8	52 50.4 99 15	165.7	53 20.1 99 15	165.6	53 49.7 99 16	165.4	54 19.3 99 16	165.3	54 49.0 99 16	165.2	9
10	51 12.5 99 16	164.5	51 42.1 99 17	164.4	52 11.7 99 17	164.3	52 41.2 99 17	164.1	53 10.8 99 17	164.0	53 40.4 99 17	163.9	54 09.9 98 17	163.7	54 39.4 98 17	163.6	10
1	51 02.6 98 18	163.0	51 32.2 98 18	162.9	52 01.7 98 18	162.7	52 31.2 98 18	162.6	53 00.6 98 18	162.4	53 30.1 98 19	162.3	53 59.6 98 19	162.1	54 29.0 98 19	162.0	1
2	50 51.9 98 19	161.5	51 21.3 98 19	161.4	51 50.8 98 20	161.2	52 20.2 98 20	161.1	52 49.5 98 20	160.9	53 18.9 98 20	160.7	53 48.3 98 20	160.6	54 17.6 98 20	160.4	2
3	50 40.3 98 21	160.1	51 09.6 98 21	159.9	51 39.0 98 21	159.7	52 08.3 98 21	159.5	52 37.6 98 21	159.4	53 06.8 98 22	159.2	53 36.1 97 22	159.0	54 05.3 97 22	158.8	3
4	50 27.9 97 22	158.6	50 57.1 97 22	158.4	51 26.3 97 23	158.2	51 55.5 97 23	158.0	52 24.7 97 23	157.8	52 53.9 97 23	157.6	53 23.0 97 23	157.4	53 52.1 97 23	157.2	4
15	50 14.6 97 24	157.1	50 43.7 97 24	156.9	51 12.8 97 24	156.7	51 41.9 97 24	156.5	52 11.0 97 24	156.3	52 40.0 97 24	156.1	53 09.0 97 25	155.9	53 38.0 97 25	155.7	15
6	50 00.4 97 25	155.7	50 29.4 97 25	155.5	50 58.4 97 25	155.3	51 27.4 97 25	155.0	51 56.4 96 26	154.8	52 25.3 96 26	154.6	52 54.2 96 26	154.4	53 23.1 96 26	154.2	6
7	49 45.5 96 26	154.2	50 14.4 96 26	154.0	50 43.3 96 27	153.8	51 12.1 96 27	153.6	51 41.0 96 27	153.4	52 09.8 96 27	153.1	52 38.6 96 27	152.9	53 07.3 96 28	152.7	7
8	49 29.7 96 28	152.8	49 58.5 96 28	152.6	50 27.3 96 28	152.3	50 56.0 96 28	152.1	51 24.8 96 28	151.9	51 53.4 96 29	151.7	52 22.1 95 29	151.4	52 50.7 95 29	151.2	8
9	49 13.2 96 29	151.4	49 41.9 96 29	151.1	50 10.5 95 29	150.9	50 39.2 95 29	150.7	51 07.7 95 30	150.4	51 36.3 95 30	150.2	52 04.8 95 30	149.9	52 33.3 95 30	149.7	9
20	48 56.0 95 30	150.0	49 24.5 95 30	149.7	49 53.0 95 30	149.5	50 21.5 95 31	149.3	50 50.0 95 31	149.0	51 18.4 95 31	148.7	51 46.8 95 31	148.5	52 15.1 94 32	148.2	20
1	48 37.9 95 31	148.6	49 06.4 95 31	148.3	49 34.7 95 32	148.1	50 03.1 94 32	147.8	50 31.4 94 32	147.6	50 59.7 94 32	147.3	51 28.0 94 33	147.0	51 56.2 94 33	146.8	1
2	48 19.2 94 32	147.2	48 47.5 94 33	147.0	49 15.7 94 33	146.7	49 44.0 94 33	146.4	50 12.2 94 33	146.2	50 40.3 94 34	145.9	51 08.4 94 34	145.6	51 36.5 94 34	145.3	2
3	47 59.7 94 34	145.9	48 27.9 94 34	145.6	48 56.0 94 34	145.3	49 24.1 94 34	145.1	49 52.2 93 34	144.8	50 20.2 93 35	144.5	50 48.1 93 35	144.2	51 16.1 93 35	143.9	3
4	47 39.6 93 35	144.5	48 07.6 93 35	144.2	48 35.6 93 35	144.0	49 03.6 93 35	143.7	49 31.5 93 36	143.4	49 59.4 93 36	143.1	50 27.2 93 36	142.8	50 55.0 93 36	142.5	4
25	47 18.8 93 36	143.2	47 46.7 93 36	142.9	48 14.6 93 36	142.6	48 42.4 93 36	142.4	49 10.1 93 37	142.1	49 37.9 92 37	141.8	50 05.6 92 37	141.5	50 33.2 92 37	141.2	25
6	46 57.4 93 37	141.9	47 25.1 92 37	141.6	47 52.8 92 37	141.3	48 20.5 92 37	141.0	48 48.1 92 38	140.7	49 15.7 92 38	140.4	49 43.3 92 38	140.1	50 10.8 92 38	139.8	6
7	46 35.3 92 38	140.6	47 02.9 92 38	140.3	47 30.5 92 38	140.0	47 58.0 92 39	139.7	48 25.5 92 39	139.4	48 52.9 91 39	139.1	49 20.3 91 39	138.8	49 47.7 91 39	138.5	7
8	46 12.6 92 39	139.3	46 40.1 92 39	139.0	47 07.5 91 39	138.7	47 34.9 91 40	138.4	48 02.3 91 40	138.1	48 29.6 91 40	137.8	48 56.8 91 40	137.5	49 24.0 91 40	137.2	8
9	45 49.3 91 40	138.0	46 16.6 91 40	137.7	46 43.9 91 40	137.4	47 11.2 91 40	137.1	47 38.4 91 41	136.8	48 05.6 90 41	136.5	48 32.7 90 41	136.2	48 59.7 90 41	135.9	9
30	45 25.4 91 41	136.8	45 52.6 91 41	136.5	46 19.8 90 41	136.2	46 46.9 90 41	135.9	47 14.0 90 42	135.5	47 41.0 90 42	135.2	48 08.0 90 42	134.9	48 34.9 90 42	134.6	30
1	45 01.0 90 42	135.5	45 28.1 90 42	135.2	45 55.1 90 42	134.9	46 22.1 90 42	134.6	46 49.0 90 42	134.3	47 15.9 89 43	134.0	47 42.7 89 43	133.6	48 09.5 89 43	133.3	1
2	44 36.0 90 42	134.3	45 03.0 90 43	134.0	45 29.9 90 43	133.7	45 56.7 89 43	133.4	46 23.5 89 43	133.1	46 50.2 89 44	132.7	47 16.9 89 44	132.4	47 43.5 89 44	132.0	2
3	44 10.5 89 43	133.1	44 37.3 89 44	132.8	45 04.1 89 44	132.5	45 30.8 89 44	132.2	45 57.5 89 44	131.8	46 24.1 89 44	131.5	46 50.6 88 45	131.2	47 17.1 88 45	130.8	3
4	43 44.5 89 44	131.9	44 11.2 89 44	131.6	44 37.9 89 45	131.3	45 04.4 89 45	131.0	45 31.0 88 45	130.6	45 57.4 88 45	130.3	46 23.8 88 45	129.9	46 50.2 88 46	129.6	4
35	43 18.0 89 45	130.7	43 44.6 88 45	130.4	44 11.1 88 45	130.1	44 37.6 88 46	129.8	45 04.0 88 46	129.4	45 30.3 88 46	129.1	45 56.6 87 46	128.7	46 22.8 87 46	128.4	35
6	42 51.1 88 46	129.6	43 17.5 88 46	129.3	43 43.9 88 46	128.9	44 10.2 88 46	128.6	44 36.5 87 46	128.3	45 02.7 87 47	127.9	45 28.8 87 47	127.6	45 54.9 87 47	127.2	6
7	42 23.7 88 46	128.4	42 50.0 88 47	128.1	43 16.3 87 47	127.8	43 42.4 87 47	127.4	44 08.6 87 47	127.1	44 34.6 87 47	126.8	45 00.7 87 48	126.4	45 26.6 86 48	126.0	7
8	41 55.9 87 47	127.3	42 22.0 87 47	127.0	42 48.2 87 48	126.6	43 14.2 87 48	126.3	43 40.2 87 48	126.0	44 06.2 86 48	125.6	44 32.1 86 48	125.3	44 57.9 86 49	124.9	8
9	41 27.6 87 48	126.2	41 53.7 87 48	125.8	42 19.7 87 48	125.5	42 45.6 86 48	125.2	43 11.5 86 49	124.8	43 37.3 86 49	124.5	44 03.1 86 49	124.1	44 28.7 86 49	123.8	9
40	40 58.9 87 48	125.1	41 24.9 86 49	124.7	41 50.8 86 49	124.4	42 16.6 86 49	124.1	42 42.3 86 49	123.7	43 08.0 86 49	123.4	43 33.7 85 50	123.0	43 59.2 85 50	122.6	40
1	40 29.9 86 49	124.0	40 55.7 86 49	123.6	41 21.5 86 49	123.3	41 47.2 86 50	123.0	42 12.8 85 50	122.6	42 38.4 85 50	122.2	43 03.9 85 50	121.9	43 29.4 85 50	121.5	1
2	40 00.4 86 50	122.9	40 26.1 86 50	122.6	40 51.8 85 50	122.2	41 17.4 85 50	121.9	41 42.9 85 50	121.5	42 08.4 85 51	121.2	42 33.8 85 51	120.8	42 59.1 84 51	120.4	2
3	39 30.6 85 50	121.8	39 56.2 85 50	121.5	40 21.8 85 51	121.1	40 47.3 85 51	120.8	41 12.7 85 51	120.4	41 38.0 84 51	120.1	42 03.3 84 51	119.7	42 28.5 84 52	119.4	3
4	39 00.5 85 51	120.8	39 26.0 85 51	120.4	39 51.4 85 51	120.1	40 16.8 84 51	119.7	40 42.1 84 52	119.4	41 07.4 84 52	119.0	41 32.5 84 52	118.7	41 57.6 84 52	118.3	4
45	38 30.0 85 51	119.7	38 55.4 85 51	119.4	39 20.8 84 52	119.0	39 46.0 84 52	118.7	40 11.2 84 52	118.3	40 36.4 84 52	118.0	41 01.4 83 52	117.6	41 26.4 83 52	117.2	45
6	37 59.2 84 52	118.7	38 24.5 84 52	118.3	38 49.8 84 52	118.0	39 14.9 84 52	117.6	39 40.0 84 52	117.3	40 05.1 83 53	116.9	40 30.0 83 53	116.6	40 54.9 83 53	116.2	6
7	37 28.2 84 52	117.7	37 53.3 84 52	117.3	38 18.5 84 53	117.0	38 43.5 83 53	116.6	39 08.5 83 53	116.3	39 33.5 83 53	115.9	39 58.3 83 53	115.5	40 23.1 83 53	115.2	7
8	36 56.8 84 53	116.6	37 21.9 84 53	116.3	37 46.9 83 53	115.9	38 11.9 83 53	115.6	38 36.8 83 53	115.2	39 01.6 83 54	114.9	39 26.4 82 54	114.5	39 51.1 82 54	114.1	8
9	36 25.1 83 53	115.6	36 50.1 83 53	115.3	37 15.0 83 54	114.9	37 39.9 83 54	114.6	38 04.7 83 54	114.2	38 29.5 82 54	113.9	38 54.2 82 54	113.5	39 18.8 82 54	113.1	9
50	35 53.2 83 54	114.6	36 18.1 83 54	114.3	36 42.9 83 54	114.0	37 07.7 83 54	113.6	37 32.5 82 54	113.2	37 57.1 82 54	112.9	38 21.7 82 54	112.5	38 46.2 82 55	112.2	50
1	35 21.0 83 54	113.7	35 45.8 83 54	113.3	36 10.6 82 54	113.0	36 35.3 82 54	112.6	36 59.9 82 55	112.3	37 24.5 82 55	111.9	37 49.0 82 55	111.5	38 13.5 81 55	111.2	1
2	34 48.6 83 54	112.7	35 13.3 82 55	112.3	35 38.0 82 55	112.0	36 02.6 82 55	111.6	36 27.2 82 55	111.3	36 51.7 82 55	110.9	37 16.1 81 55	110.6	37 40.5 81 55	110.2	2
3	34 15.9 82 55	111.7	34 40.6 82 55	111.4	35 05.2 82 55	111.0	35 29.7 82 55	110.7	35 54.2 81 55	110.3	36 18.6 81 55	110.0	36 43.0 81 56	109.6	37 07.3 81 56	109.2	3
4	33 43.1 82 55	110.8	34 07.7 82 55	110.4	34 32.2 82 55	110.1	34 56.6 81 56	109.7	35 21.1 81 56	109.4	35 45.4 81 56	109.0	36 09.7 81 56	108.7	36 33.9 81 56	108.3	4
55	33 10.0 82 55	109.8	33 34.5 82 56	109.5	33 59.0 81 56	109.1	34 23.4 81 56	108.8	34 47.7 81 56	108.4	35 12.0 81 56	108.1	35 36.2 81 56	107.7	36 00.3 80 56	107.3	55
6	32 36.7 82 56	108.9	33 01.2 81 56	108.6	33 25.6 81 56	108.2	33 49.9 81 56	107.9	34 14.1 81 56	107.5	34 38.3 81 56	107.1	35 02.5 80 56	106.8	35 26.6 80 57	106.4	6
7	32 03.3 81 56	108.0	32 27.6 81 56	107.6	32 52.0 81 56	107.3	33 16.2 81 56	106.9	33 40.4 81 56	106.6	34 04.6 80 57	106.2	34 28.6 80 57	105.9	34 52.7 80 57	105.5	7
8	31 29.6 81 56	107.1	31 53.9 81 56	106.7	32 18.2 81 57	106.4	32 42.4 81 57	106.0	33 06.5 80 57	105.7	33 30.6 80 57	105.3	33 54.6 80 57	104.9	34 18.6 80 57	104.6	8
9	30 55.8 81 57	106.1	31 20.1 81 57	105.8	31 44.3 81 57	105.5	32 08.4 80 57	105.1	32 32.5 80 57	104.8	32 56.5 80 57	104.4	33 20.5 80 57	104.0	33 44.4 80 57	103.7	9
60	30 21.9 81 57	105.2	30 46.1 81 57	104.9	31 10.2 80 57	104.6	31 34.3 80 57	104.2	31 58.3 80 57	103.9	32 22.3 80 57	103.5	32 46.2 80 57	103.1	33 10.1 79 57	102.8	60
1	29 47.8 81 57	104.3	30 11.9 80 57	104.0	30 36.0 80 57	103.7	31 00.1 80 57	103.3	31 24.0 80 57	103.0	31 47.9 80 57	102.6	32 11.8 79 58	102.2	32 35.6 79 58	101.9	1
2	29 13.6 80 57	103.5	29 37.6 80 57	103.1	30 01.7 80 57	102.8	30 25.7 80 58	102.4	30 49.6 80 58	102.1	31 13.5 79 58	101.7	31 37.3 79 58	101.4	32 01.0 79 58	101.0	2
3	28 39.2 80 57	102.6	29 03.2 80 58	102.2	29 27.2 80 58	101.9	29 51.2 80 58	101.5	30 15.1 80 58	101.2	30 38.9 79 58	100.8	31 02.7 79 58	100.5	31 26.4 79 58	100.1	3
4	28 04.7 80 58	101.7	28 28.7 80 58	101.4	28 52.7 80 58	101.0	29 16.6 80 58	100.7	29 40.4 79 58	100.3	30 04.2 79 58	100.0	30 27.9 79 58	99.6	30 51.6 79 58	99.3	4
65	27 30.1 80 58	100.8	27 54.1 80 58	100.5	28 18.0 80 58	100.1	28 41.9 79 58	99.8	29 05.7 79 58	99.5	29 29.4 79 58	99.1	29 53.1 79 58	98.8	30 16.8 79 58	98.4	65
6	26 55.4 80 58	100.0	27 19.4 80 58	99.6	27 43.2 80 58	99.3	28 07.1 79 58	98.9	28 30.8 79 58	98.6	28 54.6 79 58	98.2	29 18.2 79 58	97.9	29 41.8 79 58	97.5	6
7	26 20.7 80 58	99.1	26 44.6 80 58	98.8	27 08.4 79 58	98.4	27 32.2 79 58	98.1	27 55.9 79 58	97.7	28 19.6 79 58	97.4	28 43.3 79 58	97.0	29 06.8 79 58	96.7	7
8	25 45.8 80 58	98.3	26 09.7 79 58	97.9	26 33.5 79 58	97.6	26 57.2 79 58	97.2	27 20.9 79 58	96.9	27 44.6 79 58	96.5	28 08.2 79 58	96.2	28 31.8 78 59	95.8	8
9	25 10.9 80 58	97.4	25 34.7 79 58	97.1	25 58.5 79 58	96.7	26 22.2 79 58	96.4	26 45.9 79 58	96.0	27 09.5 79 59	95.7	27 33.1 79 59	95.4	27 56.7 78 59	95.0	9
70	24 35.9 79 58	96.6	24 59.7 79 58	96.2	25 23.4 79 58	95.9	25 47.1 79 59	95.6	26 10.8 79 59	95.2	26 34.4 79 59	94.9	26 58.0 78 59	94.5	27 21.5 78 59	94.2	70
1	24 00.8 79 59	95.7	24 24.6 79 59	95.4	24 48.3 79 59	95.1	25 12.0 79 59	94.7	25 35.7 79 59	94.4	25 59.3 79 59	94.0	26 22.8 78 59	93.7	26 46.3 78 59	93.3	1
2	23 25.7 79 59	94.9	23 49.4 79 59	94.6	24 13.2 79 59	94.2	24 36.8 79 59	93.9	25 00.5 79 59	93.6	25 24.1 79 59	93.2	25 47.6 78 59	92.9	26 11.1 78 59	92.5	2
3	22 50.5 79 59	94.1	23 14.3 79 59	93.7	23 38.0 79 59	93.4	24 01.6 79 59	93.1	24 25.3 79 59	92.7	24 48.8 79 59	92.4	25 12.4 78 59	92.0	25 35.9 78 59	91.7	3
4	22 15.3 79 59	93.2	22 39.1 79 59	92.9	23 02.8 79 59	92.6	23 26.4 79 59	92.2	23 50.0 79 59	91.9	24 13.6 78 59	91.6	24 37.1 78 59	91.2	25 00.6 78 59	90.9	4
75	21 40.1 79 59	92.4	22 03.8 79 59	92.1	22 27.5 79 59	91.8	22 51.2 79 59	91.4	23 14.8 79 59	91.1	23 38.3 78 59	90.8	24 01.9 78 59	90.4	24 25.3 78 59	90.1	75
6	21 04.9 79 59	91.6	21 28.6 79 59	91.3	21 52.3 79 59	90.9	22 15.9 79 59	90.6	22 39.5 79 59	90.3	23 03.1 78 59	89.9	23 26.6 78 59	89.6	23 50.1 78 59	89.3	6
7	20 29.6 79 59	90.8	20 53.3 79 59	90.5	21 17.0 79 59	90.1	21 40.6 79 59	89.8	22 04.2 79 59	89.5	22 27.8 78 59	89.1	22 51.3 78 59	88.8	23 14.8 78 59	88.5	7
8	19 54.3 79 59	90.0	20 18.0 79 59	89.7	20 41.7 79 59	89.3	21 05.4 79 59	89.0	21 29.0 79 59	88.7	21 52.6 78 59	88.3	22 16.1 78 59	88.0	22 39.6 78 59	87.7	8
9	19 19.1 79 59	89.2	19 42.8 79 59	88.8	20 06.5 79 59	88.5	20 30.1 79 59	88.2	20 53.7 79 59	87.9	21 17.3 79 59	87.5	21 40.8 78 59	87.2	22 04.3 78 59	86.9	9
80	18 43.8 79 59	88.4	19 07.5 79 59	88.0	19 31.2 79 59	87.7	19 54.9 79 59	87.4	20 18.5 79 59	87.1	20 42.1 79 59	86.7	21 05.6 78 59	86.4	21 29.1 78 59	86.1	80
1	18 08.6 79 59	87.6	18 32.3 79 59	87.2	18 56.0 79 59	86.9	19 19.7 79 59	86.6	19 43.3 79 59	86.3	20 06.9 79 59	85.9	20 30.5 78 59	85.6	20 54.0 78 59	85.3	1
2	17 33.3 79 59	86.8	17 57.1 79 59	86.4	18 20.8 79 59	86.1	18 44.5 79 59	85.8	19 08.1 79 59	85.5	19 31.7 79 59	85.1	19 55.3 79 58	84.8	20 18.8 78 58	84.5	2
3	16 58.1 79 59	86.0	17 21.9 79 59	85.6	17 45.6 79 59	85.3	18 09.3 79 59	85.0	18 33.0 79 58	84.7	18 56.6 79 58	84.4	19 20.2 79 58	84.0	19 43.8 78 58	83.7	3
4	16 23.0 79 59	85.2	16 46.7 79 58	84.9	17 10.5 79 58	84.5	17 34.2 79 58	84.2	17 57.9 79 58	83.9	18 21.5 79 58	83.6	18 45.2 79 58	83.2	19 08.7 79 58	82.9	4
85	15 47.9 79 58	84.4	16 11.6 79 58	84.1	16 35.4 79 58	83.7	16 59.1 79 58	83.4	17 22.8 79 58	83.1	17 46.5 79 58	82.8	18 10.2 79 58	82.5	18 33.8 79 58	82.1	85
6	15 12.8 79 58	83.6	15 36.6 79 58	83.3	16 00.4 79 58	83.0	16 24.1 79 58	82.6	16 47.9 79 58	82.3	17 11.6 79 58	82.0	17 35.2 79 58	81.7	17 58.9 79 58	81.4	6
7	14 37.8 79 58	82.8	15 01.6 79 58	82.5	15 25.4 79 58	82.2	15 49.2 79 58	81.9	16 13.0 79 58	81.5	16 36.7 79 58	81.2	17 00.4 79 58	80.9	17 24.0 79 58	80.6	7
8	14 02.8 80 58	82.0	14 26.7 80 58	81.7	14 50.5 79 58	81.4	15 14.3 79 58	81.1	15 38.1 79 58	80.8	16 01.9 79 58	80.4	16 25.6 79 58	80.1	16 49.3 79 58	79.8	8
9	13 27.9 80 58	81.2	13 51.8 80 58	80.9	14 15.7 80 58	80.6	14 39.5 79 58	80.3	15 03.3 79 58	80.0	15 27.1 79 58	79.7	15 50.9 79 58	79.3	16 14.6 79 58	79.0	9
90	12 53.1 80 58	80.4	13 17.0 80 58	80.1	13 40.9 80 58	79.8	14 04.8 80 58	79.5	14 28.7 79 58	79.2	14 52.5 79 58	78.9	15 16.3 79 58	78.6	15 40.1 79 57	78.2	90

Digitized by Google

Lat. 54°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	20 00.0	1.0 01	180.0	19 30.0	1.0 01	180.0	19 00.0	1.0 01	180.0	18 30.0	1.0 01	180.0	18 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0	17 00.0	1.0 00	180.0	16 30.0	1.0 00	180.0	00
1	19 59.7	1.0 02	179.0	19 29.7	1.0 02	179.0	18 59.7	1.0 02	179.0	18 29.7	1.0 02	179.0	17 59.7	1.0 02	179.0	17 29.7	1.0 02	179.0	16 59.7	1.0 02	179.0	16 29.7	1.0 02	179.0	1
2	19 58.7	1.0 03	178.0	19 28.7	1.0 03	178.0	18 58.8	1.0 03	178.0	18 28.8	1.0 03	178.0	17 58.8	1.0 03	178.0	17 28.8	1.0 03	178.0	16 58.8	1.0 03	178.0	16 28.8	1.0 02	178.0	2
3	19 57.2	1.0 04	176.9	19 27.2	1.0 04	176.9	18 57.2	1.0 04	177.0	18 27.2	1.0 04	177.0	17 57.2	1.0 04	177.0	17 27.2	1.0 04	177.0	16 57.3	1.0 04	177.0	16 27.3	1.0 04	177.1	3
4	19 55.0	1.0 05	175.9	19 25.0	1.0 05	175.9	18 55.0	1.0 05	176.0	18 25.1	1.0 05	176.0	17 55.1	1.0 05	176.0	17 25.1	1.0 05	176.0	16 55.1	1.0 05	176.0	16 25.2	1.0 05	176.1	4
05	19 52.1	1.0 06	174.9	19 22.2	1.0 06	174.9	18 52.2	1.0 06	174.9	18 22.3	1.0 06	175.0	17 52.3	1.0 06	175.0	17 22.4	1.0 06	175.0	16 52.4	1.0 06	175.1	16 22.4	1.0 06	175.1	05
6	19 48.7	1.0 07	173.9	19 18.7	1.0 07	173.9	18 48.8	1.0 07	173.9	18 18.9	1.0 07	174.0	17 48.9	1.0 07	174.0	17 19.0	1.0 07	174.0	16 49.1	1.0 07	174.1	16 19.1	1.0 07	174.1	6
7	19 44.6	1.0 08	172.8	19 14.7	1.0 08	172.9	18 44.8	1.0 08	172.9	18 14.9	1.0 08	173.0	17 44.9	1.0 08	173.0	17 15.0	1.0 08	173.0	16 45.1	1.0 08	173.1	16 15.2	1.0 08	173.1	7
8	19 39.9	1.0 09	171.8	19 10.0	1.0 09	171.9	18 40.1	1.0 09	171.9	18 10.2	1.0 09	172.0	17 40.4	1.0 09	172.0	17 10.5	1.0 09	172.1	16 40.6	1.0 09	172.1	16 10.7	1.0 09	172.1	8
9	19 34.6	1.0 10	170.8	19 04.7	1.0 10	170.9	18 34.9	1.0 10	170.9	18 05.0	1.0 10	171.0	17 35.2	1.0 10	171.0	17 05.3	1.0 10	171.1	16 35.4	1.0 10	171.1	16 05.6	1.0 10	171.2	9
10	19 28.6	99 11	169.8	18 58.8	99 11	169.9	18 29.0	99 11	169.9	17 59.2	99 11	170.0	17 29.3	99 11	170.0	16 59.5	99 11	170.1	16 29.7	99 11	170.1	15 59.9	99 10	170.2	10
1	19 22.1	99 12	168.8	18 52.3	99 12	168.9	18 22.5	99 12	168.9	17 52.7	99 12	169.0	17 22.9	99 12	169.0	16 53.1	99 12	169.1	16 23.4	99 12	169.2	15 53.6	99 11	169.2	1
2	19 14.9	99 13	167.8	18 45.2	99 13	167.8	18 15.4	99 13	167.9	17 45.7	99 13	168.0	17 15.9	99 13	168.0	16 46.2	99 13	168.1	16 16.4	99 13	168.2	15 46.7	99 12	168.2	2
3	19 07.2	99 14	166.8	18 37.5	99 14	166.8	18 07.8	99 14	166.9	17 38.0	99 14	167.0	17 08.3	99 14	167.1	16 38.6	99 14	167.1	16 08.9	99 14	167.2	15 39.2	99 13	167.3	3
4	18 58.8	99 15	165.8	18 29.1	99 15	165.8	17 59.5	99 15	165.9	17 29.8	99 15	166.0	17 00.1	99 15	166.1	16 30.5	99 15	166.2	16 00.8	99 14	166.2	15 31.1	99 14	166.3	4
15	18 49.8	99 16	164.8	18 20.2	99 16	164.8	17 50.6	99 16	164.9	17 21 0	99 16	165.0	16 51.4	99 16	165.1	16 21.7	99 16	165.2	15 52.1	99 15	165.3	15 22.5	99 15	165.3	15
6	18 40.3	99 17	163.8	18 10.7	99 17	163.8	17 41.1	99 17	163.9	17 11.6	99 17	164.0	16 42.0	99 17	164.1	16 12.4	99 16	164.2	15 42.9	99 16	164.3	15 13.3	99 16	164.4	6
7	18 30.1	98 18	162.8	18 00.6	98 18	162.9	17 31.1	98 18	163.0	17 01.6	98 18	163.0	16 32.1	98 18	163.1	16 02.5	98 17	163.2	15 33.0	98 17	163.3	15 03.5	98 17	163.4	7
8	18 19.4	98 19	161.8	17 49.9	98 19	161.9	17 20.5	98 19	162.0	16 51.0	98 19	162.1	16 21.5	98 18	162.2	15 52.1	98 18	162.3	15 22.6	98 18	162.4	14 53.2	98 18	162.5	8
9	18 08.0	98 20	160.8	17 38.6	98 20	160.9	17 09.3	98 20	161.0	16 39.9	98 20	161.1	16 10.5	98 19	161.2	15 41.1	98 19	161.3	15 11.7	98 19	161.4	14 42.3	98 19	161.5	9
20	17 56.1	98 21	159.8	17 26.8	98 21	159.9	16 57.5	98 21	160.0	16 28.1	98 20	160.1	15 58.8	98 20	160.2	15 29.5	98 20	160.3	15 00.1	98 20	160.4	14 30.8	98 20	160.5	20
1	17 43.7	98 22	158.8	17 14.4	98 22	158.9	16 45.1	98 22	159.0	16 15.9	98 21	159.1	15 46.6	98 21	159.3	15 17.3	98 21	159.4	14 48.0	98 21	159.5	14 18.8	98 21	159.6	1
2	17 30.6	97 23	157.8	17 01.4	97 23	157.9	16 32.2	97 22	158.1	16 03.0	97 22	158.2	15 33.8	97 22	158.3	15 04.6	97 22	158.4	14 35.4	97 22	158.5	14 06.2	97 22	158.6	2
3	17 17.0	97 24	156.8	16 47.9	97 23	157.0	16 18.8	97 23	157.1	15 49.6	97 23	157.2	15 20.5	97 23	157.3	14 51.4	97 23	157.5	14 22.2	97 23	157.6	13 53.1	97 23	157.7	3
4	17 02.9	97 24	155.9	16 33.8	97 24	156.0	16 04.8	97 24	156.1	15 35.7	97 24	156.3	15 06.7	97 24	156.4	14 37.6	97 24	156.5	14 08.5	97 24	156.6	13 39.4	97 24	156.8	4
25	16 48.2	97 25	154.9	16 19.2	97 25	155.0	15 50.2	97 25	155.2	15 21.2	97 25	155.3	14 52.3	97 25	155.4	14 23.3	97 25	155.6	13 54.3	97 25	155.7	13 25.3	97 24	155.8	25
6	16 32.9	96 26	153.9	16 04.0	96 26	154.1	15 35.1	96 26	154.2	15 06.2	96 26	154.3	14 37.3	96 26	154.5	14 08.4	96 26	154.6	13 39.5	96 26	154.8	13 10.6	96 25	154.9	6
7	16 17.2	96 27	153.0	15 48.4	96 27	153.1	15 19.5	96 27	153.2	14 50.7	96 27	153.4	14 21.9	96 27	153.5	13 53.0	96 26	153.7	13 24.2	96 26	153.8	12 55.3	96 26	154.0	7
8	16 00.9	96 28	152.0	15 32.1	96 28	152.1	15 03.4	96 28	152.3	14 34.6	96 28	152.4	14 05.9	96 27	152.6	13 37.1	96 27	152.7	13 08.4	96 27	152.9	12 39.6	96 27	153.0	8
9	15 44.1	96 29	151.0	15 15.4	96 29	151.2	14 46.7	96 29	151.3	14 18.1	96 28	151.5	13 49.4	96 28	151.7	13 20.7	96 28	151.8	12 52.0	96 28	152.0	12 23.3	96 28	152.1	9
30	15 26.7	95 30	150.1	14 58.2	95 30	150.2	14 29.6	95 29	150.4	14 01.0	95 29	150.6	13 32.4	95 29	150.7	13 03.8	95 29	150.9	12 35.2	95 29	151.0	12 06.6	95 29	151.2	30
1	15 08.9	95 31	149.1	14 40.4	95 30	149.3	14 11.9	95 30	149.5	13 43.4	95 30	149.6	13 14.9	95 30	149.8	12 46.4	95 30	149.9	12 17.9	95 30	150.1	11 49.3	95 30	150.3	1
2	14 50.6	95 31	148.2	14 22.2	95 31	148.4	13 53.7	95 31	148.5	13 25.3	95 31	148.7	12 56.9	95 31	148.9	12 28.5	95 31	149.0	12 00.0	95 30	149.2	11 31.6	95 30	149.3	2
3	14 31.7	94 32	147.3	14 03.4	94 32	147.4	13 35.1	94 32	147.6	13 06.8	94 32	147.8	12 38.4	94 32	147.9	12 10.1	94 31	148.1	11 41.7	95 31	148.3	11 13.4	95 31	148.4	3
4	14 12.4	94 33	146.3	13 44.2	94 33	146.5	13 16.0	94 33	146.7	12 47.7	94 33	146.8	12 19.5	94 32	147.0	11 51.2	94 32	147.2	11 22.9	94 32	147.4	10 54.7	94 32	147.5	4
35	13 52.6	94 34	145.4	13 24.5	94 34	145.6	12 56.3	94 33	145.7	12 28.2	94 33	145.9	12 00.0	94 33	146.1	11 31.9	94 33	146.3	11 03.7	94 33	146.5	10 35.5	94 33	146.6	35
6	13 32.4	93 35	144.5	13 04.3	93 34	144.6	12 36.3	94 34	144.8	12 08.2	94 34	145.0	11 40.1	94 34	145.2	11 12.1	94 34	145.4	10 44.0	94 34	145.6	10 15.9	94 33	145.7	6
7	13 11.6	93 35	143.5	12 43.7	93 35	143.7	12 15.7	93 35	143.9	11 47.7	93 35	144.1	11 19.8	93 35	144.3	10 51.8	93 35	144.5	10 23.8	93 34	144.7	9 55.8	93 34	144.8	7
8	12 50.4	93 36	142.6	12 22.6	93 36	142.8	11 54.7	93 36	143.0	11 26.8	93 36	143.2	10 59.0	93 35	143.4	10 31.1	93 35	143.6	10 03.2	93 35	143.8	9 35.3	93 35	143.9	8
9	12 28.8	93 37	141.7	12 01.1	93 37	141.9	11 33.3	93 36	142.1	11 05.5	93 36	142.3	10 37.7	93 36	142.5	10 09.9	93 36	142.7	9 42.1	93 36	142.9	9 14.3	93 36	143.1	9
40	12 06.7	92 38	140.8	11 39.1	92 37	141.0	11 11.4	92 37	141.2	10 43.7	92 37	141.4	10 16.0	92 37	141.6	9 48.3	92 37	141.8	9 20.6	92 37	142.0	8 52.9	92 36	142.2	40
1	11 44.2	92 38	139.9	11 16.7	92 38	140.1	10 49.1	92 38	140.3	10 21.5	92 38	140.5	9 53.9	92 38	140.7	9 26.3	92 37	140.9	8 58.7	92 37	141.1	8 31.0	92 37	141.3	1
2	11 21.3	92 39	139.0	10 53.8	92 39	139.2	10 26.3	92 39	139.4	9 58.8	92 38	139.6	9 31.3	92 38	139.8	9 03.8	92 38	140.0	8 36.3	92 38	140.2	8 08.8	92 38	140.4	2
3	10 58.0	91 40	138.1	10 30.6	91 39	138.3	10 03.2	91 39	138.5	9 35.8	91 39	138.7	9 08.4	91 39	138.9	8 41.0	91 39	139.1	8 13.5	91 39	139.3	7 46.1	91 38	139.5	3
4	10 34 2	91 40	137.2	10 06.9	91 40	137.4	9 39.6	91 40	137:6	9 12.3	91 40	137.8	8 45.0	91 40	138.1	8 17.7	91 39	138.3	7 50.3	91 39	138.5	7 23.0	91 39	138.7	4
45	10 10.1	91 41	136.3	9 42.9	91 41	136.5	9 15.7	91 41	136.8	8 48.4	91 40	137.0	8 21.2	91 40	137.2	7 54.0	91 40	137.4	7 26.8	91 40	137.6	6 59.5	91 40	137.8	45
6	9 45.5	90 42	135.4	9 18.4	90 41	135.7	8 51.3	90 41	135.9	8 24.2	90 41	136.1	7 57.1	90 41	136.3	7 29.9	90 41	136.5	7 02.8	90 41	136.7	6 35.6	90 40	137.0	6
7	9 20.6	90 42	134.6	8 53.6	90 42	134.8	8 26.6	90 42	135.0	7 59.5	90 42	135.2	7 32.5	90 42	135.4	7 05.5	90 41	135.7	6 38.4	90 41	135.9	6 11.4	90 41	136.1	7
8	8 55.3	90 43	133.7	8 28.4	90 43	133.9	8 01.4	90 42	134.1	7 34.5	90 42	134.4	7 07.6	90 42	134.6	6 40.6	90 42	134.8	6 13.7	90 42	135.0	5 46.7	90 42	135.2	8
9	8 29.6	89 43	132.8	8 02.8	89 43	133.0	7 35.9	89 43	133.3	7 09.1	89 43	133.5	6 42.3	89 43	133.7	6 15.4	89 43	133.9	5 48.6	90 42	134.2	5 21.7	90 42	134.4	9
50	8 03.5	89 44	132.0	7 36.8	89 44	132.2	7 10.1	89 44	132.4	6 43.3	89 44	132.6	6 16.6	89 43	132.9	5 49.9	89 43	133.1	5 23.1	89 43	133.3				50
1	7 37.1	89 45	131.1	7 10.5	89 44	131.3	6 43.9	89 44	131.6	6 17.2	89 44	131.8	5 50.6	89 44	132.0	5 23.9	89 44	132 2							1
2	7 10.4	88 45	130.2	6 43.8	88 45	130.5	6 17.3	88 45	130.7	5 50.7	88 45	130.9	5 24.2	89 44	131.2										2
3	6 43.3	88 46	129.4	6 16.8	88 46	129.6	5 50.4	88 45	129.8	5 23.9	88 45	130.1													3
4	6 15.8	88 46	128.5	5 49.5	88 46	128.8	5 23.1	88 46	129.0																4
55	5 48.1	88 47	127.7	5 21.8	88 47	127.9																			55
6	5 20.0	87 47	126.8																						6

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	12 18.4	80 58	79.6	12 42.3	80 58	79.3	13 06.3	80 58	79.0	13 30.2	80 58	78.7	13 54.1	80 58	78.4	14 17.9	80 57	78.1	14 41.8	79 57	77.8	15 05.6	79 57	77.5	91
2	11 43.7	80 58	78.9	12 07.7	80 58	78.6	12 31.7	80 57	78.2	12 55.6	80 57	77.9	13 19.6	80 57	77.6	13 43.5	80 57	77.3	14 07.3	80 57	77.0	14 31.2	79 57	76.7	2
3	11 09.2	80 57	78.1	11 33.2	80 57	77.8	11 57.2	80 57	77.5	12 21.2	80 57	77.2	12 45.2	80 57	76.8	13 09.1	80 57	76.5	13 33.0	80 57	76.2	13 56.9	80 57	75.9	3
4	10 34.7	80 57	77.3	10 58.8	80 57	77.0	11 22.8	80 57	76.7	11 46.9	80 57	76.4	12 10.9	80 57	76.1	12 34.9	80 57	75.8	12 58.8	80 57	75.5	13 22.8	80 57	75.1	4
95	10 00.4	80 57	76.5	10 24.5	80 57	76.2	10 48.6	80 57	75.9	11 12.6	80 57	75.6	11 36.7	80 57	75.3	12 00.7	80 57	75.0	12 24.8	80 56	74.7	12 48.8	80 56	74.4	95
6	9 26.1	81 57	75.7	9 50.3	80 57	75.4	10 14.4	80 57	75.1	10 38.5	80 57	74.8	11 02.7	80 57	74.5	11 26.7	80 56	74.2	11 50.8	80 56	73.9	12 14.9	80 56	73.6	6
7	8 52.0	81 57	74.9	9 16.2	81 57	74.6	9 40.4	81 56	74.3	10 04.6	81 56	74.0	10 28.7	80 56	73.7	10 52.9	80 56	73.4	11 17.0	80 56	73.1	11 41.1	80 56	72.8	7
8	8 18.0	81 56	74.2	8 42.3	81 56	73.9	9 06.5	81 56	73.6	9 30.7	81 56	73.3	9 54.9	81 56	73.0	10 19.1	81 56	72.7	10 43.3	81 56	72.4	11 07.5	81 56	72.1	8
9	7 44.2	81 56	73.4	8 08.5	81 56	73.1	8 32.8	81 56	72.8	8 57.0	81 56	72.5	9 21.3	81 56	72.2	9 45.5	81 56	71.9	10 09.8	81 56	71.6	10 34.0	81 56	71.3	9
100	7 10.4	81 56	72.6	7 34.8	81 56	72.3	7 59.1	81 56	72.0	8 23.5	81 56	71.7	8 47.8	81 56	71.4	9 12.1	81 55	71.1	9 36.4	81 55	70.8	10 00.7	81 55	70.5	100
1	6 36.9	81 56	71.8	7 01.3	81 56	71.5	7 25.7	81 56	71.2	7 50.1	81 55	70.9	8 14.5	81 55	70.6	8 38.8	81 55	70.3	9 03.2	81 55	70.0	9 27.5	81 55	69.7	1
2	6 03.4	82 55	71.0	6 27.9	82 55	70.7	6 52.4	82 55	70.4	7 16.8	81 55	70.1	7 41.3	81 55	69.8	8 05.7	81 55	69.5	8 30.1	81 55	69.2	8 54.5	81 55	69.0	2
3	5 30.2	82 55	70.2	5 54.7	82 55	69.9	6 19.2	82 55	69.6	6 43.7	82 55	69.3	7 08.2	82 55	69.1	7 32.7	82 55	68.8	7 57.2	82 55	68.5	8 21.7	82 54	68.2	3
4				5 21.7	82 55	69.1	5 46.2	82 55	68.8	6 10.8	82 55	68.6	6 35.4	82 54	68.3	7 00.0	82 54	68.0	7 24.5	82 54	67.7	7 49.0	82 54	67.4	4
105							5 13.4	82 54	68.1	5 38.1	82 54	67.8	6 02.7	82 54	67.5	6 27.3	82 54	67.2	6 52.0	82 54	66.9	7 16.6	82 54	66.6	105
6										5 05.5	82 54	67.0	5 30.2	82 54	66.7	5 54.9	82 54	66.4	6 19.6	82 54	66.1	6 44.3	82 53	65.8	6
7																5 22.7	83 53	65.6	5 47.5	83 53	65.3	6 12.2	82 53	65.1	7
8																			5 15.5	83 53	64.6	5 40.3	83 53	64.3	8
9																						5 08.7	83 52	63.5	9

Digitized by Google

Lat. 54°

H.A.	20° 00′				20° 30′				21° 00′				21° 30′			
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	56 00.0	1.0	01	180.0	56 30.0	1.0	01	180.0	57 00.0	1.0	01	180.0	57 30.0	1.0	01	180.0
1	55 59.5	1.0	03	178.3	56 29.5	1.0	03	178.3	56 59.5	1.0	03	178.3	57 29.5	1.0	03	178.3
2	55 57.9	1.0	04	176.6	56 27.9	1.0	04	176.6	56 57.9	1.0	04	176.6	57 27.9	1.0	04	176.5
3	55 55.4	1.0	06	175.0	56 25.3	1.0	06	174.9	56 55.3	1.0	06	174.9	57 25.2	1.0	06	174.8
4	55 51.7	1.0	08	173.3	56 21.7	1.0	08	173.2	56 51.6	1.0	08	173.2	57 21.5	1.0	08	173.1
05	55 47.1	1.0	09	171.6	56 17.0	1.0	09	171.5	56 46.9	1.0	10	171.5	57 16.7	1.0	10	171.4
6	55 41.5	99	11	170.0	56 11.3	99	11	169.9	56 41.1	99	11	169.8	57 10.9	99	11	169.7
7	55 34.8	99	13	168.3	56 04.6	99	13	168.2	56 34.3	99	13	168.1	57 04.1	99	13	168.0
8	55 27.2	99	14	166.7	55 56.9	99	14	166.5	56 26.5	99	14	166.4	56 56.2	99	15	166.3
9	55 18.6	99	16	165.0	55 48.2	99	16	164.9	56 17.8	99	16	164.7	56 47.3	99	16	164.6
10	55 09.0	98	18	163.4	55 38.5	98	18	163.2	56 08.0	98	18	163.1	56 37.5	98	18	162.9
1	54 58.4	98	19	161.8	55 27.8	98	19	161.6	55 57.2	98	20	161.4	56 26.6	98	20	161.3
2	54 46.9	98	21	160.2	55 16.3	98	21	160.0	55 45.5	98	21	159.8	56 14.8	98	21	159.6
3	54 34.5	97	22	158.6	55 03.7	97	22	158.4	55 32.9	97	22	158.2	56 02.1	97	23	158.0
4	54 21.2	97	24	157.0	54 50.3	97	24	156.8	55 19.4	97	24	156.6	55 48.4	97	24	156.4
15	54 07.0	97	25	155.5	54 36.0	96	25	155.3	55 04.9	96	26	155.0	55 33.8	96	26	154.8
6	53 52.0	96	27	153.9	54 20.8	96	27	153.7	54 49.6	96	27	153.5	55 18.4	96	27	153.2
7	53 36.1	96	28	152.4	54 04.8	96	28	152.2	54 33.4	96	28	151.9	55 02.1	95	29	151.7
8	53 19.3	95	29	150.9	53 47.9	95	29	150.7	54 16.4	95	30	150.4	54 44.9	95	30	150.1
9	53 01.8	95	31	149.4	53 30.2	95	31	149.2	53 58.6	95	31	148.9	54 26.9	94	31	148.6
20	52 43.4	94	32	148.0	53 11.7	94	32	147.7	53 40.0	94	32	147.4	54 08.2	94	33	147.1
1	52 24.3	94	33	146.5	52 52.5	94	33	146.2	53 20.6	94	34	145.9	53 48.6	93	34	145.6
2	52 04.5	93	34	145.1	52 32.5	93	34	144.8	53 00.4	93	35	144.5	53 28.3	93	35	144.2
3	51 44.0	93	35	143.6	52 11.8	93	36	143.3	52 39.6	93	36	143.0	53 07.3	92	36	142.7
4	51 22.7	92	37	142.2	51 50.4	92	37	141.9	52 18.0	92	37	141.6	52 45.6	92	37	141.3
25	51 00.8	92	38	140.9	51 28.3	92	38	140.5	51 55.8	92	38	140.2	52 23.2	91	38	139.9
6	50 38.2	91	39	139.5	51 05.6	91	39	139.2	51 32.9	91	39	138.8	52 00.2	91	39	138.5
7	50 15.0	91	40	138.2	50 42.2	91	40	137.8	51 09.4	90	40	137.5	51 36.5	90	40	137.1
8	49 51.1	90	41	136.8	50 18.2	90	41	136.5	50 45.3	90	41	136.1	51 12.2	90	41	135.8
9	49 26.7	90	42	135.5	49 53.7	90	42	135.2	50 20.5	89	42	134.8	50 47.3	89	42	134.5
30	49 01.7	89	43	134.2	49 28.5	89	43	133.9	49 55.2	89	43	133.5	50 21.9	89	43	133.2
1	48 36.2	89	43	133.0	49 02.8	89	44	132.6	49 29.4	88	44	132.2	49 55.9	88	44	131.9
2	48 10.1	88	44	131.7	48 36.6	88	45	131.3	49 03.0	88	45	131.0	49 29.4	88	45	130.6
3	47 43.5	88	45	130.5	48 09.9	88	45	130.1	48 36.2	88	46	129.7	49 02.4	87	46	129.4
4	47 16.4	87	46	129.2	47 42.7	87	46	128.9	48 08.8	87	46	128.5	48 34.9	87	47	128.1
35	46 48.9	87	47	128.0	47 15.0	87	47	127.7	47 41.0	87	47	127.3	48 06.9	86	47	126.9
6	46 20.9	87	47	126.9	46 46.8	86	48	126.5	47 12.7	86	48	126.1	47 38.5	86	48	125.7
7	45 52.5	86	48	125.7	46 18.3	86	48	125.3	46 44.0	86	48	124.9	47 09.7	85	49	124.6
8	45 23.6	86	49	124.5	45 49.3	85	49	124.2	46 14.9	85	49	123.8	46 40.4	85	49	123.4
9	44 54.4	85	49	123.4	45 19.9	85	50	123.0	45 45.4	85	50	122.6	46 10.8	85	50	122.3
40	44 24.7	85	50	122.3	44 50.2	85	50	121.9	45 15.5	84	50	121.5	45 40.8	84	51	121.1
1	43 54.7	84	51	121.2	44 20.0	84	51	120.8	44 45.3	84	51	120.4	45 10.4	84	51	120.0
2	43 24.4	84	51	120.1	43 49.6	84	51	119.7	44 14.7	84	52	119.3	44 39.7	83	52	118.9
3	42 53.7	84	52	119.0	43 18.8	83	52	118.6	43 43.8	83	52	118.2	44 08.7	83	52	117.8
4	42 22.7	83	52	117.9	42 47.6	83	52	117.5	43 12.5	83	52	117.2	43 37.3	83	53	116.8
45	41 51.4	83	53	116.9	42 16.2	83	53	116.5	42 41.0	82	53	116.1	43 05.7	82	53	115.7
6	41 19.8	83	53	115.8	41 44.5	82	53	115.4	42 09.2	82	54	115.1	42 33.8	82	54	114.7
7	40 47.9	82	54	114.8	41 12.5	82	54	114.4	41 37.1	82	54	114.0	42 01.6	82	54	113.6
8	40 15.7	82	54	113.8	40 40.3	82	54	113.4	41 04.8	81	54	113.0	41 29.2	81	54	112.6
9	39 43.3	82	54	112.8	40 07.8	81	55	112.4	40 32.2	81	55	112.0	40 56.5	81	55	111.6
50	39 10.7	81	55	111.8	39 35.1	81	55	111.4	39 59.4	81	55	111.0	40 23.6	81	55	110.6
1	38 37.8	81	55	110.8	39 02.1	81	55	110.4	39 26.4	81	56	110.0	39 50.5	80	56	109.7
2	38 04.8	81	55	109.8	38 29.0	81	56	109.5	38 53.1	80	56	109.1	39 17.2	80	56	108.7
3	37 31.5	81	56	108.9	37 55.6	80	56	108.5	38 19.7	80	56	108.1	38 43.7	80	56	107.7
4	36 58.0	80	56	107.9	37 22.1	80	56	107.5	37 46.1	80	56	107.2	38 10.0	80	56	106.8
55	36 24.4	80	56	107.0	36 48.4	80	56	106.6	37 12.3	80	56	106.2	37 36.2	79	57	105.8
6	35 50.6	80	57	106.0	36 14.5	80	57	105.7	36 38.4	79	57	105.3	37 02.2	79	57	104.9
7	35 16.6	80	57	105.1	35 40.5	79	57	104.8	36 04.3	79	57	104.4	36 28.0	79	57	104.0
8	34 42.5	80	57	104.2	35 06.3	79	57	103.8	35 30.1	79	57	103.5	35 53.7	79	57	103.1
9	34 08.2	79	57	103.3	34 32.0	79	57	102.9	34 55.7	79	58	102.6	35 19.3	79	58	102.2
60	33 33.8	79	58	102.4	33 57.6	79	58	102.0	34 21.2	79	58	101.7	34 44.8	78	58	101.3
1	32 59.3	79	58	101.5	33 23.0	79	58	101.2	33 46.6	79	58	100.8	34 10.2	78	58	100.4
2	32 24.7	79	58	100.6	32 48.4	79	58	100.3	33 11.9	78	58	99.9	33 35.4	78	58	99.5
3	31 50.0	79	58	99.8	32 13.6	79	58	99.4	32 37.1	78	58	99.0	33 00.6	78	58	98.7
4	31 15.2	79	58	98.9	31 38.8	78	58	98.5	32 02.3	78	58	98.2	32 25.7	78	58	97.8
65	30 40.3	79	58	98.0	31 03.9	78	58	97.7	31 27.3	78	58	97.3	31 50.7	78	58	96.9
6	30 05.4	78	58	97.2	30 28.9	78	58	96.8	30 52.3	78	58	96.5	31 15.7	78	58	96.1
7	29 30.4	78	58	96.3	29 53.8	78	58	96.0	30 17.2	78	58	95.6	30 40.6	78	59	95.2
8	28 55.3	78	59	95.5	29 18.7	78	59	95.1	29 42.1	78	58	94.8	30 05.5	78	59	94.4
9	28 20.2	78	59	94.7	28 43.6	78	59	94.3	29 07.0	78	59	93.9	29 30.3	78	59	93.6
70	27 45.0	78	59	93.8	28 08.4	78	59	93.5	28 31.8	78	59	93.1	28 55.1	78	59	92.8
1	27 09.8	78	59	93.0	27 33.2	78	59	92.6	27 56.5	78	59	92.3	28 19.8	78	59	91.9
2	26 34.6	78	59	92.2	26 57.9	78	59	91.8	27 21.3	78	59	91.5	27 44.6	78	59	91.1
3	25 59.3	78	59	91.4	26 22.7	78	59	91.0	26 46.0	78	59	90.7	27 09.3	78	59	90.3
4	25 24.0	78	59	90.5	25 47.4	78	59	90.2	26 10.8	78	59	89.8	26 34.0	78	59	89.5
75	24 48.8	78	59	89.7	25 12.2	78	59	89.4	25 35.5	78	59	89.0	25 58.8	78	59	88.7
6	24 13.5	78	59	88.9	24 36.9	78	59	88.6	25 00.2	78	59	88.2	25 23.5	78	59	87.9
7	23 38.3	78	59	88.1	24 01.6	78	59	87.8	24 25.0	78	59	87.4	24 48.3	78	59	87.1
8	23 03.0	78	59	87.3	23 26.4	78	59	87.0	23 49.8	78	59	86.6	24 13.1	78	59	86.3
9	22 27.8	78	59	86.5	22 51.2	78	59	86.2	23 14.6	78	59	85.8	23 37.9	78	59	85.5
80	21 52.6	78	59	85.7	22 16.0	78	59	85.4	22 39.4	78	58	85.1	23 02.8	78	58	84.7
1	21 17.5	78	59	84.9	21 40.9	78	58	84.6	22 04.3	78	58	84.3	22 27.7	78	58	83.9
2	20 42.4	78	58	84.2	21 05.8	78	58	83.8	21 29.2	78	58	83.5	21 52.6	78	58	83.2
3	20 07.3	78	58	83.4	20 30.8	78	58	83.0	20 54.2	78	58	82.7	21 17.6	78	58	82.4
4	19 32.3	78	58	82.6	19 55.8	78	58	82.3	20 19.3	78	58	81.9	20 42.7	78	58	81.6
85	18 57.4	79	58	81.8	19 20.9	78	58	81.5	19 44.4	78	58	81.1	20 07.9	78	58	80.8
6	18 22.5	79	58	81.0	18 46.1	79	58	80.7	19 09.6	78	58	80.4	19 33.1	78	58	80.0
7	17 47.7	79	58	80.3	18 11.3	79	58	79.9	18 34.9	79	58	79.6	18 58.4	78	58	79.3
8	17 13.0	79	58	79.5	17 36.6	79	58	79.2	18 00.2	79	58	78.8	18 23.8	79	58	78.5
9	16 38.3	79	58	78.7	17 02.0	79	58	78.4	17 25.7	79	58	78.1	17 49.3	79	57	77.7
90	16 03.8	79	57	77.9	16 27.5	79	57	77.6	16 51.2	79	57	77.3	17 14.9	79	57	77.0

22° 00′				22° 30′				23° 00′				23° 30′				H.A.
Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
° ′			°	° ′			°	° ′			°	° ′			°	°
58 00.0	1.0	01	180.0	58 30.0	1.0	01	180.0	59 00.0	1.0	01	180.0	59 30.0	1.0	01	180.0	00
57 59.5	1.0	03	178.3	58 29.5	1.0	03	178.2	58 59.5	1.0	03	178.2	59 29.4	1.0	03	178.2	1
57 57.8	1.0	04	176.5	58 27.8	1.0	04	176.5	58 57.8	1.0	05	176.4	59 27.8	1.0	05	176.4	2
57 55.2	1.0	06	174.8	58 25.1	1.0	06	174.7	58 55.1	1.0	06	174.6	59 25.0	1.0	06	174.6	3
57 51.4	1.0	08	173.0	58 21.3	1.0	08	172.9	58 51.2	1.0	08	172.9	59 21.1	1.0	08	172.8	4
57 46.6	1.0	10	171.3	58 16.4	1.0	10	171.2	58 46.3	1.0	10	171.1	59 16.2	99	10	171.0	05
57 40.7	99	12	169.6	58 10.5	99	12	169.4	58 40.3	99	12	169.3	59 10.1	99	12	169.2	6
57 33.8	99	13	167.8	58 03.5	99	13	167.7	58 33.3	99	14	167.6	59 03.0	99	14	167.4	7
57 25.9	99	15	166.1	57 55.5	99	15	166.0	58 25.1	99	15	165.8	58 54.8	99	15	165.7	8
57 16.9	99	17	164.4	57 46.5	99	17	164.3	58 16.0	98	17	164.1	58 45.5	98	17	163.9	9
57 06.9	98	18	162.8	57 36.4	98	18	162.6	58 05.8	98	19	162.4	58 35.3	98	19	162.2	10
56 56.0	98	20	161.1	57 25.3	98	20	160.9	57 54.7	98	20	160.7	58 24.0	98	20	160.5	1
56 44.1	97	22	159.4	57 13.3	97	22	159.2	57 42.5	97	22	159.0	58 11.7	97	22	158.8	2
56 31.2	97	23	157.8	57 00.3	97	23	157.6	57 29.4	97	23	157.3	57 58.5	97	24	157.1	3
56 17.4	97	24	156.2	56 46.4	97	25	155.9	57 15.4	96	25	155.7	57 44.3	96	26	155.4	4
56 02.7	96	26	154.6	56 31.6	96	26	154.3	57 00.4	96	26	154.1	57 29.2	96	27	153.8	15
55 47.1	96	28	153.0	56 15.8	96	28	152.7	56 44.5	96	28	152.4	57 13.2	95	28	152.2	6
55 30.7	95	29	151.4	55 59.2	95	29	151.1	56 27.8	95	29	150.8	56 56.2	95	30	150.6	7
55 13.4	95	30	149.8	55 41.8	95	30	149.6	56 10.2	95	31	149.3	56 38.5	94	31	149.0	8
54 55.2	94	32	148.3	55 23.5	94	32	148.0	55 51.7	94	32	147.7	56 19.9	94	32	147.4	9
54 36.3	94	33	146.8	55 04.4	94	33	146.5	55 32.5	93	33	146.2	56 00.5	93	34	145.9	20
54 16.6	93	34	145.3	54 44.6	93	34	145.0	55 12.5	93	35	144.7	55 40.3	93	35	144.4	1
53 56.2	93	35	143.8	54 24.0	93	36	143.5	54 51.7	92	36	143.2	55 19.4	92	36	142.9	2
53 35.0	92	36	142.4	54 02.7	92	37	142.1	54 30.2	92	37	141.7	54 57.8	92	37	141.4	3
53 13.2	92	38	141.0	53 40.6	91	38	140.6	54 08.0	91	38	140.3	54 35.4	91	38	139.9	4
52 50.6	91	39	139.6	53 17.9	91	39	139.2	53 45.2	91	39	138.9	54 12.4	91	40	138.5	25
52 27.4	91	40	138.2	52 54.6	90	40	137.8	53 21.6	90	40	137.5	53 48.7	90	41	137.1	6
52 03.6	90	41	136.8	52 30.6	90	41	136.4	52 57.5	90	41	136.1	53 24.3	89	42	135.7	7
51 39.1	90	42	135.4	52 06.0	89	42	135.1	52 32.7	89	42	134.7	52 59.4	89	43	134.3	8
51 14.1	89	43	134.1	51 40.8	89	43	133.8	52 07.4	89	43	133.4	52 33.9	88	43	133.0	9
50 48.5	89	44	132.8	51 15.0	88	44	132.4	51 41.5	88	44	132.1	52 07.8	88	44	131.7	30
50 22.3	88	44	131.5	50 48.7	88	45	131.1	51 15.0	88	45	130.8	51 41.2	87	45	130.4	1
49 55.7	88	45	130.2	50 21.9	87	46	129.9	50 48.0	87	46	129.5	51 14.1	87	46	129.1	2
49 28.5	87	46	129.0	49 54.6	87	46	128.6	50 20.6	87	47	128.2	50 46.5	86	47	127.8	3
49 00.9	87	47	127.8	49 26.8	86	47	127.4	49 52.6	86	47	127.0	50 18.4	86	48	126.6	4
48 32.8	86	48	126.6	48 58.5	86	48	126.2	49 24.2	86	48	125.8	49 49.9	85	48	125.4	35
48 04.2	86	48	125.4	48 29.9	85	48	125.0	48 55.4	85	49	124.6	49 20.9	85	49	124.2	6
47 35.2	85	49	124.2	48 00.7	85	49	123.8	48 26.2	85	49	123.4	48 51.5	84	50	123.0	7
47 05.9	85	50	123.0	47 31.2	84	50	122.6	47 56.5	84	50	122.2	48 21.7	84	50	121.8	8
46 36.1	84	50	121.9	47 01.3	84	50	121.5	47 26.5	84	51	121.1	47 51.6	83	51	120.7	9
46 06.0	84	51	120.7	46 31.1	84	51	120.3	46 56.1	83	51	119.9	47 21.1	83	51	119.5	40
45 35.5	83	51	119.6	46 00.5	83	52	119.2	46 25.4	83	52	118.8	46 50.2	83	52	118.4	1
45 04.7	83	52	118.5	45 29.5	83	52	118.1	45 54.3	82	52	117.7	46 19.0	82	52	117.3	2
44 33.5	83	52	117.4	44 58.3	82	53	117.0	45 23.0	82	53	116.6	45 47.6	82	53	116.2	3
44 02.1	82	53	116.4	44 26.7	82	53	116.0	44 51.3	82	53	115.6	45 15.8	81	53	115.2	4
43 30.3	82	53	115.3	43 54.9	82	54	114.9	44 19.3	81	54	114.5	44 43.7	81	54	114.1	45
42 58.3	82	54	114.3	43 22.8	81	54	113.9	43 47.1	81	54	113.5	44 11.4	81	54	113.1	6
42 26.0	81	54	113.3	42 50.4	81	54	112.9	43 14.7	81	54	112.5	43 38.8	80	55	112.0	7
41 53.5	81	54	112.2	42 17.8	81	55	111.8	42 41.9	80	55	111.4	43 06.0	80	55	111.0	8
41 20.8	81	55	111.2	41 44.9	80	55	110.8	42 09.0	80	55	110.4	42 33.0	80	55	110.0	9
40 47.8	80	55	110.2	41 11.9	80	55	109.9	41 35.9	80	56	109.5	41 59.8	80	56	109.0	50
40 14.6	80	56	109.3	40 38.6	80	56	108.9	41 02.5	80	56	108.5	41 26.3	79	56	108.1	1
39 41.2	80	56	108.3	40 05.1	80	56	107.9	40 29.0	79	56	107.5	40 52.7	79	56	107.1	2
39 07.6	80	56	107.3	39 31.5	79	56	106.9	39 55.2	79	56	106.6	40 18.9	79	57	106.2	3
38 33.9	79	56	106.4	38 57.7	79	57	106.0	39 21.4	79	57	105.6	39 45.0	79	57	105.2	4
38 00.0	79	57	105.5	38 23.7	79	57	105.1	38 47.3	79	57	104.7	39 10.9	78	57	104.3	55
37 25.9	79	57	104.5	37 49.5	79	57	104.1	38 13.1	78	57	103.8	38 36.6	78	57	103.4	6
36 51.7	79	57	103.6	37 15.3	79	57	103.2	37 38.8	78	57	102.8	38 02.2	78	58	102.4	7
36 17.4	79	58	102.7	36 40.9	78	58	102.3	37 04.4	78	58	101.9	37 27.7	78	58	101.5	8
35 42.9	78	58	101.8	36 06.4	78	58	101.4	36 29.8	78	58	101.0	36 53.1	78	58	100.6	9
35 08.3	78	58	100.9	35 31.8	78	58	100.5	35 55.1	78	58	100.1	36 18.4	78	58	99.8	60
34 33.6	78	58	100.0	34 57.0	78	58	99.7	35 20.4	78	58	99.3	35 43.6	77	58	98.9	1
33 58.9	78	58	99.2	34 22.2	78	58	98.8	34 45.5	78	58	98.4	35 08.7	77	58	98.0	2
33 24.0	78	58	98.3	33 47.3	78	58	97.9	34 10.6	77	58	97.5	34 33.8	77	58	97.1	3
32 49.1	78	58	97.4	33 12.4	78	58	97.1	33 35.6	77	58	96.7	33 58.8	77	58	96.3	4
32 14.1	78	58	96.6	32 37.3	77	58	96.2	33 00.5	77	58	95.8	33 23.7	77	59	95.4	65
31 39.0	78	58	95.7	32 02.2	77	59	95.4	32 25.4	77	59	95.0	32 48.5	77	59	94.6	6
31 03.9	78	59	94.9	31 27.1	77	59	94.5	31 50.3	77	59	94.1	32 13.4	77	59	93.8	7
30 28.7	77	59	94.0	30 51.9	77	59	93.7	31 15.1	77	59	93.3	31 38.2	77	59	92.9	8
29 53.5	77	59	93.2	30 16.7	77	59	92.8	30 39.9	77	59	92.5	31 02.9	77	59	92.1	9
29 18.3	77	59	92.4	29 41.5	77	59	92.0	30 04.6	77	59	91.7	30 27.7	77	59	91.3	70
28 43.1	77	59	91.6	29 06.2	77	59	91.2	29 29.4	77	59	90.8	29 52.4	77	59	90.5	1
28 07.8	77	59	90.8	28 31.0	77	59	90.4	28 54.1	77	59	90.0	29 17.1	77	59	89.7	2
27 32.5	77	59	89.9	27 55.7	77	59	89.6	28 18.8	77	59	89.2	28 41.9	77	59	88.9	3
26 57.3	77	59	89.1	27 20.4	77	59	88.8	27 43.6	77	59	88.4	28 06.6	77	59	88.1	4
26 22.0	77	59	88.3	26 45.2	77	59	88.0	27 08.3	77	59	87.6	27 31.4	77	59	87.3	75
25 46.8	77	59	87.5	26 10.0	77	59	87.2	26 33.1	77	59	86.8	26 56.2	77	59	86.5	6
25 11.5	77	59	86.7	25 34.7	77	59	86.4	25 57.9	77	59	86.0	26 21.0	77	59	85.7	7
24 36.3	77	59	85.9	24 59.6	77	59	85.6	25 22.7	77	58	85.2	25 45.8	77	59	84.9	8
24 01.2	78	59	85.2	24 24.4	77	58	84.8	24 47.6	77	58	84.5	25 10.7	77	58	84.1	9
23 26.1	78	58	84.4	23 49.3	77	58	84.0	24 12.5	77	58	83.7	24 35.7	77	58	83.3	80
22 51.0	78	58	83.6	23 14.3	78	58	83.2	23 37.5	77	58	82.9	24 00.7	77	58	82.6	1
22 16.0	78	58	82.8	22 39.3	78	58	82.5	23 02.5	77	58	82.1	23 25.7	77	58	81.8	2
21 41.0	78	58	82.0	22 04.3	78	58	81.7	22 27.6	78	58	81.4	22 50.9	77	58	81.0	3
21 06.1	78	58	81.3	21 29.5	78	58	80.9	21 52.8	78	58	80.6	22 16.1	78	58	80.2	4
20 31.3	78	58	80.5	20 54.7	78	58	80.2	21 18.0	78	58	79.8	21 41.4	78	58	79.5	85
19 56.6	78	58	79.7	20 20.0	78	58	79.4	20 43.4	78	58	79.0	21 06.7	78	58	78.7	6
19 21.9	78	58	78.9	19 45.4	78	58	78.6	20 08.8	78	58	78.3	20 32.2	78	57	77.9	7
18 47.3	78	58	78.2	19 10.8	78	57	77.8	19 34.3	78	57	77.5	19 57.8	78	57	77.2	8
18 12.9	79	57	77.4	18 36.4	78	57	77.1	18 59.9	78	57	76.8	19 23.4	78	57	76.4	9
17 38.5	79	57	76.6	18 02.1	79	57	76.3	18 25.7	78	57	76.0	18 49.2	78	57	75.7	90

Digitized by Google

Lat. 54°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	16 00.0	1.0 00	180.0	15 30.0	1.0 00	180.0	15 00.0	1.0 00	180.0	14 30.0	1.0 00	180.0	14 00.0	1.0 00	180.0	13 30.0	1.0 00	180.0	13 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	00
1	15 59.7	1.0 02	179.0	15 29.7	1.0 02	179.0	14 59.7	1.0 02	179.0	14 29.7	1.0 01	179.0	13 59.7	1.0 02	179.0	13 29.7	1.0 01	179.0	12 59.7	1.0 02	179.1	12 29.7	1.0 01	179.1	1
2	15 58.8	1.0 02	178.0	15 28.8	1.0 02	178.1	14 58.8	1.0 02	178.1	14 28.8	1.0 02	178.1	13 58.8	1.0 02	178.1	13 28.8	1.0 02	178.1	12 58.8	1.0 02	178.1	12 28.8	1.0 02	178.1	2
3	15 57.3	1.0 04	177.1	15 27.3	1.0 03	177.1	14 57.3	1.0 04	177.1	14 27.3	1.0 03	177.1	13 57.4	1.0 04	177.1	13 27.4	1.0 03	177.2	12 57.4	1.0 03	177.2	12 27.4	1.0 03	177.2	3
4	15 55.2	1.0 04	176.1	15 25.2	1.0 04	176.1	14 55.2	1.0 04	176.1	14 25.3	1.0 04	176.2	13 55.3	1.0 04	176.2	13 25.3	1.0 04	176.2	12 55.4	1.0 04	176.2	12 25.4	1.0 04	176.2	4
05	15 52.5	1.0 06	175.1	15 22.5	1.0 05	175.1	14 52.6	1.0 06	175.2	14 22.6	1.0 05	175.2	13 52.7	1.0 05	175.2	13 22.7	1.0 05	175.3	12 52.7	1.0 05	175.3	12 22.8	1.0 05	175.3	05
6	15 49.2	1.0 06	174.1	15 19.2	1.0 06	174.2	14 49.3	1.0 06	174.2	14 19.4	1.0 06	174.2	13 49.4	1.0 06	174.3	13 19.5	1.0 06	174.3	12 49.5	1.0 06	174.3	12 19.6	1.0 06	174.4	6
7	15 45.3	1.0 08	173.2	15 15.4	1.0 07	173.2	14 45.5	1.0 08	173.2	14 15.5	1.0 07	173.3	13 45.6	1.0 07	173.3	13 15.7	1.0 07	173.4	12 45.8	1.0 07	173.4	12 15.9	1.0 07	173.4	7
8	15 40.8	1.0 08	172.2	15 10.9	1.0 08	172.2	14 41.0	1.0 08	172.3	14 11.1	1.0 08	172.3	13 41.2	1.0 08	172.4	13 11.3	1.0 08	172.4	12 41.4	1.0 08	172.5	12 11.5	1.0 08	172.5	8
9	15 35.7	1.0 09	171.2	15 05.8	1.0 09	171.3	14 36.0	1.0 09	171.3	14 06.1	1.0 09	171.4	13 36.2	1.0 09	171.4	13 06.4	1.0 09	171.5	12 36.5	1.0 09	171.5	12 06.6	1.0 09	171.6	9
10	15 30.0	99 10	170.3	15 00.2	99 10	170.3	14 30.4	99 10	170.4	14 00.5	99 10	170.4	13 30.7	99 10	170.5	13 00.9	99 10	170.5	12 31.0	99 10	170.6	12 01.2	99 10	170.6	10
1	15 23.8	99 11	169.3	14 54.0	99 11	169.3	14 24.2	99 11	169.4	13 54.4	99 11	169.5	13 24.6	99 11	169.5	12 54.8	99 11	169.6	12 25.0	99 11	169.6	11 55.2	99 11	169.7	1
2	15 16.9	99 12	168.3	14 47.2	99 12	168.4	14 17.4	99 12	168.4	13 47.6	99 12	168.5	13 17.9	99 12	168.6	12 48.1	99 12	168.6	12 18.3	99 12	168.7	11 48.6	99 12	168.8	2
3	15 09.5	99 13	167.3	14 39.8	99 13	167.4	14 10.0	99 13	167.5	13 40.3	99 13	167.6	13 10.6	99 13	167.6	12 40.9	99 13	167.7	12 11.2	99 13	167.8	11 41.4	99 13	167.8	3
4	15 01.5	99 14	166.4	14 31.8	99 14	166.5	14 02.1	99 14	166.5	13 32.4	99 14	166.6	13 02.8	99 14	166.7	12 33.1	99 14	166.8	12 03.4	99 14	166.8	11 33.7	99 14	166.9	4
15	14 52.9	99 15	165.4	14 23.2	99 15	165.5	13 53.6	99 15	165.6	13 24.0	99 15	165.7	12 54.4	99 15	165.7	12 24.7	99 15	165.8	11 55.1	99 15	165.9	11 25.5	99 15	166.0	15
6	14 43.7	99 16	164.5	14 14.1	99 16	164.6	13 44.6	99 16	164.6	13 15.0	99 16	164.7	12 45.4	99 16	164.8	12 15.8	99 16	164.9	11 46.2	99 16	165.0	11 16.6	99 16	165.1	6
7	14 34.0	98 17	163.5	14 04.5	98 17	163.6	13 34.9	98 17	163.7	13 05.4	98 17	163.8	12 35.9	98 17	163.9	12 06.3	98 17	164.0	11 36.8	98 17	164.1	11 07.3	98 17	164.1	7
8	14 23.7	98 18	162.6	13 54.2	98 18	162.7	13 24.8	98 18	162.7	12 55.3	98 18	162.8	12 25.8	98 18	162.9	11 56.3	98 18	163.0	11 26.9	98 18	163.1	10 57.4	98 17	163.2	8
9	14 12.8	98 19	161.6	13 43.4	98 19	161.7	13 14.0	98 19	161.8	12 44.6	98 19	161.9	12 15.2	98 19	162.0	11 45.8	98 18	162.1	11 16.3	98 18	162.2	10 46.9	98 18	162.3	9
20	14 01.4	98 20	160.7	13 32.1	98 20	160.8	13 02.7	98 20	160.9	12 33.4	98 20	161.0	12 04.0	98 20	161.1	11 34.7	98 19	161.2	11 05.3	98 19	161.3	10 35.9	98 19	161.4	20
1	13 49.5	98 21	159.7	13 20.2	98 21	159.8	12 50.9	98 21	159.9	12 21.6	98 21	160.0	11 52.3	98 20	160.2	11 23.0	98 20	160.3	10 53.7	98 20	160.4	10 24.4	98 20	160.5	1
2	13 37.0	97 22	158.8	13 07.8	97 22	158.9	12 38.5	97 22	159.0	12 09.3	97 21	159.1	11 40.1	97 21	159.2	11 10.8	97 21	159.3	10 41.6	97 21	159.5	10 12.4	97 21	159.6	2
3	13 23.9	97 23	157.8	12 54.8	97 23	157.9	12 25.6	97 22	158.1	11 56.5	97 22	158.2	11 27.3	97 22	158.3	10 58.1	97 22	158.4	10 29.0	97 22	158.5	9 59.8	97 22	158.7	3
4	13 10.4	97 24	156.9	12 41.3	97 23	157.0	12 12.2	97 23	157.1	11 43.1	97 23	157.3	11 14.0	97 23	157.4	10 44.9	97 23	157.5	10 15.8	97 23	157.6	9 46.7	97 23	157.8	4
25	12 56.2	97 24	156.0	12 27.2	97 24	156.1	11 58.2	97 24	156.2	11 29.2	97 24	156.3	11 00.2	97 24	156.5	10 31.2	97 24	156.6	10 02.1	97 24	156.7	9 33.1	97 24	156.9	25
6	12 41.6	96 25	155.0	12 12.7	96 25	155.2	11 43.7	96 25	155.3	11 14.8	96 25	155.4	10 45.8	96 25	155.6	10 16.9	97 25	155.7	9 47.9	97 24	155.8	9 19.0	97 24	156.0	6
7	12 26.5	96 26	154.1	11 57.6	96 26	154.2	11 28.7	96 26	154.4	10 59.9	96 26	154.5	10 31.0	96 26	154.7	10 02.1	96 25	154.8	9 33.2	96 25	154.9	9 04.4	96 25	155.1	7
8	12 10.8	96 27	153.2	11 42.0	96 27	153.3	11 13.2	96 27	153.5	10 44.4	96 27	153.6	10 15.7	96 26	153.7	9 46.9	96 26	153.9	9 18.1	96 26	154.0	8 49.2	96 26	154.2	8
9	11 54.6	96 28	152.3	11 25.9	96 28	152.4	10 57.2	96 28	152.5	10 28.5	96 27	152.7	9 59.8	96 27	152.8	9 31.1	96 27	153.0	9 02.4	96 27	153.1	8 33.6	96 27	153.3	9
30	11 38.0	95 29	151.3	11 09.3	95 28	151.5	10 40.7	95 28	151.6	10 12.1	95 28	151.8	9 43.5	95 28	151.9	9 14.8	95 28	152.1	8 46.2	95 28	152.2	8 17.5	95 28	152.4	30
1	11 20.8	95 29	150.4	10 52.3	95 29	150.6	10 23.7	95 29	150.7	9 55.2	95 29	150.9	9 26.6	95 29	151.0	8 58.1	95 29	151.2	8 29.5	95 29	151.4	8 01.0	95 28	151.5	1
2	11 03.2	95 30	149.5	10 34.7	95 30	149.7	10 06.2	95 30	149.8	9 37.8	95 30	150.0	9 09.3	95 30	150.2	8 40.8	95 30	150.3	8 12.4	95 29	150.5	7 43.9	95 29	150.6	2
3	10 45.0	95 31	148.6	10 16.7	95 31	148.8	9 48.3	95 31	148.9	9 19.9	95 31	149.1	8 51.5	95 30	149.3	8 23.1	95 30	149.4	7 54.8	95 30	149.6	7 26.4	95 30	149.8	3
4	10 26.4	94 32	147.7	9 58.1	94 33	147.9	9 29.8	94 32	148.0	9 01.6	94 31	148.2	8 33.3	94 31	148.4	8 05.0	94 31	148.5	7 36.7	94 31	148.7	7 08.4	94 31	148.9	4
35	10 07.3	94 33	146.8	9 39.1	94 32	147.0	9 10.9	94 32	147.2	8 42.8	94 32	147.3	8 14.5	94 32	147.5	7 46.3	94 32	147.7	7 18.1	94 32	147.8	6 49.9	94 32	148.0	35
6	9 47.8	94 33	145.9	9 19.7	94 33	146.1	8 51.6	94 33	146.3	8 23.5	94 33	146.4	7 55.4	94 33	146.6	7 27.3	94 33	146.8	6 59.1	94 32	147.0	6 31.0	94 32	147.1	6
7	9 27.8	93 34	145.0	8 59.8	93 34	145.2	8 31.8	93 34	145.4	8 03.8	93 34	145.6	7 35.7	93 34	145.7	7 07.7	93 33	145.9	6 39.7	93 33	146.1	6 11.6	93 33	146.3	7
8	9 07.4	93 35	144.1	8 39.4	93 35	144.3	8 11.5	93 34	144.5	7 43.6	93 34	144.7	7 15.7	93 34	144.9	6 47.7	93 34	145.1	6 19.8	93 34	145.2	5 51.8	93 34	145.4	8
9	8 46.5	93 36	143.2	8 18.7	93 35	143.4	7 50.8	93 35	143.6	7 23.0	93 35	143.8	6 55.2	93 35	144.0	6 27.3	93 35	144.2	5 59.5	93 34	144.4	5 31.6	93 34	144.6	9
40	8 25.2	92 36	142.4	7 57.4	92 36	142.6	7 29.7	92 36	142.8	7 02.0	92 36	142.9	6 34.2	92 36	143.1	6 06.5	92 35	143.3	5 38.7	93 35	143.5	5 11.0	93 35	143.7	40
1	8 03.4	92 37	141.5	7 35.8	92 37	141.7	7 08.1	92 36	141.9	6 40.5	92 36	142.1	6 12.8	92 36	142.3	5 45.2	92 36	142.5	5 17.5	92 36	142.7				1
2	7 41.2	92 38	140.6	7 13.7	92 37	140.8	6 46.2	92 37	141.0	6 18.6	92 37	141.2	5 51.1	92 37	141.4	5 23.5	92 37	141.6							2
3	7 18.7	91 38	139.7	6 51.2	91 38	140.0	6 23.8	92 38	140.2	5 56.3	92 38	140.4	5 28.9	92 38	140.6	5 01.4	92 38	140.8							3
4	6 55.7	91 39	138.9	6 28.3	91 39	139.1	6 01.0	91 39	139.3	5 33.6	91 38	139.5	5 06.2	91 38	139.7										4
45	6 32.3	91 40	138.0	6 05.0	91 40	138.2	5 37.8	91 39	138.4	5 10.5	91 39	138.7													45
6	6 08.5	91 40	137.2	5 41.3	91 40	137.4	5 14.2	91 40	137.6																6
7	5 44.3	90 41	136.3	5 17.3	90 41	136.5																			7
8	5 19.8	90 42	135.5																						8

Lat. 55°

Lat. 56°

Lat. 57°

Lat. 58°

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	15 29.4	79 57	77.2	15 53.1	79 57	76.8	16 16.9	79 57	76.5	16 40.6	79 57	76.2	17 04.2	79 57	75.9	17 27.9	79 57	75.6	17 51.5	79 57	75.2	18 15.1	79 57	74.9	91
2	14 55.0	79 57	76.4	15 18.8	79 57	76.1	15 42.6	79 57	75.7	16 06.4	79 57	75.4	16 30.1	79 57	75.1	16 53.8	79 57	74.8	17 17.5	79 56	74.5	17 41.1	79 56	74.1	2
3	14 20.8	80 57	75.6	14 44.7	79 57	75.3	15 08.5	79 57	75.0	15 32.3	79 57	74.7	15 56.1	79 56	74.3	16 19.8	79 56	74.0	16 43.5	79 56	73.7	17 07.2	79 56	73.4	3
4	13 46.7	80 57	74.8	14 10.6	80 57	74.5	14 34.5	80 56	74.2	14 58.4	79 56	73.9	15 22.2	79 56	73.6	15 46.0	79 56	73.3	16 09.8	79 56	73.0	16 33.5	79 56	72.6	4
95	13 12.7	80 56	74.1	13 36.7	80 56	73.8	14 00.6	80 56	73.4	14 24.5	80 56	73.1	14 48.4	80 56	72.8	15 12.3	79 56	72.5	15 36.1	79 56	72.2	15 59.9	79 56	71.9	95
6	12 38.9	80 56	73.3	13 02.9	80 56	73.0	13 26.9	80 56	72.7	13 50.9	80 56	72.4	14 14.8	80 56	72.1	14 38.7	80 56	71.7	15 02.6	80 56	71.4	15 26.5	80 56	71.1	6
7	12 05.2	80 56	72.5	12 29.3	80 56	72.2	12 53.3	80 56	71.9	13 17.3	80 56	71.6	13 41.3	80 56	71.3	14 05.3	80 55	71.0	14 29.3	80 55	70.7	14 53.2	80 55	70.4	7
8	11 31.6	80 56	71.8	11 55.7	80 56	71.4	12 19.8	80 55	71.1	12 43.9	80 55	70.8	13 08.0	80 55	70.5	13 32.0	80 55	70.2	13 56.1	80 55	69.9	14 20.0	80 55	69.6	8
9	10 58.2	81 55	71.0	11 22.4	81 55	70.7	11 46.6	81 55	70.4	12 10.7	80 55	70.1	12 34.8	80 55	69.8	12 58.9	80 55	69.5	13 23.0	80 55	69.2	13 47.1	80 55	68.8	9
100	10 24.9	81 55	70.2	10 49.2	81 55	69.9	11 13.4	81 55	69.6	11 37.6	81 55	69.3	12 01.8	81 55	69.0	12 26.0	81 55	68.7	12 50.1	80 54	68.4	13 14.3	80 54	68.1	100
1	9 51.8	81 55	69.4	10 16.1	81 55	69.1	10 40.4	81 55	68.8	11 04.7	81 55	68.5	11 29.0	81 54	68.2	11 53.2	81 54	67.9	12 17.4	81 54	67.6	12 41.6	81 54	67.3	1
2	9 18.9	81 55	68.7	9 43.3	81 54	68.4	10 07.6	81 54	68.1	10 32.0	81 54	67.8	10 56.3	81 54	67.5	11 20.6	81 54	67.2	11 44.9	81 54	66.9	12 09.2	81 54	66.6	2
3	8 46.1	81 54	67.9	9 10.6	81 54	67.6	9 35.0	81 54	67.3	9 59.4	81 54	67.0	10 23.8	81 54	66.7	10 48.2	81 54	66.4	11 12.6	81 54	66.1	11 36.9	81 53	65.8	3
4	8 13.6	82 54	67.1	8 38.1	82 54	66.8	9 02.6	82 54	66.5	9 27.1	82 54	66.2	9 51.5	82 54	65.9	10 16.0	81 53	65.6	10 40.4	81 53	65.4	11 04.8	81 53	65.1	4
105	7 41.2	82 54	66.3	8 05.7	82 54	66.0	8 30.3	82 53	65.8	8 54.9	82 53	65.5	9 19.4	82 53	65.2	9 43.9	82 53	64.9	10 08.5	82 53	64.6	10 33.0	82 53	64.3	105
6	7 09.0	82 53	65.6	7 33.6	82 53	65.3	7 58.3	82 53	65.0	8 22.9	82 53	64.7	8 47.5	82 53	64.4	9 12.1	82 53	64.1	9 36.7	82 53	63.8	10 01.3	82 52	63.5	6
7	6 37.0	82 53	64.8	7 01.7	82 53	64.5	7 26.4	82 53	64.2	7 51.1	82 53	63.9	8 15.8	82 52	63.6	8 40.5	82 52	63.3	9 05.2	82 52	63.1	9 29.8	82 52	62.8	7
8	6 05.2	83 53	64.0	6 30.0	83 52	63.7	6 54.8	83 52	63.4	7 19.5	83 52	63.1	7 44.3	83 52	62.9	8 09.1	83 52	62.6	8 33.8	82 52	62.3	8 58.6	82 52	62.0	8
9	5 33.6	83 52	63.2	5 58.4	83 52	62.9	6 23.3	83 52	62.7	6 48.2	83 52	62.4	7 13.0	83 52	62.1	7 37.9	83 52	61.8	8 02.7	83 52	61.5	8 27.5	83 51	61.2	9
110	5 02.2	83 52	62.4	5 27.1	83 52	62.2	5 52.1	83 52	61.9	6 17.0	83 52	61.6	6 42.0	83 51	61.3	7 06.9	83 51	61.0	7 31.8	83 51	60.8	7 56.7	83 51	60.5	110
1							5 21.1	83 52	61.1	5 46.1	83 51	60.8	6 11.2	83 51	60.5	6 36.2	83 51	60.3	7 01.2	83 51	60.0	7 26.2	83 51	59.7	1
2										5 15.5	84 51	60.0	5 40.6	84 51	59.8	6 05.7	84 50	59.5	6 30.8	84 50	59.2	6 55.8	84 50	58.9	2
3													5 10.2	84 50	59.0	5 35.4	84 50	58.7	6 00.6	84 50	58.4	6 25.8	84 50	58.2	3
4																5 05.4	84 50	57.9	5 30.7	84 50	57.7	5 55.9	84 49	57.4	4
115																			5 01.0	85 49	56.9	5 26.4	84 49	56.6	115

Lat. 54°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	60 00.0	1.0 01	180.0	60 30.0	1.0 01	180.0	61 00.0	1.0 01	180.0	61 30.0	1.0 01	180.0	62 00.0	1.0 01	180.0	62 30.0	1.0 01	180.0	63 00.0	1.0 01	180.0	63 30.0	1.0 01	180.0	00
1	59 59.4	1.0 03	178.2	60 29.4	1.0 03	178.2	60 59.4	1.0 03	178.1	61 29.4	1.0 03	178.1	61 59.4	1.0 03	178.1	62 29.4	1.0 03	178.1	62 59.4	1.0 03	178.0	63 29.4	1.0 03	178.0	1
2	59 57.8	1.0 05	176.3	60 27.7	1.0 05	176.3	60 57.7	1.0 05	176.3	61 27.7	1.0 05	176.2	61 57.6	1.0 05	176.2	62 27.6	1.0 05	176.1	62 57.6	1.0 05	176.1	63 27.6	1.0 05	176.0	2
3	59 54.9	1.0 06	174.5	60 24.9	1.0 07	174.5	60 54.8	1.0 07	174.4	61 24.8	1.0 07	174.3	61 54.7	1.0 07	174.3	62 24.6	1.0 07	174.2	62 54.6	1.0 07	174.1	63 24.5	1.0 07	174.0	3
4	59 51.0	1.0 08	172.7	60 20.9	1.0 08	172.6	60 50.8	1.0 08	172.5	61 20.7	1.0 09	172.5	61 50.6	1.0 09	172.4	62 20.5	1.0 09	172.3	62 50.4	1.0 09	172.2	63 20.2	1.0 09	172.1	4
05	59 46.0	99 10	170.9	60 15.8	99 10	170.8	60 45.7	99 10	170.7	61 15.5	99 11	170.6	61 45.3	99 11	170.5	62 15.2	99 11	170.4	62 45.0	99 11	170.2	63 14.8	99 11	170.1	05
6	59 39.9	99 12	169.1	60 09.6	99 12	169.0	60 39.4	99 12	168.9	61 09.2	99 12	168.7	61 38.9	99 12	168.6	62 08.7	99 13	168.5	62 38.4	99 13	168.3	63 08.1	99 13	168.2	6
7	59 32.7	99 14	167.3	60 02.4	99 14	167.2	60 32.0	99 14	167.0	61 01.7	99 14	166.9	61 31.4	99 14	166.7	62 01.0	99 15	166.6	62 30.7	99 15	166.4	63 00.3	99 15	166.2	7
8	59 24.4	99 16	165.5	59 54.0	99 16	165.4	60 23.6	99 16	165.2	60 53.2	99 16	165.0	61 22.7	99 16	164.9	61 52.3	98 16	164.7	62 21.8	98 17	164.5	62 51.3	98 17	164.3	8
9	59 15.1	98 17	163.8	59 44.6	98 18	163.6	60 14.0	98 18	163.4	60 43.5	98 18	163.2	61 13.0	98 18	163.0	61 42.4	98 18	162.8	62 11.8	98 18	162.6	62 41.2	98 19	162.4	9
10	59 04.7	98 19	162.0	59 34.1	98 19	161.8	60 03.4	98 19	161.6	60 32.8	98 20	161.4	61 02.1	98 20	161.2	61 31.5	98 20	161.0	62 00.7	98 20	160.7	62 30.0	98 20	160.5	10
1	58 53.3	98 21	160.3	59 22.6	98 21	160.1	59 51.8	97 21	159.9	60 21.0	97 21	159.6	60 50.3	97 22	159.4	61 19.4	97 22	159.2	61 48.6	97 22	158.9	62 17.7	97 22	158.7	1
2	58 40.9	97 23	158.6	59 10.0	97 22	158.3	59 39.2	97 23	158.1	60 08.3	97 23	157.9	60 37.3	97 23	157.6	61 06.4	97 23	157.4	61 35.4	97 24	157.1	62 04.4	97 24	156.8	2
3	58 27.5	97 24	156.9	58 56.5	97 24	156.6	59 25.5	97 24	156.4	59 54.5	96 25	156.1	60 23.4	96 25	155.8	60 52.3	96 25	155.6	61 21.1	96 25	155.3	61 50.0	96 26	155.0	3
4	58 13.2	96 26	155.2	58 42.1	96 26	154.9	59 10.9	96 26	154.7	59 39.7	96 26	154.4	60 08.5	96 26	154.1	60 37.2	96 27	153.8	61 05.9	96 27	153.5	61 34.5	95 27	153.2	4
15	57 57.9	96 27	153.5	58 26.6	96 27	153.3	58 55.3	96 28	153.0	59 24.0	95 28	152.7	59 52.6	95 28	152.4	60 21.2	95 28	152.1	60 49.7	95 29	151.8	61 18.2	95 29	151.4	15
6	57 41.8	96 28	151.9	58 10.3	95 29	151.6	58 38.9	96 29	151.3	59 07.3	95 29	151.0	59 35.8	96 30	150.7	60 04.2	95 30	150.4	60 32.5	94 30	150.0	61 00.8	94 30	149.7	6
7	57 24.7	96 30	150.3	57 53.1	95 30	150.0	58 21.5	94 30	149.7	58 49.8	94 31	149.3	59 18.1	94 31	149.0	59 46.3	94 31	148.7	60 14.5	94 32	148.3	60 42.6	94 32	148.0	7
8	57 06.8	94 31	148.7	57 35.0	94 32	148.4	58 03.2	94 32	148.0	58 31.4	94 32	147.7	58 59.5	94 32	147.4	59 27.5	93 33	147.0	59 55.5	93 33	146.7	60 23.5	93 33	146.3	8
9	56 48.0	94 32	147.1	57 16.1	94 33	146.8	57 44.2	93 33	146.4	58 12.1	93 33	146.1	58 40.1	93 34	145.8	59 07.9	93 34	145.4	59 35.7	93 34	145.0	60 03.5	92 35	144.6	9
20	56 28.5	93 34	145.5	56 56.4	93 34	145.2	57 24.3	93 34	144.9	57 52.1	93 35	144.5	58 19.8	92 35	144.2	58 47.5	92 35	143.8	59 15.1	92 36	143.4	59 42.7	92 36	143.0	20
1	56 08.1	93 35	144.0	56 35.9	92 35	143.7	57 03.6	92 36	143.3	57 31.2	92 36	143.0	57 58.8	92 36	142.6	58 26.3	92 37	142.2	58 53.7	91 37	141.8	59 21.1	91 37	141.4	1
2	55 47.1	92 36	142.5	56 14.6	92 37	142.2	56 42.1	92 37	141.8	57 09.6	91 37	141.4	57 37.0	91 38	141.1	58 04.3	91 38	140.7	58 31.5	91 38	140.3	58 58.7	90 38	139.9	2
3	55 25.2	91 38	141.0	55 52.6	91 38	140.7	56 20.0	91 38	140.3	56 47.2	91 38	139.9	57 14.4	91 39	139.5	57 41.6	90 39	139.1	58 08.6	90 39	138.7	58 35.6	90 40	138.3	3
4	55 02.7	91 39	139.6	55 29.9	91 39	139.2	55 57.1	90 39	138.8	56 24.2	90 40	138.4	56 51.2	90 40	138.0	57 18.1	90 40	137.6	57 45.0	89 40	137.2	58 11.8	89 41	136.8	4
25	54 39.5	90 40	138.1	55 06.6	90 40	137.8	55 33.5	90 40	137.4	56 00.5	90 41	137.0	56 27.3	89 41	136.6	56 54.0	89 41	136.2	57 20.7	89 42	135.7	57 47.3	88 42	135.3	25
6	54 15.6	90 41	136.7	54 42.5	90 41	136.3	55 09.3	89 41	135.9	55 36.1	89 42	135.5	56 02.7	89 42	135.1	56 29.3	88 42	134.7	56 55.8	88 42	134.3	57 22.2	88 43	133.9	6
7	53 51.1	89 42	135.3	54 17.9	89 42	134.9	54 44.5	89 42	134.5	55 11.1	88 43	134.1	55 37.5	88 43	133.7	56 03.9	88 43	133.3	56 30.2	88 44	132.9	56 56.5	87 44	132.4	7
8	53 26.0	89 43	134.0	53 52.6	88 43	133.6	54 19.1	88 43	133.2	54 45.5	88 44	132.7	55 11.8	88 44	132.3	55 38.0	87 44	131.9	56 04.1	87 44	131.5	56 30.1	87 45	131.0	8
9	53 00.4	88 44	132.6	53 26.8	88 44	132.2	53 53.1	88 44	131.8	54 19.3	87 45	131.4	54 45.4	87 45	131.0	55 11.4	87 45	130.5	55 37.4	86 46	130.1	56 03.2	86 46	129.6	9
30	52 34.1	88 45	131.3	53 00.4	87 45	130.9	53 26.5	87 45	130.5	53 52.5	87 45	130.0	54 18.5	86 46	129.6	54 44.4	86 46	129.2	55 10.1	86 46	128.7	55 35.8	85 47	128.3	30
1	52 07.4	87 46	130.0	52 33.4	87 46	129.6	52 59.4	86 46	129.2	53 25.3	86 46	128.7	53 51.1	86 46	128.3	54 16.8	86 47	127.9	54 42.4	85 47	127.4	55 07.9	85 47	127.0	1
2	51 40.1	86 46	128.7	52 06.0	86 47	128.3	52 31.8	86 47	127.9	52 57.5	86 47	127.4	53 23.2	85 47	127.0	53 48.7	85 48	126.6	54 14.1	85 48	126.1	54 39.5	84 48	125.7	2
3	51 12.3	86 47	127.4	51 38.1	86 47	127.0	52 03.7	85 48	126.6	52 29.3	85 48	126.2	52 54.8	85 48	125.7	53 20.1	84 48	125.3	53 45.4	84 49	124.8	54 10.6	84 49	124.4	3
4	50 44.1	85 48	126.2	51 09.7	85 48	125.8	51 35.2	85 48	125.3	52 00.6	85 49	124.9	52 25.9	84 49	124.5	52 51.1	84 49	124.0	53 16.2	84 49	123.6	53 41.3	83 50	123.1	4
35	50 15.4	85 48	125.0	50 40.8	85 49	124.5	51 06.2	84 49	124.1	51 31.5	84 49	123.7	51 56.6	84 50	123.2	52 21.7	83 50	122.8	52 46.7	83 50	122.3	53 11.5	83 50	121.9	35
6	49 46.3	84 49	123.8	50 11.6	84 49	123.3	50 36.8	84 50	122.9	51 01.9	84 50	122.5	51 26.9	83 50	122.0	51 51.8	83 50	121.6	52 16.7	83 51	121.1	52 41.4	82 51	120.7	6
7	49 16.8	84 50	122.6	49 41.9	84 50	122.1	50 07.0	83 50	121.7	50 32.0	83 51	121.3	50 56.8	83 51	120.8	51 21.6	82 51	120.4	51 46.3	82 51	119.9	52 10.8	82 51	119.5	7
8	48 46.8	84 50	121.4	49 11.9	83 51	121.0	49 36.8	83 51	120.6	50 01.6	83 51	120.1	50 26.4	82 51	119.7	50 51.0	82 52	119.2	51 15.5	82 52	118.8	51 40.0	81 52	118.3	8
9	48 16.6	83 51	120.3	48 41.5	83 51	119.8	49 06.3	83 52	119.4	49 31.0	82 52	119.0	49 55.6	82 52	118.5	50 20.1	81 52	118.1	50 44.5	81 52	117.6	51 08.7	81 53	117.2	9
40	47 45.9	83 52	119.1	48 10.7	82 52	118.7	48 35.4	82 52	118.3	48 59.9	82 52	117.8	49 24.4	81 52	117.4	49 48.8	81 53	116.9	50 13.1	81 53	116.5	50 37.2	80 53	116.0	40
1	47 14.9	82 52	118.0	47 39.6	82 52	117.6	48 04.1	82 52	117.2	48 28.6	81 53	116.7	48 52.9	81 53	116.3	49 17.2	81 53	115.8	49 41.3	80 53	115.4	50 05.4	80 54	114.9	1
2	46 43.7	82 53	116.9	47 08.2	82 53	116.5	47 32.6	81 53	116.1	47 56.9	81 53	115.6	48 21.2	81 54	115.2	48 45.3	80 54	114.7	49 09.3	80 54	114.3	49 33.2	80 54	113.8	2
3	46 12.1	82 53	115.8	46 36.5	81 53	115.4	47 00.8	81 54	115.0	47 25.0	81 54	114.5	47 49.1	80 54	114.1	48 13.1	80 54	113.6	48 37.0	80 54	113.2	49 00.8	79 54	112.7	3
4	45 40.2	81 54	114.8	46 04.5	81 54	114.3	46 28.7	81 54	113.9	46 52.8	80 54	113.5	47 16.8	80 54	113.0	47 40.7	80 54	112.6	48 04.5	79 55	112.1	48 28.2	79 55	111.7	4
45	45 08.0	81 54	113.7	45 32.2	80 54	113.3	45 56.3	80 54	112.9	46 20.3	80 55	112.4	46 44.2	80 55	112.0	47 08.0	79 55	111.5	47 31.7	79 55	111.1	47 55.3	78 55	110.6	45
6	44 35.6	80 54	112.7	44 59.7	80 55	112.2	45 23.7	80 55	111.8	45 47.6	80 55	111.4	46 11.4	79 55	110.9	46 35.1	79 55	110.5	46 58.7	78 55	110.0	47 22.2	78 56	109.6	6
7	44 02.9	80 55	111.6	44 26.9	80 55	111.2	44 50.8	80 55	110.8	45 14.6	79 55	110.4	45 38.3	79 55	109.9	46 01.9	79 56	109.5	46 25.4	78 56	109.0	46 48.8	78 56	108.6	7
8	43 30.0	80 55	110.6	43 53.9	80 55	110.2	44 17.7	79 56	109.8	44 41.5	79 56	109.4	45 05.1	79 56	108.9	45 28.6	78 56	108.5	45 52.0	78 56	108.0	46 15.3	78 56	107.6	8
9	42 56.9	80 56	109.6	43 20.7	79 56	109.2	43 44.4	79 56	108.8	44 08.1	79 56	108.4	44 31.6	78 56	107.9	44 55.0	78 56	107.5	45 18.4	78 56	107.0	45 41.6	77 56	106.6	9
50	42 23.6	79 56	108.6	42 47.3	79 56	108.2	43 11.0	79 56	107.8	43 34.5	78 56	107.4	43 58.0	78 56	106.9	44 21.3	78 56	106.5	44 44.6	77 57	106.1	45 07.7	77 57	105.6	50
1	41 50.1	79 56	107.7	42 13.7	79 56	107.2	42 37.3	78 56	106.8	43 00.8	78 57	106.4	43 24.1	78 56	106.0	43 47.4	77 57	105.5	44 10.6	77 57	105.1	44 33.7	77 57	104.6	1
2	41 16.4	79 56	106.7	41 40.0	78 57	106.3	42 03.5	78 57	105.9	42 26.9	78 57	105.4	42 50.2	78 57	105.0	43 13.4	77 57	104.6	43 36.5	77 57	104.1	43 59.5	77 57	103.7	2
3	40 42.5	79 57	105.7	41 06.0	78 57	105.3	41 29.5	78 57	104.9	41 52.8	78 57	104.5	42 16.0	77 57	104.1	42 39.2	77 57	103.6	43 02.2	77 57	103.2	43 25.2	76 57	102.8	3
4	40 08.5	78 57	104.8	40 31.9	78 57	104.4	40 55.3	78 57	104.0	41 18.6	77 57	103.6	41 41.7	77 57	103.1	42 04.8	77 57	102.7	42 27.8	76 58	102.3	42 50.7	76 58	101.8	4
55	39 34.3	78 57	103.9	39 57.7	78 57	103.5	40 21.0	78 57	103.1	40 44.2	77 57	102.6	41 07.3	77 58	102.2	41 30.4	77 58	101.8	41 53.3	76 58	101.4	42 16.1	76 58	100.9	55
6	39 00.0	78 57	103.0	39 23.4	78 57	102.5	39 46.6	77 58	102.1	40 09.7	77 58	101.7	40 32.8	77 58	101.3	40 55.8	76 58	100.9	41 18.7	76 58	100.5	41 41.4	76 58	100.0	6
7	38 25.6	78 58	102.0	38 48.9	77 58	101.6	39 12.1	77 58	101.2	39 35.2	77 58	100.8	39 58.2	77 58	100.4	40 21.1	76 58	100.0	40 43.9	76 58	99.6	41 06.7	76 58	99.1	7
8	37 51.0	78 58	101.1	38 14.3	77 58	100.7	38 37.4	77 58	100.3	39 00.5	77 58	99.9	39 23.4	76 58	99.5	39 46.3	76 58	99.1	40 09.1	76 58	98.7	40 31.8	75 58	98.2	8
9	37 16.4	77 58	100.2	37 39.6	77 58	99.8	38 02.7	77 58	99.4	38 25.7	77 58	99.0	38 48.6	76 58	98.6	39 11.5	76 58	98.2	39 34.2	76 58	97.8	39 56.9	75 58	97.4	9
60	36 41.6	77 58	99.4	37 04.8	77 58	99.0	37 27.8	77 58	98.6	37 50.8	76 58	98.2	38 13.7	76 58	97.7	38 36.5	76 58	97.3	38 59.2	76 58	96.9	39 21.9	75 58	96.5	60
1	36 06.8	77 58	98.5	36 29.9	77 58	98.1	36 52.9	77 58	97.7	37 15.9	76 58	97.3	37 38.7	76 58	96.9	38 01.5	76 58	96.5	38 24.2	75 58	96.1	38 46.8	75 59	95.6	1
2	35 31.9	77 58	97.6	35 55.0	77 58	97.2	36 17.9	77 58	96.8	36 40.9	76 58	96.4	37 03.7	76 58	96.0	37 26.4	76 59	95.6	37 49.1	75 59	95.2	38 11.7	75 59	94.8	2
3	34 56.9	77 58	96.8	35 19.9	77 58	96.4	35 42.9	76 58	96.0	36 05.8	76 59	95.6	36 28.6	76 59	95.2	36 51.3	76 59	94.8	37 13.9	75 59	94.4	37 36.5	75 59	93.9	3
4	34 21.8	77 58	95.9	34 44.9	77 59	95.5	35 07.8	76 59	95.1	35 30.7	76 59	94.7	35 53.4	76 59	94.3	36 16.1	76 59	93.9	36 38.8	75 59	93.5	37 01.3	75 59	93.1	4
65	33 46.7	77 59	95.1	34 09.7	77 59	94.7	34 32.6	76 59	94.3	34 55.5	76 59	93.9	35 18.3	76 59	93.5	35 40.9	75 59	93.1	36 03.5	75 59	92.7	36 26.1	75 59	92.3	65
6	33 11.6	77 59	94.2	33 34.6	76 59	93.8	33 57.5	76 59	93.4	34 20.3	76 59	93.1	34 43.0	76 59	92.7	35 05.7	75 59	92.3	35 28.3	75 59	91.9	35 50.8	75 59	91.4	6
7	32 36.4	77 59	93.4	32 59.4	76 59	93.0	33 22.2	76 59	92.6	33 45.1	76 59	92.2	34 07.8	76 59	91.8	34 30.5	75 59	91.4	34 53.1	75 59	91.0	35 15.6	75 59	90.6	7
8	32 01.2	77 59	92.6	32 24.1	76 59	92.2	32 47.0	76 59	91.8	33 09.8	76 59	91.4	33 32.5	76 59	91.0	33 55.2	75 59	90.6	34 17.8	75 59	90.2	34 40.3	75 59	89.8	8
9	31 25.9	77 59	91.7	31 48.9	76 59	91.4	32 11.7	76 59	91.0	32 34.5	76 59	90.6	32 57.3	76 59	90.2	33 19.9	75 59	89.8	33 42.5	75 59	89.4	34 05.0	75 59	89.0	9
70	30 50.7	77 59	90.9	31 13.6	76 59	90.5	31 36.5	76 59	90.2	31 59.3	76 59	89.8	32 22.0	76 59	89.4	32 44.7	75 59	89.0	33 07.3	75 59	88.6	33 29.8	75 59	88.2	70
1	30 15.4	77 59	90.1	30 38.3	76 59	89.7	31 01.2	76 59	89.4	31 24.0	76 59	89.0	31 46.7	76 59	88.6	32 09.4	75 59	88.2	32 32.0	75 59	87.8	32 54.5	75 59	87.4	1
2	29 40.1	77 59	89.3	30 03.1	76 59	88.9	30 26.0	76 59	88.5	30 48.8	76 59	88.2	31 11.5	76 59	87.8	31 34.2	75 59	87.4	31 56.8	75 59	87.0	32 19.3	75 59	86.6	2
3	29 04.9	77 59	88.5	29 27.8	76 59	88.1	29 50.7	76 59	87.8	30 13.5	76 59	87.4	30 36.3	76 59	87.0	30 59.0	76 59	86.6	31 21.6	75 59	86.2	31 44.1	75 59	85.8	3
4	28 29.6	77 59	87.7	28 52.6	76 59	87.3	29 15.5	76 59	87.0	29 38.3	76 59	86.6	30 01.1	76 59	86.2	30 23.8	76 59	85.8	30 46.4	75 58	85.5	31 09.0	75 59	85.1	4
75	27 54.4	77 59	86.9	28 17.4	76 59	86.5	28 40.3	76 59	86.2	29 03.1	76 59	85.8	29 25.9	76 58	85.4	29 48.6	76 59	85.0	30 11.3	75 58	84.7	30 33.9	75 58	84.3	75
6	27 19.2	77 59	86.1	27 42.2	76 59	85.7	28 05.1	76 58	85.4	28 28.0	76 58	85.0	28 50.8	76 58	84.6	29 13.5	76 58	84.3	29 36.2	75 58	83.9	29 58.8	75 58	83.5	6
7	26 44.0	77 58	85.3	27 07.0	77 59	85.0	27 30.0	76 58	84.6	27 52.8	76 58	84.2	28 15.7	76 58	83.9	28 38.4	76 58	83.5	29 01.1	76 58	83.1	29 23.8	75 58	82.7	7
8	26 08.9	77 58	84.5	26 31.9	77 58	84.2	26 54.9	76 58	83.8	27 17.8	76 58	83.5	27 40.6	76 58	83.1	28 03.4	76 58	82.7	28 26.1	76 58	82.4	28 48.8	75 58	82.0	8
9	25 33.8	77 58	83.8	25 56.9	77 58	83.4	26 19.8	77 58	83.0	26 42.8	76 58	82.7	27 05.6	76 58	82.3	27 28.5	76 58	82.0	27 51.2	76 58	81.6	28 13.9	76 58	81.2	9
80	24 58.8	77 58	83.0	25 21.9	77 58	82.6	25 44.9	77 58	82.3	26 07.8	76 58	81.9	26 30.7	76 58	81.6	26 53.6	76 58	81.2	27 16.4	76 58	80.8	27 39.1	76 58	80.5	80
1	24 23.8	77 58	82.2	24 46.9	77 58	81.9	25 10.0	77 58	81.5	25 32.9	77 58	81.1	25 55.9	76 58	80.8	26 18.8	76 58	80.4	26 41.6	76 58	80.1	27 04.4	76 58	79.7	1
2	23 48.9	77 58	81.4	24 12.0	77 58	81.1	24 35.1	77 58	80.7	24 58.1	77 58	80.4	25 21.1	76 58	80.0	25 44.0	76 58	79.7	26 06.9	76 58	79.3	26 29.7	76 58	79.0	2
3	23 14.1	77 58	80.7	23 37.2	77 58	80.3	24 00.3	77 58	80.0	24 23.4	77 58	79.6	24 46.4	77 58	79.3	25 09.4	76 58	78.9	25 32.3	76 58	78.6	25 55.1	76 57	78.2	3
4	22 39.3	77 58	79.9	23 02.5	77 58	79.6	23 25.7	77 58	79.2	23 48.8	77 58	78.9	24 11.8	77 58	78.5	24 34.8	77 57	78.2	24 57.8	76 57	77.8	25 20.7	76 57	77.4	4
85	22 04.6	78 58	79.1	22 27.9	77 58	78.8	22 51.1	77 58	78.5	23 14.2	77 57	78.1	23 37.3	77 57	77.8	24 00.3	77 57	77.4	24 23.3	77 57	77.1	24 46.3	76 57	76.7	85
6	21 30.0	78 58	78.4	21 53.3	78 57	78.0	22 16.5	77 57	77.7	22 39.7	77 57	77.3	23 02.9	77 57	77.0	23 26.0	77 57	76.7	23 49.0	77 57	76.3	24 12.0	77 57	76.0	6
7	20 55.6	78 57	77.6	21 18.9	78 57	77.3	21 42.1	78 57	76.9	22 05.4	77 57	76.6	22 28.6	77 57	76.3	22 51.7	77 57	75.9	23 14.8	77 57	75.6	23 37.9	77 57	75.2	7
8	20 21.2	78 57	76.9	20 44.5	78 57	76.5	21 07.8	78 57	76.2	21 31.1	78 57	75.8	21 54.4	77 57	75.5	22 17.6	77 57	75.2	22 40.7	77 57	74.8	23 03.8	77 57	74.5	8
9	19 46.9	78 57	76.1	20 10.3	78 57	75.8	20 33.7	78 57	75.4	20 57.0	78 57	75.1	21 20.3	78 57	74.8	21 43.5	77 56	74.4	22 06.7	77 56	74.1	22 29.9	77 56	73.7	9
90	19 12.7	78 57	75.3	19 36.2	78 57	75.0	19 59.6	78 57	74.7	20 23.0	78 56	74.3	20 46.3	78 56	74.0	21 09.6	78 56	73.7	21 32.9	78 56	73.3	21 56.1	77 56	73.0	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0	00
1	11 59.7	1.0 02	179.1	11 29.7	1.0 01	179.1	10 59.7	1.0 01	179.1	10 29.7	1.0 01	179.1	9 59.7	1.0 01	179.1	9 29.7	1.0 01	179.1	8 59.7	1.0 01	179.1	8 29.7	1.0 01	179.1	1
2	11 58.9	1.0 02	178.1	11 28.9	1.0 02	178.1	10 58.9	1.0 02	178.2	10 28.9	1.0 02	178.2	9 58.9	1.0 02	178.2	9 28.9	1.0 02	178.2	8 58.9	1.0 02	178.2	8 28.9	1.0 02	178.2	2
3	11 57.4	1.0 03	177.2	11 27.4	1.0 03	177.2	10 57.4	1.0 03	177.2	10 27.5	1.0 03	177.2	9 57.5	1.0 03	177.3	9 27.5	1.0 03	177.3	8 57.5	1.0 03	177.3	8 27.5	1.0 03	177.3	3
4	11 55.4	1.0 04	176.3	11 25.4	1.0 04	176.3	10 55.5	1.0 04	176.3	10 25.5	1.0 04	176.3	9 55.5	1.0 04	176.4	9 25.5	1.0 04	176.4	8 55.6	1.0 04	176.4	8 25.6	1.0 04	176.4	4
05	11 52.8	1.0 05	175.3	11 22.9	1.0 05	175.4	10 52.9	1.0 05	175.4	10 22.9	1.0 05	175.4	9 53.0	1.0 05	175.4	9 23.0	1.0 05	175.5	8 53.1	1.0 05	175.5	8 23.1	1.0 05	175.5	05
6	11 49.7	1.0 06	174.4	11 19.7	1.0 06	174.4	10 49.8	1.0 06	174.5	10 19.8	1.0 06	174.5	9 49.9	1.0 06	174.5	9 20.0	1.0 06	174.6	8 50.0	1.0 06	174.6	8 20.1	1.0 06	174.6	6
7	11 45.9	1.0 07	173.5	11 16.0	1.0 07	173.5	10 46.1	1.0 07	173.5	10 16.2	1.0 07	173.6	9 46.3	1.0 07	173.6	9 16.3	1.0 07	173.7	8 46.4	1.0 07	173.7	8 16.5	1.0 07	173.7	7
8	11 41.6	1.0 08	172.5	11 11.7	1.0 08	172.6	10 41.9	1.0 08	172.6	10 12.0	1.0 08	172.7	9 42.1	1.0 08	172.7	9 12.2	1.0 08	172.8	8 42.3	1.0 08	172.8	8 12.4	1.0 08	172.8	8
9	11 36.8	1.0 09	171.6	11 06.9	1.0 09	171.7	10 37.0	1.0 09	171.7	10 07.2	1.0 09	171.8	9 37.3	1.0 09	171.8	9 07.4	1.0 09	171.8	8 37.6	1.0 09	171.9	8 07.7	1.0 09	171.9	9
10	11 31.4	99 10	170.7	11 01.5	99 10	170.7	10 31.7	99 10	170.8	10 01.8	99 10	170.8	9 32.0	99 10	170.9	9 02.2	99 10	170.9	8 32.3	99 10	171.0	8 02.5	99 10	171.1	10
1	11 25.4	99 11	169.8	10 55.6	99 11	169.8	10 25.8	99 11	169.9	9 56.0	99 11	169.9	9 26.1	99 11	170.0	8 56.3	99 11	170.0	8 26.5	99 10	170.1	7 56.7	99 10	170.2	1
2	11 18.8	99 12	168.8	10 49.0	99 12	168.9	10 19.3	99 12	169.0	9 49.5	99 12	169.0	9 19.7	99 12	169.1	8 50.0	99 12	169.1	8 20.2	99 12	169.2	7 50.4	99 11	169.3	2
3	11 11.7	99 13	167.9	10 42.0	99 13	168.0	10 12.2	99 13	168.0	9 42.5	99 13	168.1	9 12.8	99 12	168.2	8 43.1	99 12	168.2	8 13.3	99 12	168.3	7 43.6	99 12	168.4	3
4	11 04.0	99 14	167.0	10 34.4	99 14	167.1	10 04.7	99 14	167.1	9 35.0	99 13	167.2	9 05.3	99 13	167.3	8 35.6	99 13	167.4	8 05.9	99 13	167.4	7 36.2	99 13	167.5	4
15	10 55.8	99 15	166.1	10 26.2	99 15	166.1	9 56.5	99 14	166.2	9 26.9	99 14	166.3	8 57.3	99 14	166.4	8 27.6	99 14	166.5	7 58.0	99 14	166.5	7 28.3	99 14	166.6	15
6	10 47.1	99 16	165.1	10 17.5	99 15	165.2	9 47.9	99 15	165.3	9 18.3	99 15	165.4	8 48.7	99 15	165.5	8 19.1	99 15	165.6	7 49.5	99 15	165.6	7 19.9	99 15	165.7	6
7	10 37.7	98 16	164.2	10 08.2	98 16	164.3	9 38.7	98 16	164.4	9 09.1	98 16	164.5	8 39.6	98 16	164.6	8 10.0	98 16	164.7	7 40.5	98 16	164.8	7 10.9	98 16	164.8	7
8	10 27.9	98 17	163.3	9 58.4	98 17	163.4	9 28.9	98 17	163.5	8 59.4	98 17	163.6	8 29.9	98 17	163.7	8 00.4	98 17	163.8	7 31.0	98 17	163.9	7 01.5	98 17	164.0	8
9	10 17.5	98 18	162.4	9 48.1	98 18	162.5	9 18.6	98 18	162.6	8 49.2	98 18	162.7	8 19.8	98 18	162.8	7 50.3	98 18	162.9	7 20.9	98 18	163.0	6 51.5	98 18	163.1	9
20	10 06.6	98 19	161.5	9 37.2	98 19	161.6	9 07.8	98 19	161.7	8 38.5	98 19	161.8	8 09.1	98 19	161.9	7 39.7	98 19	162.0	7 10.3	98 18	162.1	6 40.9	98 18	162.2	20
1	9 55.1	98 20	160.6	9 25.8	98 20	160.7	8 56.5	98 20	160.8	8 27.2	98 20	160.9	7 57.9	98 20	161.0	7 28.6	98 19	161.1	6 59.2	98 19	161.2	6 29.9	98 19	161.3	1
2	9 43.1	97 21	159.7	9 13.9	97 21	159.8	8 44.6	97 21	159.9	8 15.4	97 20	160.0	7 46.1	97 20	160.1	7 16.9	98 20	160.2	6 47.6	98 20	160.4	6 18.4	98 20	160.5	2
3	9 30.6	97 22	158.8	9 01.4	97 22	158.9	8 32.3	97 22	159.0	8 03.1	97 21	159.1	7 33.9	97 21	159.3	7 04.7	97 21	159.4	6 35.5	97 21	159.5	6 06.3	97 21	159.6	3
4	9 17.6	97 22	157.9	8 48.5	97 22	158.0	8 19.4	97 22	158.1	7 50.3	97 22	158.2	7 21.2	97 22	158.4	6 52.0	97 22	158.5	6 22.9	97 22	158.6	5 53.8	97 22	158.7	4
25	9 04.1	97 23	157.0	8 35.0	97 23	157.1	8 06.0	97 23	157.2	7 36.9	97 23	157.4	7 07.9	97 23	157.5	6 38.9	97 23	157.6	6 09.8	97 23	157.7	5 40.8	97 23	157.9	25
6	8 50.9	97 24	156.1	8 21.1	97 24	156.2	7 52.1	97 24	156.4	7 23.1	97 24	156.5	6 54.2	97 24	156.6	6 25.2	97 24	156.7	5 56.2	97 24	156.9	5 27.2	97 23	157.0	6
7	8 35.5	96 25	155.2	8 06.6	96 25	155.3	7 37.7	96 25	155.5	7 08.8	96 25	155.6	6 39.9	96 24	155.7	6 11.0	96 24	155.9	5 42.1	96 24	156.0	5 13.2	96 24	156.1	7
8	8 20.4	96 26	154.3	7 51.6	96 26	154.5	7 22.8	96 26	154.6	6 54.0	96 26	154.7	6 25.2	96 25	154.9	5 56.4	96 25	155.0	5 27.5	96 25	155.2				8
9	8 04.9	96 27	153.4	7 36.2	96 27	153.6	7 07.4	96 26	153.7	6 38.7	96 26	153.9	6 10.0	96 26	154.0	5 41.2	96 26	154.2	5 12.5	96 26	154.3				9
30	7 48.9	96 28	152.5	7 20.2	96 27	152.7	6 51.6	96 27	152.8	6 22.9	96 27	153.0	5 54.3	96 27	153.1	5 25.6	96 27	153.3							30
1	7 32.4	95 28	151.7	7 03.8	96 28	151.8	6 35.2	95 28	152.0	6 06.7	95 28	152.1	5 38.1	95 28	152.3	5 09.5	95 27	152.4							1
2	7 15.4	95 29	150.8	6 46.9	96 29	150.9	6 18.4	95 29	151.1	5 50.0	95 29	151.3	5 21.5	95 28	151.4										2
3	6 58.0	95 30	149.9	6 29.6	95 30	150.1	6 01.2	95 30	150.2	5 32.8	95 29	150.4	5 04.4	95 29	150.6										3
4	6 40.1	94 31	149.0	6 11.7	94 30	149.2	5 43.4	94 30	149.4	5 15.1	94 30	149.5													4
35	6 21.7	94 31	148.2	5 53.5	94 31	148.4	5 25.2	94 31	148.5																35
6	6 02.9	94 32	147.3	5 34.7	94 32	147.5	5 06.6	94 32	147.7																6
7	5 43.6	93 33	146.5	5 15.6	93 33	146.6																			7
8	5 23.9	93 34	145.6																						8
9	5 03.8	93 34	144.7																						9

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	18 38.6	78 56	74.6	19 02.1	78 56	74.3	19 25.6	78 56	73.9	19 49.1	78 56	73.6	20 12.5	78 56	73.3	20 35.9	78 56	72.9	20 59.2	78 56	72.6	21 22.5	78 56	72.2	91
2	18 04.7	79 56	73.8	18 28.3	79 56	73.5	18 51.8	78 56	73.2	19 15.3	78 56	72.8	19 38.8	78 56	72.5	20 02.2	78 56	72.2	20 25.6	78 56	71.8	20 49.0	78 56	71.5	2
3	17 30.9	79 56	73.1	17 54.5	79 56	72.7	18 18.1	79 56	72.4	18 41.7	78 56	72.1	19 05.2	78 56	71.8	19 28.7	78 56	71.4	19 52.2	78 56	71.1	20 15.6	78 55	70.8	3
4	16 57.2	79 56	72.3	17 20.9	79 56	72.0	17 44.6	79 56	71.7	18 08.2	79 56	71.3	18 31.8	79 56	71.0	18 55.3	78 55	70.7	19 18.9	78 55	70.4	19 42.4	78 55	70.0	4
95	16 23.7	79 56	71.6	16 47.4	79 56	71.2	17 11.2	79 55	70.9	17 34.9	79 55	70.6	17 58.5	79 55	70.3	18 22.1	79 55	69.9	18 45.7	79 55	69.6	19 09.3	78 55	69.3	95
6	15 50.3	79 55	70.8	16 14.1	79 55	70.5	16 37.9	79 55	70.2	17 01.7	79 55	69.9	17 25.4	79 55	69.5	17 49.1	79 55	69.2	18 12.8	79 55	68.9	18 36.4	79 55	68.6	6
7	15 17.1	80 55	70.0	15 41.0	80 55	69.7	16 04.8	79 55	69.4	16 28.6	79 55	69.1	16 52.4	79 55	68.8	17 16.2	79 55	68.5	17 39.9	79 54	68.1	18 03.6	79 54	67.8	7
8	14 44.0	80 55	69.3	15 08.0	80 55	69.0	15 31.9	80 55	68.7	15 55.8	80 54	68.4	16 19.6	80 54	68.0	16 43.5	79 54	67.7	17 07.3	79 54	67.4	17 31.1	79 54	67.1	8
9	14 11.1	80 55	68.5	14 35.1	80 54	68.2	14 59.1	80 54	67.9	15 23.1	80 54	67.6	15 47.0	80 54	67.3	16 10.9	80 54	67.0	16 34.8	80 54	66.7	16 58.7	79 54	66.4	9
100	13 38.4	80 54	67.8	14 02.5	80 54	67.5	14 26.5	80 54	67.2	14 50.6	80 54	66.9	15 14.6	80 54	66.6	15 38.6	80 54	66.2	16 02.5	80 54	65.9	16 26.5	80 53	65.6	100
1	13 05.8	81 54	67.0	13 30.0	80 54	66.7	13 54.1	80 54	66.4	14 18.2	80 54	66.1	14 42.3	80 54	65.8	15 06.4	80 53	65.5	15 30.4	80 53	65.2	15 54.4	80 53	64.9	1
2	12 33.4	81 54	66.3	12 57.7	81 54	66.0	13 21.9	81 53	65.7	13 46.1	81 53	65.4	14 10.2	81 53	65.1	14 34.4	80 53	64.8	14 58.5	80 53	64.4	15 22.6	80 53	64.1	2
3	12 01.2	81 53	65.5	12 25.6	81 53	65.2	12 49.8	81 53	64.9	13 14.1	81 53	64.6	13 38.4	81 53	64.3	14 02.6	81 53	64.0	14 26.8	81 52	63.7	14 51.0	81 52	63.4	3
4	11 29.2	81 53	64.8	11 53.6	81 53	64.5	12 18.0	81 53	64.2	12 42.3	81 53	63.9	13 06.7	81 52	63.6	13 31.0	81 52	63.3	13 55.3	81 52	63.0	14 19.5	81 52	62.7	4
105	10 57.4	82 53	64.0	11 21.9	82 53	63.7	11 46.4	81 52	63.4	12 10.8	81 52	63.1	12 35.2	81 52	62.8	12 59.6	81 52	62.5	13 24.0	81 52	62.2	13 48.3	81 52	61.9	105
6	10 25.8	82 52	63.2	10 50.4	82 52	62.9	11 14.9	82 52	62.7	11 39.4	82 52	62.4	12 03.9	82 52	62.1	12 28.4	82 52	61.8	12 52.9	81 52	61.5	13 17.3	81 51	61.2	6
7	9 54.5	82 52	62.5	10 19.1	82 52	62.2	10 43.7	82 52	61.9	11 08.3	82 52	61.6	11 32.9	82 51	61.3	11 57.4	82 51	61.0	12 22.0	82 51	60.7	12 46.5	82 51	60.4	7
8	9 23.3	82 52	61.7	9 48.0	82 51	61.4	10 12.7	82 51	61.1	10 37.4	82 51	60.9	11 02.1	82 51	60.6	11 26.7	82 51	60.3	11 51.3	82 51	60.0	12 16.0	82 51	59.7	8
9	8 52.4	83 51	61.0	9 17.2	83 51	60.7	9 41.9	83 51	60.4	10 06.7	83 51	60.1	10 31.5	82 51	59.8	10 56.2	82 50	59.5	11 20.9	82 50	59.2	11 45.6	82 50	58.9	9
110	8 21.6	83 51	60.2	8 46.5	83 51	59.9	9 11.4	83 50	59.6	9 36.2	83 50	59.3	10 01.1	83 50	59.1	10 25.9	83 50	58.8	10 50.7	83 50	58.5	11 15.5	83 50	58.2	110
1	7 51.2	83 50	59.4	8 16.1	83 50	59.1	8 41.1	83 50	58.9	9 06.0	83 50	58.6	9 31.0	83 50	58.3	9 55.9	83 50	58.0	10 20.8	83 50	57.7	10 45.7	83 49	57.4	1
2	7 20.9	84 50	58.7	7 46.0	84 50	58.4	8 11.0	83 50	58.1	8 36.1	83 50	57.8	9 01.1	83 49	57.5	9 26.1	83 49	57.3	9 51.1	83 49	57.0	10 16.1	83 49	56.7	2
3	6 50.9	84 50	57.9	7 16.1	84 49	57.6	7 41.2	84 49	57.3	8 06.3	84 49	57.1	8 31.5	84 49	56.8	8 56.6	84 49	56.5	9 21.7	84 49	56.2	9 46.7	84 48	55.9	3
4	6 21.2	84 49	57.1	6 46.4	84 49	56.8	7 11.6	84 49	56.6	7 36.9	84 49	56.3	8 02.1	84 48	56.0	8 27.3	84 48	55.7	8 52.5	84 48	55.5	9 17.6	84 48	55.2	4
115	5 51.7	84 49	56.3	6 17.0	84 49	56.1	6 42.3	84 48	55.8	7 07.7	84 48	55.5	7 33.0	84 48	55.3	7 58.3	84 48	55.0	8 23.5	84 48	54.7	8 48.8	84 48	54.4	115
6	5 22.5	85 48	55.6	5 47.9	85 48	55.3	6 13.3	85 48	55.0	6 38.7	85 48	54.8	7 04.1	85 48	54.5	7 29.5	85 47	54.2	7 54.9	85 47	54.0	8 20.3	85 47	53.7	6
7				5 19.0	85 48	54.5	5 44.6	85 48	54.3	6 10.1	85 47	54.0	6 35.6	85 47	53.7	7 01.0	85 47	53.5	7 26.5	85 47	53.2	7 52.0	85 47	52.9	7
8							5 16.1	85 47	53.5	5 41.7	85 47	53.2	6 07.3	85 47	53.0	6 32.8	85 47	52.7	6 58.4	85 46	52.4	7 24.0	85 46	52.2	8
9										5 13.6	86 46	52.4	5 39.3	86 46	52.2	6 04.9	86 46	51.9	6 30.6	86 46	51.7	6 56.3	86 46	51.4	9
120													5 11.5	86 46	51.4	5 37.3	86 46	51.1	6 03.1	86 45	50.9	6 28.9	86 45	50.6	120
1																5 10.0	86 45	50.4	5 35.9	86 45	50.1	6 01.8	86 45	49.9	1
2																			5 09.0	87 44	49.3	5 34.9	87 44	49.1	2
3																						5 08.4	87 44	48.3	3

Digitized by Google

Lat. 54°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
00	64 00.0	1.0 01	180.0	64 30.0	1.0 01	180.0	65 00.0	1.0 01	180.0	66 00.0	1.0 01	180.0	68 00.0	1.0 01	180.0	70 00.0	1.0 01	180.0	70 30.0	1.0 01	180.0	71 30.0	1.0 01	180.0	00
1	63 59.4	1.0 03	178.0	64 29.4	1.0 03	178.0	64 59.4	1.0 03	177.9	65 59.3	1.0 03	177.9	67 59.3	1.0 03	177.7	69 59.3	1.0 04	177.6	70 29.2	1.0 04	177.5	71 29.2	1.0 04	177.4	1
2	63 57.5	1.0 05	176.0	64 27.5	1.0 05	175.9	64 57.5	1.0 05	175.9	65 57.4	1.0 05	175.7	67 57.2	1.0 06	175.5	69 57.0	1.0 06	175.2	70 27.0	1.0 06	175.1	71 26.8	1.0 07	174.9	2
3	63 54.4	1.0 07	174.0	64 24.4	1.0 07	173.9	64 54.3	1.0 07	173.8	65 54.1	1.0 08	173.6	67 53.7	1.0 08	173.2	69 53.3	1.0 09	172.8	70 23.2	1.0 09	172.6	71 22.9	1.0 09	172.3	3
4	63 50.1	1.0 09	172.0	64 20.0	1.0 09	171.9	64 49.8	1.0 10	171.8	65 49.6	99 10	171.5	67 48.9	99 10	171.0	69 48.1	99 11	170.4	70 17.9	99 11	170.2	71 17.4	99 12	169.8	4
05	63 44.6	99 11	170.0	64 14.4	99 11	169.8	64 44.2	99 12	169.7	65 43.7	99 12	169.4	67 42.7	99 13	168.8	69 41.5	99 13	168.0	70 11.2	99 14	167.8	71 10.4	99 14	167.3	05
6	63 37.9	99 13	168.0	64 07.6	99 13	167.8	64 37.3	99 14	167.7	65 36.6	99 14	167.3	67 35.2	99 15	166.6	69 33.4	98 16	165.6	70 03.0	98 16	165.4	71 01.9	98 17	164.8	6
7	63 29.9	99 15	166.0	63 59.5	99 15	165.9	64 29.1	99 16	165.7	65 28.3	99 16	165.3	67 26.3	98 17	164.4	69 24.0	98 18	163.3	69 53.4	98 18	163.0	70 52.0	98 19	162.4	7
8	63 20.8	98 17	164.1	63 50.3	98 17	163.9	64 19.8	98 18	163.7	65 18.7	98 18	163.2	67 16.2	98 19	162.2	69 13.2	97 20	161.0	69 42.4	97 21	160.7	70 40.6	97 21	160.0	8
9	63 10.6	98 19	162.2	63 40.0	98 19	161.9	64 09.3	98 19	161.7	65 07.9	98 20	161.2	67 04.8	97 21	160.1	69 01.1	97 22	158.8	69 30.1	96 23	158.4	70 27.8	96 24	157.6	9
10	62 59.3	97 21	160.3	63 28.5	97 21	160.0	63 57.7	97 21	159.8	64 56.0	97 22	159.2	66 52.2	97 23	158.0	68 47.7	96 24	156.5	69 16.4	96 25	156.1	70 13.8	95 26	155.3	10
1	62 46.8	97 22	158.4	63 15.9	97 23	158.1	63 44.9	97 23	157.8	64 42.9	96 24	157.2	66 38.3	96 25	155.9	68 33.0	95 26	154.4	69 01.5	95 27	153.9	69 58.4	94 28	153.0	1
2	62 33.3	96 24	156.5	63 02.2	96 25	156.2	63 31.1	96 25	155.9	64 28.7	96 25	155.3	66 23.4	95 27	153.9	68 17.2	94 28	152.2	68 45.5	94 29	151.8	69 41.8	94 30	150.8	2
3	62 18.7	96 26	154.7	62 47.5	96 26	154.4	63 16.2	96 26	154.1	64 13.4	95 27	153.4	66 07.3	95 29	151.9	68 00.2	94 30	150.1	68 28.2	93 31	149.7	69 24.0	93 32	148.6	3
4	62 03.2	96 28	152.9	62 31.7	95 28	152.6	63 00.2	95 28	152.2	63 57.1	95 29	151.5	65 50.2	94 30	149.9	67 42.1	93 32	148.1	68 09.8	92 32	147.6	69 05.1	92 33	146.5	4
15	61 46.6	95 29	151.1	62 15.0	95 30	150.8	62 43.3	94 30	150.4	63 39.8	94 30	149.7	65 32.0	93 32	148.0	67 22.9	92 34	146.1	67 50.4	92 34	145.6	68 45.1	91 35	144.5	15
6	61 29.1	94 31	149.4	61 57.3	94 31	149.0	62 25.4	94 31	148.6	63 21.5	93 32	147.8	65 12.8	92 34	146.1	67 02.7	91 35	144.1	67 30.0	91 36	143.6	68 24.1	90 37	142.4	6
7	61 10.6	93 32	147.6	61 38.6	93 33	147.2	62 06.6	93 33	146.9	63 02.2	93 34	146.1	64 52.7	91 35	144.3	66 41.6	90 37	142.2	67 08.6	90 37	141.7	68 02.1	89 38	140.5	7
8	60 51.3	93 34	145.9	61 19.1	93 34	145.5	61 46.9	92 34	145.1	62 42.1	92 35	144.3	64 31.6	91 37	142.5	66 19.5	89 38	140.4	66 46.2	89 39	139.8	67 39.2	88 40	138.6	8
9	60 31.1	92 35	144.3	60 58.7	92 35	143.9	61 26.3	92 36	143.4	62 21.1	91 36	142.6	64 09.7	90 38	140.7	65 56.6	88 40	138.5	66 23.0	88 40	138.0	67 15.5	87 41	136.7	9
20	60 10.1	91 36	142.6	60 37.5	91 37	142.2	61 04.9	91 37	141.8	61 59.3	90 38	140.9	63 46.9	89 39	139.0	65 32.9	87 41	136.8	65 59.0	87 41	136.2	66 50.9	86 42	134.9	20
1	59 48.3	91 38	141.0	60 15.5	91 38	140.6	60 42.7	90 38	140.2	61 36.6	90 39	139.3	63 23.4	88 40	137.3	65 08.3	87 42	135.0	65 34.2	86 43	134.4	66 25.5	85 43	133.2	1
2	59 25.8	90 39	139.4	59 52.8	90 39	139.0	60 19.7	90 40	138.6	61 13.2	89 40	137.6	62 59.1	87 42	135.6	64 43.0	86 43	133.4	65 08.7	85 44	132.7	65 59.4	84 45	131.5	2
3	59 02.5	89 40	137.9	59 29.3	89 40	137.4	59 56.0	89 41	137.0	60 49.1	88 41	136.1	62 34.1	87 43	134.0	64 17.0	85 44	131.7	64 42.4	84 45	131.1	65 32.7	83 46	129.8	3
4	58 38.5	89 41	136.4	59 05.1	89 41	135.9	59 31.6	88 42	135.5	60 24.3	88 42	134.5	62 08.4	86 44	132.4	63 50.4	84 45	130.1	64 15.5	83 46	129.5	65 05.3	82 47	128.2	4
25	58 13.8	88 42	134.9	58 40.2	88 43	134.4	59 06.5	88 43	133.9	59 58.8	87 44	133.0	61 42.0	85 45	130.9	63 23.1	83 46	128.5	63 48.0	83 47	127.9	64 37.2	81 48	126.6	25
6	57 48.5	88 43	133.4	58 14.7	87 44	132.9	58 40.8	87 44	132.5	59 32.7	86 44	131.5	61 15.1	84 46	129.4	62 55.2	82 47	127.0	63 19.9	82 48	126.4	64 08.6	81 49	125.1	6
7	57 22.6	87 44	132.0	57 48.6	87 44	131.5	58 14.5	86 45	131.0	59 06.0	85 45	130.0	60 47.5	84 47	127.9	62 26.8	82 48	125.5	62 51.2	81 49	124.9	63 39.5	80 49	123.6	7
8	56 56.1	86 45	130.6	57 21.9	86 45	130.1	57 47.6	86 46	129.6	58 38.7	85 46	128.6	60 19.4	83 48	126.5	61 57.8	81 49	124.1	62 22.0	80 49	123.5	63 09.9	79 50	122.1	8
9	56 29.0	86 46	129.2	56 54.6	85 46	128.7	57 20.2	85 47	128.2	58 10.9	84 47	127.2	59 50.8	82 49	125.1	61 28.4	80 50	122.7	61 52.4	80 50	122.1	62 39.8	78 51	120.7	9
30	56 01.4	85 47	127.8	56 26.9	85 47	127.3	56 52.2	84 48	126.9	57 42.6	84 48	125.9	59 21.7	82 49	123.7	60 58.5	80 51	121.3	61 22.3	79 51	120.7	62 09.3	78 52	119.4	30
1	55 33.3	84 48	126.5	55 58.6	84 48	126.0	56 23.7	84 48	125.5	57 13.7	83 49	124.5	58 52.1	81 50	122.3	60 28.2	79 51	120.0	60 51.7	78 52	119.3	61 38.4	77 52	118.0	1
2	55 04.7	84 48	125.2	55 29.8	84 49	124.7	55 54.8	83 49	124.2	56 44.4	82 50	123.2	58 22.1	80 51	121.0	59 57.4	78 52	118.7	60 20.8	78 52	118.0	61 07.0	76 53	116.7	2
3	54 35.6	83 49	123.9	55 00.6	83 49	123.4	55 25.4	83 50	122.9	56 14.7	82 50	121.9	57 51.7	80 51	119.7	59 26.3	78 52	117.4	59 49.5	77 53	116.8	60 35.4	76 53	115.5	3
4	54 06.2	83 50	122.6	54 30.9	82 50	122.2	54 55.6	82 50	121.7	55 44.6	81 51	120.6	57 20.9	79 52	118.5	58 54.8	77 53	116.1	59 17.8	77 53	115.5	60 03.4	75 54	114.2	4
35	53 36.2	82 50	121.4	54 00.9	82 51	120.9	54 25.4	81 51	120.4	55 14.0	81 52	119.4	56 49.7	79 53	117.3	58 22.9	77 54	114.9	58 45.8	76 54	114.3	59 31.0	75 54	113.0	35
6	53 06.0	82 51	120.2	53 30.4	81 51	119.7	53 54.8	81 52	119.2	54 43.1	80 52	118.2	56 18.2	78 53	116.0	57 50.8	76 54	113.7	58 13.5	75 54	113.1	58 58.4	74 55	111.8	6
7	52 35.3	81 52	119.0	52 59.6	81 52	118.5	53 23.8	81 52	118.0	54 11.9	80 53	117.0	55 46.3	78 54	114.9	57 18.4	76 54	112.5	57 41.0	75 55	111.9	58 25.6	74 55	110.7	7
8	52 04.3	81 52	117.8	52 28.5	80 52	117.3	52 52.5	80 53	116.9	53 40.3	79 53	115.8	55 14.2	77 54	113.7	56 45.7	75 55	111.4	57 08.1	75 55	110.8	57 52.4	73 56	109.5	8
9	51 32.9	80 53	116.7	51 57.0	80 53	116.2	52 20.9	80 53	115.7	53 08.4	79 54	114.7	54 41.8	77 54	112.6	56 12.7	75 55	110.3	56 35.0	74 56	109.7	57 19.1	73 56	108.4	9
40	51 01.3	80 53	115.5	51 25.2	80 54	115.1	51 49.0	79 54	114.6	52 36.2	78 54	113.6	54 09.1	76 55	111.4	55 39.5	74 56	109.2	56 01.7	74 56	108.6	56 45.5	72 56	107.3	40
1	50 29.3	80 54	114.4	50 53.1	79 54	114.0	51 16.8	79 54	113.5	52 03.8	78 55	112.5	53 36.1	76 55	110.3	55 06.1	74 56	108.1	55 28.1	73 56	107.5	56 11.8	72 57	106.3	1
2	49 57.0	79 54	113.3	50 20.7	79 54	112.9	50 44.3	78 54	112.4	51 31.0	77 55	111.4	53 02.9	76 56	109.3	54 32.4	74 56	107.0	54 54.4	73 57	106.4	55 37.8	72 57	105.2	2
3	49 24.5	79 55	112.3	49 48.1	78 55	111.8	50 11.6	78 55	111.3	50 58.1	77 55	110.3	52 29.5	75 56	108.2	53 58.6	73 57	106.0	54 20.5	73 57	105.4	55 03.7	71 57	104.2	3
4	48 51.8	78 55	111.2	49 15.2	78 55	110.7	49 38.6	78 55	110.2	50 24.9	77 56	109.3	51 55.9	75 56	107.2	53 24.6	73 57	105.0	53 46.4	72 57	104.4	54 29.4	71 57	103.2	4
45	48 18.8	78 55	110.2	48 42.1	78 56	109.7	49 05.4	77 56	109.2	49 51.5	76 56	108.2	51 22.2	75 57	106.2	52 50.5	73 57	103.9	53 12.2	72 57	103.4	53 55.0	71 58	102.2	45
6	47 45.6	78 56	109.1	48 08.8	77 56	108.7	48 32.0	77 56	108.2	49 17.9	76 56	107.2	50 48.2	74 57	105.1	52 16.2	72 57	103.0	52 37.8	72 58	102.4	53 20.5	71 58	101.2	6
7	47 12.1	77 56	108.1	47 35.3	77 56	107.6	47 58.4	77 56	107.2	48 44.1	76 57	106.2	50 14.1	74 57	104.2	51 41.8	72 58	102.0	52 03.3	72 58	101.4	52 45.9	70 58	100.3	7
8	46 38.5	77 56	107.1	47 01.6	77 56	106.6	47 24.6	76 57	106.2	48 10.2	76 57	105.2	49 39.8	74 57	103.2	51 07.2	72 58	101.0	51 28.7	71 58	100.5	52 11.1	70 58	99.3	8
9	46 04.7	77 57	106.1	46 27.7	77 57	105.7	46 50.6	76 57	105.2	47 36.1	75 57	104.2	49 05.4	74 58	102.2	50 32.5	72 58	100.1	50 53.9	71 58	99.5	51 36.3	70 58	98.4	9
50	45 30.8	77 57	105.2	45 53.7	76 57	104.7	46 16.5	76 57	104.2	47 01.8	75 57	103.3	48 30.9	73 58	101.3	49 57.8	71 58	99.2	50 19.1	71 58	98.6	51 01.3	70 58	97.5	50
1	44 56.6	76 57	104.2	45 19.5	76 57	103.7	45 42.3	76 57	103.3	46 27.4	75 58	102.3	47 56.2	73 58	100.3	49 22.9	71 58	98.2	49 44.2	71 58	97.7	50 26.3	70 58	96.6	1
2	44 22.4	76 57	103.3	44 45.2	76 57	102.8	45 07.9	75 58	102.3	45 52.9	75 58	101.4	47 21.5	73 58	99.4	48 48.0	71 58	97.3	49 09.2	71 58	96.8	49 51.3	70 59	95.7	2
3	43 48.0	76 58	102.3	44 10.7	76 58	101.9	44 33.4	75 58	101.4	45 18.3	74 58	100.5	46 46.7	73 58	98.5	48 12.9	71 58	96.5	48 34.2	70 59	95.9	49 16.1	69 59	94.8	3
4	43 13.5	76 58	101.4	43 36.2	75 58	100.9	43 58.7	75 58	100.5	44 43.5	74 58	99.6	46 11.7	73 58	97.6	47 37.9	71 59	95.6	47 59.1	70 59	95.1	48 41.0	69 59	94.0	4
55	42 38.9	76 58	100.5	43 01.5	75 58	100.0	43 24.0	75 58	99.6	44 08.7	74 58	98.7	45 36.7	73 58	96.7	47 02.7	71 59	94.7	47 23.9	70 59	94.2	48 05.8	69 59	93.1	55
6	42 04.1	75 58	99.6	42 26.7	75 58	99.1	42 49.2	75 58	98.7	43 33.8	74 58	97.8	45 01.7	72 59	95.9	46 27.6	71 59	93.9	46 48.7	70 59	93.3	47 30.6	69 59	92.3	6
7	41 29.3	75 58	98.7	41 51.8	75 58	98.2	42 14.3	75 58	97.8	42 58.8	74 58	96.9	44 26.6	72 59	95.0	45 52.4	71 59	93.0	46 13.5	70 59	92.5	46 55.3	69 59	91.5	7
8	40 54.4	75 58	97.8	41 16.9	75 58	97.4	41 39.3	74 58	96.9	42 23.8	74 58	96.0	43 51.4	72 59	94.1	45 17.1	71 59	92.2	45 38.2	70 59	91.7	46 20.0	69 59	90.6	8
9	40 19.4	75 58	96.9	40 41.9	75 58	96.5	41 04.3	74 58	96.1	41 48.7	74 59	95.2	43 16.2	72 59	93.3	44 41.9	71 59	91.4	45 03.0	70 59	90.8	45 44.8	69 59	89.8	9
60	39 44.4	75 58	96.1	40 06.8	75 59	95.6	40 29.2	74 59	95.2	41 13.5	74 59	94.3	42 41.0	72 59	92.5	44 06.6	71 59	90.5	44 27.7	70 59	90.0	45 09.5	69 59	89.0	60
1	39 09.3	75 59	95.2	39 31.7	75 59	94.8	39 54.0	74 59	94.3	40 38.4	74 59	93.5	42 05.8	72 59	91.6	43 31.4	71 59	89.7	43 52.5	70 59	89.2	44 34.3	69 59	88.2	1
2	38 34.1	75 59	94.4	38 56.5	74 59	93.9	39 18.8	74 59	93.5	40 03.1	74 59	92.6	41 30.5	72 59	90.8	42 56.1	71 59	88.9	43 17.2	70 59	88.4	43 59.0	69 59	87.4	2
3	37 59.0	75 59	93.5	38 21.3	74 59	93.1	38 43.6	74 59	92.7	39 27.9	73 59	91.8	40 55.2	72 59	90.0	42 20.8	71 59	88.1	42 42.0	70 59	87.6	43 23.8	69 59	86.7	3
4	37 23.7	75 59	92.7	37 46.1	74 59	92.3	38 08.4	74 59	91.8	38 52.6	73 59	91.0	40 20.0	72 59	89.2	41 45.6	71 59	87.3	42 06.7	70 59	86.9	42 48.6	69 59	85.9	4
65	36 48.5	75 59	91.9	37 10.9	74 59	91.4	37 33.1	74 59	91.0	38 17.4	73 59	90.2	39 44.7	72 59	88.4	41 10.4	71 59	86.6	41 31.5	70 59	86.1	42 13.4	69 59	85.1	65
6	36 13.3	75 59	91.0	36 35.6	74 59	90.6	36 57.9	74 59	90.2	37 42.1	73 59	89.4	39 09.5	72 59	87.6	40 35.2	71 59	85.8	40 56.4	70 59	85.3	41 38.3	70 58	84.4	6
7	35 38.0	75 59	90.2	36 00.3	74 59	89.8	36 22.6	74 59	89.4	37 06.8	73 59	88.6	38 34.2	72 59	86.8	40 00.0	71 59	85.0	40 21.2	70 58	84.5	41 03.3	70 58	83.6	7
8	35 02.7	75 59	89.4	35 25.1	74 59	89.0	35 47.3	74 59	88.6	36 31.6	73 59	87.8	37 59.1	72 59	86.0	39 24.9	71 58	84.2	39 46.1	71 58	83.8	40 28.2	70 58	82.9	8
9	34 27.5	75 59	88.6	34 49.8	74 59	88.2	35 12.1	74 59	87.8	35 56.4	74 59	87.0	37 23.9	72 59	85.3	38 49.9	71 58	83.5	39 11.1	71 58	83.0	39 53.3	70 58	82.1	9
70	33 52.2	75 59	87.8	34 14.6	74 59	87.4	34 36.9	74 59	87.0	35 21.2	74 59	86.2	36 48.8	72 58	84.5	38 14.9	71 58	82.7	38 36.1	71 58	82.3	39 18.4	70 58	81.4	70
1	33 17.0	75 59	87.0	33 39.4	74 59	86.6	34 01.6	74 59	86.2	34 46.0	74 59	85.4	36 13.7	72 58	83.7	37 39.9	71 58	82.0	38 01.2	71 58	81.5	38 43.5	70 58	80.6	1
2	32 41.8	75 59	86.2	33 04.2	74 59	85.8	33 26.5	74 58	85.4	34 10.9	74 58	84.6	35 38.6	73 58	83.0	37 05.0	71 58	81.2	37 26.4	71 58	80.8	38 08.8	70 58	79.9	2
3	32 06.6	75 58	85.5	32 29.0	75 58	85.1	32 51.3	74 58	84.7	33 35.8	74 58	83.9	35 03.7	73 58	82.2	36 30.2	71 58	80.5	36 51.6	71 58	80.1	37 34.1	71 58	79.2	3
4	31 31.5	75 58	84.7	31 53.9	75 58	84.3	32 16.2	74 58	83.9	33 00.7	74 58	83.1	34 28.8	73 58	81.5	35 55.4	72 58	79.8	36 16.9	71 58	79.3	36 59.5	71 58	78.5	4
75	30 56.4	75 58	83.9	31 18.8	75 58	83.5	31 41.2	75 58	83.1	32 25.8	74 58	82.3	33 53.9	73 58	80.7	35 20.8	72 58	79.0	35 42.3	71 58	78.6	36 25.0	71 57	77.7	75
6	30 21.3	75 58	83.1	30 43.8	75 58	82.8	31 06.2	75 58	82.4	31 50.8	74 58	81.6	33 19.2	73 58	80.0	34 46.2	72 57	78.3	35 07.7	72 57	77.9	35 50.6	71 57	77.0	6
7	29 46.3	75 58	82.4	30 08.9	75 58	82.0	30 31.3	75 58	81.6	31 16.0	74 58	80.8	32 44.5	73 58	79.2	34 11.7	72 57	77.6	34 33.3	72 57	77.2	35 16.3	71 57	76.3	7
8	29 11.4	75 58	81.6	29 34.0	75 58	81.2	29 56.4	75 58	80.8	30 41.2	74 58	80.1	32 09.9	73 58	78.5	33 37.3	72 57	76.9	33 59.0	72 57	76.4	34 42.0	71 57	75.6	8
9	28 36.6	75 58	80.8	28 59.1	75 58	80.5	29 21.7	75 58	80.1	30 06.5	75 58	79.3	31 35.4	74 57	77.8	33 03.0	73 57	76.1	33 24.7	72 57	75.7	34 07.9	72 57	74.9	9
80	28 01.8	75 58	80.1	28 24.4	75 58	79.7	28 47.0	75 58	79.3	29 31.9	75 58	78.6	31 00.9	74 57	77.0	32 28.8	73 57	75.4	32 50.6	72 57	75.0	33 33.9	72 56	74.2	80
1	27 27.1	76 58	79.3	27 49.7	75 58	79.0	28 12.3	75 58	78.6	28 57.4	75 57	77.8	30 26.6	74 57	76.3	31 54.8	73 57	74.7	32 16.6	73 56	74.3	33 00.1	72 56	73.5	1
2	26 52.5	76 58	78.6	27 15.2	76 57	78.2	27 37.8	75 57	77.8	28 22.9	75 57	77.1	29 52.4	74 57	75.6	31 20.8	73 56	74.0	31 42.7	73 56	73.6	32 26.3	72 56	72.8	2
3	26 18.0	76 57	77.8	26 40.7	76 57	77.5	27 03.4	76 57	77.1	27 48.6	75 57	76.4	29 18.3	74 57	74.9	30 47.0	73 56	73.3	31 08.9	73 56	72.9	31 52.7	73 56	72.1	3
4	25 43.5	76 57	77.1	26 06.3	76 57	76.7	26 29.1	76 57	76.4	27 14.4	75 57	75.6	28 44.3	75 56	74.1	30 13.2	74 56	72.6	30 35.3	73 56	72.2	31 19.2	73 56	71.4	4
85	25 09.2	76 57	76.3	25 32.1	76 57	76.0	25 54.9	76 57	75.6	26 40.3	76 57	74.9	28 10.5	75 56	73.4	29 39.7	74 56	71.9	30 01.8	74 56	71.5	30 45.8	73 55	70.7	85
6	24 35.0	76 57	75.6	24 57.9	76 57	75.2	25 20.7	76 57	74.9	26 06.3	76 56	74.2	27 36.7	75 56	72.7	29 06.2	74 56	71.2	29 28.4	74 55	70.8	30 12.6	73 55	70.0	6
7	24 00.9	77 57	74.9	24 23.8	76 57	74.5	24 46.8	76 56	74.2	25 32.4	76 56	73.4	27 03.1	75 56	72.0	28 32.9	74 55	70.5	28 55.2	74 55	70.1	29 39.6	74 55	69.3	7
8	23 26.9	77 56	74.1	23 49.9	77 56	73.8	24 12.9	76 56	73.4	24 58.7	76 56	72.7	26 29.7	75 56	71.3	27 59.7	75 55	69.8	28 22.1	74 55	69.4	29 06.6	74 55	68.6	8
9	22 53.0	77 56	73.4	23 16.1	77 56	73.0	23 39.2	77 56	72.7	24 25.1	76 56	72.0	25 56.3	76 55	70.5	27 26.7	75 55	69.1	27 49.2	74 55	68.7	28 33.9	74 54	67.9	9
90	22 19.3	77 56	72.6	22 42.5	77 56	72.3	23 05.6	77 56	72.0	23 51.6	77 56	71.3	25 23.2	76 55	69.8	26 53.9	75 54	68.4	27 16.4	75 54	68.0	28 01.3	75 54	67.3	90

Lat. 54°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	8 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	7 00.0	1.0 00	180.0	6 00.0	1.0 00	180.0													00
1	7 59.7	1.0 01	179.1	7 29.7	1.0 01	179.1	6 59.7	1.0 01	179.1	5 59.7	1.0 01	179.1													1
2	7 58.9	1.0 02	178.2	7 28.9	1.0 02	178.2	6 58.9	1.0 02	178.2	5 58.9	1.0 02	178.3													2
3	7 57.5	1.0 03	177.3	7 27.5	1.0 03	177.3	6 57.6	1.0 03	177.4	5 57.6	1.0 03	177.4													3
4	7 55.6	1.0 04	176.4	7 25.6	1.0 04	176.5	6 55.7	1.0 04	176.5	5 55.7	1.0 04	176.5													4
05	7 53.1	1.0 05	175.5	7 23.2	1.0 05	175.6	6 53.2	1.0 05	175.6	5 53.3	1.0 05	175.6													05
6	7 50.1	1.0 06	174.7	7 20.2	1.0 06	174.7	6 50.2	1.0 06	174.7	5 50.4	1.0 06	174.8													6
7	7 46.6	1.0 07	173.8	7 16.7	1.0 07	173.8	6 46.7	1.0 07	173.8	5 46.9	1.0 07	173.9													7
8	7 42.5	1.0 08	172.9	7 12.6	1.0 08	172.9	6 42.7	1.0 08	173.0	5 42.9	1.0 08	173.0													8
9	7 37.8	1.0 09	172.0	7 08.0	1.0 09	172.0	6 38.1	1.0 08	172.1	5 38.3	1.0 08	172.2													9
10	7 32.6	99 10	171.1	7 02.8	99 09	171.2	6 33.0	99 09	171.2	5 33.3	99 09	171.3													10
1	7 26.9	99 10	170.2	6 57.1	99 10	170.3	6 27.3	99 10	170.3	5 27.7	99 10	170.4													1
2	7 20.7	99 11	169.3	6 50.9	99 11	169.4	6 21.1	99 11	169.5	5 21.6	99 11	169.6													2
3	7 13.9	99 12	168.5	6 44.1	99 12	168.5	6 14.4	99 12	168.6	5 14.9	99 12	168.7													3
4	7 06.5	99 13	167.6	6 36.8	99 13	167.6	6 07.2	99 13	167.7	5 07.8	99 13	167.9													4
15	6 58.7	99 14	166.7	6 29.0	99 14	166.8	5 59.4	99 14	166.8	5 00.1	99 14	167.0													15
6	6 50.3	99 15	165.8	6 20.7	99 15	165.9	5 51.1	99 15	166.0																6
7	6 41.4	98 16	164.9	6 11.8	98 16	165.0	5 42.3	98 16	165.1																7
8	6 32.0	98 17	164.1	6 02.5	98 16	164.2	5 33.0	98 16	164.2																8
9	6 22.0	98 18	163.2	5 52.6	98 17	163.3	5 23.1	98 17	163.4																9
20	6 11.6	98 18	162.3	5 42.2	98 18	162.4	5 12.8	98 18	162.5																20
1	6 00.6	98 19	161.4	5 31.3	98 19	161.6	5 02.0	98 19	161.7																1
2	5 49.1	98 20	160.6	5 19.9	98 20	160.7																			2
3	5 37.2	97 21	159.7	5 08.0	97 21	159.8																			3
4	5 24.7	97 22	158.9																						4
25	5 11.7	97 23	158.0																						25

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	21 45.7	77 56	71.9	22 08.9	77 56	71.6	22 32.1	77 56	71.2	23 18.3	77 55	70.5	24 50.1	76 55	69.1	26 21.1	75 54	67.7	26 43.8	75 54	67.3	27 28.8	75 54	66.6	91
2	21 12.3	78 56	71.2	21 35.5	78 55	70.8	21 58.8	77 55	70.5	22 45.1	77 55	69.8	24 17.3	76 54	68.4	25 48.6	76 54	67.0	26 11.3	76 54	66.6	26 56.6	75 54	65.9	2
3	20 39.0	78 55	70.4	21 02.3	78 55	70.1	21 25.6	78 55	69.8	22 12.1	77 55	69.1	23 44.5	77 54	67.7	25 16.2	76 54	66.3	25 39.0	76 54	65.9	26 24.5	76 53	65.2	3
4	20 05.8	78 55	69.7	20 29.2	78 55	69.4	20 52.6	78 55	69.0	21 39.2	78 54	68.4	23 12.0	77 54	67.0	24 44.0	76 53	65.6	25 06.9	76 53	65.2	25 52.5	76 53	64.5	4
95	19 32.8	78 55	69.0	19 56.3	78 55	68.6	20 19.8	78 54	68.3	21 06.5	78 54	67.6	22 39.6	77 54	66.3	24 12.0	77 53	64.9	24 35.0	77 53	64.5	25 20.8	76 53	63.8	95
6	19 00.0	79 54	68.2	19 23.5	78 54	67.9	19 47.1	78 54	67.6	20 34.0	78 54	66.9	22 07.4	78 53	65.6	23 40.2	77 53	64.2	24 03.2	77 53	63.8	24 49.2	76 52	63.1	6
7	18 27.3	79 54	67.5	18 50.9	79 54	67.2	19 14.6	79 54	66.8	20 01.7	78 54	66.2	21 35.4	78 53	64.9	23 08.5	77 52	63.5	23 31.7	77 52	63.1	24 17.9	77 52	62.4	7
8	17 54.8	79 54	66.8	18 18.5	79 54	66.4	18 42.2	79 54	66.1	19 29.5	79 53	65.5	21 03.6	78 53	64.1	22 37.1	78 52	62.8	23 00.3	77 52	62.5	23 46.7	77 52	61.8	8
9	17 22.5	79 54	66.0	17 46.3	79 53	65.7	18 10.1	79 53	65.4	18 57.5	79 53	64.7	20 31.9	78 52	63.4	22 05.8	78 52	62.1	22 29.1	78 52	61.8	23 15.7	78 51	61.1	9
100	16 50.4	80 53	65.3	17 14.2	80 53	65.0	17 38.1	79 53	64.7	18 25.7	79 53	64.0	20 00.5	79 52	62.7	21 34.7	78 51	61.4	21 58.2	78 51	61.1	22 45.0	78 51	60.4	100
1	16 18.4	80 53	64.6	16 42.4	80 53	64.2	17 06.3	80 53	63.9	17 54.1	80 52	63.3	19 29.2	79 52	62.0	21 03.9	79 51	60.7	21 27.4	78 51	60.4	22 14.4	78 51	59.7	1
2	15 46.7	80 53	63.8	16 10.7	80 52	63.5	16 34.7	80 52	63.2	17 22.7	80 52	62.6	18 58.2	79 51	61.3	20 33.2	79 51	60.0	20 56.9	79 51	59.7	21 44.1	79 50	59.0	2
3	15 15.1	80 52	63.1	15 39.2	80 52	62.8	16 03.4	80 52	62.5	16 51.5	80 52	61.9	18 27.4	80 51	60.6	20 02.8	79 50	59.3	20 26.5	79 50	59.0	21 14.0	79 50	58.3	3
4	14 43.8	81 52	62.4	15 08.0	81 52	62.0	15 32.2	81 52	61.7	16 20.5	80 51	61.1	17 56.8	80 51	59.9	19 32.6	80 50	58.6	19 56.4	79 50	58.3	20 44.1	79 49	57.6	4
105	14 12.6	81 52	61.6	14 36.9	81 51	61.3	15 01.2	81 51	61.0	15 49.7	81 51	60.4	17 26.4	80 50	59.2	19 02.6	80 50	57.9	19 26.5	80 49	57.6	20 14.4	80 49	56.9	105
6	13 41.7	81 51	60.9	14 06.1	81 51	60.6	14 30.5	81 51	60.3	15 19.2	81 51	59.7	16 56.2	81 50	58.4	18 32.8	80 49	57.2	18 56.9	80 49	56.9	19 44.9	80 49	56.3	6
7	13 11.0	82 51	60.1	13 35.5	82 51	59.8	14 00.0	82 50	59.5	14 48.8	81 50	58.9	16 26.3	81 50	57.7	18 03.3	81 49	56.5	18 27.5	81 49	56.2	19 15.7	80 48	55.6	7
8	12 40.6	82 50	59.4	13 05.1	82 50	59.1	13 29.7	82 50	58.8	14 18.7	82 50	58.2	15 56.6	81 49	57.0	17 34.0	81 48	55.8	17 58.3	81 48	55.5	18 46.8	81 48	54.9	8
9	12 10.3	82 50	58.7	12 35.0	82 50	58.4	12 59.6	82 50	58.1	13 48.9	82 49	57.5	15 27.1	82 49	56.3	17 05.0	81 48	55.1	17 29.3	81 48	54.8	18 18.0	81 47	54.2	9
110	11 40.3	83 50	57.9	12 05.1	83 49	57.6	12 29.8	82 49	57.3	13 19.3	82 49	56.8	14 57.9	82 48	55.6	16 36.2	82 48	54.4	17 00.7	82 47	54.1	17 49.6	81 47	53.5	110
1	11 10.6	83 49	57.2	11 35.4	83 49	56.9	12 00.3	83 49	56.6	12 49.9	83 49	56.0	14 28.9	82 48	54.9	16 07.6	82 47	53.7	16 32.2	82 47	53.4	17 21.4	82 47	52.8	1
2	10 41.1	83 49	56.4	11 06.0	83 49	56.1	11 30.9	83 48	55.9	12 20.8	83 48	55.3	14 00.2	83 47	54.1	15 39.3	82 47	53.0	16 04.0	82 47	52.7	16 53.4	82 46	52.1	2
3	10 11.8	84 48	55.7	10 36.9	83 48	55.4	11 01.9	83 48	55.1	11 51.9	83 48	54.5	13 31.8	83 47	53.4	15 11.3	83 46	52.3	15 36.1	83 46	52.0	16 25.7	83 46	51.4	3
4	9 42.8	84 48	54.9	10 08.0	84 48	54.6	10 33.1	84 48	54.4	11 23.3	84 47	53.8	13 03.6	83 46	52.7	14 43.6	83 46	51.5	15 08.5	83 46	51.3	15 58.3	83 45	50.7	4
115	9 14.1	84 47	54.2	9 39.3	84 47	53.9	10 04.6	84 47	53.6	10 55.0	84 47	53.1	12 35.7	84 46	52.0	14 16.1	84 45	50.8	14 41.1	83 45	50.5	15 31.2	83 45	50.0	115
6	8 45.6	85 47	53.4	9 11.0	84 47	53.1	9 36.3	84 47	52.9	10 26.9	84 46	52.3	12 08.0	84 46	51.2	13 48.9	84 45	50.1	14 14.0	84 45	49.8	15 04.3	84 44	49.3	6
7	8 17.4	85 46	52.7	8 42.9	85 46	52.4	9 08.3	85 46	52.1	9 59.2	85 46	51.6	11 40.7	84 45	50.5	13 22.0	84 44	49.4	13 47.2	84 44	49.1	14 37.7	84 44	48.6	7
8	7 49.6	85 46	51.9	8 15.1	85 46	51.6	8 40.6	85 46	51.4	9 31.7	85 45	50.8	11 13.6	85 45	49.8	12 55.3	85 44	48.7	13 20.7	85 44	48.4	14 11.4	84 43	47.9	8
9	7 21.9	86 46	51.1	7 47.6	85 45	50.9	8 13.2	85 45	50.6	9 04.5	85 45	50.1	10 46.8	85 44	49.0	12 29.0	85 43	48.0	12 54.5	85 43	47.7	13 45.4	85 43	47.1	9
120	6 54.6	86 45	50.4	7 20.4	86 45	50.1	7 46.1	86 45	49.9	8 37.6	86 44	49.3	10 20.4	86 44	48.3	12 02.9	85 43	47.2	12 28.5	85 43	47.0	13 19.7	85 42	46.4	120
1	6 27.6	86 44	49.6	6 53.5	86 44	49.4	7 19.3	86 44	49.1	8 11.0	86 44	48.6	9 54.2	86 43	47.6	11 37.2	86 42	46.5	12 02.9	86 42	46.2	12 54.3	86 42	45.7	1
2	6 00.9	87 44	48.8	6 26.9	87 44	48.6	6 52.8	86 44	48.3	7 44.7	86 43	47.8	9 28.3	86 43	46.8	11 11.8	86 42	45.8	11 37.6	86 42	45.5	12 29.2	86 41	45.0	2
3	5 34.5	87 44	48.1	6 00.6	87 43	47.8	6 26.6	87 43	47.6	7 18.7	87 43	47.1	9 02.8	87 42	46.1	10 46.7	86 41	45.1	11 12.6	86 41	44.8	12 04.4	86 41	44.3	3
4	5 08.4	87 43	47.3	5 34.6	87 43	47.1	6 00.7	87 42	46.8	6 53.0	87 42	46.3	8 37.5	87 42	45.3	10 21.8	87 41	44.3	10 47.9	87 41	44.1	11 40.0	87 40	43.6	4
125				5 08.9	88 42	46.3	5 35.2	88 42	46.0	6 27.7	87 42	45.6	8 12.6	87 41	44.6	9 57.4	87 40	43.6	10 23.5	87 40	43.3	11 15.8	87 40	42.8	125
6							5 10.9	88 42	45.3	6 02.7	88 41	44.8	7 48.0	88 40	43.8	9 33.2	88 40	42.9	9 59.5	88 40	42.6	10 52.0	87 39	42.1	6
7										5 38.0	88 41	44.0	7 23.8	88 40	43.1	9 09.4	88 39	42.1	9 35.8	88 39	41.9	10 28.5	88 39	41.4	7
8										5 13.7	89 40	43.3	6 59.8	88 39	42.3	8 45.9	88 39	41.4	9 12.4	88 38	41.1	10 05.4	88 38	40.7	8
9													6 36.3	89 39	41.6	8 22.8	89 38	40.6	8 49.4	89 38	40.4	9 42.6	89 37	39.9	9
130													6 13.1	89 38	40.8	8 00.0	89 37	39.9	8 26.7	89 37	39.7	9 20.1	89 37	39.2	130
1													5 50.2	90 38	40.0	7 37.5	89 37	39.1	8 04.4	89 37	38.9	8 58.0	89 36	38.5	1
2													5 27.7	90 37	39.3	7 15.5	90 36	38.4	7 42.4	90 36	38.2	8 36.2	90 36	37.7	2
3													5 05.5	90 36	38.5	6 53.7	90 36	37.6	7 20.8	90 35	37.4	8 14.8	90 35	37.0	3
4																6 32.4	90 35	36.9	6 59.5	90 35	36.7	7 53.8	90 34	36.2	4
135																6 11.4	91 34	36.1	6 38.7	91 34	35.9	7 33.1	91 34	35.5	135
6																5 50.8	91 34	35.4	6 18.1	91 34	35.2	7 12.8	91 33	34.8	6
7																5 30.6	92 33	34.6	5 58.0	92 33	34.4	6 52.9	91 33	34.0	7
8																5 10.7	92 32	33.8	5 38.3	92 32	33.7	6 33.4	92 32	33.3	8
9																			5 18.9	92 32	32.9	6 14.3	92 31	32.5	9
140																			5 00.0	93 31	32.1	5 55.5	93 31	31.7	140
1																						5 37.1	93 30	31.0	1
2																						5 19.2	93 29	30.2	2
3																						5 01.6	93 29	29.5	3

Digitized by Google

Lat. 54°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	
00	72 00.0	1.0 01	180.0	73 00.0	1.0 01	180.0	74 30.0	1.0 02	180.0	76 00.0	1.0 02	180.0	78 00.0	1.0 02	180.0	78 30.0	1.0 02	180.0	79 00.0	1.0 02	180.0	81 00.0	1.0 02	180.0	00
1	71 59.2	1.0 04	177.4	72 59.2	1.0 04	177.3	74 29.1	1.0 04	177.1	75 59.0	1.0 05	176.8	77 58.9	1.0 05	176.4	78 28.9	1.0 06	176.3	78 58.8	1.0 06	176.2	80 58.6	1.0 07	175.5	1
2	71 56.8	1.0 07	174.8	72 56.6	1.0 07	174.5	74 26.4	1.0 07	174.2	75 56.1	1.0 08	173.7	77 55.6	1.0 09	172.9	78 25.5	99 09	172.6	78 55.3	99 10	172.4	80 54.5	99 11	171.0	2
3	71 52.8	1.0 09	172.2	72 52.5	99 10	171.8	74 21.9	99 10	171.3	75 51.3	99 11	170.6	77 50.2	99 13	169.4	78 19.8	99 13	169.0	78 49.5	99 13	168.6	80 47.6	98 16	166.6	3
4	71 47.2	99 12	169.6	72 46.6	99 12	169.2	74 15.7	99 13	168.4	75 44.6	99 14	167.5	77 42.6	98 16	165.9	78 12.0	98 17	165.4	78 41.4	98 17	164.9	80 38.2	97 20	162.4	4
05	71 40.0	99 14	167.0	72 39.2	99 15	166.5	74 07.7	98 16	165.6	75 36.0	98 17	164.4	77 33.0	97 19	162.5	78 02.1	97 20	161.9	78 31.2	97 21	161.3	80 26.3	96 24	158.2	05
6	71 31.4	98 17	164.5	72 30.2	98 18	163.9	73 58.1	97 19	162.8	75 25.6	97 20	161.4	77 21.4	96 22	159.2	77 50.2	96 23	158.5	78 18.8	96 24	157.8	80 12.1	93 27	154.3	6
7	71 21.2	97 19	162.0	72 19.6	97 20	161.3	73 46.9	97 21	160.0	75 13.6	96 23	158.5	77 06.0	96 25	156.0	77 36.4	94 26	155.3	78 04.6	94 27	154.4	79 55.7	91 31	150.5	7
8	71 09.6	97 22	159.6	72 07.6	96 22	158.8	73 34.0	96 24	157.4	74 59.8	96 26	155.7	76 52.8	93 28	152.9	77 20.7	93 29	152.1	77 48.4	92 30	151.2	79 37.4	89 34	146.9	8
9	70 56.7	96 24	157.2	71 54.1	96 25	156.3	73 19.7	95 26	154.7	74 44.5	94 28	152.9	76 35.9	92 31	149.9	77 03.4	91 32	149.0	77 30.6	91 32	148.1	79 17.2	87 36	143.5	9
10	70 42.3	95 26	154.8	71 39.2	95 27	153.9	73 04.0	94 29	152.2	74 27.7	92 30	150.2	76 17.5	90 33	147.0	76 44.4	90 34	146.1	77 11.2	89 35	145.1	78 55.4	85 39	140.3	10
1	70 26.7	94 28	152.5	71 23.0	94 29	151.5	72 46.8	93 31	149.7	74 09.5	91 33	147.6	75 57.5	89 35	144.2	76 24.0	88 36	143.3	76 50.3	87 37	142.2	78 32.2	83 41	137.2	1
2	70 09.8	93 30	150.3	71 05.6	93 31	149.2	72 28.4	91 33	147.3	73 50.0	90 35	145.1	75 36.3	87 38	141.6	76 02.3	86 38	140.6	76 28.0	85 39	139.5	78 07.6	80 43	134.4	2
3	69 51.7	92 32	148.1	70 46.9	92 33	146.9	72 08.8	90 35	145.0	73 29.2	89 37	142.7	75 13.7	86 39	139.0	75 39.2	85 40	138.0	76 04.5	84 41	136.9	77 41.8	78 45	131.7	3
4	69 32.5	91 34	145.9	70 27.1	91 35	144.7	71 47.9	89 36	142.7	73 07.3	87 38	140.3	74 50.0	84 41	136.6	75 15.1	83 42	135.5	75 39.8	82 43	134.4	77 15.0	76 46	129.2	4
15	69 12.3	90 36	143.9	70 06.2	89 37	142.6	71 26.0	88 38	140.5	72 44.2	86 40	138.1	74 25.3	82 43	134.3	74 49.9	81 44	133.2	75 14.1	80 44	132.0	76 47.2	75 48	126.8	15
6	68 51.0	89 37	141.8	69 44.3	88 38	140.5	71 03.1	87 40	138.4	72 20.2	85 42	135.9	73 59.6	81 44	132.0	74 23.7	80 45	130.9	74 47.4	79 46	129.8	76 18.6	73 49	124.6	6
7	68 28.7	88 39	139.9	69 21.4	87 40	138.5	70 39.2	85 41	136.3	71 55.2	83 43	133.8	73 32.9	79 46	129.9	73 56.6	78 46	128.8	74 19.9	77 47	127.6	75 49.2	71 50	122.4	7
8	68 05.5	87 40	137.9	68 57.6	86 41	136.6	70 14.4	84 43	134.3	71 29.3	82 44	131.8	73 05.5	78 47	127.9	73 28.7	77 48	126.8	73 51.6	76 48	125.6	75 19.1	70 51	120.4	8
9	67 41.5	86 41	136.1	68 32.9	85 42	134.7	69 48.8	83 44	132.4	71 02.6	81 46	129.8	72 37.3	77 48	125.9	73 00.1	76 49	124.8	73 22.6	74 49	123.7	74 48.4	68 52	118.6	9
20	67 16.6	85 43	134.2	68 07.5	84 44	132.9	69 22.3	82 45	130.6	70 35.2	80 47	128.0	72 08.4	76 49	124.0	72 30.8	74 50	122.9	72 52.9	73 50	121.8	74 17.1	67 53	116.8	20
1	66 50.9	84 44	132.5	67 41.2	83 45	131.1	68 55.2	81 46	128.8	70 07.0	79 48	126.2	71 38.8	74 50	122.2	72 00.9	73 51	121.2	72 22.7	72 51	120.0	73 45.4	66 54	115.1	1
2	66 24.6	84 45	130.8	67 14.3	82 46	129.4	68 27.3	80 47	127.0	69 38.2	77 49	124.4	71 08.7	73 51	120.5	71 30.5	72 52	119.4	71 51.9	71 52	118.3	73 13.2	65 54	113.4	2
3	65 57.5	83 46	129.1	66 46.7	81 47	127.7	67 58.9	79 48	125.3	69 08.9	76 50	122.8	70 38.1	72 52	118.9	70 59.5	71 52	117.8	71 20.6	70 53	116.7	72 40.7	64 55	111.9	3
4	65 29.9	82 47	127.5	66 18.5	80 48	126.1	67 29.8	78 49	123.7	68 38.9	75 51	121.2	70 07.0	71 53	117.3	70 28.1	70 53	116.2	70 48.9	69 54	115.1	72 07.8	63 55	110.4	4
25	65 01.6	81 48	125.9	65 49.7	79 49	124.5	67 00.2	77 50	122.2	68 08.5	74 52	119.6	69 35.4	70 53	115.8	69 56.3	69 54	114.7	70 16.8	68 54	113.7	71 34.6	62 56	109.0	25
6	64 32.8	80 49	124.4	65 20.4	79 50	123.0	66 30.1	76 51	120.6	67 37.6	74 52	118.1	69 03.5	69 54	114.3	69 24.1	68 54	113.3	69 44.3	67 55	112.2	71 01.1	61 56	107.6	6
7	64 03.4	79 50	122.9	64 50.5	78 51	121.5	65 59.6	75 52	119.2	67 06.3	73 53	116.6	68 31.1	68 54	112.9	68 51.5	67 55	111.9	69 11.5	66 55	110.8	70 27.4	60 57	106.3	7
8	63 33.6	78 50	121.5	64 20.2	77 51	120.0	65 28.5	75 52	117.7	66 34.6	72 53	115.2	67 58.5	68 55	111.5	68 18.6	67 55	110.5	68 38.4	65 56	109.5	69 53.4	60 57	105.1	8
9	63 03.2	78 51	120.1	63 49.5	76 52	118.6	64 57.1	74 53	116.3	66 02.5	71 54	113.9	67 25.5	67 55	110.2	67 45.4	66 56	109.2	68 05.0	65 56	108.2	69 19.3	59 57	103.9	9
30	62 32.5	77 52	118.7	63 18.3	76 53	117.3	64 25.3	73 54	115.0	65 30.1	71 55	112.5	66 52.3	66 56	108.9	67 12.0	65 56	108.0	67 31.4	64 56	107.0	68 45.0	59 57	102.7	30
1	62 01.4	76 53	117.4	62 46.8	75 53	115.9	63 53.2	73 54	113.7	64 57.4	70 55	111.2	66 18.8	66 56	107.7	66 38.4	65 56	106.7	66 57.6	63 57	105.8	68 10.5	58 58	101.6	1
2	61 29.9	76 53	116.0	62 14.9	74 54	114.6	63 20.8	72 55	112.4	64 24.3	69 55	110.0	65 45.1	65 57	106.5	66 04.5	64 57	105.6	66 23.5	63 57	104.6	67 35.9	58 58	100.5	2
3	60 58.0	75 54	114.8	61 42.7	74 54	113.4	62 48.0	71 55	111.2	63 51.1	69 56	108.8	65 11.2	65 57	105.3	65 30.4	64 57	104.4	65 49.3	62 57	103.5	67 01.1	57 58	99.5	3
4	60 25.8	75 54	113.5	61 10.2	73 55	112.2	62 15.0	71 55	110.0	63 17.6	68 56	107.6	64 37.1	64 57	104.2	64 56.2	63 57	103.3	65 14.9	62 58	102.4	66 26.3	57 58	98.4	4
35	59 53.4	74 55	112.3	60 37.4	73 55	111.0	61 41.7	70 56	108.8	62 43.9	68 57	106.5	64 02.8	64 57	103.1	64 21.8	63 58	102.2	64 40.4	62 58	101.3	65 51.4	57 58	97.4	35
6	59 20.6	74 55	111.2	60 04.3	72 56	109.8	61 08.2	70 56	107.6	62 09.9	67 57	105.3	63 28.4	63 58	102.0	63 47.2	62 58	101.2	64 05.8	61 58	100.3	65 16.4	56 58	96.5	6
7	58 47.6	73 55	110.0	59 31.0	72 56	108.7	60 34.5	69 56	106.5	61 35.8	67 57	104.3	62 53.8	63 58	101.0	63 12.6	62 58	100.1	63 31.0	61 58	99.2	64 41.3	56 59	95.5	7
8	58 14.3	73 56	108.9	58 57.5	71 56	107.5	60 00.6	69 57	105.4	61 01.6	66 57	103.2	62 19.1	63 58	100.0	62 37.8	62 58	99.1	62 56.2	61 58	98.3	64 06.2	56 59	94.6	8
9	57 40.9	72 56	107.8	58 23.8	71 57	106.4	59 26.5	69 57	104.4	60 27.2	66 58	102.2	61 44.4	62 58	99.0	62 02.9	61 58	98.1	62 21.2	60 58	97.3	63 31.0	56 59	93.7	9
40	57 07.2	72 56	106.7	57 49.9	70 57	105.4	58 52.3	68 57	103.3	59 52.6	66 58	101.1	61 09.5	62 58	98.0	61 28.0	61 58	97.2	61 46.2	60 58	96.4	62 55.8	56 59	92.8	40
1	56 33.3	71 57	105.6	57 15.8	70 57	104.3	58 17.9	68 58	102.3	59 18.0	66 58	100.1	60 34.5	62 58	97.1	60 53.0	61 58	96.3	61 11.1	60 59	95.4	62 20.6	56 59	92.0	1
2	55 59.2	71 57	104.6	56 41.5	70 57	103.3	57 43.4	68 58	101.3	58 43.2	65 58	99.2	59 59.5	62 58	96.1	60 17.9	61 59	95.3	60 36.0	60 59	94.5	61 45.3	56 59	91.1	2
3	55 25.0	71 57	103.6	56 07.1	69 58	102.3	57 08.7	67 58	100.3	58 08.3	65 58	98.2	59 24.4	62 59	95.2	59 42.7	61 59	94.4	60 00.8	60 59	93.7	61 10.0	56 59	90.3	3
4	54 50.7	71 57	102.6	55 32.6	69 58	101.3	56 34.0	67 58	99.4	57 33.4	65 58	97.3	58 49.2	61 59	94.3	59 07.6	61 59	93.6	59 25.6	60 59	92.8	60 34.8	56 59	89.5	4
45	54 16.2	70 58	101.6	54 58.0	69 58	100.4	55 59.1	67 58	98.4	56 58.4	65 58	96.4	58 14.1	61 59	93.5	58 32.3	60 59	92.7	58 50.4	60 59	91.9	59 59.5	56 59	88.7	45
6	53 41.6	70 58	100.6	54 23.2	69 58	99.4	55 24.2	67 58	97.5	56 23.3	65 59	95.5	57 38.8	61 59	92.6	57 57.1	60 59	91.9	58 15.1	60 59	91.1	59 24.3	56 59	87.9	6
7	53 06.9	70 58	99.7	53 48.4	69 58	98.5	54 49.2	67 58	96.6	55 48.2	64 59	94.6	57 03.6	61 59	91.8	57 21.8	60 59	91.0	57 39.8	60 59	90.3	58 49.0	56 59	87.2	7
8	52 32.1	70 58	98.7	53 13.5	68 58	97.5	54 14.1	66 59	95.7	55 13.0	64 59	93.7	56 28.3	61 59	90.9	56 46.6	60 59	90.2	57 04.6	60 59	89.5	58 13.8	56 59	86.4	8
9	51 57.2	69 58	97.8	52 38.5	68 58	96.6	53 39.0	66 59	94.8	54 37.8	64 59	92.8	55 53.1	61 59	90.1	56 11.3	60 59	89.4	56 29.3	60 59	88.7	57 38.6	56 59	85.7	9
50	51 22.2	69 58	96.9	52 03.4	68 59	95.7	53 03.9	66 59	93.9	54 02.6	64 59	92.0	55 17.8	61 59	89.3	55 36.1	60 59	88.6	55 54.1	60 59	87.9	57 03.5	56 59	84.9	50
1	50 47.1	69 58	96.0	51 28.3	68 59	94.9	52 28.7	66 59	93.1	53 27.3	64 59	91.2	54 42.6	61 59	88.5	55 00.8	60 59	87.8	55 18.8	60 59	87.1	56 28.4	56 58	84.2	1
2	50 12.0	69 59	95.2	50 53.1	68 59	94.0	51 53.4	66 59	92.2	52 52.0	64 59	90.4	54 07.3	61 59	87.7	54 25.6	61 59	87.1	54 43.6	60 59	86.4	55 53.3	56 58	83.5	2
3	49 36.9	69 59	94.3	50 17.9	68 59	93.1	51 18.2	66 59	91.4	52 16.8	64 59	89.5	53 32.1	61 59	87.0	53 50.4	61 59	86.3	54 08.4	60 59	85.6	55 18.3	57 58	82.8	3
4	49 01.7	69 59	93.4	49 42.7	68 59	92.3	50 42.9	66 59	90.6	51 41.5	64 59	88.7	52 56.9	61 59	86.2	53 15.2	61 59	85.5	53 33.3	60 58	84.9	54 43.3	57 58	82.1	4
55	48 26.5	69 59	92.6	49 07.5	68 59	91.5	50 07.7	66 59	89.8	51 06.3	64 59	88.0	52 21.7	62 59	85.4	52 40.0	61 58	84.8	52 58.2	60 58	84.1	54 08.4	57 58	81.4	55
6	47 51.3	69 59	91.8	48 32.2	68 59	90.7	49 32.4	66 59	89.0	50 31.0	64 59	87.2	51 46.6	62 58	84.7	52 04.9	61 58	84.1	52 23.1	60 58	83.4	53 33.6	57 58	80.7	6
7	47 16.0	69 59	90.9	47 56.9	68 59	89.8	48 57.1	66 59	88.2	49 55.8	64 59	86.4	51 11.5	62 58	84.0	51 29.9	61 58	83.3	51 48.1	60 58	82.7	52 58.8	57 58	80.0	7
8	46 40.7	69 59	90.1	47 21.7	68 59	89.0	48 21.9	66 59	87.4	49 20.6	64 59	85.7	50 36.4	62 58	83.2	50 54.9	61 58	82.6	51 13.2	61 58	82.0	52 24.1	58 58	79.4	8
9	46 05.5	69 59	89.3	46 46.4	68 59	88.2	47 46.7	66 59	86.6	48 45.5	64 58	84.9	50 01.4	62 58	82.5	50 19.9	61 58	81.9	50 38.3	61 58	81.3	51 49.5	58 58	78.7	9
60	45 30.2	69 59	88.5	46 11.2	68 59	87.5	47 11.5	66 59	85.8	48 10.4	65 58	84.2	49 26.5	62 58	81.8	49 45.1	62 58	81.2	50 03.4	61 58	80.6	51 14.9	58 57	78.1	60
1	44 55.0	69 59	87.7	45 35.9	68 59	86.7	46 36.3	66 59	85.1	47 35.3	65 58	83.4	48 51.6	62 58	81.1	49 10.2	62 58	80.5	49 28.7	61 58	79.9	50 40.5	58 57	77.4	1
2	44 19.7	69 59	86.9	45 00.7	68 59	85.9	46 01.2	66 58	84.3	47 00.3	65 58	82.7	48 16.8	63 58	80.4	48 35.5	62 58	79.8	48 54.0	61 58	79.2	50 06.1	59 57	76.7	2
3	43 44.5	69 59	86.2	44 25.6	68 59	85.1	45 26.1	67 58	83.6	46 25.4	65 58	82.0	47 42.1	63 58	79.7	48 00.8	62 58	79.1	48 19.4	67 58	78.5	49 31.8	59 57	76.1	3
4	43 09.4	69 59	85.4	43 50.5	68 58	84.4	44 51.1	67 58	82.8	45 50.5	65 58	81.2	47 07.4	63 58	79.0	47 26.2	62 58	78.4	47 44.9	62 57	77.9	48 57.6	59 57	75.5	4
65	42 34.2	69 58	84.6	43 15.4	68 58	83.6	44 16.2	67 58	82.1	45 15.6	65 58	80.5	46 32.8	63 58	78.3	46 51.7	63 57	77.8	47 10.4	62 57	77.2	48 23.6	60 57	74.8	65
6	41 59.1	69 58	83.9	42 40.4	68 58	82.9	43 41.3	67 58	81.4	44 40.9	66 58	79.8	45 58.3	63 57	77.6	46 17.3	63 57	77.1	46 36.1	62 57	76.5	47 49.6	60 56	74.2	6
7	41 24.1	69 58	83.1	42 05.4	68 58	82.2	43 06.4	67 58	80.7	44 06.2	66 58	79.1	45 23.9	64 57	77.0	45 43.0	63 57	76.4	46 01.9	63 57	75.9	47 15.7	60 56	73.6	7
8	40 48.1	69 58	82.4	41 30.5	68 58	81.4	42 31.7	67 58	79.9	43 31.6	66 58	78.4	44 49.6	64 57	76.3	45 08.7	63 57	75.7	45 27.7	63 57	75.2	46 41.9	61 56	72.9	8
9	40 14.2	70 58	81.6	40 55.7	69 58	80.7	41 57.0	67 58	79.2	42 57.1	66 57	77.7	44 15.4	64 57	75.6	44 34.6	64 57	75.1	44 53.7	63 57	74.5	46 08.3	61 56	72.3	9
70	39 30.3	70 58	80.9	40 20.9	69 58	80.0	41 22.4	68 58	78.5	42 22.7	66 57	77.0	43 41.3	65 57	75.0	44 00.6	64 57	74.4	44 19.7	64 56	73.9	45 34.7	61 56	71.7	70
1	39 04.5	70 58	80.2	39 46.2	69 58	79.2	40 47.9	68 57	77.8	41 48.4	67 57	76.3	43 07.3	65 56	74.3	43 26.7	64 56	73.8	43 45.9	64 56	73.2	45 01.3	62 56	71.1	1
2	38 39.8	70 58	79.5	39 11.6	69 58	78.5	40 13.4	68 57	77.1	41 14.2	67 57	75.7	42 33.4	65 56	73.6	42 52.9	65 56	73.1	43 12.2	64 56	72.6	44 28.0	62 55	70.4	2
3	37 55.2	70 58	78.7	38 37.1	69 57	77.8	39 39.1	68 57	76.4	40 40.1	67 57	75.0	41 59.6	65 56	73.0	42 19.2	65 56	72.5	42 38.6	65 56	72.0	43 54.8	63 55	69.8	3
4	37 20.7	70 57	78.0	38 02.7	70 57	77.1	39 04.9	69 57	75.7	40 06.1	67 56	74.3	41 26.0	66 56	72.3	41 45.6	65 56	71.8	42 05.1	65 56	71.3	43 21.8	63 55	69.2	4
75	36 46.2	71 57	77.3	37 28.3	70 57	76.4	38 30.7	69 57	75.0	39 32.2	68 56	73.6	40 52.4	66 56	71.7	41 12.2	66 56	71.2	41 31.8	65 55	70.7	42 48.9	63 55	68.6	75
6	36 11.8	71 57	76.6	36 54.1	70 57	75.7	37 56.7	69 56	74.3	38 58.4	68 56	73.0	40 19.0	66 55	71.0	40 38.8	66 55	70.5	40 58.6	66 55	70.0	42 16.1	64 54	68.0	6
7	35 37.6	71 57	75.9	36 20.0	70 57	75.0	37 22.8	69 56	73.7	38 24.7	68 56	72.3	39 45.7	67 55	70.4	40 05.7	66 55	69.9	40 25.5	66 55	69.4	41 43.5	64 54	67.4	7
8	35 03.4	71 57	75.2	35 46.0	71 56	74.3	36 49.0	70 56	73.0	37 51.2	69 56	71.6	39 12.6	67 55	69.7	39 32.6	67 55	69.3	39 52.5	66 55	68.8	41 11.0	65 54	66.8	8
9	34 29.4	71 57	74.5	35 12.1	71 56	73.6	36 15.4	70 56	72.3	37 17.8	69 55	71.0	38 39.5	67 55	69.1	38 59.7	67 55	68.6	39 19.7	67 54	68.1	40 38.7	65 54	66.2	9
80	33 55.5	72 56	73.8	34 38.3	71 56	72.9	35 41.8	70 56	71.6	36 44.5	69 55	70.3	38 06.7	68 55	68.5	38 26.9	67 54	68.0	38 47.1	67 54	67.5	40 06.5	65 53	65.6	80
1	33 21.7	72 56	73.1	34 04.6	71 56	72.2	35 08.4	70 55	71.0	36 11.4	69 55	69.6	37 33.9	68 54	67.8	37 54.3	68 54	67.4	38 14.6	67 54	66.9	39 34.5	66 53	65.0	1
2	32 48.0	72 56	72.4	33 31.1	72 56	71.6	34 35.2	71 55	70.3	35 38.4	70 55	69.0	37 01.4	68 54	67.2	37 21.8	68 54	66.7	37 42.2	68 54	66.3	39 02.6	66 53	64.4	2
3	32 14.5	72 56	71.7	32 57.7	72 55	70.9	34 02.0	71 55	69.6	35 05.6	70 54	68.3	36 28.9	69 54	66.5	36 49.5	68 54	66.1	37 10.0	68 53	65.6	38 30.9	67 53	63.8	3
4	31 41.0	73 55	71.0	32 24.5	72 55	70.2	33 29.1	71 55	68.9	34 32.9	70 54	67.7	35 56.7	69 54	65.9	36 17.4	69 53	65.5	36 38.0	69 53	65.0	37 59.3	67 52	63.2	4
85	31 07.8	73 55	70.3	31 51.4	72 55	69.5	32 56.2	72 54	68.3	34 00.3	71 54	67.0	35 24.5	70 53	65.3	35 45.4	69 53	64.8	36 06.1	69 53	64.4	37 27.9	68 52	62.6	85
6	30 34.6	73 55	69.6	31 18.4	73 55	68.8	32 23.5	72 54	67.6	33 27.9	71 54	66.4	34 52.6	70 53	64.6	35 13.5	70 53	64.2	35 34.4	69 53	63.8	36 56.7	68 52	62.0	6
7	30 01.6	74 55	68.9	30 45.6	73 54	68.1	31 51.0	72 54	66.9	32 55.7	71 53	65.7	34 20.8	70 53	64.0	34 41.9	70 52	63.6	35 02.8	70 52	63.1	36 25.7	68 51	61.4	7
8	29 28.8	74 54	68.2	30 13.0	73 54	67.5	31 18.6	73 54	66.3	32 23.6	72 53	65.0	33 49.2	71 52	63.4	34 10.4	70 52	62.9	34 31.4	70 52	62.5	35 54.8	69 51	60.8	8
9	28 56.1	74 54	67.6	29 40.5	74 54	66.8	30 46.4	73 53	65.6	31 51.8	72 53	64.4	33 17.7	71 52	62.7	33 39.0	71 52	62.3	34 00.2	71 52	61.9	35 24.1	69 51	60.2	9
90	28 23.6	74 54	66.9	29 08.1	74 54	66.1	30 14.4	73 53	64.9	31 20.0	73 53	63.7	32 46.5	72 52	62.1	33 07.9	71 52	61.7	33 29.2	71 51	61.3	34 53.6	70 51	59.6	90

Digitized by Google

Lat. 54°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	27 51.3	75 54	66.2	28 36.0	74 53	65.4	29 42.5	74 53	64.3	30 48.5	73 52	63.1	32 15.4	72 51	61.5	32 36.9	72 51	61.1	32 58.4	71 51	60.7	34 23.3	70 50	59.0	91
2	27 19.1	75 53	65.5	28 04.0	75 53	64.8	29 10.9	74 52	63.6	30 17.1	73 52	62.4	31 44.5	72 51	60.8	32 06.2	72 51	60.4	32 27.7	72 51	60.0	33 53.2	71 50	58.4	2
3	26 47.1	75 53	64.8	27 32.2	75 53	64.1	28 39.4	74 52	63.0	29 46.0	74 52	61.8	31 13.8	73 51	60.2	31 35.6	72 51	59.8	31 57.3	72 50	59.4	33 23.3	71 50	57.7	3
4	26 15.3	76 53	64.1	27 00.6	75 52	63.4	28 08.0	75 52	62.3	29 15.0	74 51	61.1	30 43.3	73 51	59.6	31 05.2	73 50	59.2	31 27.0	73 50	58.8	32 53.6	72 49	57.1	4
95	25 43.6	76 52	63.5	26 29.1	76 52	62.7	27 36.9	75 52	61.6	28 44.2	74 51	60.5	30 13.0	74 50	58.9	30 35.0	73 50	58.6	30 57.0	73 50	58.2	32 24.0	72 49	56.5	95
6	25 12.2	76 52	62.8	25 57.9	76 52	62.1	27 06.0	75 51	61.0	28 13.6	75 51	59.8	29 42.9	74 50	58.3	30 05.0	74 50	57.9	30 27.1	73 49	57.5	31 54.7	73 48	55.9	6
7	24 40.9	77 52	62.1	25 26.8	76 51	61.4	26 35.3	76 51	60.3	27 43.2	75 50	59.2	29 13.0	74 50	57.7	29 35.2	74 49	57.3	29 57.5	74 49	56.9	31 25.6	73 48	55.3	7
8	24 09.8	77 51	61.4	24 55.9	77 51	60.7	26 04.7	76 51	59.6	27 13.0	76 50	58.5	28 43.3	75 49	57.0	29 05.7	75 49	56.7	29 28.0	74 49	56.3	30 56.7	73 48	54.7	8
9	23 39.0	77 51	60.7	24 25.3	77 51	60.0	25 34.4	77 50	59.0	26 43.0	76 50	57.9	28 13.8	75 49	56.4	28 36.3	75 49	56.0	28 58.8	75 48	55.7	30 28.0	74 47	54.1	9
100	23 08.3	78 51	60.0	23 54.8	77 50	59.4	25 04.3	77 50	58.3	26 13.3	76 49	57.2	27 44.5	76 48	55.8	28 07.2	75 48	55.4	28 29.8	75 48	55.0	29 59.6	74 47	53.5	100
1	22 37.9	78 50	59.4	23 24.6	78 50	58.7	24 34.4	77 49	57.6	25 43.7	77 49	56.6	27 15.5	76 48	55.1	27 38.2	76 48	54.8	28 01.0	76 48	54.4	29 31.3	75 47	52.9	1
2	22 07.6	78 50	58.7	22 54.6	78 50	58.0	24 04.7	78 49	57.0	25 14.4	77 48	55.9	26 46.6	77 48	54.5	27 09.5	76 47	54.1	27 32.4	76 47	53.8	29 03.3	75 46	52.3	2
3	21 37.6	79 50	58.0	22 24.8	78 49	57.3	23 35.2	78 49	56.3	24 45.3	78 48	55.3	26 18.0	77 47	53.9	26 41.1	77 47	53.5	27 04.1	77 47	53.2	28 35.5	76 46	51.7	3
4	21 07.8	79 49	57.3	21 55.2	79 49	56.6	23 06.0	78 48	55.6	24 16.4	78 48	54.6	25 49.7	77 47	53.2	26 12.8	77 47	52.9	26 36.0	77 46	52.5	28 08.0	76 46	51.1	4
105	20 38.2	79 49	56.6	21 25.9	79 49	56.0	22 37.0	79 48	55.0	23 47.8	78 47	54.0	25 21.5	78 46	52.6	25 44.8	78 46	52.2	26 08.1	77 46	51.9	27 40.6	77 45	50.5	105
6	20 08.9	80 48	55.9	20 56.8	80 48	55.3	22 08.2	79 48	54.3	23 19.4	79 47	53.3	24 53.6	78 46	52.0	25 17.1	78 46	51.6	25 40.5	78 46	51.3	27 13.6	77 45	49.9	6
7	19 39.8	80 48	55.2	20 27.9	80 48	54.6	21 39.7	80 47	53.6	22 51.2	79 46	52.7	24 26.0	79 46	51.3	24 49.6	79 45	51.0	25 13.1	78 45	50.6	26 46.7	78 44	49.2	7
8	19 11.0	81 48	54.6	19 59.3	80 47	53.9	21 11.4	80 47	53.0	22 23.3	80 46	52.0	23 58.6	79 45	50.7	24 22.3	79 45	50.3	24 45.9	79 45	50.0	26 20.1	78 44	48.6	8
9	18 42.4	81 47	53.9	19 30.9	81 47	53.2	20 43.4	80 46	52.3	21 55.6	80 46	51.3	23 31.4	80 45	50.0	23 55.3	79 45	49.7	24 19.1	79 44	49.4	25 53.8	79 43	48.0	9
110	18 14.0	81 47	53.2	19 02.8	81 46	52.6	20 15.6	81 46	51.6	21 28.2	80 45	50.7	23 04.5	80 44	49.4	23 28.5	80 44	49.1	23 52.4	80 44	48.7	25 27.7	79 43	47.4	110
1	17 45.9	82 46	52.5	18 34.9	82 46	51.9	19 48.1	81 45	50.9	21 01.1	81 45	50.0	22 37.9	80 44	48.7	23 02.0	80 44	48.4	23 26.0	80 44	48.1	25 01.9	80 43	46.8	1
2	17 18.1	82 46	51.8	18 07.3	82 46	51.2	19 20.9	82 45	50.3	20 34.2	81 44	49.3	22 11.5	81 44	48.1	22 35.7	81 43	47.8	22 59.9	81 43	47.4	24 36.3	80 42	46.1	2
3	16 50.5	82 46	51.1	17 39.9	82 45	50.5	18 53.9	82 45	49.6	20 07.6	82 44	48.7	21 45.4	81 43	47.4	22 09.8	81 43	47.1	22 34.1	81 43	46.8	24 11.0	81 42	45.5	3
4	16 23.2	83 45	50.4	17 12.9	83 45	49.8	18 27.2	82 44	48.9	19 41.2	82 43	48.0	21 19.6	82 43	46.8	21 44.0	82 42	46.5	22 08.5	81 42	46.2	23 46.0	81 41	44.9	4
115	15 56.2	83 45	49.7	16 46.1	83 44	49.1	18 00.7	83 44	48.2	19 15.2	83 43	47.3	20 54.0	82 42	46.1	21 18.6	82 42	45.8	21 43.2	82 42	45.5	23 21.2	81 41	44.3	115
6	15 29.4	84 44	49.0	16 19.5	83 44	48.4	17 34.6	83 43	47.5	18 49.4	83 43	46.7	20 28.7	83 42	45.5	20 53.5	82 41	45.2	21 18.2	82 41	44.9	22 56.8	82 40	43.6	6
7	15 02.9	84 44	48.3	15 53.3	84 43	47.7	17 08.7	84 43	46.9	18 23.9	83 42	46.0	20 03.7	83 41	44.8	20 28.6	83 41	44.5	20 53.4	83 41	44.2	22 32.6	82 40	43.0	7
8	14 36.8	84 43	47.6	15 27.4	84 43	47.0	16 43.1	84 42	46.2	17 58.6	84 42	45.3	19 39.0	83 41	44.2	20 04.0	83 40	43.9	20 29.0	83 40	43.6	22 08.6	83 39	42.4	8
9	14 10.9	85 43	46.9	15 01.7	85 42	46.3	16 17.8	84 42	45.5	17 33.7	84 41	44.6	19 14.6	84 40	43.5	19 39.7	84 40	43.2	20 04.8	84 40	42.9	21 45.0	83 39	41.7	9
120	13 45.3	85 42	46.2	14 36.3	85 42	45.6	15 52.8	85 41	44.8	17 09.1	85 41	44.0	18 50.4	84 40	42.8	19 15.7	84 40	42.6	19 41.0	84 39	42.3	21 21.7	84 38	41.1	120
1	13 20.0	86 42	45.5	14 11.3	85 41	44.9	15 28.1	85 41	44.1	16 44.7	85 40	43.3	18 26.6	85 39	42.2	18 52.0	85 39	41.9	19 17.4	85 39	41.6	20 58.6	84 38	40.5	1
2	12 55.0	86 41	44.7	13 46.5	86 41	44.2	15 03.7	86 40	43.4	16 20.7	85 40	42.6	18 03.1	85 39	41.5	18 28.6	85 38	41.2	18 54.1	85 38	41.0	20 35.9	85 37	39.8	2
3	12 30.3	86 41	44.0	13 22.1	86 40	43.5	14 39.6	86 40	42.7	15 57.0	86 39	41.9	17 39.8	86 38	40.9	18 05.5	86 38	40.6	18 31.1	85 38	40.3	20 13.5	85 37	39.2	3
4	12 06.0	87 40	43.3	12 58.0	87 40	42.8	14 15.9	86 39	42.0	15 33.6	86 38	41.2	17 16.9	86 38	40.2	17 42.7	86 37	39.9	18 08.5	86 37	39.6	19 51.3	86 36	38.6	4
125	11 42.0	87 40	42.6	12 34.2	87 39	42.1	13 52.4	87 38	41.3	15 10.5	87 38	40.6	16 54.3	86 37	39.5	17 20.2	86 37	39.2	17 46.1	86 37	39.0	19 29.5	86 36	37.9	125
6	11 18.3	87 39	41.9	12 10.7	87 39	41.4	13 29.3	87 38	40.6	14 47.7	87 37	39.9	16 32.1	87 37	38.8	16 58.1	87 36	38.6	17 24.1	87 36	38.3	19 08.0	86 35	37.3	6
7	10 54.9	88 38	41.1	11 47.6	88 38	40.7	13 06.5	88 37	39.9	14 25.3	87 37	39.2	16 10.1	87 36	38.2	16 36.3	87 36	37.9	17 02.4	87 36	37.7	18 46.8	87 35	36.6	7
8	10 31.8	88 38	40.4	11 24.7	88 37	39.9	12 44.0	88 37	39.2	14 03.2	88 36	38.5	15 48.5	88 36	37.5	16 14.8	88 35	37.2	16 41.0	88 35	37.0	18 25.9	87 34	36.0	8
9	10 09.2	89 37	39.7	11 02.3	89 37	39.2	12 21.9	88 36	38.5	13 41.4	88 36	37.8	15 27.2	88 35	36.8	15 53.6	88 35	36.6	16 20.0	88 35	36.3	18 05.4	88 34	35.3	9
130	9 46.8	89 37	39.0	10 40.1	89 36	38.5	12 00.1	89 36	37.8	13 19.9	89 35	37.1	15 06.2	88 34	36.1	15 32.7	88 34	35.9	15 59.2	88 34	35.6	17 45.1	88 33	34.7	130
1	9 24.8	89 36	38.2	10 18.4	89 36	37.8	11 38.7	89 35	37.1	12 58.8	89 35	36.4	14 45.6	89 34	35.4	15 12.2	89 34	35.2	15 38.9	89 33	35.0	17 25.2	89 33	34.0	1
2	9 03.1	90 36	37.5	9 56.9	90 35	37.1	11 17.6	90 35	36.4	12 38.1	89 34	35.7	14 25.3	89 33	34.8	14 52.1	89 33	34.5	15 18.8	89 33	34.3	17 05.7	89 32	33.4	2
3	8 41.9	90 35	36.8	9 35.9	90 35	36.3	10 56.8	90 34	35.7	12 17.7	90 33	35.0	14 05.4	90 33	34.1	14 32.2	90 32	33.9	14 59.1	90 32	33.6	16 46.5	89 31	32.7	3
4	8 20.9	90 34	36.0	9 15.2	90 34	35.6	10 36.4	90 33	34.9	11 57.6	90 33	34.3	13 45.8	90 32	33.4	14 12.8	90 32	33.2	14 39.8	90 32	32.9	16 27.6	90 31	32.0	4
135	8 00.4	91 34	35.3	8 54.8	91 33	34.9	10 16.4	91 33	34.2	11 38.0	91 32	33.6	13 26.5	90 31	32.7	13 53.7	90 31	32.5	14 20.8	90 31	32.3	16 09.1	90 30	31.4	135
6	7 40.2	91 33	34.5	8 34.8	91 33	34.1	9 56.8	91 32	33.5	11 18.6	91 32	32.9	13 07.7	91 31	32.0	13 34.9	91 31	31.8	14 02.1	91 30	31.6	15 50.9	91 30	30.7	6
7	7 20.4	91 32	33.8	8 15.2	91 32	33.4	9 37.5	91 32	32.8	10 59.7	91 31	32.2	12 49.2	91 30	31.3	13 16.5	91 30	31.1	13 43.8	91 30	30.9	15 33.0	91 29	30.0	7
8	7 00.9	92 32	33.1	7 56.0	92 31	32.7	9 18.6	92 31	32.0	10 41.1	92 30	31.4	12 31.0	92 30	30.6	12 58.5	91 29	30.4	13 25.9	91 29	30.2	15 15.6	91 29	29.4	8
9	6 41.9	92 31	32.3	7 37.2	92 31	31.9	9 00.1	92 30	31.3	10 22.9	92 30	30.7	12 13.2	92 29	29.9	12 40.8	92 29	29.7	13 08.3	92 29	29.5	14 58.5	92 28	28.7	9
140	6 23.3	92 30	31.6	7 18.7	92 30	31.2	8 41.9	92 30	30.6	10 05.1	92 29	30.0	11 55.8	92 28	29.2	12 23.5	92 28	29.0	12 51.1	92 28	28.8	14 41.7	92 27	28.0	140
1	6 05.0	93 30	30.8	7 00.7	93 29	30.4	8 24.2	93 29	29.9	9 47.6	93 28	29.3	11 38.8	93 28	28.5	12 06.6	93 28	28.3	12 34.3	93 27	28.1	14 25.3	92 27	27.4	1
2	5 47.1	93 29	30.0	6 43.0	93 29	29.7	8 06.8	93 28	29.1	9 30.6	93 28	28.6	11 22.1	93 27	27.8	11 50.0	93 27	27.6	12 17.9	93 27	27.4	14 09.3	93 26	26.7	2
3	5 29.7	93 28	29.3	6 25.8	93 28	28.9	7 49.8	93 28	28.4	9 13.9	93 27	27.8	11 05.9	93 26	27.1	11 33.9	93 26	26.9	12 01.8	93 26	26.7	13 53.6	93 25	26.0	3
4	5 12.6	94 28	28.5	6 08.9	94 27	28.2	7 33.3	94 27	27.6	8 57.6	94 26	27.1	10 50.0	94 26	26.4	11 18.1	94 26	26.2	11 46.1	94 26	26.0	13 38.4	93 25	25.3	4
145				5 52.5	94 27	27.4	7 17.1	94 26	26.9	8 41.7	94 26	26.4	10 34.5	94 25	25.7	11 02.7	94 25	25.5	11 30.9	94 25	25.3	13 23.5	94 24	24.6	145
6				5 36.4	94 26	26.7	7 01.4	94 26	26.2	8 26.3	94 25	25.7	10 19.4	94 24	25.0	10 47.7	94 24	24.8	11 16.0	94 24	24.6	13 09.0	94 24	24.0	6
7				5 20.8	95 25	25.9	6 46.0	95 25	25.4	8 11.2	95 24	24.9	10 04.7	95 24	24.3	10 33.1	95 24	24.1	11 01.4	95 24	23.9	12 54.8	94 23	23.3	7
8				5 05.6	95 25	25.1	6 31.1	95 24	24.7	7 56.5	95 24	24.2	9 50.4	95 23	23.6	10 18.9	95 23	23.4	10 47.3	95 23	23.2	12 41.1	95 22	22.6	8
9							6 16.6	95 24	23.9	7 42.3	95 23	23.5	9 36.5	95 22	22.8	10 05.1	95 22	22.7	10 33.6	95 22	22.5	12 27.7	95 22	21.9	9
150							6 02.5	96 23	23.2	7 28.5	96 22	22.7	9 23.0	95 22	22.1	9 51.7	95 22	22.0	10 20.3	95 22	21.8	12 14.8	95 21	21.2	150
1							5 48.8	96 22	22.4	7 15.0	96 22	22.0	9 10.0	96 21	21.4	9 38.7	96 21	21.3	10 07.4	96 21	21.1	12 02.2	96 20	20.5	1
2							5 35.6	96 21	21.7	7 02.1	96 21	21.2	8 57.3	96 20	20.7	9 26.1	96 20	20.5	9 54.9	96 20	20.4	11 50.1	96 20	19.8	2
3							5 22.8	96 21	20.9	6 49.5	96 20	20.5	8 45.0	96 20	20.0	9 13.9	96 20	19.8	9 42.8	96 19	19.7	11 38.3	96 19	19.1	3
4							5 10.4	97 20	20.1	6 37.3	97 20	19.8	8 33.2	97 19	19.2	9 02.2	97 19	19.1	9 31.1	97 19	19.0	11 26.9	96 18	18.4	4
155										6 25.6	97 19	19.0	8 21.8	97 18	18.5	8 50.9	97 18	18.4	9 19.9	97 18	18.3	11 16.0	97 18	17.7	155
6										6 14.4	97 18	18.3	8 10.8	97 18	17.8	8 39.9	97 18	17.7	9 09.1	97 17	17.5	11 05.5	97 17	17.0	6
7										6 03.5	97 17	17.5	8 00.3	97 17	17.1	8 29.5	97 17	16.9	8 58.6	97 17	16.8	10 55.3	97 16	16.3	7
8										5 53.1	98 17	16.8	7 50.2	97 16	16.3	8 19.4	97 16	16.2	8 48.6	97 16	16.1	10 45.6	97 16	15.6	8
9										5 43.2	98 16	16.0	7 40.5	98 15	15.6	8 09.8	98 15	15.5	8 39.1	98 15	15.4	10 36.3	98 15	14.9	9
160										5 33.7	98 15	15.3	7 31.2	98 15	14.9	8 00.6	98 15	14.8	8 29.9	98 14	14.7	10 27.4	98 14	14.2	160
1										5 24.6	98 14	14.5	7 22.4	98 14	14.1	7 51.8	98 14	14.0	8 21.2	98 14	13.9	10 19.0	98 13	13.5	1
2										5 16.0	98 14	13.8	7 14.0	98 13	13.4	7 43.5	98 13	13.3	8 13.0	98 13	13.2	10 10.9	98 13	12.8	2
3										5 07.9	99 13	13.0	7 06.0	98 12	12.6	7 35.6	98 12	12.6	8 05.1	98 12	12.5	10 03.3	98 12	12.1	3
4										5 00.2	99 12	12.2	6 58.5	99 12	11.9	7 28.1	99 12	11.8	7 57.7	99 12	11.7	9 56.1	99 11	11.4	4
165													6 51.5	99 11	11.2	7 21.1	99 11	11.1	7 50.8	99 11	11.0	9 49.4	99 11	10.7	165
6													6 44.9	99 10	10.4	7 14.6	99 10	10.4	7 44.3	99 10	10.3	9 43.0	99 10	10.0	6
7													6 38.7	99 10	09.7	7 08.5	99 09	09.6	7 38.2	99 09	09.6	9 37.1	99 09	09.3	7
8													6 33.0	99 09	08.9	7 02.8	99 09	08.9	7 32.6	99 09	08.8	9 31.6	99 08	08.6	8
9													6 27.8	99 08	08.2	6 57.6	99 08	08.1	7 27.4	99 08	08.1	9 26.6	99 08	07.9	9
170													6 22.9	99 07	07.5	6 52.8	99 07	07.4	7 22.6	99 07	07.4	9 22.0	99 07	07.1	170
1													6 18.6	1.0 06	06.7	6 48.5	1.0 06	06.7	7 18.3	1.0 06	06.6	9 17.8	1.0 06	06.4	1
2													6 14.7	1.0 06	06.0	6 44.6	1.0 06	05.9	7 14.5	1.0 06	05.9	9 14.1	1.0 06	05.7	2
3													6 11.3	1.0 05	05.2	6 41.2	1.0 05	05.2	7 11.1	1.0 05	05.2	9 10.8	1.0 05	05.0	3
4													6 08.3	1.0 04	04.5	6 38.2	1.0 04	04.4	7 08.2	1.0 04	04.4	9 07.9	1.0 04	04.3	4
175													6 05.7	1.0 03	03.7	6 35.7	1.0 03	03.7	7 05.7	1.0 03	03.7	9 05.5	1.0 03	03.6	175
6													6 03.7	1.0 03	03.0	6 33.7	1.0 03	03.0	7 03.6	1.0 03	02.9	9 03.5	1.0 03	02.9	6
7													6 02.1	1.0 02	02.2	6 32.1	1.0 02	02.2	7 02.0	1.0 02	02.2	9 02.0	1.0 02	02.1	7
8													6 00.9	1.0 01	01.5	6 30.9	1.0 01	01.5	7 00.9	1.0 01	01.5	9 00.9	1.0 01	01.4	8
9													6 00.2	1.0 00	00.7	6 30.2	1.0 00	00.7	7 00.2	1.0 00	00.7	9 00.2	1.0 00	00.7	9
180													6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	7 00.0	1.0 00	00.0	9 00.0	1.0 00	00.0	180

Lat. 54°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	°
00	82 00.0	1.0 00	180.0	83 00.0	1.0 00	180.0	84 30.0	1.0 04	180.0	85 30.0	1.0 04	180.0	86 30.0	1.0 05	180.0	87 30.0	1.0 07	180.0	88 30.0	1.0 12	180.0	90 00.0	.. 59	....	00
1	81 58.5	1.0 08	175.0	82 58.3	1.0 09	174.4	84 27.9	99 10	173.1	85 27.5	99 12	171.8	86 26.8	99 15	169.7	87 25.7	97 21	166.0	88 23.1	93 30	157.9	89 24.8	01 59	89.6	1
2	81 53.9	99 13	170.1	82 53.2	99 14	168.9	84 21.6	98 17	166.4	85 20.0	97 20	163.8	86 17.6	95 24	159.9	87 13.4	91 31	153.4	88 04.9	79 42	140.6	88 49.5	01 59	89.2	2
3	81 46.4	98 17	165.3	82 44.8	97 19	163.6	84 11.4	95 23	160.0	85 08.0	93 27	156.4	86 02.9	89 32	151.1	86 54.6	82 39	142.8	87 39.7	66 49	128.7	88 14.2	02 59	88.8	3
4	81 36.0	96 22	160.6	82 33.3	95 24	158.5	83 57.6	92 28	153.9	84 51.9	89 32	149.6	85 43.8	83 38	143.4	86 31.2	74 44	134.3	87 10.6	55 52	120.5	87 38.9	03 59	88.4	4
05	81 23.0	94 26	156.2	82 19.0	92 28	153.6	83 40.5	89 33	148.4	84 32.5	84 37	143.5	85 21.2	77 42	136.8	86 04.6	66 48	127.5	86 39.3	48 54	114.6	87 03.7	04 59	88.0	05
6	81 07.6	92 29	151.9	82 02.0	90 32	149.0	83 20.7	85 37	143.3	84 10.1	80 41	138.1	84 55.8	72 46	131.2	85 35.6	60 51	122.1	86 06.6	42 56	110.3	86 28.4	04 59	87.6	6
7	80 49.9	89 33	147.9	81 42.8	87 36	144.8	82 58.5	81 40	138.7	83 45.5	75 44	133.3	84 28.3	67 49	126.4	85 05.0	55 53	117.7	85 33.2	38 57	106.9	85 53.2	05 59	87.2	7
8	80 30.2	87 36	144.1	81 21.4	84 39	140.8	82 34.3	77 43	134.5	83 18.9	71 47	129.1	83 59.2	62 51	122.3	84 33.3	51 54	114.1	84 59.2	35 57	104.2	85 18.0	06 59	86.8	8
9	80 08.6	84 39	140.6	80 58.3	81 41	137.2	82 08.3	74 46	130.7	82 50.8	67 49	125.3	83 28.8	59 52	118.8	84 00.7	47 55	111.0	84 24.9	33 58	101.9	84 42.8	06 59	86.4	9
10	79 45.5	82 41	137.3	80 33.6	78 44	133.8	81 40.9	71 48	127.3	82 21.5	64 51	122.0	82 57.4	55 54	115.7	83 27.5	44 56	108.4	83 50.2	31 58	100.0	84 07.6	07 59	86.0	10
1	79 20.8	79 43	134.2	80 07.4	76 46	130.6	81 12.3	68 49	124.2	81 51.1	61 52	119.0	82 25.3	53 55	113.0	82 53.8	42 57	106.1	83 15.4	30 58	98.4	83 32.4	08 59	85.5	1
2	78 54.9	77 45	131.3	79 40.1	73 47	127.8	80 42.6	65 51	121.4	81 19.9	59 53	116.4	81 52.6	50 55	110.6	82 19.8	40 57	104.1	82 40.5	29 58	96.9	82 57.3	08 59	85.1	2
3	78 27.9	75 47	128.6	79 11.7	71 49	125.1	80 12.1	63 52	118.8	80 47.9	56 54	114.0	81 19.3	48 56	108.5	81 45.4	39 58	102.4	82 05.4	28 59	95.7	82 22.2	09 59	84.7	3
4	77 59.9	73 48	126.1	78 42.4	69 50	122.6	79 40.9	61 53	116.5	80 15.4	54 55	111.8	80 45.7	46 57	106.6	81 10.9	37 58	100.8	81 30.3	27 59	94.5	81 47.1	10 58	84.3	4
15	77 30.9	71 49	123.7	78 12.3	67 51	120.3	79 09.0	59 54	114.3	79 42.5	52 56	109.8	80 11.7	45 57	104.8	80 36.2	36 58	99.3	80 55.1	27 59	93.4	81 12.0	11 58	83.9	15
6	77 01.2	69 51	121.5	77 41.5	65 52	118.1	78 36.6	57 55	112.3	79 09.1	51 56	108.0	79 37.5	44 57	103.2	80 01.3	35 58	98.0	80 19.9	26 59	92.4	80 36.9	11 58	83.5	6
7	76 30.8	68 52	119.4	77 10.2	63 53	116.1	78 03.8	56 55	110.5	78 35.4	50 57	106.3	79 03.1	43 58	101.7	79 26.3	35 58	96.8	79 44.6	26 59	91.5	80 01.9	12 58	83.1	7
8	75 59.8	66 53	117.5	76 38.2	62 54	114.2	77 30.6	54 56	108.8	78 01.4	48 57	104.7	78 28.5	42 58	100.3	78 51.3	34 59	95.6	79 09.4	26 59	90.6	79 26.9	13 58	82.7	8
9	75 28.3	65 53	115.6	76 05.9	60 55	112.5	76 57.1	53 56	107.2	77 27.2	47 57	103.3	77 53.7	41 58	99.1	78 16.1	34 59	94.6	78 34.1	26 59	89.8	78 51.9	13 58	82.3	9
20	74 56.3	63 54	113.9	75 33.1	59 55	110.8	76 23.2	52 57	105.7	76 52.8	46 58	101.9	77 18.8	40 58	97.9	77 41.0	33 59	93.6	77 58.9	26 59	89.0	78 17.0	14 58	81.9	20
1	74 23.8	62 55	112.2	74 59.9	58 56	109.2	75 49.1	51 57	104.2	76 18.2	46 58	100.6	76 43.8	40 58	96.7	77 05.8	33 59	92.6	77 23.6	26 59	88.3	77 42.1	15 58	81.5	1
2	73 51.0	61 55	110.7	74 26.5	57 56	107.7	75 14.9	50 57	102.9	75 43.5	45 58	99.4	76 08.8	39 59	95.7	76 30.5	33 59	91.7	76 48.4	26 59	87.6	77 07.3	16 58	81.1	2
3	73 17.8	60 56	109.2	73 52.8	56 57	106.3	74 40.4	50 58	101.6	75 08.6	44 58	98.2	75 33.7	39 59	94.6	75 55.2	33 59	90.8	76 13.1	27 59	86.9	76 32.4	16 58	80.7	3
4	72 44.4	59 56	107.8	73 18.8	55 57	105.0	74 05.8	49 58	100.4	74 33.7	44 58	97.1	74 58.5	39 59	93.7	75 20.0	33 59	90.0	75 37.9	27 59	86.2	75 57.7	17 58	80.2	4
25	72 10.7	58 57	106.4	72 44.6	55 57	103.7	73 31.0	48 58	99.3	73 58.6	44 58	96.1	74 23.3	38 59	92.7	74 44.7	33 59	89.2	75 02.8	27 59	85.6	75 22.9	18 58	79.8	25
6	71 36.7	58 57	105.1	72 10.3	54 58	102.5	72 56.2	48 58	98.1	73 23.5	43 59	95.1	73 48.0	38 59	91.8	74 09.5	33 59	88.5	74 27.6	27 58	84.9	74 48.2	18 58	79.4	6
7	71 02.6	57 57	103.9	71 35.8	53 58	101.3	72 21.2	47 58	97.1	72 48.4	43 59	94.1	73 12.8	38 59	91.0	73 34.2	33 59	87.7	73 52.5	28 58	84.3	74 13.6	19 58	79.0	7
8	70 28.3	56 57	102.7	71 01.1	53 58	100.1	71 46.2	47 58	96.1	72 13.2	43 59	93.2	72 37.5	38 59	90.2	72 59.0	33 59	87.0	73 17.4	28 58	83.7	73 39.0	20 58	78.6	8
9	69 53.8	56 58	101.5	70 26.3	52 58	99.1	71 11.1	47 59	95.1	71 38.0	43 59	92.3	72 02.2	38 59	89.4	72 23.8	33 59	86.3	72 42.4	28 58	83.1	73 04.4	20 58	78.2	9
30	69 19.2	55 58	100.4	69 51.5	52 58	98.0	70 35.9	47 59	94.1	71 02.7	43 59	91.4	71 27.0	38 59	88.6	71 48.6	34 59	85.6	72 07.4	29 58	82.5	72 30.0	21 57	77.8	30
1	68 44.4	55 58	99.3	69 16.5	52 58	97.0	70 00.7	46 59	93.2	70 27.4	43 59	90.6	70 51.7	38 59	87.8	71 13.4	34 59	85.0	71 32.4	29 58	82.0	71 55.5	22 57	77.4	1
2	68 09.6	55 58	98.3	68 41.5	52 58	96.0	69 25.5	46 59	92.3	69 52.2	43 59	89.8	70 16.5	39 59	87.1	70 38.3	34 58	84.3	70 57.5	30 58	81.4	71 21.1	23 57	76.9	2
3	67 34.6	54 58	97.3	68 06.4	51 59	95.1	68 50.3	46 59	91.5	69 16.9	43 59	89.0	69 41.3	39 59	86.4	70 03.3	35 58	83.7	70 22.7	30 58	80.9	70 46.8	23 57	76.5	3
4	66 59.6	54 58	96.3	67 31.2	51 59	94.1	68 15.0	46 59	90.6	68 41.7	43 59	88.2	69 06.1	39 59	85.7	69 28.2	35 58	83.0	69 47.9	31 58	80.3	70 12.5	24 57	76.1	4
35	66 24.5	54 59	95.4	66 56.0	51 59	93.2	67 39.7	46 59	89.8	68 06.4	43 59	87.5	68 31.0	39 59	85.0	68 53.3	35 58	82.4	69 13.2	31 58	79.8	69 38.3	25 57	75.7	35
6	65 49.4	54 59	94.5	66 20.8	51 59	92.4	67 04.5	46 59	89.0	67 31.2	43 59	86.7	67 55.8	39 58	84.3	68 18.3	36 58	81.8	68 38.5	32 58	79.3	69 04.2	25 57	75.3	6
7	65 14.2	54 59	93.6	65 45.5	51 59	91.5	66 29.2	46 59	88.3	66 56.0	43 59	86.0	67 20.8	40 58	83.7	67 43.4	36 58	81.2	68 03.9	32 58	78.7	68 30.1	26 57	74.9	7
8	64 39.0	53 59	92.7	65 10.3	51 59	90.7	65 54.0	46 59	87.5	66 20.8	43 59	85.3	66 45.7	40 58	83.0	67 08.6	36 58	80.6	67 29.3	33 58	78.2	67 56.1	27 57	74.4	8
9	64 03.8	53 59	91.8	64 35.0	51 59	89.9	65 18.8	46 59	86.8	65 45.7	43 58	84.6	66 10.8	40 58	82.4	66 33.8	37 58	80.1	66 54.8	33 57	77.7	67 22.2	28 56	74.0	9
40	63 28.5	53 59	91.0	63 59.7	51 59	89.1	64 43.6	47 59	86.0	65 10.6	44 58	83.9	65 35.8	40 58	81.7	65 59.1	37 58	79.5	66 20.4	34 57	77.2	66 48.3	28 56	73.6	40
1	62 53.3	53 59	90.2	63 24.5	51 59	88.3	64 08.4	47 59	85.3	64 35.6	44 58	83.3	65 01.0	41 58	81.1	65 24.5	38 58	78.9	65 46.0	34 57	76.7	66 14.5	29 56	73.2	1
2	62 18.0	53 59	89.4	62 49.2	51 59	87.5	63 33.3	47 58	84.6	64 00.6	44 58	82.6	64 26.2	41 58	80.5	64 49.9	38 58	78.4	65 11.8	35 57	76.2	65 40.8	30 56	72.7	2
3	61 42.7	53 59	88.6	62 14.0	51 59	86.8	62 58.2	47 58	83.9	63 25.6	44 58	81.9	63 51.4	42 58	79.9	64 15.4	38 57	77.8	64 37.6	35 57	75.7	65 07.2	30 56	72.3	3
4	61 07.5	53 59	87.8	61 38.8	51 59	86.0	62 23.1	47 58	83.2	62 50.7	45 58	81.3	63 16.7	42 58	79.3	63 41.0	39 57	77.3	64 03.4	36 57	75.2	64 33.6	31 56	71.9	4
45	60 32.2	53 59	87.0	61 03.7	51 59	85.3	61 48.1	48 58	82.6	62 15.9	45 58	80.7	62 42.1	42 58	78.7	63 06.6	39 57	76.7	63 29.4	36 57	74.7	64 00.1	32 56	71.5	45
6	59 57.0	54 59	86.3	60 28.5	51 58	84.6	61 13.2	48 58	81.9	61 41.1	45 58	80.0	62 07.5	43 57	78.1	62 32.3	40 57	76.2	62 55.4	37 56	74.2	63 26.7	32 56	71.0	6
7	59 21.9	54 59	85.5	59 53.4	52 58	83.9	60 38.3	48 58	81.2	61 06.4	46 58	79.4	61 33.1	43 57	77.6	61 58.1	40 57	75.6	62 21.5	38 56	73.7	62 53.4	33 55	70.6	7
8	58 46.7	54 58	84.8	59 18.4	52 58	83.2	60 03.5	48 58	80.6	60 31.8	46 58	78.8	60 58.7	44 57	77.0	61 24.0	41 57	75.1	61 47.7	38 56	73.2	62 20.2	34 55	70.2	8
9	58 11.6	54 58	84.1	58 43.4	52 58	82.5	59 28.7	49 58	80.0	59 57.2	46 57	78.2	60 24.3	44 57	76.4	60 49.9	41 57	74.6	61 14.0	39 56	72.7	61 47.0	35 55	69.8	9
50	57 36.6	54 58	83.4	58 08.5	52 58	81.8	58 54.0	49 58	79.3	59 22.7	47 57	77.6	59 50.1	44 57	75.9	60 16.0	42 56	74.1	60 40.4	39 56	72.2	61 14.0	35 55	69.3	50
1	57 01.5	54 58	82.7	57 33.6	52 58	81.1	58 19.4	49 58	78.7	58 48.3	47 57	77.0	59 15.9	45 57	75.3	59 42.1	42 56	73.5	60 06.9	40 56	71.7	60 41.0	36 55	68.9	1
2	56 26.6	55 58	82.0	56 58.8	53 58	80.5	57 44.8	50 57	78.1	58 14.0	48 57	76.4	58 41.9	45 57	74.7	59 08.4	43 56	73.0	59 33.4	41 56	71.2	60 08.2	37 55	68.5	2
3	55 51.7	55 58	81.3	56 24.0	53 58	79.8	57 10.4	50 57	77.5	57 39.8	48 57	75.9	58 07.9	46 56	74.2	58 34.7	44 56	72.5	59 00.1	41 55	70.7	59 35.4	37 54	68.0	3
4	55 16.9	55 58	80.7	55 49.4	53 58	79.2	56 36.0	50 57	76.9	57 05.6	48 57	75.3	57 34.0	46 56	73.6	58 01.1	44 56	72.0	58 26.8	42 55	70.2	59 02.8	38 54	67.6	4
55	54 42.1	55 58	80.0	55 14.8	54 58	78.5	56 01.7	51 57	76.3	56 31.6	49 57	74.7	57 00.2	47 56	73.1	57 27.6	45 56	71.4	57 53.7	42 55	69.8	58 30.2	39 54	67.2	55
6	54 07.4	55 58	79.3	54 40.2	54 57	77.9	55 27.5	51 57	75.7	55 57.6	49 56	74.1	56 26.5	47 56	72.5	56 54.2	45 55	70.9	57 20.7	43 55	69.3	57 57.8	40 54	66.7	6
7	53 32.8	55 58	78.7	54 05.8	54 57	77.3	54 53.4	52 57	75.1	55 23.7	50 56	73.6	55 52.9	48 56	72.0	56 20.9	46 55	70.4	56 47.7	44 55	68.8	57 25.4	40 54	66.3	7
8	52 58.3	55 57	78.0	53 31.4	54 57	76.6	54 19.3	52 57	74.5	54 49.9	50 56	73.0	55 19.4	48 56	71.5	55 47.8	46 55	69.9	56 14.9	44 55	68.3	56 53.2	41 54	65.8	8
9	52 23.8	55 57	77.4	52 57.2	55 57	76.0	53 45.4	52 56	73.9	54 16.3	51 56	72.4	54 46.1	49 55	70.9	55 14.7	47 55	69.4	55 42.2	45 54	67.8	56 21.1	42 53	65.4	9
60	51 49.4	57 57	76.7	52 23.0	55 57	75.4	53 11.6	53 56	73.3	53 42.7	51 56	71.9	54 12.8	49 55	70.4	54 41.8	47 55	68.9	55 09.6	45 54	67.3	55 49.1	42 53	65.0	60
1	51 15.1	57 57	76.1	51 48.9	56 57	74.8	52 37.8	53 56	72.7	53 09.2	51 56	71.3	53 39.6	50 55	69.9	54 08.9	48 55	68.4	54 37.1	46 54	66.9	55 17.2	43 53	64.5	1
2	50 41.0	57 57	75.5	51 14.9	56 56	74.2	52 04.2	54 56	72.1	52 35.9	52 55	70.7	53 06.6	50 55	69.3	53 36.2	48 54	67.9	54 04.7	47 54	66.4	54 45.4	44 53	64.1	2
3	50 06.9	58 57	74.8	50 41.1	56 56	73.6	51 30.7	54 56	71.6	52 02.7	52 55	70.2	52 33.6	51 55	68.8	53 03.6	49 54	67.4	53 32.5	47 54	65.9	54 13.7	44 53	63.6	3
4	49 32.9	58 56	74.2	50 07.3	57 56	72.9	50 57.3	54 55	71.0	51 29.5	53 55	69.6	52 00.8	51 54	68.3	52 31.1	50 54	66.8	53 00.3	48 53	65.4	53 42.2	45 52	63.2	4
65	48 59.0	58 56	73.6	49 33.6	57 56	72.3	50 24.0	55 55	70.4	50 56.5	53 55	69.1	51 28.1	52 54	67.7	51 58.7	50 54	66.3	52 28.3	48 53	64.9	53 10.8	46 52	62.7	65
6	48 25.2	59 56	73.0	49 00.1	57 56	71.7	49 50.9	55 55	69.8	50 23.6	54 55	68.5	50 55.5	52 54	67.2	51 26.5	51 54	65.8	51 56.5	49 53	64.4	52 39.5	47 52	62.3	6
7	47 51.5	59 56	72.4	48 26.6	58 56	71.2	49 17.8	56 55	69.3	49 50.9	54 54	68.0	50 23.1	53 54	66.7	50 54.4	51 53	65.3	51 24.7	50 53	64.0	52 08.3	47 52	61.8	7
8	47 18.0	60 56	71.8	47 53.3	58 55	70.6	48 44.9	56 55	68.7	49 18.3	55 54	67.4	49 50.8	53 54	66.1	50 22.4	52 53	64.8	50 53.1	50 52	63.5	51 37.3	48 51	61.4	8
9	46 44.6	60 56	71.1	47 20.1	59 55	70.0	48 12.1	57 54	68.1	48 45.7	55 54	66.9	49 18.6	54 53	65.6	49 50.5	53 53	64.3	50 21.6	51 52	63.0	51 06.4	49 51	60.9	9
70	46 11.2	60 55	70.5	46 47.1	59 55	69.4	47 39.4	57 54	67.6	48 13.4	56 54	66.4	48 46.5	55 53	65.1	49 18.8	53 53	63.8	49 50.2	52 52	62.5	50 35.7	49 51	60.5	70
1	45 38.1	61 55	69.9	46 14.1	60 55	68.8	47 06.9	58 54	67.0	47 41.1	56 54	65.8	48 14.6	55 53	64.6	48 47.2	54 52	63.3	49 19.0	52 52	62.0	50 05.1	50 51	60.0	1
2	45 05.0	61 55	69.3	45 41.3	60 54	68.2	46 34.5	58 54	66.5	47 09.0	57 53	65.3	47 42.8	56 53	64.0	48 15.8	54 52	62.8	48 48.0	53 52	61.5	49 34.6	51 51	59.6	2
3	44 32.1	61 55	68.7	45 08.6	60 54	67.6	46 02.2	59 54	65.9	46 37.1	57 53	64.7	47 11.2	56 52	63.5	47 44.5	55 52	62.3	48 17.0	54 51	61.0	49 04.3	51 50	59.1	3
4	43 59.3	62 54	68.1	44 36.1	61 54	67.0	45 30.1	59 53	65.3	46 05.3	58 53	64.2	46 39.7	57 52	63.0	47 13.4	55 52	61.8	47 46.3	54 51	60.5	48 34.1	52 50	58.6	4
75	43 26.6	62 54	67.5	44 03.7	61 54	66.5	44 58.1	60 53	64.8	45 33.6	59 53	63.6	46 08.3	57 52	62.5	46 42.4	56 51	61.3	47 15.6	55 51	60.0	48 04.0	53 50	58.2	75
6	42 54.1	63 54	66.9	43 31.4	62 54	65.9	44 26.3	60 53	64.2	45 02.1	59 52	63.1	45 37.2	58 52	61.9	46 11.5	57 51	60.8	46 45.2	55 51	59.6	47 34.1	53 50	57.7	6
7	42 21.7	63 54	66.4	42 59.3	62 53	65.3	43 54.6	61 53	63.7	44 30.7	60 52	62.5	45 06.1	58 51	61.4	45 40.8	57 51	60.2	46 14.8	56 50	59.1	47 04.4	54 49	57.2	7
8	41 49.5	64 53	65.8	42 27.4	63 53	64.7	43 23.1	61 52	63.1	43 59.5	60 52	62.0	44 35.2	59 51	60.9	45 10.3	58 51	59.7	45 44.7	57 50	58.6	46 34.8	55 49	56.8	8
9	41 17.4	64 53	65.2	41 55.5	63 53	64.1	42 51.7	62 52	62.5	43 28.4	61 52	61.5	44 04.5	60 51	60.4	44 39.9	58 50	59.2	45 14.6	57 50	58.1	46 05.4	55 49	56.3	9
80	40 45.5	64 53	64.6	41 23.9	64 52	63.6	42 20.5	62 52	62.0	42 57.5	61 51	60.9	43 33.9	60 51	59.8	44 09.7	59 50	58.7	44 44.8	58 49	57.6	45 36.1	56 48	55.8	80
1	40 13.7	65 53	64.0	40 52.4	64 52	63.0	41 49.4	63 52	61.4	42 26.8	62 51	60.4	43 03.5	61 50	59.3	43 39.6	60 50	58.2	44 15.1	59 49	57.1	45 07.0	57 48	55.4	1
2	39 42.1	65 52	63.4	40 21.1	65 52	62.4	41 18.6	63 51	60.9	41 56.2	62 51	59.8	42 33.3	61 50	58.8	43 09.7	60 50	57.7	43 45.6	59 49	56.6	44 38.1	58 48	54.9	2
3	39 10.6	66 52	62.8	39 49.9	65 52	61.8	40 47.8	64 51	60.3	41 25.8	63 50	59.3	42 03.2	62 50	58.2	42 40.0	61 49	57.2	43 16.2	60 49	56.1	44 09.4	58 48	54.4	3
4	38 39.3	66 52	62.2	39 18.9	66 51	61.2	40 17.3	64 51	59.8	40 55.6	63 50	58.7	41 33.3	62 50	57.7	42 10.5	61 49	56.7	42 47.1	60 48	55.6	43 40.8	59 47	53.9	4
85	38 08.2	67 52	61.6	38 48.1	66 51	60.7	39 46.9	65 50	59.2	40 25.5	64 50	58.2	41 03.6	63 49	57.2	41 41.1	62 49	56.1	42 18.0	61 48	55.1	43 12.3	60 47	53.4	85
6	37 37.3	67 51	61.0	38 17.4	66 51	60.1	39 16.7	65 50	58.6	39 55.6	64 50	57.7	40 34.0	64 49	56.6	41 11.9	63 48	55.6	41 49.2	62 48	54.6	42 44.1	60 47	53.0	6
7	37 06.5	68 51	60.4	37 46.9	67 50	59.5	38 46.7	66 50	58.1	39 25.9	65 49	57.1	40 04.7	64 49	56.1	40 42.9	63 48	55.1	41 20.6	62 47	54.1	42 16.0	61 46	52.5	7
8	36 35.9	68 51	59.9	37 16.6	67 50	58.9	38 16.8	66 49	57.5	38 56.4	66 49	56.6	39 35.5	65 48	55.6	40 14.0	64 48	54.6	40 52.1	63 47	53.6	41 48.2	62 46	52.0	8
9	36 05.5	69 50	59.3	36 46.5	68 50	58.4	37 47.2	67 49	57.0	38 27.1	66 49	56.0	39 06.5	65 48	55.0	39 45.4	64 47	54.1	40 23.8	64 47	53.1	41 20.5	62 46	51.5	9
90	35 35.3	69 50	58.7	36 16.6	68 50	57.8	37 17.7	67 49	56.4	37 57.9	67 48	55.5	38 37.7	66 48	54.5	39 16.9	65 47	53.5	39 55.7	64 46	52.5	40 52.9	63 46	51.0	90

Lat. 54°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	35 05.3	70 50	58.1	35 46.8	69 49	57.2	36 48.4	68 48	55.8	37 29.0	67 48	54.9	38 09.0	66 47	54.0	38 48.7	66 47	53.0	39 27.8	65 46	52.0	40 25.6	64 45	50.5	91
2	34 35.4	70 49	57.5	35 17.3	69 49	56.6	36 19.3	68 48	55.3	37 00.2	68 48	54.4	37 40.6	67 47	53.4	38 20.6	66 46	52.5	39 00.1	65 46	51.5	39 58.5	64 45	50.0	2
3	34 05.8	71 49	56.9	34 47.9	70 49	56.0	35 50.4	69 48	54.7	36 31.6	68 47	53.8	37 12.4	68 47	52.9	37 52.7	67 46	52.0	38 32.6	66 46	51.0	39 31.6	65 45	49.6	3
4	33 36.3	71 49	56.3	34 18.8	70 48	55.5	35 21.8	70 47	54.2	36 03.3	69 47	53.3	36 44.4	68 46	52.4	37 25.1	67 46	51.4	38 05.3	67 45	50.5	39 04.8	66 44	49.1	4
95	33 07.1	71 48	55.7	33 49.8	71 48	54.9	34 53.3	70 47	53.6	35 35.1	69 47	52.7	36 16.5	69 46	51.8	36 57.6	68 45	50.9	37 38.2	67 45	50.0	38 38.3	66 44	48.6	95
6	32 38.1	72 48	55.1	33 21.1	71 48	54.3	34 25.0	71 47	53.0	35 07.2	70 46	52.2	35 48.9	69 46	51.3	36 30.3	69 45	50.4	37 11.3	68 44	49.5	38 11.9	67 44	48.1	6
7	32 09.2	72 48	54.5	32 52.6	72 47	53.7	33 56.9	71 46	52.5	34 39.4	70 46	51.6	35 21.5	70 45	50.7	36 03.3	69 45	49.8	36 44.6	69 44	48.9	37 45.8	67 43	47.6	7
8	31 40.6	73 47	53.9	32 24.2	72 47	53.1	33 29.1	72 46	51.9	34 11.9	71 46	51.0	34 54.3	70 45	50.2	35 36.4	70 44	49.3	36 18.1	69 44	48.4	37 19.9	68 43	47.1	8
9	31 12.2	73 47	53.3	31 56.1	73 46	52.5	33 01.4	72 46	51.3	33 44.6	72 45	50.5	34 27.3	71 45	49.6	35 09.8	70 44	48.8	35 51.8	70 43	47.9	36 54.2	69 42	46.6	9
100	30 44.1	74 47	52.7	31 28.3	73 46	51.9	32 34.0	73 45	50.7	33 17.5	72 45	49.9	34 00.6	72 44	49.1	34 43.4	71 44	48.2	35 25.8	70 43	47.4	36 28.7	69 42	46.0	100
1	30 16.1	74 46	52.1	31 00.6	74 46	51.4	32 06.8	73 45	50.2	32 50.6	73 44	49.4	33 34.0	72 44	48.5	34 17.2	72 43	47.7	34 59.9	71 43	46.8	36 03.4	70 42	45.5	1
2	29 48.4	75 46	51.5	30 33.2	74 45	50.8	31 39.9	74 45	49.6	32 23.9	73 44	48.8	33 07.7	73 43	48.0	33 51.2	72 43	47.2	34 34.3	72 42	46.3	35 38.3	71 41	45.0	2
3	29 20.9	75 45	50.9	30 06.0	75 45	50.2	31 13.1	74 44	49.0	31 57.5	74 44	48.2	32 41.6	73 43	47.4	33 25.4	73 43	46.6	34 08.9	72 42	45.8	35 13.5	71 41	44.5	3
4	28 53.6	76 45	50.3	29 39.0	75 45	49.6	30 46.6	75 44	48.4	31 31.3	74 43	47.7	32 15.8	74 43	46.9	32 59.9	73 42	46.1	33 43.8	73 42	45.3	34 48.9	72 41	44.0	4
105	28 26.6	76 45	49.7	29 12.3	76 44	49.0	30 20.3	75 43	47.9	31 05.4	75 43	47.1	31 50.2	74 42	46.3	32 34.7	74 42	45.5	33 18.8	73 41	44.7	34 24.5	73 40	43.5	105
6	27 59.8	77 44	49.1	28 45.8	76 44	48.4	29 54.3	76 43	47.3	30 39.7	75 42	46.5	31 24.8	75 42	45.8	32 09.6	74 41	45.0	32 54.1	74 41	44.2	34 00.4	73 40	43.0	6
7	27 33.2	77 44	48.5	28 19.5	77 43	47.8	29 28.5	76 43	46.7	30 14.2	76 42	46.0	30 59.6	76 42	45.2	31 44.8	75 41	44.4	32 29.7	75 40	43.6	33 36.4	74 39	42.4	7
8	27 06.9	78 43	47.9	27 53.5	77 43	47.2	29 03.0	77 42	46.1	29 49.0	76 42	45.4	30 34.7	76 41	44.6	31 20.2	76 41	43.9	32 05.5	75 40	43.1	33 12.7	74 39	41.9	8
9	26 40.9	78 43	47.3	27 27.7	78 42	46.6	28 37.7	77 42	45.5	29 24.0	77 41	44.8	30 10.1	77 41	44.1	30 55.9	76 40	43.3	31 41.5	76 40	42.6	32 49.3	75 39	41.4	9
110	26 15.1	79 43	46.7	27 02.2	78 42	46.0	28 12.6	78 41	45.0	28 59.3	78 41	44.2	29 45.7	77 40	43.5	30 31.8	77 40	42.8	31 17.7	76 39	42.0	32 26.1	76 38	40.9	110
1	25 49.5	79 42	46.1	26 37.0	79 42	45.4	27 47.8	78 41	44.4	28 34.8	78 40	43.7	29 21.5	78 40	42.9	30 08.0	77 39	42.2	30 54.3	77 39	41.5	32 03.1	76 38	40.3	1
2	25 24.3	80 42	45.5	26 12.0	79 41	44.8	27 23.3	79 40	43.8	28 10.6	79 40	43.1	28 57.6	78 39	42.4	29 44.4	78 39	41.7	30 31.0	77 38	40.9	31 40.4	77 37	39.8	2
3	24 59.2	80 41	44.9	25 47.3	80 41	44.2	26 59.0	79 40	43.2	27 46.6	79 40	42.5	28 34.0	79 39	41.8	29 21.1	78 38	41.1	30 08.0	78 38	40.4	31 18.0	77 37	39.3	3
4	24 34.5	81 41	44.3	25 22.8	80 40	43.6	26 35.0	80 40	42.6	27 22.9	80 39	41.9	28 10.6	79 39	41.2	28 58.1	79 38	40.5	29 45.3	79 37	39.8	30 55.8	78 37	38.8	4
115	24 10.0	81 40	43.6	24 58.7	81 40	43.0	26 11.3	80 39	42.0	26 59.5	80 39	41.3	27 47.5	80 38	40.7	28 35.3	79 38	40.0	29 22.9	79 37	39.3	30 33.8	79 36	38.2	115
6	23 45.8	82 40	43.0	24 34.7	81 39	42.4	25 47.8	81 39	41.4	26 36.3	81 38	40.8	27 24.6	80 38	40.1	28 12.7	80 37	39.4	29 00.7	80 37	38.7	30 12.1	79 36	37.7	6
7	23 21.9	82 39	42.4	24 11.1	82 39	41.8	25 24.6	81 38	40.8	26 13.4	81 38	40.2	27 02.0	81 37	39.5	27 50.5	81 37	38.8	28 38.7	80 36	38.2	29 50.7	80 35	37.1	7
8	22 58.3	83 39	41.8	23 47.8	82 38	41.2	25 01.7	82 38	40.2	25 50.8	82 37	39.6	26 39.7	81 37	38.9	27 28.5	81 36	38.3	28 17.1	81 36	37.6	29 29.6	80 35	36.6	8
9	22 34.9	83 38	41.1	23 24.7	83 38	40.5	24 39.1	82 37	39.6	25 28.5	82 37	39.0	26 17.7	82 36	38.4	27 06.8	82 36	37.7	27 55.7	81 35	37.1	29 08.7	81 34	36.1	9
120	22 11.9	84 38	40.5	23 01.9	83 38	39.9	24 16.7	83 37	39.0	25 06.4	83 36	38.4	25 56.0	82 36	37.8	26 45.4	82 35	37.1	27 34.6	82 35	36.5	28 48.0	81 34	35.5	120
1	21 49.1	84 37	39.9	22 39.4	84 37	39.3	23 54.7	83 36	38.4	24 44.7	83 36	37.8	25 34.5	83 35	37.2	26 24.2	83 35	36.6	27 13.7	82 34	35.9	28 27.7	82 33	35.0	1
2	21 26.6	84 37	39.3	22 17.2	84 36	38.7	23 32.9	84 36	37.8	24 23.2	84 35	37.2	25 13.3	83 35	36.6	26 03.3	83 34	36.0	26 53.2	83 34	35.4	28 07.6	82 33	34.4	2
3	21 04.5	85 36	38.6	21 55.3	85 36	38.1	23 11.4	84 35	37.2	24 02.0	84 35	36.6	24 52.5	84 34	36.0	25 42.8	84 34	35.4	26 32.9	83 33	34.8	27 47.8	83 33	33.9	3
4	20 42.6	85 36	38.0	21 33.7	85 36	37.4	22 50.3	85 35	36.6	23 41.1	85 34	36.0	24 31.9	84 34	35.4	25 22.5	84 33	34.8	26 12.9	84 33	34.2	27 28.3	84 32	33.3	4
125	20 21.0	86 35	37.4	21 12.5	86 35	36.8	22 29.4	85 34	36.0	23 20.6	85 34	35.4	24 11.6	85 33	34.8	25 02.5	85 33	34.3	25 53.2	84 32	33.7	27 09.1	84 32	32.8	125
6	19 59.8	86 35	36.7	20 51.5	86 34	36.2	22 08.8	86 34	35.4	23 00.3	86 33	34.8	23 51.6	85 33	34.2	24 42.8	85 32	33.7	25 33.8	85 32	33.1	26 50.1	85 31	32.2	6
7	19 38.8	87 34	36.1	20 30.8	87 34	35.6	21 48.6	86 33	34.7	22 40.3	86 33	34.2	23 31.9	86 32	33.6	24 23.4	86 32	33.1	25 14.7	85 31	32.5	26 31.5	85 31	31.6	7
8	19 18.2	87 34	35.5	20 10.5	87 33	34.9	21 28.6	87 33	34.1	22 20.6	87 32	33.6	23 12.5	86 32	33.0	24 04.3	86 31	32.5	24 55.9	86 31	31.9	26 13.1	86 30	31.1	8
9	18 57.9	88 33	34.8	19 50.4	87 33	34.3	21 09.0	87 32	33.5	22 01.3	87 32	33.0	22 53.4	87 31	32.5	23 45.5	87 31	31.9	24 37.4	86 30	31.4	25 55.1	86 30	30.5	9
130	18 38.0	88 33	34.2	19 30.7	88 32	33.7	20 49.7	88 32	32.9	21 42.2	87 31	32.4	22 34.7	87 31	31.9	23 27.0	87 30	31.3	24 19.2	87 30	30.8	25 37.3	87 29	30.0	130
1	18 18.3	88 32	33.5	19 11.3	88 32	33.0	20 30.7	88 31	32.3	21 23.5	88 31	31.8	22 16.2	88 30	31.2	23 08.8	88 30	30.7	24 01.3	87 29	30.2	25 19.9	87 29	29.4	1
2	17 59.0	89 32	32.9	18 52.3	89 31	32.4	20 12.0	89 31	31.6	21 05.1	88 30	31.1	21 58.1	88 30	30.6	22 50.9	88 29	30.1	23 43.7	88 29	29.6	25 02.7	88 28	28.8	2
3	17 40.0	89 31	32.2	18 33.6	89 31	31.7	19 53.7	89 30	31.0	20 47.0	89 30	30.5	21 40.2	89 29	30.0	22 33.4	89 29	29.5	23 26.5	88 28	29.0	24 45.8	88 28	28.3	3
4	17 21.4	90 30	31.6	18 15.2	90 30	31.1	19 35.7	89 29	30.4	20 29.3	89 29	29.9	21 22.8	89 29	29.4	22 16.2	89 28	28.9	23 09.5	89 28	28.4	24 29.3	89 27	27.7	4
135	17 03.1	90 30	30.9	17 57.1	90 30	30.5	19 18.0	90 29	29.8	20 11.8	90 28	29.3	21 05.6	90 28	28.8	21 59.3	89 28	28.3	22 52.9	89 27	27.9	24 13.1	89 27	27.1	135
6	16 45.2	90 29	30.3	17 39.4	90 29	29.8	19 00.7	90 28	29.1	19 54.7	90 28	28.7	20 48.8	90 28	28.2	21 42.7	90 27	27.7	22 36.5	90 27	27.3	23 57.2	89 26	26.5	6
7	16 27.6	91 29	29.6	17 22.1	91 28	29.2	18 43.7	91 28	28.5	19 38.0	90 27	28.1	20 32.3	90 27	27.6	21 26.4	90 27	27.1	22 20.6	90 26	26.7	23 41.6	90 25	26.0	7
8	16 10.3	91 28	28.9	17 05.0	91 28	28.5	18 27.0	91 27	27.9	19 21.6	91 27	27.4	20 16.1	91 26	27.0	21 10.5	91 26	26.5	22 04.9	91 26	26.1	23 26.3	90 25	25.4	8
9	15 53.4	92 28	28.3	16 48.4	92 27	27.9	18 10.7	91 27	27.2	19 05.5	91 26	26.8	20 00.2	91 26	26.4	20 54.9	91 25	25.9	21 49.5	91 25	25.5	23 11.3	91 24	24.8	9
140	15 36.9	92 27	27.6	16 32.1	92 27	27.2	17 54.7	92 26	26.6	18 49.8	92 26	26.2	19 44.8	92 25	25.7	20 39.7	91 25	25.3	21 34.5	91 24	24.9	22 56.7	91 24	24.2	140
1	15 20.7	92 26	27.0	16 16.1	92 26	26.6	17 39.1	92 25	26.0	18 34.4	92 25	25.5	19 29.6	92 25	25.1	20 24.8	92 24	24.7	21 19.9	92 24	24.3	22 42.4	92 23	23.6	1
2	15 04.9	93 26	26.3	16 00.5	93 25	25.9	17 23.9	93 25	25.3	18 19.4	92 24	24.9	19 14.8	92 24	24.5	20 10.2	92 24	24.1	21 05.5	92 23	23.7	22 28.4	92 23	23.1	2
3	14 49.5	93 25	25.6	15 45.3	93 25	25.2	17 09.0	93 24	24.7	18 04.7	93 24	24.3	19 00.4	93 24	23.9	19 56.0	93 23	23.5	20 51.5	93 23	23.1	22 14.8	92 22	22.5	3
4	14 34.4	93 24	25.0	15 30.5	93 24	24.6	16 54.4	93 24	24.0	17 50.4	93 23	23.6	18 46.3	93 23	23.3	19 42.1	93 23	22.9	20 37.9	93 22	22.5	22 01.5	93 22	21.9	4
145	14 19.7	94 24	24.3	15 16.0	94 24	23.9	16 40.3	94 23	23.4	17 36.4	94 23	23.0	18 32.5	93 22	22.6	19 28.6	93 22	22.3	20 24.6	93 22	21.9	21 48.5	93 21	21.3	145
6	14 05.4	94 23	23.6	15 01.9	94 23	23.3	16 26.5	94 22	22.7	17 22.8	94 22	22.4	18 19.1	94 22	22.0	19 15.4	94 21	21.6	20 11.6	94 21	21.3	21 35.8	94 20	20.7	6
7	13 51.5	94 23	22.9	14 48.1	94 22	22.6	16 13.0	94 22	22.1	17 09.6	94 21	21.7	18 06.1	94 21	21.4	19 02.6	94 21	21.0	19 59.0	94 20	20.7	21 23.6	94 20	20.1	7
8	13 37.9	95 22	22.3	14 34.8	95 22	21.9	15 59.9	95 21	21.4	16 56.7	95 21	21.1	17 53.4	94 20	20.7	18 50.1	94 20	20.4	19 46.7	94 20	20.0	21 11.6	94 19	19.5	8
9	13 24.8	95 21	21.6	14 21.8	95 21	21.3	15 47.2	95 21	20.8	16 44.2	95 20	20.4	17 41.1	95 20	20.1	18 38.0	95 20	19.8	19 34.8	95 19	19.4	21 00.0	95 19	18.9	9
150	13 12.0	95 21	20.9	14 09.2	95 20	20.6	15 34.9	95 20	20.1	16 32.1	95 20	19.8	17 29.2	95 19	19.5	18 26.2	95 19	19.2	19 23.2	95 19	18.8	20 48.7	95 18	18.3	150
1	12 59.6	96 20	20.2	13 57.0	96 20	19.9	15 23.0	96 19	19.5	16 20.3	95 19	19.2	17 17.6	95 19	18.8	18 14.8	95 18	18.5	19 12.0	95 18	18.2	20 37.8	95 18	17.7	1
2	12 47.6	96 19	19.5	13 45.2	96 19	19.2	15 11.4	96 19	18.8	16 08.9	96 18	18.5	17 06.4	96 18	18.2	18 03.8	96 18	17.9	19 01.2	96 17	17.6	20 27.2	96 17	17.1	2
3	12 36.0	96 19	18.9	13 33.7	96 18	18.6	15 00.3	96 18	18.1	15 57.9	96 18	17.9	16 55.5	96 17	17.6	17 53.1	96 17	17.3	18 50.7	96 17	17.0	20 17.0	96 16	16.5	3
4	12 24.8	96 18	18.2	13 22.7	96 18	17.9	14 49.5	96 17	17.5	15 47.3	96 17	17.2	16 45.1	96 17	16.9	17 42.9	96 17	16.6	18 40.6	96 16	16.4	20 07.2	96 16	15.9	4
155	12 14.0	97 17	17.5	13 12.1	97 17	17.2	14 39.1	97 17	16.8	15 37.0	97 16	16.6	16 35.0	97 16	16.3	17 32.9	97 16	16.0	18 30.9	97 16	15.7	19 57.7	96 15	15.3	155
6	12 03.6	97 17	16.8	13 01.8	97 16	16.5	14 29.0	97 16	16.2	15 27.2	97 16	15.9	16 25.3	97 16	15.6	17 23.4	97 15	15.4	18 21.5	97 15	15.1	19 48.5	97 15	14.7	6
7	11 53.7	97 16	16.1	12 52.0	97 16	15.9	14 19.4	97 15	15.5	15 17.7	97 15	15.3	16 16.0	97 15	15.0	17 14.2	97 15	14.8	18 12.5	97 14	14.5	19 39.8	97 14	14.1	7
8	11 44.1	97 15	15.4	12 42.5	97 15	15.2	14 10.2	97 15	14.8	15 08.6	97 14	14.6	16 07.0	97 14	14.4	17 05.4	97 14	14.1	18 03.8	97 14	13.9	19 31.3	97 13	13.5	8
9	11 34.9	98 15	14.7	12 33.5	98 14	14.5	14 01.4	98 14	14.2	14 59.9	98 14	13.9	15 58.5	98 14	13.7	16 57.0	98 13	13.5	17 55.5	98 13	13.3	19 23.3	97 13	12.9	9
160	11 26.2	98 14	14.0	12 24.9	98 14	13.8	13 52.9	98 13	13.5	14 51.6	98 13	13.3	15 50.3	98 13	13.1	16 49.0	98 13	12.9	17 47.6	98 13	12.6	19 15.6	98 12	12.3	160
1	11 17.8	98 13	13.3	12 16.7	98 13	13.1	13 44.9	98 13	12.8	14 43.7	98 12	12.6	15 42.5	98 12	12.4	16 41.3	98 12	12.2	17 40.1	98 12	12.0	19 08.3	98 12	11.7	1
2	11 09.9	98 12	12.6	12 08.8	98 12	12.4	13 37.3	98 12	12.2	14 36.2	98 12	12.0	15 35.1	98 12	11.8	16 34.1	98 12	11.6	17 33.0	98 11	11.4	19 01.3	98 11	11.1	2
3	11 02.4	98 12	11.9	12 01.5	98 12	11.8	13 30.0	98 11	11.5	14 29.1	98 11	11.3	15 28.1	98 11	11.1	16 27.2	98 11	10.9	17 26.2	98 11	10.8	18 54.7	98 10	10.5	3
4	10 55.3	99 11	11.2	11 54.5	99 11	11.1	13 23.2	99 11	10.8	14 22.4	99 11	10.6	15 21.5	99 10	10.5	16 20.7	99 10	10.3	17 19.8	99 10	10.1	18 48.5	99 10	09.9	4
165	10 48.6	99 10	10.5	11 47.9	99 10	10.4	13 16.8	99 10	10.1	14 16.1	99 10	10.0	15 15.3	99 10	09.8	16 14.6	99 10	09.7	17 13.8	99 09	09.5	18 42.6	99 09	09.2	165
6	10 42.4	99 10	09.8	11 41.8	99 10	09.7	13 10.8	99 09	09.5	14 10.1	99 09	09.3	15 09.5	99 09	09.2	16 08.8	99 09	09.0	17 08.2	99 09	08.9	18 37.2	99 09	08.6	6
7	10 36.6	99 09	09.1	11 36.0	99 09	09.0	13 05.2	99 09	08.8	14 04.6	99 09	08.7	15 04.1	99 08	08.5	16 03.5	99 08	08.4	17 02.9	99 08	08.2	18 32.1	99 08	08.0	7
8	10 31.2	99 08	08.4	11 30.7	99 08	08.3	13 00.0	99 08	08.1	13 59.5	99 08	08.0	14 59.0	99 08	07.9	15 58.6	99 08	07.7	16 58.1	99 07	07.6	18 27.3	99 07	07.4	8
9	10 26.2	99 08	07.7	11 25.8	99 07	07.6	12 55.2	99 07	07.5	13 54.8	99 07	07.3	14 54.4	99 07	07.2	15 54.0	99 07	07.1	16 53.6	99 07	07.0	18 23.0	99 07	06.8	9
170	10 21.7	99 07	07.0	11 21.3	99 07	06.9	12 50.8	99 07	06.8	13 50.5	99 06	06.7	14 50.2	99 06	06.6	15 49.8	99 06	06.5	16 49.5	99 06	06.3	18 19.0	99 06	06.2	170
1	10 17.6	1.0 06	06.3	11 17.3	1.0 06	06.2	12 46.9	1.0 06	06.1	13 46.6	1.0 06	06.0	14 46.4	1.0 06	05.9	15 46.1	1.0 06	05.8	16 45.8	1.0 06	05.7	18 15.4	1.0 05	05.6	1
2	10 13.9	1.0 05	05.6	11 13.7	1.0 05	05.6	12 43.4	1.0 05	05.4	13 43.1	1.0 05	05.3	14 42.9	1.0 05	05.3	15 42.7	1.0 05	05.2	16 42.5	1.0 05	05.1	18 12.2	1.0 05	04.9	2
3	10 10.6	1.0 05	04.9	11 10.5	1.0 05	04.9	12 40.2	1.0 05	04.7	13 40.1	1.0 04	04.7	14 39.9	1.0 04	04.6	15 39.7	1.0 04	04.5	16 39.6	1.0 04	04.4	18 09.3	1.0 04	04.3	3
4	10 07.8	1.0 04	04.2	11 07.7	1.0 04	04.2	12 37.5	1.0 04	04.1	13 37.4	1.0 04	04.0	14 37.3	1.0 04	03.9	15 37.2	1.0 04	03.9	16 37.0	1.0 04	03.8	18 06.8	1.0 04	03.7	4
175	10 05.4	1.0 03	03.5	11 05.3	1.0 03	03.5	12 35.2	1.0 03	03.4	13 35.1	1.0 03	03.3	14 35.1	1.0 03	03.3	15 35.0	1.0 03	03.2	16 34.9	1.0 03	03.2	18 04.8	1.0 03	03.1	175
6	10 03.5	1.0 03	02.8	11 03.4	1.0 02	02.8	12 33.3	1.0 02	02.7	13 33.3	1.0 02	02.7	14 33.2	1.0 02	02.6	15 33.2	1.0 02	02.6	16 33.1	1.0 02	02.5	18 03.0	1.0 02	02.5	6
7	10 02.0	1.0 02	02.1	11 01.9	1.0 02	02.1	12 31.9	1.0 02	02.0	13 31.8	1.0 02	02.0	14 31.8	1.0 02	02.0	15 31.8	1.0 02	01.9	16 31.8	1.0 02	01.9	18 01.7	1.0 02	01.9	7
8	10 00.9	1.0 01	01.4	11 00.9	1.0 01	01.4	12 30.8	1.0 01	01.4	13 30.8	1.0 01	01.3	14 30.8	1.0 01	01.3	15 30.8	1.0 01	01.3	16 30.8	1.0 01	01.3	18 00.8	1.0 01	01.2	8
9	10 00.2	1.0 00	00.7	11 00.2	1.0 00	00.7	12 30.2	1.0 00	00.7	13 30.2	1.0 00	00.7	14 30.2	1.0 00	00.7	15 30.2	1.0 00	00.6	16 30.2	1.0 00	00.6	18 00.2	1.0 00	00.6	9
180	10 00.0	1.0 00	00.0	11 00.0	1.0 00	00.0	12 30.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 30.0	1.0 00	00.0	16 30.0	1.0 00	00.0	18 00.0	1.0 00	00.0	180

Lat. 54°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	89 30.0	1.0 27	00.0	89 00.0	1.0 16	00.0	88 00.0	1.0 06	00.0	87 30.9	1.0 06	00.0	87 00.0	1.0 05	00.0	86 30.0	1.0 04	00.0	85 00.0	1.0 03	00.0	84 30.0	1.0 03	00.0	00
1	89 13.9	64 50	49.0	88 50.6	86 38	29.7	87 55.2	96 22	15.6	87 26.2	97 18	12.4	86 56.8	98 15	10.3	86 27.3	99 13	08.7	84 58.2	99 09	05.9	84 28.4	99 08	05.3	1
2	88 43.7	38 55	66.0	88 28.0	64 48	48.5	87 41.7	86 33	29.0	87 15.2	90 28	23.7	86 47.6	93 24	19.9	86 19.4	95 21	17.0	84 52.8	97 15	11.6	84 23.6	98 13	10.4	2
3	88 10.7	25 57	72.9	87 59.5	43 52	58.9	87 21.7	74 41	39.5	86 58.3	81 35	33.1	86 33.2	86 31	28.3	86 06.9	89 28	24.5	84 44.1	94 20	17.1	84 15.6	95 18	15.4	3
4	87 36.6	18 57	76.3	87 28.3	37 54	65.1	86 57.4	64 45	47.3	86 37.0	72 41	40.7	86 14.5	78 37	35.4	85 50.4	82 33	31.1	84 32.2	90 24	22.2	84 04.9	92 22	20.1	4
05	87 02.2	13 58	78.3	86 55.8	29 55	69.0	86 30.3	54 48	53.1	86 12.6	63 44	46.7	85 52.6	70 41	41.3	85 30.7	76 37	36.8	84 17.6	86 28	26.8	83 51.5	88 26	24.4	05
6	86 27.6	10 58	79.5	86 22.6	23 56	71.6	86 01.3	46 50	57.4	85 46.0	55 47	51.4	85 28.2	63 44	46.1	85 08.4	69 40	41.5	84 00.5	81 32	31.0	83 35.8	83 30	28.4	6
7	85 52.9	07 58	80.2	85 49.0	19 56	73.3	85 31.0	40 52	60.7	85 17.7	49 49	55.1	85 01.9	56 46	50.0	84 44.1	63 43	45.5	83 41.3	76 35	34.8	83 18.1	79 33	32.0	7
8	85 18.1	05 58	80.7	85 15.0	15 57	74.6	84 59.9	35 53	63.2	84 48.2	43 50	58.0	84 34.3	50 48	53.2	84 18.2	57 45	48.9	83 20.3	71 38	38.2	82 58.5	74 35	35.3	8
9	84 43.3	03 58	80.9	84 41.0	12 57	75.5	84 28.1	30 54	65.2	84 18.0	38 52	60.4	84 05.5	45 49	55.9	83 51.1	51 47	51.7	82 57.8	66 40	41.1	82 37.4	70 37	38.2	9
10	84 08.5	01 58	81.1	84 06.8	10 57	76.2	83 55.9	26 54	66.7	83 47.0	33 52	62.3	83 35.9	40 50	58.0	83 22.9	46 48	54.1	82 34.0	61 42	43.7	82 15.0	65 39	40.8	10
1	83 33.6	00 58	81.1	83 32.5	08 57	76.6	83 23.4	23 55	68.0	83 15.6	29 53	63.8	83 05.7	36 51	59.8	82 54.0	42 49	56.0	82 09.1	57 43	46.0	81 51.4	61 41	43.1	1
2	82 58.8	01 58	81.1	82 58.2	06 57	77.0	82 50.6	19 55	68.9	82 43.8	26 54	65.1	82 35.0	32 52	61.3	82 24.5	38 50	57.7	81 43.3	53 44	48.0	81 26.8	57 42	45.2	2
3	82 24.0	03 58	81.0	82 23.8	04 57	77.2	82 17.6	17 55	69.7	82 11.6	23 54	66.1	82 03.9	29 52	62.6	81 54.4	34 51	59.2	81 16.7	49 45	49.8	81 01.4	53 44	47.0	3
4	81 49.1	04 58	80.8	81 49.4	02 57	77.3	81 44.4	14 55	70.3	81 39.3	20 54	66.9	81 32.4	26 53	63.6	81 23.9	31 51	60.4	80 49.4	45 46	51.4	80 35.2	49 45	48.7	4
15	81 14.3	05 58	80.7	81 15.0	01 57	77.4	81 11.2	12 56	70.8	81 06.8	17 54	67.6	81 00.7	23 53	64.5	80 53.1	28 52	61.4	80 21.6	42 47	52.8	80 08.4	46 46	50.1	15
6	80 39.5	06 58	80.5	80 40.6	01 57	77.4	80 37.8	10 56	71.2	80 34.1	15 55	68.2	80 28.8	20 53	65.2	80 22.0	25 52	62.3	79 53.3	39 48	54.0	79 41.1	43 46	51.4	6
7	80 04.8	07 58	80.2	80 06.1	02 57	77.3	80 04.4	08 56	71.5	80 01.3	13 55	68.6	79 56.7	18 54	65.8	79 50.7	22 53	63.0	79 24.6	35 48	55.0	79 13.4	39 47	52.5	7
8	79 30.0	08 58	80.0	79 31.7	03 57	77.2	79 30.9	06 56	71.7	79 28.4	11 55	69.0	79 24.5	15 54	66.3	79 19.2	20 53	63.6	78 55.5	33 49	56.0	78 45.2	36 48	53.5	8
9	78 55.3	09 58	79.7	78 57.4	05 57	77.1	78 57.4	04 56	71.9	78 55.4	09 55	69.3	78 52.1	13 54	66.7	78 47.5	18 53	64.2	78 26.2	30 49	56.8	78 16.6	34 48	54.4	9
20	78 20.6	10 58	79.4	78 23.0	06 57	77.0	78 23.9	03 56	72.0	78 22.4	07 55	69.5	78 19.7	11 54	67.0	78 15.7	15 53	64.6	77 56.5	27 50	57.5	77 47.8	31 48	55.2	20
1	77 46.0	11 58	79.1	77 48.6	07 57	76.8	77 50.3	01 56	72.0	77 49.4	05 55	69.7	77 47.2	09 54	67.3	77 43.8	13 53	65.0	77 26.7	25 50	58.1	77 18.7	28 49	55.9	1
2	77 11.4	12 58	78.8	77 14.3	08 57	76.6	77 16.8	00 56	72.1	77 16.3	04 55	69.8	77 14.6	07 54	67.5	77 11.8	11 53	65.3	76 56.7	22 50	58.7	76 49.4	26 49	56.5	2
3	76 36.8	13 58	78.5	76 40.0	09 57	76.4	76 43.2	02 56	72.0	76 43.2	02 55	69.9	76 42.0	06 54	67.7	76 39.8	09 54	65.5	76 26.5	20 51	59.1	76 19.9	24 49	57.1	3
4	76 02.2	14 58	78.2	76 05.8	10 57	76.1	76 09.7	03 56	72.0	76 10.1	01 55	69.9	76 09.4	04 54	67.8	76 07.6	08 54	65.7	75 56.1	18 51	59.5	75 50.2	21 50	57.5	4
25	75 27.7	14 57	77.9	75 31.6	11 57	75.9	75 36.2	04 56	71.9	75 37.0	01 55	69.9	75 36.7	02 54	67.9	75 35.5	06 54	65.9	75 25.7	16 51	59.9	75 20.4	19 50	57.9	25
6	74 53.3	15 57	77.5	74 57.4	12 57	75.6	75 02.7	06 56	71.8	75 03.8	02 55	69.8	75 04.1	01 54	67.9	75 03.3	04 54	66.0	74 55.1	14 51	60.2	74 50.5	17 50	58.3	6
7	74 18.9	16 57	77.2	74 23.2	13 57	75.4	74 29.2	07 56	71.6	74 30.7	04 55	69.8	74 31.4	01 54	67.9	74 31.1	03 54	66.0	74 24.5	12 51	60.4	74 20.4	15 50	58.6	7
8	73 44.5	17 57	76.8	73 49.1	14 57	75.1	73 55.7	08 56	71.5	73 57.7	05 55	69.7	73 58.7	02 54	67.9	73 58.8	01 54	66.1	73 53.8	10 51	60.7	73 50.3	13 50	58.9	8
9	73 10.2	18 57	76.5	73 15.1	15 57	74.8	73 22.3	09 56	71.3	73 24.6	06 55	69.6	73 26.0	03 54	67.8	73 26.6	00 54	66.1	73 23.0	08 51	60.8	73 20.0	11 50	59.1	9
30	72 35.9	19 57	76.1	72 41.1	16 57	74.5	72 48.9	10 56	71.1	72 51.6	07 55	69.5	72 53.4	05 54	67.8	72 54.4	02 54	66.1	72 52.2	07 51	61.0	72 49.7	09 51	59.3	30
1	72 01.7	19 57	75.8	72 07.1	17 56	74.2	72 15.5	11 56	70.9	72 18.6	09 55	69.3	72 20.8	06 54	67.7	72 22.1	03 54	66.0	72 21.3	05 51	61.1	72 19.4	08 51	59.4	1
2	71 27.5	20 57	75.4	71 33.2	18 56	73.9	71 42.2	12 55	70.7	71 45.6	10 55	69.1	71 48.1	07 54	67.5	71 49.9	05 54	65.9	71 50.4	03 52	61.1	71 49.0	06 51	59.5	2
3	70 53.4	21 57	75.0	70 59.4	18 56	73.5	71 09.0	14 55	70.5	71 12.6	11 55	69.0	71 15.6	08 54	67.4	71 17.7	06 54	65.9	71 19.6	02 52	61.2	71 18.6	04 51	59.6	3
4	70 19.4	22 57	74.7	70 25.6	19 56	73.2	70 35.7	15 55	70.3	70 39.8	12 55	68.8	70 43.0	10 54	67.3	70 45.6	07 54	65.7	70 48.7	00 52	61.2	70 48.2	03 51	59.7	4
35	69 45.4	22 57	74.3	69 51.8	20 56	72.9	70 02.6	16 55	70.0	70 06.9	13 55	68.6	70 10.5	11 54	67.1	70 13.4	08 54	65.6	70 17.8	01 52	61.2	70 17.7	01 51	59.7	35
6	69 11.5	23 56	73.9	69 18.2	21 56	72.5	69 29.5	17 55	69.7	69 34.1	14 55	68.3	69 38.1	12 54	66.9	69 41.3	10 53	65.5	69 46.9	03 51	61.2	69 47.3	00 51	59.7	6
7	68 37.6	24 56	73.5	68 44.5	22 56	72.2	68 56.4	18 55	69.5	69 01.4	15 54	68.1	69 05.6	13 54	66.7	69 09.2	11 53	65.3	69 16.0	04 51	61.1	69 16.8	02 51	59.7	7
8	68 03.9	25 56	73.1	68 11.0	23 56	71.8	68 23.4	19 55	69.2	68 28.7	16 54	67.9	68 33.3	14 54	66.5	68 37.2	12 53	65.2	68 45.1	05 51	61.0	68 46.4	03 51	59.7	8
9	67 30.1	26 56	72.8	67 37.5	24 56	71.5	67 50.5	20 55	68.9	67 56.0	17 54	67.6	68 00.9	15 54	66.3	68 05.2	13 53	65.0	68 14.3	07 51	61.0	68 16.0	05 51	59.6	9
40	66 56.5	26 56	72.4	67 04.1	24 56	71.1	67 17.6	20 55	68.6	67 23.4	18 54	67.3	67 28.7	16 54	66.1	67 33.3	14 53	64.8	67 43.4	08 51	60.9	67 45.6	06 51	59.5	40
1	66 22.9	27 56	72.0	66 30.8	25 55	70.8	66 44.8	21 55	68.3	66 50.9	19 54	67.1	66 56.5	18 54	65.8	67 01.4	16 53	64.6	67 12.7	09 51	60.7	67 15.2	07 51	59.4	1
2	65 49.4	28 56	71.6	65 57.5	26 55	70.4	66 12.1	22 54	68.0	66 18.5	20 54	66.8	66 24.3	19 53	65.6	66 29.6	17 53	64.3	66 41.9	11 51	60.6	66 44.8	09 51	59.3	2
3	65 16.0	29 56	71.2	65 24.3	27 55	70.0	65 39.4	23 54	67.7	65 46.1	21 54	66.5	65 52.3	20 53	65.3	65 57.9	18 53	64.1	66 11.2	12 51	60.5	66 14.5	10 50	59.2	3
4	64 42.7	29 55	70.8	64 51.2	28 55	69.7	65 06.8	24 54	67.4	65 13.8	22 54	66.2	65 20.2	21 53	65.1	65 26.2	19 53	63.9	65 40.6	13 51	60.3	65 44.2	11 50	59.1	4
45	64 09.4	30 55	70.4	64 18.2	28 55	69.3	64 34.3	25 54	67.1	64 41.6	23 54	65.9	64 48.3	22 53	64.8	64 54.5	20 53	63.6	65 09.9	14 51	60.1	65 14.0	13 50	58.9	45
6	63 36.2	31 55	70.0	63 45.2	29 55	68.9	64 01.8	26 54	66.7	64 09.4	24 53	65.6	64 16.4	23 53	64.5	64 23.0	21 52	63.4	64 39.4	16 51	59.9	64 43.8	14 50	58.8	6
7	63 03.1	32 55	69.6	63 12.4	30 55	68.5	63 29.5	27 54	66.4	63 37.3	25 53	65.3	63 44.6	24 53	64.2	63 51.5	22 52	63.1	64 08.9	17 51	59.8	64 13.7	15 50	58.6	7
8	62 30.1	32 55	69.2	62 39.6	31 54	68.1	62 57.2	28 54	66.1	63 05.3	26 53	65.0	63 12.9	25 53	63.9	63 20.1	23 52	62.8	63 38.5	18 51	59.5	63 43.6	16 50	58.4	8
9	61 57.2	33 55	68.8	62 06.9	32 54	67.8	62 25.0	29 54	65.7	62 33.4	27 53	64.7	62 41.3	26 53	63.6	62 48.7	24 52	62.6	63 08.1	19 51	59.3	63 13.6	17 50	58.2	9
50	61 24.4	34 55	68.4	61 34.3	32 54	67.4	61 52.9	30 53	65.4	62 01.6	28 53	64.3	62 09.7	27 52	63.3	62 17.5	25 52	62.3	62 37.8	20 50	59.1	62 43.6	19 50	58.0	50
1	60 51.6	35 54	67.9	61 01.8	33 54	67.0	61 20.9	30 53	65.0	61 29.8	29 53	64.0	61 38.3	27 52	63.0	61 46.3	26 52	62.0	62 07.6	21 50	58.9	62 13.7	20 50	57.8	1
2	60 19.0	35 54	67.5	60 29.4	34 54	66.6	60 49.0	31 53	64.6	60 58.2	30 53	63.7	61 06.9	28 52	62.7	61 15.2	27 52	61.7	61 37.4	22 50	58.6	61 43.9	21 50	57.6	2
3	59 46.5	36 54	67.1	59 57.1	35 54	66.2	60 17.2	32 53	64.3	60 26.6	31 52	63.3	60 35.6	29 52	62.4	60 44.2	28 52	61.4	61 07.3	23 50	58.4	61 14.2	22 49	57.4	3
4	59 14.0	37 54	66.7	59 24.9	36 54	65.8	59 45.5	33 53	63.9	59 55.1	32 52	63.0	60 04.4	30 52	62.0	60 13.3	29 51	61.1	60 37.3	25 50	58.1	60 44.5	23 49	57.2	4
55	58 41.7	38 54	66.3	58 52.8	36 53	65.4	59 13.8	34 53	63.6	59 23.8	32 52	62.6	59 33.3	31 52	61.7	59 42.5	30 51	60.8	60 07.4	26 50	57.9	60 14.9	24 49	56.9	55
6	58 09.5	38 54	65.9	58 20.8	37 53	65.0	58 42.3	35 52	63.2	58 52.5	33 52	62.3	59 02.3	32 52	61.4	59 11.7	31 51	60.4	59 37.6	27 50	57.6	59 45.4	25 49	56.7	6
7	57 37.3	39 53	65.4	57 48.9	38 53	64.6	58 10.9	35 52	62.8	58 21.3	34 52	61.9	58 31.4	33 51	61.0	58 41.1	32 51	60.1	59 07.9	28 49	57.3	59 16.0	26 49	56.4	7
8	57 05.3	40 53	65.0	57 17.1	39 53	64.2	57 39.6	36 52	62.4	57 50.3	35 52	61.6	58 00.6	34 51	60.7	58 10.6	33 51	59.8	58 38.2	29 49	57.1	58 46.6	27 49	56.1	8
9	56 33.4	41 53	64.6	56 45.4	39 53	63.7	57 08.4	37 52	62.1	57 19.3	36 51	61.2	57 29.9	35 51	60.3	57 40.2	34 51	59.4	58 08.7	30 49	56.8	58 17.4	28 49	55.9	9
60	56 01.6	41 53	64.2	56 13.8	40 52	63.3	56 37.3	38 52	61.7	56 48.5	37 51	60.8	56 59.3	36 51	60.0	57 09.8	34 50	59.1	57 39.2	31 49	56.5	57 48.3	30 48	55.6	60
1	55 29.9	42 53	63.7	55 42.4	41 52	62.9	56 06.3	39 51	61.3	56 17.7	38 51	60.5	56 28.8	37 51	59.6	56 39.6	35 50	58.8	57 09.9	32 49	56.2	57 19.2	31 48	55.3	1
2	54 58.4	43 52	63.3	55 11.0	42 52	62.5	55 35.4	40 51	60.9	55 47.1	38 51	60.1	55 58.5	37 50	59.3	56 09.5	36 50	58.4	56 40.6	33 49	55.9	56 50.3	32 48	55.0	2
3	54 26.9	43 52	62.9	54 39.8	42 52	62.1	55 04.6	40 51	60.5	55 16.6	39 51	59.7	55 28.2	38 50	58.9	55 39.5	37 50	58.1	56 11.5	34 48	55.6	56 21.4	33 48	54.7	3
4	53 55.6	44 52	62.4	54 08.7	43 52	61.7	54 34.0	41 51	60.1	54 46.2	40 50	59.3	54 58.1	39 50	58.5	55 09.7	38 50	57.7	55 42.4	35 48	55.2	55 52.7	34 48	54.4	4
65	53 24.4	45 52	62.0	53 37.7	44 51	61.2	54 03.5	42 51	59.7	54 15.9	41 50	58.9	54 28.1	40 50	58.1	54 39.9	39 49	57.3	55 13.5	36 48	54.9	55 24.1	35 48	54.1	65
6	52 53.3	46 52	61.5	53 06.9	45 51	60.8	53 33.1	43 50	59.3	53 45.8	42 50	58.5	53 58.2	41 50	57.8	54 10.3	40 49	57.0	54 44.7	37 48	54.6	54 55.6	36 47	53.8	6
7	52 22.4	46 51	61.1	52 36.1	45 51	60.4	53 02.8	44 50	58.9	53 15.8	43 50	58.1	53 28.4	42 49	57.4	53 40.8	41 49	56.6	54 16.0	38 48	54.3	54 27.2	37 47	53.5	7
8	51 51.6	47 51	60.7	52 05.5	46 51	59.9	52 32.7	44 50	58.5	52 45.9	43 50	57.8	52 58.8	43 49	57.0	53 11.4	42 49	56.2	53 47.5	39 47	53.9	53 58.9	38 47	53.2	8
9	51 20.9	48 51	60.2	51 35.1	47 51	59.5	52 02.7	45 50	58.1	52 16.1	44 49	57.4	52 29.3	43 49	56.6	52 42.1	42 49	55.9	53 19.0	40 47	53.6	53 30.7	39 47	52.8	9
70	50 50.3	48 51	59.8	51 04.8	48 50	59.1	51 32.8	46 50	57.7	51 46.5	45 49	57.0	51 59.9	44 49	56.2	52 13.0	43 48	55.5	52 50.7	40 47	53.3	53 02.7	39 47	52.5	70
1	50 19.9	49 50	59.3	50 34.6	48 50	58.6	51 03.1	47 49	57.3	51 17.0	46 49	56.5	51 30.6	45 49	55.8	51 44.0	44 48	55.1	52 22.5	41 47	52.9	52 34.8	40 46	52.2	1
2	49 49.7	50 50	58.9	50 04.5	49 50	58.2	50 33.5	48 49	56.8	50 47.6	47 49	56.1	51 01.5	46 48	55.4	51 15.1	45 48	54.7	51 54.4	42 47	52.6	52 07.0	41 46	51.8	2
3	49 19.5	51 50	58.4	49 34.6	50 50	57.8	50 04.1	48 49	56.4	50 18.4	47 48	55.7	50 32.5	47 48	55.0	50 46.4	46 48	54.3	51 26.5	43 46	52.2	51 39.3	42 46	51.5	3
4	48 49.6	51 50	58.0	49 04.9	51 49	57.3	49 34.8	49 49	56.0	49 49.4	48 48	55.3	50 03.7	47 48	54.6	50 17.8	47 47	54.0	50 58.7	44 46	51.8	51 11.8	43 46	51.1	4
75	48 19.7	52 49	57.5	48 35.2	51 49	56.9	49 05.6	50 48	55.6	49 20.4	49 48	54.9	49 35.0	48 48	54.2	49 49.4	47 47	53.6	50 31.0	45 46	51.5	50 44.4	44 45	50.8	75
6	47 50.1	53 49	57.1	48 05.8	52 49	56.4	48 36.6	51 48	55.1	48 51.6	50 48	54.5	49 06.5	49 47	53.8	49 21.1	48 47	53.2	50 03.5	46 46	51.1	50 17.2	45 45	50.4	6
7	47 20.5	53 49	56.6	47 36.5	53 49	56.0	48 07.7	51 48	54.7	48 23.0	51 47	54.1	48 38.1	50 47	53.4	48 52.9	49 47	52.8	49 36.1	47 45	50.7	49 50.1	46 45	50.1	7
8	46 51.2	54 49	56.2	47 07.3	53 48	55.5	47 39.0	52 48	54.3	47 54.5	51 47	53.6	48 09.8	51 47	53.0	48 24.9	50 46	52.4	49 08.9	48 45	50.4	49 23.1	47 45	49.7	8
9	46 22.0	55 48	55.7	46 38.3	54 48	55.1	47 10.4	53 47	53.9	47 26.2	52 47	53.2	47 41.8	51 47	52.6	47 57.1	51 46	52.0	48 41.8	49 45	50.0	48 56.3	48 44	49.3	9
80	45 52.9	56 48	55.2	46 09.5	55 48	54.6	46 42.0	54 47	53.4	46 58.0	53 47	52.8	47 13.8	52 46	52.2	47 29.4	52 46	51.5	48 14.9	49 45	49.6	48 29.6	49 44	49.0	80
1	45 24.0	56 48	54.8	45 40.8	56 48	54.2	46 13.8	54 47	53.0	46 30.0	54 46	52.4	46 46.0	53 46	51.8	47 01.9	52 46	51.1	47 48.1	50 44	49.2	48 03.1	50 44	48.6	1
2	44 55.3	57 48	54.3	45 12.3	56 47	53.7	45 45.7	55 47	52.5	46 02.2	54 46	51.9	46 18.4	54 46	51.3	46 34.5	53 45	50.7	47 21.5	51 44	48.8	47 36.7	50 44	48.2	2
3	44 26.7	58 47	53.8	44 43.9	57 47	53.3	45 17.8	56 46	52.1	45 34.5	55 46	51.5	45 51.0	55 45	50.9	46 07.3	54 45	50.3	46 55.0	52 44	48.5	47 10.5	51 43	47.8	3
4	43 58.3	58 47	53.4	44 15.8	58 47	52.8	44 50.1	57 46	51.6	45 07.0	56 46	51.1	45 23.7	55 45	50.5	45 40.2	55 45	49.9	46 28.7	53 44	48.1	46 44.4	52 43	47.4	4
85	43 30.1	59 47	52.9	43 47.8	58 46	52.3	44 22.5	57 46	51.2	44 39.6	57 45	50.6	44 56.6	56 45	50.0	45 13.3	56 45	49.5	46 02.5	54 43	47.7	46 18.5	53 43	47.1	85
6	43 02.1	60 46	52.4	43 19.9	59 46	51.9	43 55.1	58 45	50.8	44 12.4	58 45	50.2	44 29.6	57 45	49.6	44 46.6	56 44	49.0	45 36.5	55 43	47.3	45 52.8	54 43	46.7	6
7	42 34.2	60 46	51.9	42 52.3	60 46	51.4	43 27.9	59 45	50.3	43 45.4	58 45	49.7	44 02.8	58 44	49.2	44 20.1	57 44	48.6	45 10.7	55 43	46.9	45 27.2	55 42	46.3	7
8	42 06.6	61 46	51.5	42 24.8	61 46	50.9	43 00.8	60 45	49.8	43 18.6	59 44	49.3	43 36.2	58 44	48.7	43 53.7	58 44	48.2	44 45.1	56 42	46.5	45 01.8	56 42	45.9	8
9	41 39.1	62 46	51.0	41 57.5	61 45	50.5	42 34.0	60 44	49.4	42 52.0	60 44	48.8	43 09.8	59 44	48.3	43 27.5	59 43	47.7	44 19.6	57 42	46.0	44 36.6	56 42	45.5	9
90	41 11.7	62 45	50.5	41 30.4	62 45	50.0	42 07.3	61 44	48.9	42 25.5	60 44	48.4	42 43.6	60 43	47.9	43 01.5	59 43	47.3	43 54.3	58 42	45.6	44 11.6	57 41	45.1	90

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	40 44.6	63 45	50.0	41 03.5	63 45	49.5	41 40.8	62 44	48.5	41 59.2	61 43	47.9	42 17.5	61 43	47.4	42 35.7	60 43	46.9	43 29.2	59 42	45.2	43 46.7	58 41	44.7	91
2	40 17.7	64 45	49.5	40 36.8	63 44	49.0	41 14.5	62 44	48.0	41 33.1	62 43	47.5	41 51.7	61 43	47.0	42 10.0	61 42	46.4	43 04.2	59 41	44.8	43 22.0	59 41	44.2	2
3	39 51.0	64 44	49.1	40 10.2	64 44	48.6	40 48.4	63 43	47.5	41 07.2	63 43	47.0	41 26.0	62 42	46.5	41 44.6	62 42	46.0	42 39.5	60 41	44.4	42 57.5	60 41	43.8	3
4	39 24.4	65 44	48.6	39 43.9	65 44	48.1	40 22.5	64 43	47.1	40 41.5	63 42	46.6	41 00.5	63 42	46.1	41 19.3	62 42	45.5	42 14.9	61 41	44.0	42 33.1	61 40	43.4	4
95	38 58.1	66 44	48.1	39 17.7	65 43	47.6	39 56.7	65 43	46.6	40 16.0	64 42	46.1	40 35.2	64 42	45.6	40 54.2	63 41	45.1	41 50.5	62 40	43.5	42 09.0	61 40	43.0	95
6	38 31.9	66 43	47.6	38 51.8	66 43	47.1	39 31.2	65 42	46.1	39 50.7	65 42	45.6	40 10.1	64 42	45.1	40 29.4	64 41	44.6	41 26.3	63 40	43.1	41 45.0	62 40	42.6	6
7	38 06.0	67 43	47.1	38 26.1	67 43	46.6	39 05.9	66 42	45.7	39 25.6	66 42	45.2	39 45.2	65 41	44.7	40 04.7	65 41	44.2	41 02.3	63 40	42.7	41 21.3	63 39	42.2	7
8	37 40.3	68 43	46.6	38 00.5	67 42	46.1	38 40.8	67 42	45.2	39 00.7	66 41	44.7	39 20.5	66 41	44.2	39 40.2	65 40	43.7	40 38.5	64 39	42.2	40 57.7	64 39	41.7	8
9	37 14.8	68 42	46.1	37 35.2	68 42	45.6	38 15.8	67 41	44.7	38 36.0	67 41	44.2	38 56.0	67 40	43.8	39 15.9	66 40	43.3	40 14.9	65 39	41.8	40 34.3	64 39	41.3	9
100	36 49.5	69 42	45.6	37 10.1	69 41	45.1	37 51.1	68 41	44.2	38 11.5	68 40	43.8	38 31.7	67 40	43.3	38 51.9	67 40	42.8	39 51.5	66 39	41.4	40 11.2	65 38	40.9	100
1	36 24.4	70 41	45.1	36 45.2	69 41	44.6	37 26.7	69 40	43.7	37 47.2	68 40	43.3	38 07.7	68 40	42.8	38 28.0	68 39	42.3	39 28.3	66 38	40.9	39 48.2	66 38	40.4	1
2	35 59.5	70 41	44.6	36 20.6	70 41	44.1	37 02.4	69 40	43.3	37 23.1	69 40	42.8	37 43.8	69 39	42.3	38 04.3	68 39	41.9	39 05.3	67 38	40.5	39 25.4	67 38	40.0	2
3	35 34.9	71 41	44.1	35 56.1	71 40	43.6	36 38.3	70 40	42.8	36 59.3	70 39	42.3	37 20.1	69 39	41.9	37 40.9	69 39	41.4	38 42.5	68 38	40.0	39 02.8	68 37	39.6	3
4	35 10.4	72 40	43.6	35 31.9	71 40	43.1	36 14.5	71 39	42.3	36 35.7	70 39	41.8	36 56.7	70 39	41.4	37 17.7	70 38	40.9	38 20.0	69 37	39.6	38 40.5	68 37	39.1	4
105	34 46.2	72 40	43.1	35 07.9	72 40	42.6	35 50.9	71 39	41.8	36 12.2	71 39	41.4	36 33.5	71 38	40.9	36 54.7	70 38	40.5	37 57.6	69 37	39.1	38 18.4	69 37	38.7	105
6	34 22.3	73 40	42.6	34 44.1	73 39	42.1	35 27.5	72 39	41.3	35 49.0	72 38	40.9	36 10.5	71 38	40.4	36 31.9	71 38	40.0	37 35.5	70 37	38.7	37 56.4	70 36	38.2	6
7	33 58.5	74 39	42.0	34 20.5	73 39	41.6	35 04.3	73 38	40.8	35 26.1	72 38	40.4	35 47.8	72 38	40.0	36 09.3	72 37	39.5	37 13.5	71 36	38.2	37 34.7	70 36	37.8	7
8	33 35.0	74 39	41.5	33 57.2	74 38	41.1	34 41.4	73 38	40.3	35 03.4	73 37	39.9	35 25.2	73 37	39.5	35 47.0	72 37	39.0	36 51.8	72 36	37.8	37 13.2	71 35	37.3	8
9	33 11.8	75 38	41.0	33 34.2	75 38	40.6	34 18.7	74 37	39.8	34 40.9	74 37	39.4	35 02.9	73 37	39.0	35 24.9	73 36	38.6	36 30.3	72 35	37.3	36 52.0	72 35	36.9	9
110	32 48.8	75 38	40.5	33 11.3	75 38	40.1	33 56.2	75 37	39.3	34 18.6	74 37	38.9	34 40.9	74 36	38.5	35 03.0	74 36	38.1	36 09.1	73 35	36.8	36 30.9	73 35	36.4	110
1	32 26.0	76 38	40.0	32 48.7	76 37	39.6	33 34.0	75 37	38.8	33 56.6	75 36	38.4	34 19.0	75 36	38.0	34 41.4	74 36	37.6	35 48.1	74 35	36.4	36 10.1	73 34	35.9	1
2	32 03.4	77 37	39.4	32 26.4	76 37	39.1	33 12.1	76 36	38.3	33 34.8	76 36	37.9	33 57.4	75 36	37.5	34 20.0	75 35	37.1	35 27.3	74 34	35.9	35 49.5	74 34	35.5	2
3	31 41.2	77 37	38.9	32 04.3	77 36	38.5	32 50.3	77 36	37.8	33 13.2	76 36	37.4	33 36.1	76 35	37.0	33 58.9	76 35	36.6	35 06.7	75 34	35.4	35 29.2	75 34	35.0	3
4	31 19.1	78 36	38.4	31 42.4	78 36	38.0	32 28.8	77 35	37.3	32 52.0	77 35	36.9	33 15.0	77 35	36.5	33 37.9	76 34	36.1	34 46.4	76 33	34.9	35 09.1	75 33	34.5	4
115	30 57.4	78 36	37.9	31 20.8	78 36	37.5	32 07.6	78 35	36.8	32 30.9	78 35	36.4	32 54.1	77 34	36.0	33 17.3	77 34	35.6	34 26.3	76 33	34.5	34 49.2	76 33	34.1	115
6	30 35.9	79 35	37.3	30 59.5	79 35	37.0	31 46.6	78 35	36.2	32 10.1	78 34	35.9	32 33.5	78 34	35.5	32 56.9	78 34	35.1	34 06.5	77 33	34.0	34 29.5	77 32	33.6	6
7	30 14.6	80 35	36.8	30 38.4	79 35	36.4	31 25.9	79 34	35.7	31 49.6	79 34	35.4	32 13.2	79 34	35.0	32 36.7	78 33	34.6	33 46.9	78 32	33.5	34 10.1	77 32	33.1	7
8	29 53.6	80 35	36.3	30 17.6	80 34	35.9	31 05.5	80 34	35.2	31 29.3	79 33	34.9	31 53.1	79 33	34.5	32 16.8	79 33	34.1	33 27.5	78 32	33.0	33 51.0	78 32	32.7	8
9	29 32.9	81 34	35.7	29 57.1	80 34	35.4	30 45.3	80 33	34.7	31 09.3	80 33	34.3	31 33.2	80 33	34.0	31 57.1	80 32	33.6	33 08.4	79 31	32.5	33 32.1	79 31	32.2	9
120	29 12.4	81 34	35.2	29 36.8	81 33	34.8	30 25.3	81 33	34.2	30 49.5	81 32	33.8	31 13.6	80 32	33.5	31 37.7	80 32	33.1	32 49.6	80 31	32.1	33 13.4	79 31	31.7	120
1	28 52.2	82 33	34.6	29 16.8	82 33	34.3	30 05.6	81 32	33.6	30 30.0	81 32	33.3	30 54.3	81 32	33.0	31 18.6	81 31	32.6	32 31.0	80 31	31.6	32 55.0	80 30	31.2	1
2	28 32.3	82 33	34.1	28 57.0	82 32	33.8	29 46.2	82 32	33.1	30 10.8	82 32	32.8	30 35.3	82 31	32.4	30 59.7	81 31	32.1	32 12.7	81 30	31.1	32 36.9	81 30	30.7	2
3	28 12.7	83 32	33.6	28 37.6	83 32	33.2	29 27.1	82 31	32.6	29 51.8	82 31	32.3	30 16.5	82 31	31.9	30 41.1	82 31	31.6	31 54.6	81 30	30.6	32 19.0	81 29	30.2	3
4	27 53.4	83 32	33.0	28 18.4	83 32	32.7	29 08.2	83 31	32.1	29 33.1	83 31	31.7	29 58.0	83 30	31.4	30 22.7	83 30	31.1	31 36.8	82 29	30.1	32 01.3	82 29	29.8	4
125	27 34.3	84 31	32.5	27 59.5	84 31	32.1	28 49.7	84 30	31.5	29 14.7	83 30	31.2	29 39.7	83 30	30.9	30 04.7	83 30	30.6	31 19.2	83 29	29.6	31 44.0	82 29	29.3	125
6	27 15.5	84 31	31.9	27 40.8	84 31	31.6	28 31.4	84 30	31.0	28 56.6	84 30	30.7	29 21.7	84 29	30.4	29 46.9	84 29	30.1	31 01.9	83 28	29.1	31 26.9	83 28	28.8	6
7	26 57.0	85 30	31.4	27 22.5	85 30	31.1	28 13.4	85 30	30.5	28 38.7	84 29	30.2	29 04.0	84 29	29.8	29 29.3	84 29	29.5	30 44.9	84 28	28.6	31 10.0	84 28	28.3	7
8	26 38.8	86 30	30.8	27 04.5	85 30	30.5	27 55.6	85 29	29.9	28 21.1	85 29	29.6	28 46.6	85 29	29.3	29 12.1	85 28	29.0	30 28.2	84 27	28.1	30 53.5	84 27	27.8	8
9	26 20.9	86 29	30.2	26 46.7	86 29	30.0	27 38.2	86 29	29.4	28 03.9	86 28	29.1	28 29.5	85 28	28.8	28 55.1	85 28	28.5	30 11.7	85 27	27.6	30 37.2	85 27	27.3	9
130	26 03.3	87 29	29.7	26 29.2	86 29	29.4	27 21.0	86 28	28.8	27 46.9	86 28	28.5	28 12.7	86 28	28.3	28 38.4	86 27	28.0	29 55.5	85 27	27.1	30 21.1	85 26	26.8	130
1	25 46.0	87 28	29.1	26 12.1	87 28	28.8	27 04.2	87 28	28.3	27 30.2	87 27	28.0	27 56.1	86 27	27.7	28 22.0	86 27	27.4	29 39.6	86 26	26.6	30 05.4	86 26	26.3	1
2	25 29.0	88 28	28.6	25 55.2	87 28	28.3	26 47.6	87 27	27.7	27 13.7	87 27	27.5	27 39.9	87 27	27.2	28 05.9	87 26	26.9	29 24.0	87 26	26.1	29 49.9	86 25	25.8	2
3	25 12.3	88 27	28.0	25 38.6	88 27	27.7	26 31.3	88 27	27.2	26 57.6	88 26	26.9	27 23.9	87 26	26.7	27 50.1	87 26	26.4	29 08.6	87 25	25.5	29 34.7	87 25	25.3	3
4	24 55.9	88 27	27.4	25 22.4	88 27	27.2	26 15.4	88 26	26.6	26 41.8	88 26	26.4	27 08.2	88 26	26.1	27 34.6	88 25	25.9	28 53.5	88 25	25.0	29 19.8	87 24	24.8	4
135	24 39.8	89 26	26.9	25 06.4	89 26	26.6	25 59.7	89 26	26.1	26 26.3	89 25	25.8	26 52.8	88 25	25.6	27 19.4	88 25	25.3	28 38.8	88 24	24.5	29 05.2	88 24	24.2	135
6	24 24.0	89 26	26.3	24 50.8	89 26	26.0	25 44.3	89 25	25.5	26 11.1	89 25	25.3	26 37.8	89 25	25.0	27 04.4	89 24	24.8	28 24.3	89 24	24.0	28 50.8	88 23	23.7	6
7	24 08.5	90 25	25.7	24 35.5	90 25	25.5	25 29.3	90 25	25.0	25 56.1	90 24	24.7	26 23.0	89 24	24.5	26 49.8	89 24	24.2	28 10.1	89 23	23.5	28 36.8	89 23	23.2	7
8	23 53.4	90 25	25.1	24 20.5	90 24	24.9	25 14.5	90 24	24.4	25 41.5	90 24	24.2	26 08.5	90 24	24.0	26 35.5	90 23	23.7	27 56.2	90 23	23.0	28 23.0	89 22	22.7	8
9	23 38.6	91 24	24.6	24 05.8	91 24	24.3	25 00.1	90 24	23.9	25 27.2	90 23	23.6	25 54.3	90 23	23.4	26 21.4	90 23	23.2	27 42.6	90 22	22.4	28 09.6	90 22	22.2	9
140	23 24.0	91 24	24.0	23 51.4	91 23	23.8	24 46.0	91 23	23.3	25 13.2	91 23	23.1	25 40.5	91 23	22.9	26 07.7	91 22	22.6	27 29.3	90 22	21.9	27 56.4	90 21	21.7	140
1	23 09.9	92 23	23.4	23 37.3	91 23	23.2	24 32.2	91 22	22.8	24 59.6	91 22	22.5	25 27.0	91 22	22.3	25 54.3	91 22	22.1	27 16.2	91 21	21.4	27 43.5	91 21	21.2	1
2	22 56.0	92 23	22.8	23 23.6	92 22	22.6	24 18.7	92 22	22.2	24 46.2	92 22	22.0	25 13.7	92 22	21.8	25 41.2	92 21	21.5	27 03.5	91 21	20.9	27 30.9	91 20	20.6	2
3	22 42.5	92 22	22.3	23 10.2	92 22	22.1	24 05.5	92 21	21.6	24 33.2	92 21	21.4	25 00.8	92 21	21.2	25 28.4	92 21	21.0	26 51.1	92 20	20.3	27 18.7	92 20	20.1	3
4	22 29.3	93 21	21.7	22 57.1	93 21	21.5	23 52.7	93 21	21.1	24 20.5	93 21	20.9	24 48.2	92 20	20.7	25 15.9	92 20	20.4	26 39.0	92 20	19.8	27 06.7	92 19	19.6	4
145	22 16.4	93 21	21.1	22 44.4	93 21	20.9	23 40.2	93 20	20.5	24 08.1	93 20	20.3	24 35.9	93 20	20.1	25 03.8	93 20	19.9	26 27.2	93 19	19.3	26 55.0	93 19	19.1	145
6	22 03.9	93 20	20.5	22 31.9	93 20	20.3	23 28.0	93 20	19.9	23 56.0	93 20	19.7	24 24.0	93 19	19.5	24 51.9	93 19	19.3	26 15.8	93 19	18.7	26 43.7	93 18	18.5	6
7	21 51.7	94 20	19.9	22 19.9	94 20	19.7	23 16.1	94 19	19.4	23 44.2	94 19	19.2	24 12.3	94 19	19.0	24 40.4	94 19	18.8	26 04.6	93 18	18.2	26 32.6	93 18	18.0	7
8	21 39.9	94 19	19.3	22 08.1	94 19	19.2	23 04.6	94 19	18.8	23 32.8	94 18	18.6	24 01.0	94 18	18.4	24 29.2	94 18	18.2	25 53.7	94 18	17.7	26 21.9	94 17	17.5	8
9	21 28.4	95 19	18.7	21 56.7	95 18	18.6	22 53.4	94 18	18.2	23 21.7	94 18	18.0	23 50.1	94 18	17.9	24 18.4	94 18	17.7	25 43.2	94 17	17.1	26 11.4	94 17	16.9	9
150	21 17.2	95 18	18.2	21 45.7	95 18	18.0	22 42.6	95 18	17.6	23 11.0	95 17	17.5	23 39.4	95 17	17.3	24 07.8	95 17	17.1	25 33.0	95 17	16.6	26 01.3	95 16	16.4	150
1	21 06.4	95 17	17.6	21 34.9	95 17	17.4	22 32.0	95 17	17.1	23 00.6	95 17	16.9	23 29.1	95 17	16.7	23 57.6	95 16	16.6	25 23.1	95 16	16.0	25 51.5	95 16	15.9	1
2	20 55.9	96 17	17.0	21 24.6	96 17	16.8	22 21.9	95 16	16.5	22 50.5	95 16	16.3	23 19.1	95 16	16.2	23 47.7	95 16	16.0	25 13.5	95 15	15.5	25 42.0	95 15	15.3	2
3	20 45.8	96 16	16.4	21 14.5	96 16	16.2	22 12.0	96 16	15.9	22 40.7	96 16	15.8	23 09.5	96 16	15.6	23 38.2	96 15	15.4	25 04.2	96 15	15.0	25 32.9	96 15	14.8	3
4	20 36.0	96 16	15.8	21 04.9	96 16	15.6	22 02.5	96 15	15.3	22 31.3	96 15	15.2	23 00.1	96 15	15.0	23 28.9	96 15	14.9	24 55.3	96 14	14.4	25 24.0	96 14	14.3	4
155	20 26.6	96 15	15.2	20 55.5	96 15	15.0	21 53.4	96 15	14.8	22 22.3	96 15	14.6	22 51.2	96 14	14.5	23 20.0	96 14	14.3	24 46.6	96 14	13.9	25 15.5	96 14	13.7	155
6	20 17.6	97 14	14.6	20 46.6	97 14	14.4	21 44.6	97 14	14.2	22 13.5	97 14	14.0	22 42.5	97 14	13.9	23 11.5	97 14	13.8	24 38.4	96 13	13.3	25 07.3	96 13	13.2	6
7	20 08.9	97 14	14.0	20 37.9	97 14	13.9	21 36.1	97 14	13.6	22 05.2	97 13	13.5	22 34.2	97 13	13.3	23 03.3	97 13	13.2	24 30.4	97 13	12.8	24 59.4	97 13	12.6	7
8	20 00.5	97 13	13.4	20 29.7	97 13	13.3	21 28.0	97 13	13.0	21 57.1	97 13	12.9	22 26.3	97 13	12.8	22 55.4	97 13	12.6	24 22.8	97 12	12.2	24 51.9	97 12	12.1	8
9	19 52.5	97 13	12.8	20 21.8	97 13	12.7	21 20.2	97 12	12.4	21 49.4	97 12	12.3	22 18.6	97 12	12.2	22 47.9	97 12	12.1	24 15.5	97 12	11.7	24 44.6	97 12	11.6	9
160	19 44.9	98 12	12.2	20 14.2	98 12	12.1	21 12.8	98 12	11.8	21 42.1	98 12	11.7	22 11.4	98 12	11.6	22 40.7	98 11	11.5	24 08.5	98 11	11.1	24 37.7	98 11	11.0	160
1	19 37.6	98 11	11.6	20 07.0	98 11	11.5	21 05.7	98 11	11.3	21 35.1	98 11	11.1	22 04.5	98 11	11.0	22 33.8	98 11	10.9	24 01.8	98 10	10.6	24 31.2	98 10	10.5	1
2	19 30.7	98 11	11.0	20 00.2	98 11	10.9	20 59.0	98 11	10.7	21 28.5	98 10	10.6	21 57.9	98 10	10.5	22 27.3	98 10	10.3	23 55.5	98 10	10.0	24 24.9	98 10	09.9	2
3	19 24.2	98 10	10.4	19 53.7	98 10	10.3	20 52.7	98 10	10.1	21 22.2	98 10	10.0	21 51.7	98 10	09.9	22 21.1	98 10	09.8	23 49.6	98 09	09.5	24 19.0	98 09	09.4	3
4	19 18.0	99 10	09.8	19 47.6	99 10	09.7	20 46.7	98 09	09.5	21 16.2	98 09	09.4	21 45.8	98 09	09.3	22 15.3	98 09	09.2	23 43.9	98 09	08.9	24 13.4	98 09	08.8	4
165	19 12.2	99 09	09.2	19 41.9	99 09	09.1	20 41.1	99 09	08.9	21 10.7	99 09	08.8	21 40.3	99 09	08.7	22 09.9	99 09	08.6	23 38.6	99 08	08.4	24 08.2	99 08	08.3	165
6	19 06.8	99 08	08.6	19 36.5	99 08	08.5	20 35.8	99 08	08.3	21 05.4	99 08	08.2	21 35.1	99 08	08.1	22 04.7	99 08	08.1	23 33.7	99 08	07.8	24 03.3	99 08	07.7	6
7	19 01.8	99 08	07.9	19 31.5	99 08	07.9	20 30.9	99 08	07.7	21 00.6	99 08	07.6	21 30.3	99 07	07.6	22 00.0	99 07	07.5	23 29.0	99 07	07.3	23 58.7	99 07	07.2	7
8	18 57.1	99 07	07.3	19 26.8	99 07	07.3	20 26.3	99 07	07.1	20 56.1	99 07	07.1	21 25.8	99 07	07.0	21 55.5	99 07	06.9	23 24.7	99 07	06.7	23 54.5	99 07	06.6	8
9	18 52.8	99 07	06.7	19 22.5	99 07	06.7	20 22.1	99 06	06.5	20 51.9	99 06	06.5	21 21.7	99 06	06.4	21 51.5	99 06	06.3	23 20.8	99 06	06.1	23 50.6	99 06	06.1	9
170	18 48.8	99 06	06.1	19 18.6	99 06	06.1	20 18.3	99 06	05.9	20 48.1	99 06	05.9	21 17.9	99 06	05.8	21 47.7	99 06	05.8	23 17.2	99 05	05.6	23 47.0	99 05	05.5	170
1	18 45.2	1.0 05	05.5	19 15.1	1.0 05	05.5	20 14.8	1.0 05	05.4	20 44.7	1.0 05	05.3	21 14.5	1.0 05	05.2	21 44.4	1.0 05	05.2	23 13.9	99 05	05.0	23 43.8	99 05	05.0	1
2	18 42.0	1.0 05	04.9	19 11.9	1.0 05	04.8	20 11.7	1.0 05	04.8	20 41.6	1.0 05	04.7	21 11.5	1.0 04	04.7	21 41.4	1.0 04	04.6	23 11.0	1.0 04	04.5	23 40.9	1.0 04	04.4	2
3	18 39.2	1.0 04	04.3	19 09.1	1.0 04	04.2	20 09.0	1.0 04	04.2	20 38.9	1.0 04	04.1	21 08.8	1.0 04	04.1	21 38.7	1.0 04	04.0	23 08.4	1.0 04	03.9	23 38.3	1.0 04	03.9	3
4	18 36.8	1.0 03	03.7	19 06.7	1.0 03	03.6	20 06.6	1.0 03	03.6	20 36.5	1.0 03	03.5	21 06.5	1.0 03	03.5	21 36.4	1.0 03	03.5	23 06.2	1.0 03	03.4	23 36.1	1.0 03	03.3	4
175	18 34.7	1.0 03	03.1	19 04.7	1.0 03	03.0	20 04.6	1.0 03	03.0	20 34.5	1.0 03	02.9	21 04.5	1.0 03	02.9	21 34.4	1.0 03	02.9	23 04.3	1.0 03	02.8	23 34.3	1.0 03	02.8	175
6	18 33.0	1.0 02	02.4	19 03.0	1.0 02	02.4	20 02.9	1.0 02	02.4	20 32.9	1.0 02	02.4	21 02.9	1.0 02	02.3	21 32.8	1.0 02	02.3	23 02.8	1.0 02	02.2	23 32.7	1.0 02	02.2	6
7	18 31.7	1.0 02	01.8	19 01.7	1.0 02	01.8	20 01.6	1.0 02	01.8	20 31.6	1.0 02	01.8	21 01.6	1.0 02	01.8	21 31.6	1.0 01	01.7	23 01.6	1.0 01	01.7	23 31.5	1.0 01	01.7	7
8	18 30.8	1.0 01	01.2	19 00.7	1.0 01	01.2	20 00.7	1.0 01	01.2	20 30.7	1.0 01	01.2	21 00.7	1.0 01	01.2	21 30.7	1.0 01	01.2	23 00.7	1.0 01	01.1	23 30.7	1.0 01	01.1	8
9	18 30.2	1.0 00	00.6	19 00.2	1.0 00	00.6	20 00.2	1.0 00	00.6	20 30.2	1.0 00	00.6	21 00.2	1.0 00	00.6	21 30.2	1.0 00	00.6	23 00.2	1.0 00	00.6	23 30.2	1.0 00	00.6	9
180	18 30.0	1.0 00	00.0	19 00.0	1.0 00	00.0	20 00.0	1.0 00	00.0	20 30.0	1.0 00	00.0	21 00.0	1.0 00	00.0	21 30.0	1.0 00	00.0	23 00.0	1.0 00	00.0	23 30.0	1.0 00	00.0	180

Lat. 54°

H.A.	60° 00′ Alt. ° ′	Δd Δt	Az. °	60° 30′ Alt. ° ′	Δd Δt	Az. °	62° 00′ Alt. ° ′	Δd Δt	Az. °	62° 30′ Alt. ° ′	Δd Δt	Az. °
00	84 00.0	1.0 02	00.0	83 30.0	1.0 02	00.0	82 00.0	1.0 02	00.0	81 30.0	1.0 02	00.0
1	83 58.5	1.0 07	04.8	83 28.7	1.0 07	04.3	81 59.0	1.0 05	03.4	81 29.0	1.0 05	03.1
2	83 54.2	98 12	09.5	83 24.7	98 11	08.6	81 55.9	99 09	06.7	81 26.2	99 08	06.2
3	83 47.0	96 16	14.0	83 18.1	96 15	12.8	81 50.7	98 12	10.0	81 21.4	98 11	09.3
4	83 37.2	93 20	18.3	83 09.1	94 19	16.7	81 43.7	96 15	13.2	81 14.8	96 14	12.2
05	83 24.9	89 24	22.3	82 57.9	91 22	20.5	81 34.7	94 18	16.2	81 06.5	94 17	15.1
6	83 10.4	86 27	26.1	82 44.5	87 26	24.0	81 24.0	91 21	19.2	80 56.5	92 19	17.9
7	82 54.0	81 30	29.5	82 29.2	84 28	27.3	81 11.6	88 23	21.9	80 44.9	90 22	20.5
8	82 35.8	77 33	32.7	82 12.2	80 31	30.3	80 57.7	85 26	24.6	80 31.9	87 24	23.0
9	82 16.0	73 35	35.5	81 53.6	76 33	33.1	80 42.3	82 28	27.0	80 17.4	84 26	25.4
10	81 54.8	69 37	38.1	81 33.7	72 35	35.6	80 25.6	79 30	29.4	80 01.7	81 28	27.6
1	81 32.5	65 39	40.4	81 12.6	68 37	37.9	80 07.8	76 32	31.5	79 44.8	78 30	29.7
2	81 09.1	61 40	42.5	80 50.4	64 39	40.0	79 48.8	72 33	33.5	79 26.8	74 32	31.6
3	80 44.8	57 42	44.4	80 27.3	60 40	41.9	79 28.9	69 35	35.3	79 07.8	71 33	33.4
4	80 19.8	53 43	46.1	80 03.3	57 41	43.6	79 08.0	66 36	37.0	78 48.0	68 34	35.1
15	79 54.1	50 44	47.6	79 38.6	53 42	45.2	78 46.4	62 37	38.6	78 27.3	65 36	36.7
6	79 27.8	46 45	48.9	79 13.3	50 43	46.5	78 24.0	59 38	40.1	78 05.9	62 37	38.1
7	79 01.0	43 45	50.1	78 47.5	47 44	47.8	78 01.0	56 39	41.4	77 43.8	59 38	39.4
8	78 33.7	40 46	51.2	78 21.1	44 45	48.9	77 37.4	53 40	42.6	77 21.1	56 39	40.7
9	78 06.0	37 47	52.1	77 54.3	41 46	49.9	77 13.3	50 41	43.7	76 57.8	53 40	41.8
20	77 38.0	34 47	53.0	77 27.2	38 46	50.8	76 48.7	47 42	44.7	76 34.1	50 40	42.8
1	77 09.7	32 48	53.7	76 59.7	35 46	51.6	76 23.7	45 42	45.7	76 09.9	47 41	43.8
2	76 41.1	29 48	54.4	76 31.9	33 47	52.4	75 58.3	42 43	46.5	75 45.3	45 42	44.7
3	76 12.4	27 48	55.0	76 03.8	30 47	53.0	75 32.5	39 43	47.3	75 20.3	42 42	45.5
4	75 43.4	25 49	55.6	75 35.5	28 47	53.6	75 06.5	37 44	48.0	74 55.0	39 43	46.2
25	75 14.2	22 49	56.0	75 07.0	26 48	54.1	74 40.1	34 44	48.6	74 29.4	37 43	46.9
6	74 44.9	20 49	56.4	74 38.4	23 48	54.6	74 13.6	32 45	49.2	74 03.6	35 44	47.5
7	74 15.4	18 49	56.8	74 09.6	21 48	55.0	73 46.7	30 45	49.7	73 37.5	32 44	48.0
8	73 45.9	16 49	57.1	73 40.6	19 48	55.3	73 19.7	27 45	50.2	73 11.1	30 44	48.5
9	73 16.2	14 50	57.4	73 11.6	17 49	55.7	72 52.6	25 46	50.6	72 44.6	28 44	49.0
30	72 46.5	12 50	57.6	72 42.4	15 49	55.9	72 25.2	23 46	51.0	72 17.9	26 45	49.4
1	72 16.7	10 50	57.8	72 13.1	13 49	56.1	71 57.7	21 46	51.3	71 51.1	24 45	49.8
2	71 46.8	09 50	57.9	71 43.8	11 49	56.3	71 30.1	19 46	51.6	71 24.1	22 45	50.1
3	71 16.9	07 50	58.1	71 14.4	10 49	56.5	71 02.4	17 46	51.9	70 57.0	20 45	50.4
4	70 47.0	06 50	58.2	70 45.0	08 49	56.6	70 34.6	15 46	52.1	70 29.7	18 46	50.7
35	70 17.0	04 50	58.2	70 15.5	06 49	56.7	70 06.8	13 47	52.3	70 02.4	16 46	50.9
6	69 47.0	02 50	58.3	69 46.0	04 49	56.8	69 38.8	12 47	52.5	69 35.0	14 46	51.1
7	69 17.0	01 50	58.3	69 16.5	03 49	56.9	69 10.8	10 47	52.6	69 07.5	12 46	51.2
8	68 47.0	01 50	58.3	68 47.0	01 49	56.9	68 42.7	08 47	52.8	68 40.0	10 46	51.4
9	68 17.0	02 50	58.3	68 17.4	00 49	56.9	68 14.7	06 47	52.9	68 12.4	09 46	51.5
40	67 47.0	04 50	58.2	67 47.9	02 49	56.9	67 46.5	05 47	52.9	67 44.8	07 46	51.6
1	67 17.1	05 50	58.2	67 18.3	03 49	56.9	67 18.4	03 47	53.0	67 17.1	05 46	51.7
2	66 47.1	07 50	58.1	66 48.8	05 49	56.8	66 50.2	01 47	53.0	66 49.5	04 46	51.7
3	66 17.2	08 50	58.0	66 19.3	06 49	56.7	66 22.0	00 47	53.0	66 21.8	02 46	51.8
4	65 47.3	09 50	57.9	65 49.8	07 49	56.7	65 53.9	02 47	53.0	65 54.1	00 46	51.8
45	65 17.5	11 50	57.8	65 20.4	09 49	56.6	65 25.7	03 47	53.0	65 26.4	01 46	51.8
6	64 47.7	12 50	57.6	64 51.0	10 49	56.5	64 57.6	06 47	52.9	64 58.7	03 46	51.7
7	64 17.9	13 50	57.5	64 21.6	11 49	56.3	64 29.4	06 47	52.9	64 31.0	04 46	51.7
8	63 48.2	14 49	57.3	63 52.3	13 49	56.2	64 01.3	07 47	52.8	64 03.3	06 46	51.7
9	63 18.5	16 49	57.1	63 23.0	14 49	56.0	63 33.3	09 47	52.7	63 35.7	07 46	51.6
50	62 48.9	17 49	57.0	62 53.8	15 49	55.9	63 05.2	10 47	52.6	63 08.0	09 46	51.5
1	62 19.4	18 49	56.8	62 24.6	17 48	55.7	62 37.2	12 47	52.5	62 40.4	10 46	51.4
2	61 49.9	19 49	56.6	61 55.5	18 48	55.5	62 09.3	13 46	52.4	62 12.9	11 46	51.3
3	61 20.5	20 49	56.4	61 26.4	19 48	55.3	61 41.4	14 46	52.2	61 45.4	13 46	51.2
4	60 51.2	22 49	56.2	60 57.5	20 48	55.1	61 13.5	16 46	52.1	61 17.9	14 46	51.1
55	60 21.9	23 49	55.9	60 28.6	21 48	54.9	60 45.7	17 46	51.9	60 50.5	15 46	50.9
6	59 52.8	24 48	55.7	59 59.7	22 48	54.7	60 18.0	18 46	51.8	60 23.2	17 46	50.8
7	59 23.7	26 48	55.5	59 31.0	24 48	54.5	59 50.3	19 46	51.6	59 55.9	18 45	50.6
8	58 54.7	26 48	55.2	59 02.3	25 48	54.3	59 22.7	21 46	51.4	59 28.7	19 45	50.4
9	58 25.8	27 48	54.9	58 33.7	26 48	54.0	58 55.2	22 46	51.2	59 01.5	20 45	50.3
60	57 56.9	28 48	54.7	58 05.2	27 47	53.8	58 27.7	23 46	51.0	58 34.4	22 45	50.1
1	57 28.2	29 48	54.4	57 36.8	28 47	53.5	58 00.4	24 45	50.8	58 07.4	23 45	49.9
2	56 59.6	30 48	54.1	57 08.5	29 47	53.3	57 33.1	25 45	50.6	57 40.5	24 45	49.7
3	56 31.0	31 47	53.9	56 40.3	30 47	53.0	57 05.9	27 45	50.4	57 13.6	25 45	49.5
4	56 02.6	32 47	53.6	56 12.2	31 47	52.7	56 38.7	28 45	50.1	56 46.9	26 44	49.2
65	55 34.3	33 47	53.3	55 44.2	32 47	52.4	56 11.7	29 45	49.9	56 20.2	28 44	49.0
6	55 06.1	35 47	53.0	55 16.3	33 46	52.2	55 44.8	30 45	49.6	55 53.6	29 44	48.8
7	54 38.0	36 47	52.7	54 48.5	34 46	51.9	55 18.0	31 45	49.4	55 27.1	30 44	48.5
8	54 10.0	37 46	52.4	54 20.8	35 46	51.6	54 51.3	32 44	49.1	55 00.8	31 44	48.3
9	53 42.1	38 46	52.0	53 53.2	36 46	51.3	54 24.6	33 44	48.9	54 34.5	32 44	48.0
70	53 14.4	39 46	51.7	53 25.8	37 46	51.0	53 58.1	34 44	48.6	54 08.3	33 43	47.8
1	52 46.8	39 46	51.4	52 58.5	38 45	50.6	53 31.8	35 44	48.3	53 42.2	34 43	47.5
2	52 19.3	40 46	51.1	52 31.2	39 45	50.3	53 05.5	37 44	48.0	53 16.3	36 43	47.3
3	51 51.9	41 45	50.7	52 04.2	40 45	50.0	52 39.3	38 43	47.7	52 50.4	37 43	47.0
4	51 24.6	42 45	50.4	51 37.2	41 45	49.7	52 13.3	39 43	47.4	52 24.7	38 43	46.7
75	50 57.5	43 45	50.1	51 10.4	42 44	49.3	51 47.4	40 43	47.1	51 59.1	39 42	46.4
6	50 30.6	44 45	49.7	50 43.7	43 44	49.0	51 21.6	41 43	46.8	51 33.6	40 42	46.1
7	50 03.7	45 44	49.4	50 17.2	44 44	48.7	50 55.9	42 43	46.5	51 08.3	41 42	45.8
8	49 37.0	46 44	49.0	49 50.7	45 44	48.3	50 30.4	43 42	46.2	50 43.1	42 42	45.5
9	49 10.5	47 44	48.7	49 24.5	46 44	48.0	50 05.0	44 42	45.9	50 18.0	43 42	45.2
80	48 44.1	48 44	48.3	48 58.3	47 43	47.6	49 39.7	45 42	45.6	49 53.0	44 41	44.9
1	48 17.8	49 44	47.9	48 32.4	48 43	47.3	49 14.6	46 42	45.3	49 28.2	45 41	44.6
2	47 51.7	50 43	47.6	48 06.5	49 43	46.9	48 49.6	47 41	44.9	49 03.5	46 41	44.2
3	47 25.8	51 43	47.2	47 40.9	50 43	46.5	48 24.8	48 41	44.6	48 39.0	47 41	43.9
4	47 00.0	52 43	46.8	47 15.3	51 42	46.2	48 00.1	49 41	44.2	48 14.6	48 40	43.6
85	46 34.3	52 42	46.4	46 50.0	52 42	45.8	47 35.6	50 41	43.9	47 50.3	49 40	43.3
6	46 08.9	53 42	46.0	46 24.8	53 42	45.4	47 11.2	51 40	43.6	47 26.2	50 40	42.9
7	45 43.6	54 42	45.7	45 59.7	53 41	45.1	46 47.0	51 40	43.2	47 02.3	51 40	42.6
8	45 18.4	55 42	45.3	45 34.8	54 41	44.7	46 22.9	52 40	42.9	46 38.5	52 39	42.2
9	44 53.5	56 41	44.9	45 10.1	55 41	44.3	45 59.0	53 40	42.5	46 14.9	53 39	41.9
90	44 28.6	57 41	44.5	44 45.6	56 41	43.9	45 35.2	54 39	42.1	45 51.4	54 39	41.5

H.A.	63° 00′ Alt. ° ′	Δd Δt	Az. °	69° 00′ Alt. ° ′	Δd Δt	Az. °	69° 30′ Alt. ° ′	Δd Δt	Az. °	74° 30′ Alt. ° ′	Δd Δt	Az. °
00	81 00.0	1.0 01	00.0	75 00.0	1.0 01	00.0	74 30.0	1.0 01	00.0	69 30.0	1.0 00	00.0
1	80 59.1	1.0 04	02.9	74 59.6	1.0 02	01.4	74 29.6	1.0 02	01.3	69 29.8	1.0 01	00.8
2	80 56.4	99 07	05.8	74 58.3	1.0 04	02.8	74 28.4	1.0 03	02.6	69 29.1	1.0 02	01.5
3	80 52.0	98 10	08.6	74 56.2	99 05	04.1	74 26.4	99 05	03.9	69 27.9	1.0 03	02.3
4	80 45.9	97 13	11.4	74 53.2	99 06	05.5	74 23.6	99 06	05.2	69 26.2	99 04	03.0
05	80 38.1	95 16	14.1	74 49.4	98 08	06.9	74 20.0	98 07	06.5	69 24.1	99 04	03.8
6	80 28.8	93 18	16.7	74 44.8	97 09	08.2	74 15.6	97 09	07.8	69 21.6	98 05	04.5
7	80 17.9	91 20	19.2	74 39.4	96 10	09.5	74 10.5	96 10	09.0	69 18.6	98 06	05.3
8	80 05.6	88 23	21.5	74 33.2	95 12	10.8	74 04.6	95 11	10.2	69 15.1	97 07	06.0
9	79 52.0	85 25	23.8	74 26.2	94 13	12.1	73 57.9	94 12	11.4	69 11.2	97 07	06.8
10	79 37.2	82 27	25.9	74 18.4	93 14	13.3	73 50.6	93 13	12.6	69 06.8	96 08	07.5
1	79 21.2	79 28	28.0	74 10.0	91 15	14.5	73 42.5	92 15	13.8	69 02.0	95 09	08.2
2	79 04.2	76 30	29.9	74 00.8	90 16	15.7	73 33.8	90 16	14.9	68 56.7	94 09	08.9
3	78 46.1	73 32	31.6	73 50.9	88 18	16.8	73 24.4	89 17	16.0	68 51.1	93 10	09.6
4	78 27.2	70 33	33.3	73 40.3	86 19	18.0	73 14.3	87 18	17.1	68 45.0	92 11	10.3
15	78 07.4	67 34	34.8	73 29.1	84 20	19.0	73 03.7	85 19	18.1	68 38.5	91 12	10.9
6	77 46.9	64 35	36.3	73 17.3	83 21	20.1	72 52.4	84 20	19.1	68 31.6	90 12	11.6
7	77 25.8	61 36	37.6	73 04.9	81 22	21.1	72 40.6	82 21	20.1	68 24.3	88 13	12.3
8	77 04.0	58 37	38.8	72 51.9	79 23	22.1	72 28.2	80 22	21.1	68 16.6	87 13	12.9
9	76 41.6	56 38	40.0	72 38.4	77 23	23.0	72 15.2	78 22	22.0	68 08.6	86 14	13.5
20	76 18.7	53 39	41.0	72 24.4	75 24	23.9	72 01.8	76 23	22.8	68 00.1	84 15	14.1
1	75 55.3	50 40	42.0	72 09.8	73 25	24.8	71 47.8	74 24	23.7	67 51.4	83 15	14.7
2	75 31.5	47 40	42.9	71 54.8	70 26	25.6	71 33.4	72 25	24.5	67 42.2	81 16	15.3
3	75 07.3	45 41	43.7	71 39.3	68 26	26.4	71 18.6	70 25	25.3	67 32.7	80 16	15.9
4	74 42.8	42 41	44.5	71 23.4	66 27	27.2	71 03.3	68 26	26.0	67 22.9	78 17	16.4
25	74 17.9	40 42	45.2	71 07.1	64 28	27.9	70 47.7	66 27	26.7	67 12.8	77 17	17.0
6	73 52.8	37 42	45.8	70 50.4	62 28	28.6	70 31.6	63 27	27.4	67 02.4	75 18	17.5
7	73 27.4	35 43	46.4	70 33.4	60 29	29.3	70 15.2	61 28	28.1	66 51.6	73 18	18.0
8	73 01.7	33 43	46.9	70 16.0	58 30	29.9	69 58.4	59 28	28.7	66 40.6	72 19	18.5
9	72 35.9	30 43	47.4	69 58.2	55 30	30.5	69 41.3	57 29	29.3	66 29.3	70 19	19.0
30	72 09.8	28 44	47.8	69 40.2	53 31	31.0	69 23.9	55 30	29.8	66 17.7	68 20	19.4
1	71 43.6	26 44	48.2	69 21.8	51 31	31.6	69 06.2	53 30	30.4	66 05.8	66 20	19.9
2	71 17.2	24 44	48.6	69 03.2	49 31	32.1	68 48.3	51 30	30.9	65 53.7	65 21	20.3
3	70 50.7	22 44	48.9	68 44.4	47 32	32.6	68 30.0	49 31	31.4	65 41.4	63 21	20.7
4	70 24.1	20 45	49.2	68 25.3	45 32	33.0	68 11.6	47 31	31.8	65 28.8	61 21	21.1
35	69 57.4	18 45	49.4	68 06.0	43 33	33.4	67 52.9	45 32	32.2	65 16.0	59 22	21.5
6	69 30.5	16 45	49.7	67 46.4	41 33	33.8	67 33.9	42 32	32.6	65 03.0	57 22	21.9
7	69 03.6	14 45	49.9	67 26.7	39 33	34.2	67 14.8	40 32	33.0	64 49.7	56 22	22.2
8	68 36.6	12 45	50.0	67 06.8	37 34	34.6	66 55.5	38 32	33.4	64 36.3	54 23	22.6
9	68 09.5	11 45	50.2	66 46.7	35 34	34.9	66 36.0	36 33	33.7	64 22.7	52 23	22.9
40	67 42.4	09 45	50.3	66 26.4	33 34	35.2	66 16.4	34 33	34.0	64 08.9	50 23	23.2
1	67 15.3	07 45	50.4	66 06.0	31 34	35.5	65 56.6	32 33	34.3	63 54.9	48 24	23.5
2	66 48.1	06 45	50.5	65 45.5	29 34	35.7	65 36.6	30 33	34.6	63 40.8	46 24	23.8
3	66 20.9	04 45	50.5	65 24.8	27 35	36.0	65 16.5	29 34	34.8	63 26.5	44 24	24.1
4	65 53.7	02 45	50.5	65 04.1	25 35	36.2	64 56.3	27 34	35.1	63 12.0	42 24	24.3
45	65 26.4	01 45	50.6	64 43.2	23 35	36.4	64 36.0	25 34	35.3	62 57.4	41 25	24.6
6	64 59.2	01 45	50.6	64 22.2	21 35	36.6	64 15.6	23 34	35.5	62 42.7	39 25	24.8
7	64 32.0	02 45	50.5	64 01.2	19 35	36.7	63 55.1	21 34	35.6	62 27.8	37 25	25.0
8	64 04.7	04 45	50.5	63 40.0	17 35	36.9	63 34.5	19 34	35.8	62 12.9	35 25	25.2
9	63 37.5	05 45	50.5	63 18.8	16 35	37.0	63 13.9	17 35	35.9	61 57.8	33 25	25.4
50	63 10.3	07 45	50.4	62 57.5	14 36	37.1	62 53.1	15 35	36.1	61 42.6	31 25	25.6
1	62 43.2	08 45	50.3	62 36.2	12 36	37.2	62 32.4	14 35	36.2	61 27.3	29 26	25.8
2	62 16.0	10 45	50.2	62 14.9	10 36	37.3	62 11.5	12 35	36.3	61 12.0	28 26	25.9
3	61 48.9	11 45	50.1	61 53.4	09 36	37.4	61 50.6	10 35	36.4	60 56.5	26 26	26.1
4	61 21.9	12 45	50.0	61 32.0	07 36	37.5	61 29.7	08 35	36.4	60 41.0	24 26	26.2
55	60 54.9	14 45	49.9	61 10.5	05 36	37.5	61 08.8	07 35	36.5	60 25.4	22 26	26.3
6	60 27.9	15 45	49.8	60 49.1	03 36	37.5	60 47.8	05 35	36.5	60 09.7	20 26	26.4
7	60 01.0	16 45	49.6	60 27.6	02 36	37.6	60 26.8	03 35	36.5	59 54.0	18 26	26.5
8	59 34.2	18 45	49.5	60 06.1	00 36	37.6	60 05.8	02 35	36.6	59 38.2	17 26	26.6
9	59 07.4	19 44	49.3	59 44.6	01 36	37.6	59 44.8	00 35	36.6	59 22.3	15 26	26.7
60	58 40.7	20 44	49.1	59 23.1	03 36	37.5	59 23.8	02 35	36.6	59 06.5	13 27	26.8
1	58 14.1	22 44	49.0	59 01.6	05 36	37.5	59 02.8	03 35	36.5	58 50.5	11 27	26.9
2	57 47.5	23 44	48.8	58 40.1	06 36	37.5	58 41.8	05 35	36.5	58 34.6	10 27	26.9
3	57 21.0	24 44	48.6	58 18.7	08 36	37.4	58 20.8	06 35	36.5	58 18.6	08 27	27.0
4	56 54.6	25 44	48.4	57 57.2	09 36	37.4	57 59.8	08 35	36.4	58 02.6	06 27	27.0
65	56 28.3	26 44	48.2	57 35.8	11 36	37.3	57 38.9	09 35	36.4	57 46.6	04 27	27.0
6	56 02.1	28 44	47.9	57 14.5	12 36	37.2	57 18.0	11 35	36.3	57 30.6	03 27	27.0
7	55 36.0	29 43	47.7	56 53.2	14 35	37.1	56 57.1	13 35	36.2	57 14.6	01 27	27.0
8	55 09.9	30 43	47.5	56 31.9	15 35	37.0	56 36.3	14 35	36.2	56 58.5	01 27	27.0
9	54 44.0	31 43	47.2	56 10.7	17 35	36.9	56 15.5	15 35	36.1	56 42.5	02 27	27.0
70	54 18.1	32 43	47.0	55 49.5	18 35	36.8	55 54.8	17 34	36.0	56 26.5	04 27	27.0
1	53 52.4	33 43	46.7	55 28.4	20 35	36.7	55 34.1	18 34	35.8	56 10.4	06 27	27.0
2	53 26.8	34 43	46.5	55 07.3	21 35	36.6	55 13.5	20 34	35.7	55 54.4	07 27	27.0
3	53 01.3	36 42	46.2	54 46.4	22 35	36.5	54 52.9	21 34	35.6	55 38.5	09 27	26.9
4	52 35.9	37 42	45.9	54 25.4	24 35	36.3	54 32.4	23 34	35.5	55 22.5	11 27	26.9
75	52 10.6	38 42	45.7	54 04.6	25 35	36.2	54 12.0	24 34	35.3	55 06.6	12 26	26.8
6	51 45.4	39 42	45.4	53 43.8	27 34	36.0	53 51.6	25 34	35.2	54 50.7	14 26	26.8
7	51 20.4	40 42	45.1	53 23.1	28 34	35.8	53 31.3	27 34	35.0	54 34.8	15 26	26.7
8	50 55.5	41 41	44.8	53 02.5	29 34	35.7	53 11.1	28 34	34.9	54 19.0	17 26	26.6
9	50 30.7	42 41	44.5	52 42.0	31 34	35.5	52 51.0	30 33	34.7	54 03.2	18 26	26.5
80	50 06.1	43 41	44.2	52 21.6	32 34	35.3	52 31.0	31 33	34.5	53 47.5	20 26	26.5
1	49 41.6	44 41	43.9	52 01.2	33 34	35.1	52 11.0	32 33	34.3	53 31.8	21 26	26.4
2	49 17.2	45 40	43.6	51 41.0	34 34	34.9	51 51.2	33 33	34.2	53 16.2	23 26	26.3
3	48 52.9	46 40	43.3	51 20.9	36 33	34.7	51 31.4	35 33	34.0	53 00.6	24 26	26.2
4	48 28.8	47 40	42.9	51 00.8	37 33	34.5	51 11.8	36 33	33.8	52 45.1	26 26	26.0
85	48 04.9	48 40	42.6	50 40.9	38 33	34.3	50 52.2	37 32	33.6	52 29.6	27 26	25.9
6	47 41.1	49 39	42.3	50 21.1	39 33	34.1	50 32.8	39 32	33.4	52 14.2	29 26	25.8
7	47 17.4	50 39	41.9	50 01.4	41 33	33.9	50 13.5	40 32	33.1	51 58.9	30 25	25.7
8	46 53.9	51 39	41.6	49 41.8	42 32	33.6	49 54.2	41 32	32.9	51 43.7	32 25	25.5
9	46 30.6	52 39	41.3	49 22.3	43 32	33.4	49 35.1	42 32	32.7	51 28.5	33 25	25.4
90	46 07.4	53 38	40.9	49 03.0	44 32	33.1	49 16.2	43 31	32.5	51 13.4	35 25	25.3

Digitized by Google

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	44 04.0	58 41	44.1	44 21.2	57 40	43.5	45 11.7	55 39	41.8	45 28.1	55 39	41.2	45 44.4	54 38	40.6	48 43.8	45 32	32.9	48 57.3	45 31	32.2	50 58.4	36 25	25.1	91
2	43 39.6	58 40	43.7	43 57.0	58 40	43.1	44 48.3	56 39	41.4	45 05.0	55 38	40.8	45 21.6	55 38	40.2	48 24.7	47 32	32.7	48 38.5	46 31	32.0	50 43.5	37 25	25.0	2
3	43 15.3	59 40	43.3	43 33.0	59 40	42.7	44 25.0	57 38	41.0	44 42.0	56 38	40.4	44 58.9	56 38	39.9	48 05.7	48 31	32.4	48 19.9	47 31	31.7	50 28.6	38 25	24.8	3
4	42 51.2	60 40	42.9	43 09.1	59 39	42.3	44 02.0	58 38	40.6	44 19.2	57 38	40.1	44 36.3	57 37	39.5	47 46.9	49 31	32.1	48 01.4	48 31	31.5	50 13.9	40 24	24.6	4
95	42 27.3	61 40	42.5	42 45.5	60 39	41.9	43 39.1	59 38	40.3	43 56.6	58 37	39.7	44 14.0	58 37	39.1	47 28.2	50 31	31.9	47 43.1	49 30	31.2	49 59.2	41 24	24.5	95
6	42 03.6	62 39	42.0	42 22.0	61 39	41.5	43 16.4	60 38	39.9	43 34.2	59 37	39.3	43 51.8	59 37	38.8	47 09.6	51 31	31.6	47 24.9	50 30	31.0	49 44.7	43 24	24.3	6
7	41 40.1	62 39	41.6	41 58.7	62 38	41.1	42 53.9	60 37	39.5	43 11.9	60 37	39.0	43 29.8	59 36	38.4	46 51.2	52 30	31.3	47 06.8	51 30	30.7	49 30.2	44 24	24.1	7
8	41 16.7	63 39	41.2	41 35.6	63 38	40.7	42 31.5	61 37	39.1	42 49.8	61 36	38.6	43 08.0	60 36	38.0	46 33.0	53 30	31.1	46 48.8	53 30	30.4	49 15.9	45 24	23.9	8
9	40 53.6	64 38	40.8	41 12.8	64 38	40.3	42 09.4	62 37	38.7	42 27.9	62 36	38.2	42 46.4	61 36	37.7	46 14.8	54 30	30.8	46 31.0	54 29	30.2	49 01.6	46 24	23.7	9
100	40 30.7	65 38	40.4	40 50.0	64 38	39.9	41 47.4	63 36	38.3	42 06.2	63 36	37.8	42 24.9	62 35	37.3	45 56.9	55 30	30.5	46 13.4	55 29	29.9	48 47.5	48 23	23.5	100
1	40 07.9	66 38	39.9	40 27.5	65 37	39.4	41 25.6	64 36	37.9	41 44.7	63 36	37.4	42 03.7	63 35	36.9	45 39.0	56 29	30.2	45 55.9	56 29	29.6	48 33.5	49 23	23.3	1
2	39 45.4	66 37	39.5	40 05.2	66 37	39.0	41 04.0	65 36	37.5	41 23.4	64 35	37.0	41 42.6	64 35	36.5	45 21.4	57 29	29.9	45 38.5	57 29	29.3	48 19.5	50 23	23.2	2
3	39 23.1	67 37	39.1	39 43.1	67 36	38.6	40 42.7	66 35	37.1	41 02.3	65 35	36.6	41 21.7	65 34	36.1	45 03.8	59 29	29.6	45 21.3	58 28	29.1	48 05.7	51 23	22.9	3
4	39 00.9	68 37	38.6	39 21.2	68 36	38.2	40 21.5	66 35	36.7	40 41.3	66 35	36.2	41 01.0	65 34	35.7	44 46.5	60 29	29.3	45 04.3	59 28	28.8	47 52.0	53 23	22.7	4
105	38 39.0	69 36	38.2	38 59.6	68 36	37.7	40 00.5	67 35	36.3	40 20.6	67 34	35.8	40 40.5	66 34	35.3	44 29.3	61 28	29.0	44 47.4	60 28	28.5	47 38.5	54 22	22.5	105
6	38 17.3	69 36	37.8	38 38.1	69 35	37.3	39 39.7	68 34	35.9	40 00.0	68 34	35.4	40 20.2	67 33	34.9	44 12.3	62 28	28.7	44 30.7	61 28	28.2	47 25.0	55 22	22.3	6
7	37 55.8	70 35	37.3	38 16.8	70 35	36.9	39 19.2	69 34	35.5	39 39.7	68 34	35.0	40 00.1	68 33	34.5	43 55.4	63 28	28.4	44 14.1	62 27	27.9	47 11.7	56 22	22.1	7
8	37 34.6	71 35	36.9	37 55.8	71 35	36.4	38 58.8	69 34	35.1	39 19.6	69 33	34.6	39 40.3	69 33	34.1	43 38.7	63 28	28.1	43 57.7	63 27	27.6	46 58.5	57 22	21.9	8
9	37 13.5	72 35	36.4	37 34.9	71 34	36.0	38 38.6	70 33	34.6	38 59.7	70 33	34.2	39 20.6	70 32	33.7	43 22.2	64 27	27.8	43 41.4	64 27	27.3	46 45.4	58 22	21.6	9
110	36 52.7	72 34	36.0	37 14.3	72 34	35.5	38 18.7	71 33	34.2	38 40.0	71 32	33.8	39 01.1	70 32	33.3	43 05.8	65 27	27.5	43 25.4	65 26	26.9	46 32.5	60 21	21.4	110
1	36 32.1	73 34	35.5	36 53.9	73 34	35.1	37 59.0	72 32	33.8	38 20.5	71 32	33.3	38 41.9	71 32	32.9	42 49.7	66 27	27.1	43 09.5	66 26	26.6	46 19.7	61 21	21.2	1
2	36 11.7	74 34	35.1	36 33.8	73 33	34.6	37 39.5	73 32	33.4	38 01.2	72 32	32.9	38 22.8	72 31	32.5	42 33.7	67 26	26.8	42 53.8	67 26	26.3	46 07.0	62 21	20.9	2
3	35 51.6	74 33	34.6	36 13.8	74 33	34.2	37 20.2	73 32	32.9	37 42.1	73 31	32.5	38 04.0	73 31	32.1	42 17.8	68 26	26.5	42 38.2	68 26	26.0	45 54.5	63 21	20.7	3
4	35 31.6	75 33	34.1	35 54.1	75 32	33.7	37 01.1	74 31	32.5	37 23.3	74 31	32.1	37 45.4	73 31	31.6	42 02.2	69 26	26.2	42 22.9	69 25	25.7	45 42.1	64 20	20.5	4
115	35 12.0	76 32	33.7	35 34.7	76 32	33.3	36 42.3	75 31	32.1	37 04.7	74 31	31.6	37 27.0	74 30	31.2	41 46.7	70 25	25.8	42 07.7	70 25	25.3	45 29.8	65 20	20.2	115
6	34 52.5	77 32	33.2	35 15.4	76 32	32.8	36 23.7	75 31	31.6	36 46.3	75 30	31.2	37 08.8	75 30	30.8	41 31.5	71 25	25.5	41 52.7	70 25	25.0	45 17.7	66 20	20.0	6
7	34 33.3	77 32	32.7	34 56.4	77 31	32.4	36 05.3	76 30	31.2	36 28.1	76 30	30.8	36 50.9	76 30	30.4	41 16.4	72 25	25.1	41 37.9	71 24	24.7	45 05.7	67 20	19.7	7
8	34 14.4	78 31	32.3	34 37.7	78 31	31.9	35 47.2	77 30	30.7	36 10.2	77 29	30.3	36 33.2	76 29	29.9	41 01.5	73 24	24.8	41 23.2	72 24	24.3	44 53.9	68 19	19.5	8
9	33 55.7	78 31	31.8	34 19.2	78 30	31.4	35 29.3	78 29	30.3	35 52.5	77 29	29.9	36 15.7	77 29	29.5	40 46.8	73 24	24.5	41 08.8	73 24	24.0	44 42.2	69 19	19.2	9
120	33 37.2	79 30	31.3	34 00.9	79 30	31.0	35 11.6	78 29	29.8	35 35.1	78 29	29.5	35 58.4	78 28	29.1	40 32.3	74 24	24.1	40 54.5	74 23	23.7	44 30.7	70 19	18.9	120
1	33 19.6	80 30	30.9	33 42.9	80 30	30.5	34 54.2	79 29	29.4	35 17.8	79 28	29.0	35 41.4	78 28	28.6	40 18.0	75 24	23.8	40 40.5	75 23	23.3	44 19.3	71 19	18.7	1
2	33 01.0	80 30	30.4	33 25.1	80 29	30.0	34 37.0	80 28	28.9	35 00.9	79 28	28.6	35 24.6	79 28	28.2	40 03.9	76 23	23.4	40 26.6	76 23	23.0	44 08.1	72 18	18.4	2
3	32 43.3	81 29	29.9	33 07.6	81 29	29.5	34 20.1	80 28	28.5	34 44.1	80 28	28.1	35 08.1	80 27	27.7	39 50.0	77 23	23.0	40 13.0	76 22	22.6	43 57.1	73 18	18.1	3
4	32 25.9	82 29	29.4	32 50.3	81 28	29.1	34 03.4	81 27	28.0	34 27.6	81 27	27.7	34 51.8	80 27	27.3	39 36.3	77 22	22.7	39 59.5	77 22	22.3	43 46.2	74 18	17.9	4
125	32 08.7	82 28	28.9	32 33.3	82 28	28.6	33 47.0	82 27	27.6	34 11.4	81 27	27.2	34 35.7	81 26	26.9	39 22.8	78 22	22.3	39 46.2	78 22	21.9	43 35.4	75 18	17.6	125
6	31 51.8	83 28	28.4	32 16.6	83 27	28.1	33 30.8	82 27	27.1	33 55.4	82 26	26.8	34 19.9	82 26	26.4	39 09.5	79 22	22.0	39 33.2	79 21	21.6	43 24.8	76 17	17.3	6
7	31 35.1	83 27	28.0	32 00.1	83 27	27.6	33 14.8	83 26	26.6	33 39.6	83 26	26.3	34 04.4	82 26	26.0	38 56.4	80 21	21.6	39 20.3	79 21	21.2	43 14.4	76 17	17.0	7
8	31 18.7	84 27	27.5	31 43.9	84 27	27.1	32 59.1	83 26	26.2	33 24.1	83 25	25.8	33 49.1	83 25	25.5	38 43.6	80 21	21.2	39 07.7	80 21	20.8	43 04.2	77 17	16.8	8
9	31 02.6	85 26	27.0	31 27.9	84 26	26.7	32 43.7	84 25	25.7	33 08.9	84 25	25.4	33 34.0	84 25	25.1	38 30.9	81 21	20.9	38 55.2	81 20	20.5	42 54.1	78 17	16.5	9
130	30 46.7	85 26	26.5	31 12.2	85 26	26.2	32 28.5	85 25	25.2	32 53.9	84 25	24.9	33 19.2	84 24	24.6	38 18.5	82 20	20.5	38 43.0	82 20	20.1	42 44.2	79 16	16.2	130
1	30 31.1	86 26	26.0	30 56.8	86 25	25.7	32 13.6	85 24	24.8	32 39.2	85 24	24.4	33 04.6	85 24	24.1	38 06.2	83 20	20.1	38 31.0	82 20	19.7	42 34.4	80 16	15.9	1
2	30 15.8	86 25	25.5	30 41.7	86 25	25.2	31 59.0	86 24	24.3	32 24.7	86 24	24.0	32 50.4	85 23	23.7	37 54.2	83 20	19.7	38 19.2	83 19	19.4	42 24.9	81 16	15.6	2
3	30 00.8	87 25	25.0	30 26.8	87 24	24.7	31 44.6	86 24	23.8	32 10.5	86 23	23.5	32 36.3	86 23	23.2	37 42.4	84 19	19.3	38 07.6	84 19	19.0	42 15.5	81 15	15.3	3
4	29 46.0	87 24	24.5	30 12.2	87 24	24.2	31 30.5	87 23	23.3	31 56.6	87 23	23.0	32 22.6	87 22	22.7	37 30.8	85 19	19.0	37 56.2	84 19	18.6	42 06.2	82 15	15.0	4
135	29 31.5	88 24	24.0	29 57.9	88 23	23.7	31 16.7	87 23	22.9	31 42.9	87 22	22.6	32 09.0	87 22	22.3	37 19.5	85 19	18.6	37 45.0	85 18	18.3	41 57.2	83 15	14.7	135
6	29 17.4	88 23	23.5	29 43.9	88 23	23.2	31 03.1	88 22	22.4	31 29.5	88 22	22.1	31 55.8	88 22	21.8	37 08.4	86 18	18.2	37 34.1	86 18	17.9	41 48.3	84 14	14.4	6
7	29 03.5	89 23	23.0	29 30.1	89 22	22.7	30 49.8	88 22	21.9	31 16.4	88 21	21.6	31 42.8	88 21	21.3	36 57.5	87 18	17.8	37 23.4	86 17	17.5	41 39.6	84 14	14.1	7
8	28 49.8	89 22	22.5	29 16.6	89 22	22.2	30 36.8	89 21	21.4	31 03.5	89 21	21.1	31 30.1	89 21	20.9	36 46.8	87 17	17.4	37 12.9	87 17	17.1	41 31.1	85 14	13.8	8
9	28 36.5	90 22	21.9	29 03.5	90 22	21.7	30 24.1	89 21	20.9	30 50.9	89 20	20.7	31 17.7	89 20	20.4	36 36.4	88 17	17.0	37 02.6	88 17	16.7	41 22.8	86 14	13.5	9
140	28 23.5	90 21	21.4	28 50.6	90 21	21.2	30 11.6	90 20	20.4	30 38.6	90 20	20.2	31 05.6	90 20	19.9	36 26.1	88 17	16.6	36 52.6	88 16	16.3	41 14.6	86 13	13.2	140
1	28 10.8	91 21	20.9	28 38.0	91 20	20.7	29 59.5	90 20	19.9	30 26.6	90 20	19.7	30 53.7	90 19	19.4	36 16.2	89 16	16.2	36 42.8	89 16	16.0	41 06.7	87 13	12.9	1
2	27 58.3	91 20	20.4	28 25.7	91 20	20.2	29 47.6	91 19	19.5	30 14.8	91 19	19.2	30 42.1	91 19	19.0	36 06.4	89 16	15.8	36 33.2	89 16	15.6	40 58.9	88 13	12.6	2
3	27 46.2	92 20	19.9	28 13.7	92 20	19.7	29 36.0	91 19	19.0	30 03.4	91 19	18.7	30 30.7	91 18	18.5	35 56.9	90 15	15.5	36 23.9	90 15	15.2	40 51.3	88 12	12.3	3
4	27 34.3	92 19	19.4	28 01.9	92 19	19.1	29 24.7	92 18	18.5	29 52.2	92 18	18.2	30 19.7	92 18	18.0	35 47.6	90 15	15.1	36 14.7	90 15	14.8	40 43.9	89 12	12.0	4
145	27 22.8	93 19	18.8	27 50.5	92 19	18.6	29 13.6	92 18	18.0	29 41.3	92 18	17.8	30 08.9	92 17	17.5	35 38.6	91 15	14.7	36 05.9	91 14	14.4	40 36.7	90 12	11.6	145
6	27 11.5	93 18	18.3	27 39.4	93 18	18.1	29 02.9	93 17	17.5	29 30.7	93 17	17.3	29 58.5	93 17	17.0	35 29.8	91 14	14.2	35 57.2	91 14	14.0	40 29.6	90 11	11.3	6
7	27 00.6	93 18	17.8	27 28.6	93 18	17.6	28 52.5	93 17	17.0	29 20.4	93 17	16.8	29 48.3	93 16	16.6	35 21.2	92 14	13.8	35 48.8	92 14	13.6	40 22.8	91 11	11.0	7
8	26 50.0	94 17	17.3	27 18.1	94 17	17.1	28 42.3	93 16	16.5	29 10.3	93 16	16.3	29 38.4	93 16	16.1	35 12.9	92 13	13.4	35 40.6	92 13	13.2	40 16.2	91 11	10.7	8
9	26 39.7	94 17	16.7	27 07.9	94 16	16.6	28 32.5	94 16	16.0	29 00.6	94 16	15.8	29 28.7	94 16	15.6	35 04.8	93 13	13.0	35 32.7	93 13	12.8	40 09.7	92 10	10.4	9
150	26 29.7	94 16	16.2	26 58.0	94 16	16.0	28 22.9	94 15	15.5	28 51.2	94 15	15.3	29 19.4	94 15	15.1	34 57.0	93 13	12.6	35 25.0	93 12	12.4	40 03.5	92 10	10.1	150
1	26 20.0	95 16	15.7	26 48.4	95 15	15.5	28 13.6	95 15	15.0	28 42.0	95 15	14.8	29 10.4	95 15	14.6	34 49.4	94 12	12.2	35 17.5	94 12	12.0	39 57.4	93 10	09.7	1
2	26 10.6	95 15	15.2	26 39.1	95 15	15.0	28 04.7	95 14	14.5	28 33.2	95 14	14.3	29 01.6	95 14	14.1	34 42.1	94 12	11.8	35 10.3	94 12	11.6	39 51.5	93 09	09.4	2
3	26 01.5	95 15	14.6	26 30.2	95 14	14.5	27 56.0	95 14	14.0	28 24.6	95 14	13.8	28 53.2	95 14	13.6	34 35.0	95 11	11.4	35 03.3	95 11	11.2	39 45.9	94 09	09.1	3
4	25 52.8	96 14	14.1	26 21.5	96 14	13.9	27 47.7	96 13	13.5	28 16.4	96 13	13.3	28 45.0	96 13	13.1	34 28.1	95 11	11.0	34 56.6	95 11	10.8	39 40.4	94 09	08.8	4
155	25 44.3	96 14	13.6	26 13.2	96 13	13.4	27 39.6	96 13	12.9	28 08.4	96 13	12.8	28 37.2	96 13	12.6	34 21.5	95 11	10.6	34 50.1	95 10	10.4	39 35.1	95 08	08.4	155
6	25 36.2	96 13	13.0	26 05.1	96 13	12.9	27 31.9	96 12	12.4	28 00.7	96 12	12.3	28 29.6	96 12	12.1	34 15.2	96 10	10.2	34 43.9	96 10	10.0	39 30.1	95 08	08.1	6
7	25 28.4	97 12	12.5	25 57.4	97 12	12.4	27 24.4	97 12	11.9	27 53.4	97 12	11.8	28 22.4	97 12	11.6	34 09.1	96 10	09.7	34 37.9	96 10	09.6	39 25.2	95 08	07.8	7
8	25 21.0	97 12	12.0	25 50.1	97 12	11.8	27 17.3	97 11	11.4	27 46.3	97 11	11.3	28 15.4	97 11	11.1	34 03.3	96 09	09.3	34 32.2	96 09	09.2	39 20.5	96 07	07.4	8
9	25 13.8	97 11	11.4	25 43.0	97 11	11.3	27 10.5	97 11	10.9	27 39.6	97 11	10.8	28 08.7	97 11	10.6	33 57.7	97 09	08.9	34 26.7	97 09	08.8	39 16.1	96 07	07.1	9
160	25 07.0	98 11	10.9	25 36.2	97 11	10.8	27 03.9	97 10	10.4	27 33.2	97 10	10.3	28 02.4	97 10	10.1	33 52.3	97 08	08.5	34 21.4	97 08	08.3	39 11.8	97 07	06.8	160
1	25 00.5	98 10	10.3	25 29.8	98 10	10.2	26 57.7	98 10	09.9	27 27.0	98 10	09.8	27 56.3	98 10	09.6	33 47.3	97 08	08.1	34 16.4	97 08	07.9	39 07.8	97 06	06.4	1
2	24 54.3	98 10	09.8	25 23.7	98 10	09.7	26 51.9	98 09	09.4	27 21.2	98 09	09.2	27 50.6	98 09	09.1	33 42.4	98 08	07.6	34 11.7	98 07	07.5	39 03.9	97 06	06.1	2
3	24 48.5	98 09	09.3	25 17.9	98 09	09.2	26 46.3	98 09	08.8	27 15.7	98 09	08.7	27 45.1	98 09	08.6	33 37.9	98 07	07.2	34 07.2	98 07	07.1	39 00.3	98 06	05.8	3
4	24 43.0	98 09	08.7	25 12.5	98 09	08.6	26 41.0	98 08	08.3	27 10.5	98 08	08.2	27 40.0	98 08	08.1	33 33.6	98 07	06.8	34 03.0	98 07	06.7	38 56.8	98 05	05.4	4
165	24 37.8	99 08	08.2	25 07.4	99 08	08.1	26 36.1	99 08	07.8	27 05.6	99 08	07.7	27 35.2	99 08	07.6	33 29.5	98 06	06.4	33 59.0	98 06	06.3	38 53.6	98 05	05.1	165
6	24 32.9	99 08	07.6	25 02.6	99 07	07.6	26 31.4	99 07	07.3	27 01.0	99 07	07.2	27 30.7	99 07	07.1	33 25.7	99 06	06.0	33 55.3	99 06	05.9	38 50.5	98 05	04.8	6
7	24 28.4	99 07	07.1	24 58.1	99 07	07.0	26 27.1	99 07	06.8	26 56.8	99 07	06.7	27 26.4	99 06	06.6	33 22.2	99 05	05.5	33 51.8	99 05	05.4	38 47.7	99 04	04.4	7
8	24 24.2	99 06	06.6	24 53.9	99 06	06.5	26 23.1	99 06	06.3	26 52.8	99 06	06.2	27 22.5	99 06	06.1	33 18.9	99 05	05.1	33 48.6	99 05	05.0	38 45.1	99 04	04.1	8
9	24 20.3	99 06	06.0	24 50.1	99 06	05.9	26 19.4	99 06	05.7	26 49.2	99 06	05.7	27 18.9	99 05	05.6	33 15.9	99 05	04.7	33 45.6	99 04	04.6	38 42.7	99 04	03.7	9
170	24 16.8	99 05	05.5	24 46.6	99 05	05.4	26 16.1	99 05	05.2	26 45.9	99 06	05.2	27 15.7	99 05	05.1	33 13.1	99 04	04.3	33 42.9	99 04	04.2	38 40.5	99 03	03.4	170
1	24 13.6	99 05	04.9	24 43.5	99 05	04.9	26 13.0	99 05	04.7	26 42.8	99 04	04.6	27 12.7	99 04	04.6	33 10.6	99 04	03.8	33 40.5	99 04	03.8	38 38.5	99 03	03.1	1
2	24 10.8	1.0 04	04.4	24 40.6	1.0 04	04.3	26 10.3	1.0 04	04.2	26 40.2	1.0 04	04.1	27 10.0	1.0 04	04.1	33 08.4	1.0 03	03.4	33 38.3	1.0 03	03.4	38 36.7	99 03	02.7	2
3	24 08.2	1.0 04	03.8	24 38.2	1.0 04	03.8	26 07.9	1.0 03	03.7	26 37.8	1.0 03	03.6	27 07.7	1.0 03	03.6	33 06.4	1.0 03	03.0	33 36.3	1.0 03	02.9	38 35.1	1.0 02	02.4	3
4	24 06.1	1.0 03	03.3	24 36.0	1.0 03	03.2	26 05.8	1.0 03	03.1	26 35.7	1.0 03	03.1	27 05.6	1.0 03	03.1	33 04.7	1.0 02	02.6	33 34.7	1.0 02	02.5	38 33.8	1.0 02	02.0	4
175	24 04.2	1.0 03	02.7	24 34.2	1.0 02	02.7	26 04.0	1.0 02	02.6	26 34.0	1.0 02	02.6	27 03.9	1.0 02	02.5	33 03.3	1.0 02	02.1	33 33.2	1.0 02	02.1	38 32.6	1.0 02	01.7	175
6	24 02.7	1.0 02	02.2	24 32.7	1.0 02	02.2	26 02.6	1.0 02	02.1	26 32.5	1.0 02	02.1	27 02.5	1.0 02	02.0	33 02.1	1.0 02	01.7	33 32.1	1.0 02	01.7	38 31.7	1.0 01	01.4	6
7	24 01.5	1.0 01	01.6	24 31.5	1.0 01	01.6	26 01.4	1.0 01	01.6	26 31.4	1.0 01	01.5	27 01.4	1.0 01	01.5	33 01.2	1.0 01	01.3	33 31.2	1.0 01	01.3	38 30.9	1.0 01	01.0	7
8	24 00.7	1.0 01	01.1	24 30.7	1.0 01	01.1	26 00.6	1.0 01	01.0	26 30.6	1.0 01	01.0	27 00.6	1.0 01	01.0	33 00.5	1.0 01	00.9	33 30.5	1.0 01	00.8	38 30.4	1.0 01	00.7	8
9	24 00.2	1.0 00	00.5	24 30.2	1.0 00	00.5	26 00.2	1.0 00	00.5	26 30.2	1.0 00	00.5	27 00.2	1.0 00	00.5	33 00.1	1.0 00	00.4	33 30.1	1.0 00	00.4	38 30.1	1.0 00	00.3	9
180	24 00.0	1.0 00	00.0	24 30.0	1.0 00	00.0	26 00.0	1.0 00	00.0	26 30.0	1.0 00	00.0	27 00.0	1.0 00	00.0	33 00.0	1.0 00	00.0	33 30.0	1.0 00	00.0	38 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 54°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	40	180	44	180	48	180	52	180	56	180	60	180	64	180	68	180	72	180	76	180	80	180	00
4	40	175	44	174	48	174	52	174	56	173	60	173	64	172	68	171	72	170	76	167	80	164	4
8	40	170	44	169	48	168	51	168	55	167	59	166	63	164	67	162	71	160	75	156	79	149	8
12	39	165	43	164	47	163	51	162	55	160	59	159	63	157	66	154	70	150	74	145	77	137	12
16	38	159	42	158	46	157	50	156	54	154	58	152	61	149	65	146	69	142	72	136	76	127	16
20	37	155	41	153	45	152	49	150	53	148	56	146	60	143	64	139	67	134	71	128	74	119	20
24	36	150	40	148	44	146	48	145	51	142	55	140	59	136	62	132	65	127	69	121	71	113	24
28	35	145	39	143	43	141	46	139	50	137	53	134	57	131	60	126	64	121	67	115	69	107	28
32	34	141	37	139	41	137	45	134	48	132	52	129	55	125	58	121	61	116	64	110	67	103	32
36	32	136	36	134	39	132	43	130	46	127	50	124	53	120	56	116	59	111	62	105	65	98	36
40	30	132	34	130	37	128	41	125	44	122	48	119	51	116	54	111	57	107	60	101	62	95	40
44	29	128	32	126	36	123	39	121	42	118	46	115	49	111	52	107	55	103	58	97	60	91	44
48	27	124	30	122	34	119	37	117	40	114	44	111	47	107	50	103	53	99	55	94	58	88	48
52	25	120	28	118	31	115	35	113	38	110	41	107	44	103	47	99	50	95	53	90	55	85	52
56	23	116	26	114	29	112	33	109	36	106	39	103	42	100	45	96	48	92	51	87	53	82	56
60	20	113	24	110	27	108	30	105	34	102	37	99	40	96	43	92	46	89	48	84	51	79	60
64	18	109	22	107	25	104	28	102	31	99	34	96	37	93	40	89	43	85	46	81	48	77	64
68	16	106	19	103	23	101	26	98	29	95	32	93	35	89	38	86	41	82	44	78	46	74	68
72	14	102	17	100	20	97	23	95	27	92	30	89	33	86	36	83	38	79	41	76	44	72	72
76	11	99	15	97	18	94	21	92	24	89	27	86	30	83	33	80	36	77	39	73	42	69	76
80	09	96	12	93	16	91	19	88	22	86	25	83	28	80	31	77	34	74	37	70	39	67	80
84	07	93	10	90	13	88	16	85	20	83	23	80	26	77	29	74	32	71	35	68	37	64	84
88	04	89	08	87	11	84	14	82	17	79	20	77	23	74	26	71	29	68	32	65	35	62	88
92	02	86	05	84	09	81	12	79	15	76	18	74	21	71	24	68	27	66	30	62	33	59	92
96	*00*	83	03	80	06	78	09	76	13	73	16	71	19	68	22	66	25	63	28	60	31	57	96
100	*03*	80	01	77	04	75	07	73	10	70	14	68	17	65	20	63	23	60	26	57	29	54	100
104	*05*	76	*02*	74	02	72	05	69	08	67	11	65	15	62	18	60	21	57	24	55	27	52	104
108	*07*	73	*04*	70	*01*	68	03	66	06	64	09	62	13	59	16	57	19	55	22	52	26	49	108
112	*09*	70	*06*	67	*03*	65	01	63	04	61	07	59	11	56	14	54	17	52	21	49	24	47	112
116	*12*	66	*08*	64	*05*	62	*01*	60	02	58	05	56	09	53	12	51	15	49	19	47	22	44	116
120	*14*	63	*10*	61	*07*	59	*03*	57	00	54	03	52	07	50	10	48	14	46	17	44	21	42	120
124	*16*	59	*12*	57	*09*	55	*05*	53	*02*	51	02	49	05	47	09	45	12	43	16	41	19	39	124
128	*18*	56	*14*	54	*11*	52	*07*	50	*04*	48	*00*	46	03	44	07	42	11	40	14	38	18	36	128
132	*20*	52	*16*	50	*13*	48	*09*	46	*05*	45	*02*	43	02	41	05	39	09	38	13	36	16	34	132
136	*21*	48	*18*	46	*14*	44	*11*	43	*07*	41	*03*	39	00	38	04	36	08	35	11	33	15	31	136
140	*23*	44	*19*	42	*16*	41	*12*	39	*08*	38	*05*	36	*01*	35	03	33	06	32	10	30	14	28	140
144	*25*	40	*21*	39	*17*	37	*14*	36	*10*	34	*06*	33	*02*	31	01	30	05	29	09	27	13	26	144
148	*26*	36	*22*	35	*19*	33	*15*	32	*11*	30	*07*	29	*03*	28	00	27	04	25	08	24	12	23	148
152	*27*	32	*24*	31	*20*	29	*16*	28	*12*	27	*08*	26	*04*	25	*01*	23	03	22	07	21	11	20	152
156	*29*	28	*25*	26	*21*	25	*17*	24	*13*	23	*09*	22	*05*	21	*02*	20	02	19	06	18	10	17	156
160	*30*	23	*26*	22	*22*	21	*18*	20	*14*	19	*10*	19	*06*	18	*02*	17	02	16	06	15	09	14	160
164	*30*	19	*27*	18	*23*	17	*19*	16	*15*	16	*11*	15	*07*	14	*03*	14	01	13	05	12	09	12	164
168	*31*	14	*27*	13	*23*	13	*19*	12	*15*	12	*11*	11	*07*	11	*03*	10	01	10	05	09	09	09	168
172	*32*	09	*28*	09	*24*	09	*20*	08	*16*	08	*12*	07	*08*	07	*04*	07	00	06	04	06	08	06	172
176	*32*	05	*28*	04	*24*	04	*20*	04	*16*	04	*12*	04	*08*	04	*04*	03	00	03	04	03	08	03	176
180	*32*	00	*28*	00	*24*	00	*20*	00	*16*	00	*12*	00	*08*	00	*04*	00	00	00	04	00	08	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	84	180	88	180	88	00	84	00	80	00	76	00	72	00	68	00	64	00	60	00	56	00	00
4	83	156	87	128	87	47	84	18	80	10	76	06	72	04	68	03	64	02	60	01	56	00	4
8	82	137	85	109	85	63	83	33	79	19	76	12	72	08	68	05	64	03	60	02	56	00	8
12	80	124	83	101	83	69	81	43	78	27	75	17	71	12	68	08	64	05	60	02	56	01	12
16	78	114	80	95	81	71	79	49	77	33	74	22	71	15	67	10	63	06	60	03	56	01	16
20	76	107	78	91	78	72	78	53	76	38	73	26	70	18	67	12	63	08	60	04	56	01	20
24	74	102	75	88	76	72	76	56	74	41	72	30	69	21	66	14	63	09	59	05	56	01	24
28	72	97	73	85	74	71	74	57	73	44	71	32	68	23	66	16	62	10	59	05	56	02	28
32	69	94	71	83	72	71	72	58	71	46	70	35	67	25	65	18	62	11	59	06	56	02	32
36	67	90	68	81	69	70	70	58	69	47	68	36	66	27	64	19	62	12	59	07	56	02	36
40	64	87	66	78	67	69	68	58	68	48	67	38	65	28	63	20	61	13	58	07	56	02	40
44	62	84	64	76	65	67	66	58	66	48	65	39	64	30	63	21	60	14	58	08	55	02	44
48	60	81	62	74	63	66	64	57	64	48	64	39	63	30	62	22	60	15	58	08	55	03	48
52	57	79	59	72	61	65	62	57	62	48	62	39	62	31	61	23	59	16	57	09	55	03	52
56	55	76	57	70	59	63	60	56	61	48	61	40	61	31	60	24	59	16	57	09	55	03	56
60	53	74	55	68	57	62	58	55	59	47	59	40	59	32	59	24	58	16	57	09	55	03	60
64	51	72	53	66	55	60	56	54	57	47	58	39	58	32	58	24	57	17	56	10	55	03	64
68	48	69	51	64	53	58	54	52	55	46	56	39	57	32	57	24	57	17	56	10	55	03	68
72	46	67	49	62	51	57	52	51	54	45	55	38	56	31	56	24	56	17	55	10	55	03	72
76	44	65	46	60	49	55	51	50	52	44	53	38	54	31	55	24	55	17	55	10	54	03	76
80	42	63	44	58	47	53	49	48	51	43	52	37	53	31	54	24	55	17	55	10	54	03	80
84	40	60	42	56	45	52	47	47	49	42	51	36	52	30	53	24	54	17	54	10	54	03	84
88	38	58	41	54	43	50	45	45	47	40	49	35	51	29	52	23	53	17	54	10	54	03	88
92	36	56	39	52	41	48	44	44	46	39	48	34	50	29	51	23	52	17	53	10	54	03	92
96	34	53	37	50	40	46	42	42	44	38	47	33	49	28	50	22	52	16	53	10	54	03	96
100	32	51	35	48	38	44	41	40	43	36	45	32	48	27	49	22	51	16	53	10	54	03	100
104	30	49	33	46	36	42	39	39	42	35	44	30	47	26	49	21	51	15	52	10	53	03	104
108	29	46	32	43	35	40	38	37	40	33	43	29	46	25	48	20	50	15	52	09	53	03	108
112	27	44	30	41	33	38	36	35	39	32	42	28	45	24	47	19	49	14	51	09	53	03	112
116	25	42	29	39	32	36	35	33	38	30	41	26	44	23	46	18	49	14	51	09	53	03	116
120	24	39	27	37	30	34	34	31	37	28	40	25	43	21	46	17	48	13	51	08	53	03	120
124	22	37	26	35	29	32	32	29	36	27	39	23	42	20	45	16	48	12	50	08	53	03	124
128	21	34	25	32	28	30	31	27	35	25	38	22	41	19	44	15	47	12	50	07	53	03	128
132	20	32	23	30	27	28	30	25	34	23	37	20	40	18	44	14	47	11	50	07	53	02	132
136	19	29	22	28	26	26	29	23	33	21	36	19	40	16	43	13	46	10	49	06	53	02	136
140	17	27	21	25	25	23	28	21	32	19	36	17	39	15	43	12	46	09	49	06	52	02	140
144	16	24	20	23	24	21	28	19	31	18	35	16	38	13	42	11	46	08	49	05	52	02	144
148	16	22	19	20	23	19	27	17	31	16	34	14	38	12	42	10	45	08	49	05	52	02	148
152	15	19	19	18	22	16	26	15	30	14	34	12	38	11	41	09	45	07	49	04	52	02	152
156	14	16	18	15	22	14	26	13	29	12	33	11	37	09	41	07	45	06	48	04	52	01	156
160	13	14	17	13	21	12	25	11	29	10	33	09	37	08	41	06	44	05	48	03	52	01	160
164	13	11	17	10	21	09	25	09	29	08	33	07	37	06	40	05	44	04	48	02	52	01	164
168	13	08	16	08	20	07	24	07	28	06	32	05	36	05	40	04	44	03	48	02	52	01	168
172	12	05	16	05	20	05	24	04	28	04	32	04	36	03	40	03	44	02	48	01	52	00	172
176	12	03	16	03	20	02	24	02	28	02	32	02	36	02	40	01	44	01	48	01	52	00	176
180	12	00	16	00	20	00	24	00	28	00	32	00	36	00	40	00	44	00	48	00	52	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

Lat. 55°

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ d d Δt	°	° ′ d d Δt	°	° ′ d d Δt	°	° ′ d d Δt	°	° ′ d d Δt	°	° ′ d d Δt	°	° ′ d d Δt	°	° ′ d d Δt	°	°
00	35 00.0 1.0 01	180.0	35 30.0 1.0 01	180.0	36 00.0 1.0 01	180.0	36 30.0 1.0 01	180.0	37 00.0 1.0 01	180.0	37 30.0 1.0 01	180.0	38 00.0 1.0 01	180.0	38 30.0 1.0 01	180.0	00
1	34 59.6 1.0 02	178.8	35 29.6 1.0 02	178.8	35 59.6 1.0 02	178.8	36 29.6 1.0 02	178.8	36 59.6 1.0 02	178.7	37 29.6 1.0 02	178.7	37 59.6 1.0 02	178.7	38 29.6 1.0 02	178.7	1
2	34 58.5 1.0 03	177.6	35 28.5 1.0 03	177.5	35 58.5 1.0 03	177.5	36 28.5 1.0 03	177.5	36 58.5 1.0 03	177.5	37 28.5 1.0 03	177.5	37 58.5 1.0 03	177.5	38 28.5 1.0 03	177.4	2
3	34 56.7 1.0 04	176.3	35 26.7 1.0 04	176.3	35 56.7 1.0 04	176.3	36 26.6 1.0 04	176.3	36 56.6 1.0 04	176.2	37 26.6 1.0 04	176.2	37 56.6 1.0 04	176.2	38 26.6 1.0 04	176.2	3
4	34 54.1 1.0 05	175.1	35 24.1 1.0 06	175.1	35 54.1 1.0 06	175.1	36 24.0 1.0 06	175.0	36 54.0 1.0 06	175.0	37 24.0 1.0 06	175.0	37 53.9 1.0 06	174.9	38 23.9 1.0 06	174.9	4
05	34 50.8 1.0 07	173.9	35 20.8 1.0 07	173.9	35 50.7 1.0 07	173.8	36 20.7 1.0 07	173.8	36 50.6 1.0 07	173.8	37 20.6 1.0 07	173.7	37 50.5 1.0 07	173.7	38 20.4 1.0 07	173.6	05
6	34 46.8 1.0 08	172.7	35 16.8 1.0 08	172.6	35 46.7 1.0 08	172.6	36 16.6 1.0 08	172.6	36 46.5 1.0 08	172.5	37 16.4 1.0 08	172.5	37 46.3 1.0 08	172.4	38 16.2 1.0 08	172.4	6
7	34 42.1 1.0 09	171.5	35 12.0 1.0 09	171.4	35 41.9 1.0 09	171.4	36 11.8 1.0 09	171.3	36 41.6 1.0 09	171.3	37 11.5 1.0 09	171.2	37 41.4 1.0 09	171.2	38 11.3 1.0 10	171.1	7
8	34 36.6 1.0 10	170.3	35 06.5 1.0 10	170.2	35 36.3 1.0 10	170.1	36 06.2 1.0 10	170.1	36 36.0 1.0 11	170.0	37 05.9 99 11	170.0	37 35.7 99 11	169.9	38 05.6 99 11	169.8	8
9	34 30.5 99 11	169.1	35 00.3 99 12	169.0	35 30.1 99 12	168.9	35 59.9 99 12	168.9	36 29.7 99 12	168.8	36 59.5 99 12	168.7	37 29.3 99 12	168.6	37 59.1 99 12	168.6	9
10	34 23.6 99 13	167.9	34 53.3 99 13	167.8	35 23.1 99 13	167.7	35 52.9 99 13	167.6	36 22.7 99 13	167.6	36 52.4 99 13	167.5	37 22.2 99 13	167.4	37 52.0 99 13	167.3	10
1	34 16.0 99 14	166.7	34 45.7 99 14	166.6	35 15.4 99 14	166.5	35 45.2 99 14	166.4	36 14.9 99 14	166.3	36 44.6 99 14	166.2	37 14.3 99 14	166.2	37 44.0 99 14	166.1	1
2	34 07.7 99 15	165.5	34 37.4 99 15	165.4	35 07.0 99 15	165.3	35 36.7 99 15	165.2	36 06.4 99 15	165.1	36 36.1 99 15	165.0	37 05.7 99 16	164.9	37 35.4 99 16	164.8	2
3	33 58.7 99 16	164.3	34 28.3 99 16	164.2	34 57.9 99 16	164.1	35 27.6 99 16	164.0	35 57.2 99 16	163.9	36 26.8 99 17	163.8	36 56.4 99 17	163.7	37 26.0 99 17	163.6	3
4	33 49.0 99 17	163.1	34 18.6 99 17	163.0	34 48.2 99 17	162.9	35 17.7 99 18	162.8	35 47.3 99 18	162.7	36 16.8 99 18	162.6	36 46.4 98 18	162.4	37 15.9 98 18	162.3	4
15	33 38.6 98 18	161.9	34 08.2 98 18	161.8	34 37.7 98 19	161.7	35 07.2 98 19	161.6	35 36.7 98 19	161.4	36 06.2 98 19	161.3	36 35.7 98 19	161.2	37 05.1 98 19	161.1	15
6	33 27.6 98 20	160.7	33 57.1 98 20	160.6	34 26.5 98 20	160.5	34 55.9 98 20	160.4	35 25.4 98 20	160.2	35 54.8 98 20	160.1	36 24.2 98 20	160.0	36 53.6 98 20	159.9	6
7	33 15.9 98 21	159.5	33 45.3 98 21	159.4	34 14.7 98 21	159.3	34 44.0 98 21	159.2	35 13.4 98 21	159.0	35 42.8 98 21	158.9	36 12.1 98 21	158.8	36 41.5 98 21	158.7	7
8	33 03.5 98 22	158.4	33 32.9 98 22	158.2	34 02.2 98 22	158.1	34 31.5 98 22	158.0	35 00.8 98 22	157.8	35 30.1 98 22	157.7	35 59.3 98 22	157.6	36 28.6 98 23	157.4	8
9	32 50.5 97 23	157.2	33 19.8 97 23	157.1	33 49.0 97 23	156.9	34 18.2 97 23	156.8	34 47.5 97 23	156.7	35 16.7 97 23	156.5	35 45.9 97 24	156.4	36 15.1 97 24	156.2	9
20	32 36.9 97 24	156.0	33 06.0 97 24	155.9	33 35.2 97 24	155.8	34 04.4 97 24	155.6	34 33.5 97 24	155.5	35 02.6 97 24	155.3	35 31.8 97 25	155.2	36 00.9 97 25	155.0	20
1	32 22.6 97 25	154.9	32 51.7 97 25	154.7	33 20.8 97 25	154.6	33 49.8 97 25	154.5	34 18.9 97 25	154.3	34 47.9 97 26	154.2	35 17.0 97 26	154.0	35 45.0 97 26	153.8	1
2	32 07.7 97 26	153.7	32 36.7 97 26	153.6	33 05.7 97 26	153.4	33 34.7 97 26	153.3	34 03.7 97 26	153.1	34 32.6 97 27	153.0	35 01.6 96 27	152.8	35 30.5 96 27	152.7	2
3	31 52.1 96 27	152.6	32 21.1 96 27	152.5	32 50.0 96 27	152.3	33 18.9 96 27	152.1	33 47.8 96 27	152.0	34 16.7 96 28	151.8	34 45.5 96 28	151.6	35 14.4 96 28	151.5	3
4	31 36.0 96 28	151.5	32 04.9 96 28	151.3	32 33.7 96 28	151.2	33 02.5 96 28	151.0	33 31.3 96 28	150.8	34 00.1 96 29	150.6	34 28.9 96 29	150.5	34 57.7 96 29	150.3	4
25	31 19.3 96 29	150.3	31 48.0 96 29	150.2	32 16.8 96 29	150.0	32 45.5 96 29	149.8	33 14.2 96 29	149.7	33 42.9 96 30	149.5	34 11.6 96 30	149.3	34 40.3 96 30	149.1	25
6	31 02.0 96 30	149.2	31 30.6 96 30	149.1	31 59.3 96 30	148.9	32 27.9 95 30	148.7	32 56.6 95 30	148.5	33 25.2 95 31	148.4	33 53.8 95 31	148.2	34 22.4 95 31	148.0	6
7	30 44.1 95 31	148.1	31 12.7 95 31	147.9	31 41.2 95 31	147.8	32 09.8 95 31	147.6	32 38.3 95 31	147.4	33 06.8 95 32	147.2	33 35.3 95 32	147.0	34 03.8 95 32	146.8	7
8	30 25.6 95 32	147.0	30 54.1 95 32	146.8	31 22.6 95 32	146.6	31 51.0 95 32	146.5	32 19.5 95 32	146.3	32 47.9 95 32	146.1	33 16.3 96 33	145.9	33 44.7 95 33	145.7	8
9	30 06.6 95 33	145.9	30 35.0 95 33	145.7	31 03.4 95 33	145.5	31 31.7 95 33	145.3	32 00.1 94 33	145.2	32 28.4 94 33	145.0	32 56.7 94 34	144.8	33 25.0 94 34	144.6	9
30	29 47.0 94 33	144.8	30 15.3 94 34	144.6	30 43.6 94 34	144.4	31 11.9 94 34	144.2	31 40.2 94 34	144.0	32 08.4 94 34	143.8	32 36.6 94 34	143.6	33 04.8 94 35	143.4	30
1	29 26.9 94 34	143.7	29 55.2 94 35	143.5	30 23.4 94 35	143.3	30 51.5 94 35	143.1	31 19.7 94 35	142.9	31 47.8 94 35	142.7	32 16.0 94 35	142.5	32 44.0 94 36	142.3	1
2	29 06.3 94 35	142.7	29 34.5 94 35	142.5	30 02.6 94 36	142.3	30 30.6 94 36	142.1	30 58.7 94 36	141.9	31 26.7 93 36	141.6	31 54.8 93 36	141.4	32 22.8 93 36	141.2	2
3	28 45.2 93 36	141.6	29 13.2 93 36	141.4	29 41.2 93 36	141.2	30 09.2 93 37	141.0	30 37.2 93 37	140.8	31 05.1 93 37	140.6	31 33.0 93 37	140.3	32 00.9 93 37	140.1	3
4	28 23.6 93 37	140.5	28 51.5 93 37	140.3	29 19.4 93 37	140.1	29 47.3 93 37	139.9	30 15.2 93 38	139.7	30 43.0 93 38	139.5	31 10.8 93 38	139.3	31 38.6 93 38	139.0	4
35	28 01.5 93 38	139.5	28 29.3 93 38	139.3	28 57.1 93 38	139.1	29 24.9 93 38	138.8	29 52.7 93 38	138.6	30 20.4 92 38	138.4	30 48.1 92 39	138.2	31 15.8 92 39	138.0	35
6	27 38.9 92 38	138.4	28 06.6 92 39	138.2	28 34.3 92 39	138.0	29 02.0 92 39	137.8	29 29.7 92 39	137.6	29 57.3 92 39	137.3	30 24.9 92 39	137.1	30 52.5 92 40	136.9	6
7	27 15.8 92 39	137.4	27 43.4 92 39	137.2	28 11.0 92 40	136.9	28 38.6 92 40	136.7	29 06.2 92 40	136.5	29 33.8 92 40	136.3	30 01.3 92 40	136.0	30 28.8 92 40	135.8	7
8	26 52.3 92 40	136.4	27 19.8 92 40	136.1	27 47.3 92 40	135.9	28 14.8 92 40	135.7	28 42.3 92 41	135.5	29 09.7 91 41	135.2	29 37.2 91 41	135.0	30 04.6 91 41	134.8	8
9	26 28.3 92 41	135.3	26 55.7 91 41	135.1	27 23.2 91 41	134.9	27 50.6 91 41	134.6	28 17.9 91 41	134.4	28 45.3 91 42	134.2	29 12.6 91 42	133.9	29 39.9 91 42	133.7	9
40	26 03.9 91 41	134.3	26 31.2 91 42	134.1	26 58.5 91 42	133.9	27 25.8 91 42	133.6	27 53.1 91 42	133.4	28 20.4 91 42	133.1	28 47.6 91 42	132.9	29 14.8 91 43	132.7	40
1	25 39.0 91 42	133.3	26 06.3 91 42	133.1	26 33.5 91 42	132.8	27 00.7 91 43	132.6	27 27.9 91 43	132.4	27 55.1 90 43	132.1	28 22.2 90 43	131.9	28 49.3 90 43	131.6	1
2	25 13.8 91 43	132.3	25 40.9 90 43	132.1	26 08.1 90 43	131.8	26 35.2 90 43	131.6	27 02.3 90 43	131.3	27 29.3 90 44	131.1	27 56.4 90 44	130.9	28 23.4 90 44	130.6	2
3	24 48.1 90 43	131.3	25 15.2 90 44	131.1	25 42.2 90 44	130.8	26 09.2 90 44	130.6	26 36.2 90 44	130.3	27 03.2 90 44	130.1	27 30.1 90 44	129.8	27 57.0 90 45	129.6	3
4	24 22.1 90 44	130.3	24 49.0 90 44	130.1	25 16.0 90 44	129.8	25 42.9 90 45	129.6	26 09.8 90 45	129.3	26 36.7 90 45	129.1	27 03.5 89 45	128.8	27 30.3 89 45	128.6	4
45	23 55.6 90 45	129.3	24 22.5 90 45	129.1	24 49.4 89 45	128.8	25 16.2 89 45	128.6	25 43.0 89 45	128.3	26 09.8 89 45	128.1	26 36.5 89 46	127.8	27 03.2 89 46	127.6	45
6	23 28.8 89 45	128.3	23 55.6 89 45	128.1	24 22.4 89 46	127.9	24 49.1 89 46	127.6	25 15.8 89 46	127.4	25 42.5 89 46	127.1	26 09.2 89 46	126.8	26 35.8 89 46	126.6	6
7	23 01.7 89 46	127.4	23 28.4 89 46	127.1	23 55.0 89 46	126.9	24 21.7 89 46	126.6	24 48.3 89 46	126.4	25 14.9 89 47	126.1	25 41.4 89 47	125.9	26 08.0 88 47	125.6	7
8	22 34.1 89 46	126.4	23 00.7 89 47	126.2	23 27.3 89 47	125.9	23 53.9 88 47	125.7	24 20.4 88 47	125.4	24 46.9 88 47	125.1	25 13.4 88 47	124.9	25 39.8 88 47	124.6	8
9	22 06.3 88 47	125.5	22 32.8 88 47	125.2	22 59.3 88 47	124.9	23 25.7 88 47	124.7	23 52.2 88 48	124.4	24 18.6 88 48	124.2	24 45.0 88 48	123.9	25 11.3 88 48	123.6	9
50	21 38.1 88 48	124.5	22 04.5 88 48	124.2	22 30.9 88 48	124.0	22 57.3 88 48	123.7	23 23.6 88 48	123.5	23 50.0 88 48	123.2	24 16.3 88 48	122.9	24 42.5 88 49	122.7	50
1	21 09.6 88 48	123.6	21 35.9 88 48	123.3	22 02.2 88 48	123.0	22 28.5 88 48	122.8	22 54.8 88 49	122.5	23 21.0 87 49	122.3	23 47.2 87 49	122.0	24 13.4 87 49	121.7	1
2	20 40.7 88 49	122.6	21 07.0 87 49	122.4	21 33.2 87 49	122.1	21 59.4 87 49	121.8	22 25.6 87 49	121.6	22 51.8 87 49	121.3	23 17.9 87 49	121.0	23 44.0 87 50	120.8	2
3	20 11.6 87 49	121.7	20 37.8 87 49	121.4	21 03.9 87 49	121.2	21 30.0 87 49	120.9	21 56.1 87 50	120.6	22 22.2 87 50	120.4	22 48.3 87 50	120.1	23 14.3 87 50	119.8	3
4	19 42.2 87 50	120.8	20 08.3 87 50	120.5	20 34.3 87 50	120.2	21 00.4 87 50	120.0	21 26.4 87 50	119.7	21 52.4 87 50	119.4	22 18.3 87 50	119.2	22 44.3 86 50	118.9	4
55	19 12.4 87 50	119.8	19 38.5 87 50	119.6	20 04.4 87 50	119.3	20 30.4 87 50	119.0	20 56.4 86 50	118.8	21 22.3 86 51	118.5	21 48.2 86 51	118.2	22 14.0 86 51	118.0	55
6	18 42.5 86 50	118.9	19 08.4 86 51	118.7	19 34.3 86 51	118.4	20 00.2 86 51	118.1	20 26.1 86 51	117.9	20 51.9 86 51	117.6	21 17.7 86 51	117.3	21 43.5 86 51	117.0	6
7	18 12.2 86 51	118.0	18 38.1 86 51	117.7	19 03.9 86 51	117.5	19 29.7 86 51	117.2	19 55.5 86 51	116.9	20 21.3 86 51	116.7	20 47.0 86 52	116.4	21 12.7 86 52	116.1	7
8	17 41.7 86 51	117.1	18 07.5 86 51	116.8	18 33.2 86 52	116.6	18 59.0 86 52	116.3	19 24.7 86 52	116.0	19 50.4 86 52	115.8	20 16.1 86 52	115.5	20 41.7 85 52	115.2	8
9	17 10.9 86 52	116.2	17 36.7 86 52	115.9	18 02.3 86 52	115.7	18 28.0 86 52	115.4	18 53.7 85 52	115.1	19 19.3 85 52	114.8	19 44.9 85 52	114.6	20 10.4 85 52	114.3	9
60	16 39.9 86 52	115.3	17 05.6 85 52	115.0	17 31.2 85 52	114.8	17 56.8 85 52	114.5	18 22.4 85 52	114.2	18 47.9 85 53	113.9	19 13.5 85 53	113.7	19 39.0 85 53	113.4	60
1	16 08.7 85 52	114.4	16 34.3 85 53	114.1	16 59.8 85 53	113.9	17 25.4 85 53	113.6	17 50.9 85 53	113.3	18 16.4 85 53	113.0	18 41.8 85 53	112.8	19 07.3 85 53	112.5	1
2	15 37.3 85 53	113.5	16 02.8 85 53	113.3	16 28.3 85 53	113.0	16 53.7 85 53	112.7	17 19.2 85 53	112.4	17 44.6 85 53	112.2	18 10.0 85 53	111.9	18 35.4 85 54	111.6	2
3	15 05.6 85 53	112.7	15 31.1 85 53	112.4	15 56.5 85 53	112.1	16 21.9 85 53	111.8	16 47.3 85 54	111.5	17 12.6 84 54	111.3	17 38.0 84 54	111.0	18 03.3 84 54	110.7	3
4	14 33.8 85 53	111.8	14 59.1 85 54	111.5	15 24.5 85 54	111.2	15 49.8 84 54	110.9	16 15.2 84 54	110.7	16 40.5 84 54	110.4	17 05.7 84 54	110.1	17 31.0 84 54	109.8	4
65	14 01.7 84 54	110.9	14 27.0 84 54	110.6	14 52.3 84 54	110.4	15 17.6 84 54	110.1	15 42.9 84 54	109.8	16 08.1 84 54	109.5	16 33.3 84 54	109.2	16 58.5 84 54	108.9	65
6	13 29.5 84 54	110.0	13 54.7 84 54	109.8	14 20.0 84 54	109.5	14 45.2 84 54	109.2	15 10.4 84 54	108.9	15 35.6 84 54	108.6	16 00.7 84 55	108.4	16 25.9 84 55	108.1	6
7	12 57.0 84 54	109.2	13 22.3 84 54	108.9	13 47.4 84 54	108.6	14 12.6 84 55	108.3	14 37.8 84 55	108.1	15 02.9 84 55	107.8	15 28.0 84 55	107.5	15 53.1 84 55	107.2	7
8	12 24.5 84 55	108.3	12 49.6 84 55	108.0	13 14.7 84 55	107.8	13 39.9 84 55	107.5	14 05.0 84 55	107.2	14 30.0 84 55	106.9	14 55.1 83 55	106.6	15 20.1 83 55	106.3	8
9	11 51.7 84 55	107.5	12 16.8 84 55	107.2	12 41.9 84 55	106.9	13 07.0 84 55	106.6	13 32.0 83 55	106.3	13 57.0 83 55	106.0	14 22.1 83 55	105.8	14 47.0 83 55	105.5	9
70	11 18.8 84 55	106.6	11 43.9 83 55	106.3	12 08.9 83 55	106.0	12 33.9 83 55	105.8	12 58.9 83 55	105.5	13 23.9 83 55	105.2	13 48.9 83 56	104.9	14 13.8 83 56	104.6	70
1	10 45.7 83 55	105.8	11 10.8 83 55	105.5	11 35.7 83 55	105.2	12 00.7 83 56	104.9	12 25.7 83 56	104.6	12 50.6 83 56	104.3	13 15.5 83 56	104.1	13 40.4 83 56	103.8	1
2	10 12.6 83 56	104.9	10 37.5 83 56	104.6	11 02.5 83 56	104.3	11 27.4 83 56	104.1	11 52.3 83 56	103.8	12 17.2 83 56	103.5	12 42.1 83 56	103.2	13 07.0 83 56	102.9	2
3	9 39.2 83 56	104.1	10 04.2 83 56	103.8	10 29.1 83 56	103.5	10 54.0 83 56	103.2	11 18.8 83 56	102.9	11 43.7 83 56	102.6	12 08.5 83 56	102.4	12 33.4 83 56	102.1	3
4	9 05.8 83 56	103.2	9 30.7 83 56	102.9	9 55.5 83 56	102.7	10 20.4 83 56	102.4	10 45.2 83 56	102.1	11 10.1 83 56	101.8	11 34.9 83 56	101.5	11 59.7 83 56	101.2	4
75	8 32.2 83 56	102.4	8 57.1 83 56	102.1	9 21.9 83 56	101.8	9 46.7 83 56	101.5	10 11.5 83 56	101.2	10 36.3 83 56	101.0	11 01.1 83 56	100.7	11 25.8 82 56	100.4	75
6	7 58.6 83 56	101.5	8 23.4 83 56	101.3	8 48.2 83 56	101.0	9 13.0 83 56	100.7	9 37.7 83 56	100.4	10 02.5 82 57	100.1	10 27.2 82 57	99.8	10 52.0 82 57	99.5	6
7	7 24.8 83 56	100.7	7 49.6 83 56	100.4	8 14.3 83 57	100.1	8 39.1 82 57	99.9	9 03.8 82 57	99.6	9 28.6 82 57	99.3	9 53.3 82 57	99.0	10 18.0 82 57	98.7	7
8	6 50.9 83 57	99.9	7 15.7 82 57	99.6	7 40.4 82 57	99.3	8 05.1 82 57	99.0	8 29.9 82 57	98.7	8 54.6 82 57	98.4	9 19.2 82 57	98.2	9 43.9 82 57	97.9	8
9	6 17.0 82 57	99.0	6 41.7 82 57	98.8	7 06.4 82 57	98.5	7 31.1 82 57	98.2	7 55.8 82 57	97.9	8 20.5 82 57	97.6	8 45.1 82 57	97.3	9 09.8 82 57	97.0	9
80	5 43.0 82 57	98.2	6 07.7 82 57	97.9	6 32.3 82 57	97.6	6 57.0 82 57	97.4	7 21.7 82 57	97.1	7 46.3 82 57	96.8	8 11.0 82 57	96.5	8 35.6 82 57	96.2	80
1	5 08.9 82 57	97.4	5 33.5 82 57	97.1	5 58.2 82 57	96.8	6 22.9 82 57	96.5	6 47.5 82 57	96.2	7 12.1 82 57	96.0	7 36.8 82 57	95.7	8 01.4 82 57	95.4	1
2					5 24.0 82 57	96.0	5 48.6 82 57	95.7	6 13.3 82 57	95.4	6 37.9 82 57	95.1	7 02.5 82 57	94.8	7 27.1 82 57	94.6	2
3							5 14.4 82 57	94.9	5 39.0 82 57	94.6	6 03.6 82 57	94.3	6 28.2 82 57	94.0	6 52.8 82 57	93.7	3
4									5 04.7 82 57	93.8	5 29.3 82 57	93.5	5 53.8 82 57	93.2	6 18.4 82 57	92.9	4
85													5 19.5 82 57	92.4	5 44.0 82 57	92.1	85
6															5 09.6 82 57	91.3	6

Digitized by Google

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	35 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	34 00.0	1.0 01	180.0	33 30.0	1.0 01	180.0	33 00.0	1.0 01	180.0	32 30.0	1.0 01	180.0	32 00.0	1.0 01	180.0	31 30.0	1.0 01	180.0	00
1	34 59.6	1.0 02	178.8	34 29.6	1.0 02	178.8	33 59.6	1.0 02	178.8	33 29.6	1.0 02	178.8	32 59.6	1.0 02	178.8	32 29.6	1.0 02	178.8	31 59.6	1.0 02	178.8	31 29.6	1.0 02	178.8	1
2	34 58.5	1.0 03	177.6	34 28.5	1.0 03	177.6	33 58.6	1.0 03	177.6	33 28.6	1.0 03	177.6	32 58.6	1.0 03	177.6	32 28.6	1.0 03	177.6	31 58.6	1.0 03	177.6	31 28.6	1.0 03	177.7	2
3	34 56.7	1.0 04	176.3	34 26.7	1.0 04	176.4	33 56.7	1.0 04	176.4	33 26.8	1.0 04	176.4	32 56.8	1.0 04	176.4	32 26.8	1.0 04	176.4	31 56.8	1.0 04	176.5	31 26.8	1.0 04	176.5	3
4	34 54.1	1.0 05	175.1	34 24.2	1.0 05	175.2	33 54.2	1.0 05	175.2	33 24.2	1.0 05	175.2	32 54.3	1.0 05	175.2	32 24.3	1.0 05	175.3	31 54.3	1.0 05	175.3	31 24.4	1.0 05	175.3	4
05	34 50.8	1.0 07	173.9	34 20.9	1.0 07	173.9	33 51.0	1.0 07	174.0	33 21.0	1.0 07	174.0	32 51.1	1.0 07	174.0	32 21.1	1.0 06	174.1	31 51.2	1.0 06	174.1	31 21.2	1.0 06	174.2	05
6	34 46.8	1.0 08	172.7	34 16.9	1.0 08	172.7	33 47.0	1.0 08	172.8	33 17.1	1.0 08	172.8	32 47.1	1.0 08	172.9	32 17.2	1.0 08	172.9	31 47.3	1.0 08	172.9	31 17.4	1.0 08	173.0	6
7	34 42.1	1.0 09	171.5	34 12.2	1.0 09	171.5	33 42.3	1.0 09	171.6	33 12.4	1.0 09	171.6	32 42.5	1.0 09	171.7	32 12.6	1.0 09	171.7	31 42.7	1.0 09	171.8	31 12.8	1.0 09	171.8	7
8	34 36.6	1.0 10	170.3	34 06.8	1.0 10	170.3	33 36.9	1.0 10	170.4	33 07.0	1.0 10	170.4	32 37.2	1.0 10	170.5	32 07.3	1.0 10	170.6	31 37.4	1.0 10	170.6	31 07.6	1.0 10	170.7	8
9	34 30.5	99 11	169.1	34 00.6	99 11	169.1	33 30.8	99 11	169.2	33 01.0	99 11	169.3	32 31.1	99 11	169.3	32 01.3	99 11	169.4	31 31.5	99 11	169.4	31 01.7	99 11	169.5	9
10	34 23.6	99 13	167.9	33 53.8	99 13	167.9	33 24.0	99 12	168.0	32 54.2	99 12	168.1	32 24.4	99 12	168.1	31 54.6	99 12	168.2	31 24.8	99 12	168.3	30 55.0	99 12	168.3	10
1	34 16.0	99 14	166.7	33 46.2	99 14	166.7	33 16.5	99 14	166.8	32 46.7	99 14	166.9	32 17.0	99 14	167.0	31 47.3	99 13	167.0	31 17.5	99 13	167.1	30 47.7	99 13	167.2	1
2	34 07.7	99 15	165.5	33 38.0	99 15	165.5	33 08.3	99 15	165.6	32 38.6	99 15	165.7	32 08.9	99 15	165.8	31 39.2	99 15	165.9	31 09.5	99 14	166.0	30 39.8	99 14	166.0	2
3	33 58.7	99 16	164.3	33 29.0	99 16	164.4	32 59.4	99 16	164.4	32 29.8	99 16	164.5	32 00.1	99 16	164.6	31 30.5	99 16	164.7	31 00.8	99 16	164.8	30 31.1	99 16	164.9	3
4	33 49.0	99 17	163.1	33 19.4	99 17	163.2	32 49.8	99 17	163.3	32 20.2	99 17	163.4	31 50.7	99 17	163.5	31 21.1	99 17	163.6	30 51.5	99 17	163.7	30 21.8	99 17	163.7	4
15	33 38.6	98 18	161.9	33 09.1	98 18	162.0	32 39.6	98 18	162.1	32 10.1	98 18	162.2	31 40.5	98 18	162.3	31 11.0	98 18	162.4	30 41.4	98 18	162.5	30 11.9	99 18	162.6	15
6	33 27.6	98 20	160.7	32 58.1	98 19	160.8	32 28.7	98 19	160.9	31 59.2	98 19	161.0	31 29.7	98 19	161.2	31 00.3	98 19	161.3	30 30.8	98 19	161.4	30 01.3	98 19	161.5	6
7	33 15.9	98 21	159.5	32 46.5	98 20	159.7	32 17.1	98 20	159.8	31 47.7	98 20	159.9	31 18.3	98 20	160.0	30 48.9	98 20	160.1	30 19.4	98 20	160.2	29 50.0	98 20	160.3	7
8	33 03.5	98 22	158.4	32 34.2	98 22	158.5	32 04.9	98 21	158.6	31 35.5	98 21	158.7	31 06.2	98 21	158.9	30 36.8	98 21	159.0	30 07.5	98 21	159.1	29 38.1	98 21	159.2	8
9	32 50.5	97 23	157.2	32 21.3	98 23	157.3	31 52.0	98 23	157.5	31 22.7	98 22	157.6	30 53.5	98 22	157.7	30 24.2	98 22	157.8	29 54.9	98 22	158.0	29 25.6	98 22	158.1	9
20	32 36.9	97 24	156.0	32 07.7	97 24	156.2	31 38.5	97 24	156.3	31 09.3	97 23	156.5	30 40.1	97 23	156.6	30 10.9	97 23	156.7	29 41.7	97 23	156.8	29 12.4	97 23	157.0	20
1	32 22.6	97 25	154.9	31 53.5	97 25	155.0	31 24.4	97 25	155.2	30 55.2	97 24	155.3	30 26.1	97 24	155.5	29 57.0	97 24	155.6	29 27.8	97 24	155.7	28 58.7	97 24	155.9	1
2	32 07.7	97 26	153.7	31 38.6	97 26	153.9	31 09.6	97 26	154.0	30 40.6	97 25	154.2	30 11.5	97 25	154.3	29 42.5	97 25	154.5	29 13.4	97 25	154.6	28 44.3	97 25	154.8	2
3	31 52.1	96 27	152.6	31 23.2	96 27	152.8	30 54.2	97 27	152.9	30 25.3	97 26	153.1	29 56.3	97 26	153.2	29 27.3	97 26	153.4	28 58.3	97 26	153.5	28 29.3	97 26	153.7	3
4	31 36.0	96 28	151.5	31 07.2	96 28	151.6	30 38.3	96 28	151.8	30 09.4	96 27	152.0	29 40.5	96 27	152.1	29 11.6	96 27	152.3	28 42.7	96 27	152.4	28 13.8	96 27	152.6	4
25	31 19.3	96 29	150.3	30 50.5	96 29	150.5	30 21.7	96 29	150.7	29 52.9	96 28	150.8	29 24.1	96 28	151.0	28 55.3	96 28	151.2	28 26.5	96 28	151.3	27 57.6	96 28	151.5	25
6	31 02.0	96 30	149.2	30 33.3	96 30	149.4	30 04.6	96 30	149.6	29 35.9	96 29	149.7	29 07.1	96 29	149.9	28 38.4	96 29	150.1	28 09.7	96 29	150.2	27 40.9	96 29	150.4	6
7	30 44.1	95 31	148.1	30 15.5	95 31	148.3	29 46.9	95 30	148.5	29 18.2	95 30	148.6	28 49.6	95 30	148.8	28 20.9	96 30	149.0	27 52.3	96 30	149.1	27 23.6	96 30	149.3	7
8	30 25.6	95 32	147.0	29 57.1	95 32	147.2	29 28.6	95 31	147.4	29 00.0	95 31	147.5	28 31.5	95 31	147.7	28 02.9	95 31	147.9	27 34.4	95 31	148.1	27 05.8	95 31	148.2	8
9	30 06.6	95 33	145.9	29 38.2	95 32	146.1	29 09.8	95 32	146.3	28 41.3	95 32	146.5	28 12.8	95 32	146.6	27 44.4	95 32	146.8	27 15.9	95 32	147.0	26 47.4	95 32	147.2	9
30	29 47.0	94 33	144.8	29 18.7	94 33	145.0	28 50.4	94 33	145.2	28 22.0	95 33	145.4	27 53.7	95 33	145.6	27 25.3	95 33	145.8	26 56.9	95 33	145.9	26 28.5	95 32	146.1	30
1	29 26.9	94 34	143.7	28 58.7	94 34	143.9	28 30.5	94 34	144.1	28 02.2	94 34	144.3	27 33.9	94 34	144.5	27 05.6	94 34	144.7	26 37.3	94 33	144.9	26 09.0	94 33	145.1	1
2	29 06.3	94 35	142.7	28 38.2	94 35	142.9	28 10.0	94 35	143.1	27 41.9	94 35	143.3	27 13.7	94 35	143.4	26 45.5	94 34	143.6	26 17.3	94 34	143.8	25 49.0	94 34	144.0	2
3	28 45.2	93 36	141.6	28 17.2	93 36	141.8	27 49.1	94 36	142.0	27 21.0	94 36	142.2	26 52.9	94 35	142.4	26 24.8	94 35	142.6	25 56.7	94 35	142.8	25 28.6	94 35	143.0	3
4	28 23.6	93 37	140.5	27 55.6	93 37	140.7	27 27.7	93 37	140.9	26 59.7	93 36	141.1	26 31.7	93 36	141.3	26 03.7	93 36	141.5	25 35.6	93 36	141.7	25 07.6	94 36	141.9	4
35	28 01.5	93 38	139.5	27 33.6	93 38	139.7	27 05.7	93 37	139.9	26 37.9	93 37	140.1	26 10.0	93 37	140.3	25 42.0	93 37	140.5	25 14.1	93 37	140.7	24 46.1	93 37	140.9	35
6	27 38.9	92 38	138.4	27 11.1	93 38	138.6	26 43.3	93 38	138.9	26 15.5	93 38	139.1	25 47.7	93 38	139.3	25 19.9	93 38	139.5	24 52.1	93 38	139.7	24 24.2	93 37	139.9	6
7	27 15.8	92 39	137.4	26 48.1	92 39	137.6	26 20.5	92 39	137.8	25 52.8	92 39	138.0	25 25.1	92 39	138.2	24 57.3	92 38	138.5	24 29.6	93 38	138.7	24 01.8	93 38	138.9	7
8	26 52.3	92 40	136.4	26 24.7	92 40	136.6	25 57.1	92 40	136.8	25 29.5	92 40	137.0	25 01.9	92 39	137.2	24 34.3	92 39	137.4	24 06.6	92 39	137.7	23 38.9	92 39	137.9	8
9	26 28.3	92 41	135.3	26 00.8	92 41	135.6	25 33.3	92 40	135.8	25 05.8	92 40	136.0	24 38.3	92 40	136.2	24 10.8	92 40	136.4	23 43.2	92 40	136.7	23 15.6	92 40	136.9	9
40	26 03.9	91 41	134.3	25 36.5	91 41	134.5	25 09.1	91 41	134.8	24 41.7	91 41	135.0	24 14.3	91 41	135.2	23 46.8	92 41	135.4	23 19.4	92 40	135.7	22 51.9	92 40	135.9	40
1	25 39.0	91 42	133.3	25 11.8	91 42	133.5	24 44.5	91 42	133.8	24 17.2	91 42	134.0	23 49.8	91 41	134.2	23 22.5	91 41	134.4	22 55.1	91 41	134.7	22 27.7	91 41	134.9	1
2	25 13.8	91 43	132.3	24 46.6	91 43	132.5	24 19.4	91 42	132.8	23 52.2	91 42	133.0	23 25.0	91 42	133.2	22 57.7	91 42	133.4	22 30.4	91 42	133.7	22 03.1	91 42	133.9	2
3	24 48.1	90 43	131.3	24 21.0	90 43	131.5	23 53.9	90 43	131.8	23 26.8	90 43	132.0	22 59.7	91 43	132.2	22 32.5	91 43	132.5	22 05.3	91 42	132.7	21 38.1	91 42	132.9	3
4	24 22.1	90 44	130.3	23 55.1	90 44	130.5	23 28.1	90 44	130.8	23 01.0	90 44	131.0	22 34.0	90 43	131.3	22 06.9	90 43	131.5	21 39.8	90 43	131.7	21 12.7	90 43	131.9	4
45	23 55.6	90 45	129.3	23 28.8	90 45	129.6	23 01.8	90 44	129.8	22 34.9	90 44	130.0	22 07.9	90 44	130.3	21 40.9	90 44	130.5	21 13.9	90 44	130.8	20 46.9	90 44	131.0	45
6	23 28.8	89 45	128.3	23 02.0	89 45	128.6	22 35.2	89 45	128.8	22 08.4	90 45	129.1	21 41.5	90 45	129.3	21 14.6	90 45	129.6	20 47.7	90 44	129.8	20 20.8	90 44	130.0	6
7	23 01.7	89 46	127.4	22 35.0	89 46	127.6	22 08.2	89 46	127.9	21 41.5	89 45	128.1	21 14.7	89 45	128.4	20 47.9	89 45	128.6	20 21.1	89 45	128.8	19 54.2	89 45	129.1	7
8	22 34.1	89 46	126.4	22 07.5	89 46	126.7	21 40.9	89 46	126.9	21 14.2	89 46	127.2	20 47.5	89 46	127.4	20 20.8	89 46	127.6	19 54.1	89 46	127.9	19 27.3	89 45	128.1	8
9	22 06.3	88 47	125.5	21 39.7	88 47	125.7	21 13.2	89 47	126.0	20 46.6	89 47	126.2	20 20.0	89 46	126.5	19 53.4	89 46	126.7	19 26.7	89 46	126.9	19 00.1	89 46	127.2	9
50	21 38.1	88 48	124.5	21 11.6	88 47	124.8	20 45.2	88 47	125.0	20 18.7	88 47	125.3	19 52.2	88 47	125.5	19 25.6	88 47	125.8	18 59.1	89 47	126.0	18 32.5	89 47	126.2	50
1	21 09.6	88 48	123.6	20 43.2	88 48	123.8	20 16.8	88 48	124.1	19 50.4	88 48	124.3	19 24.0	88 48	124.6	18 57.5	88 47	124.8	18 31.1	88 47	125.1	18 04.6	88 47	125.3	1
2	20 40.7	88 49	122.6	20 14.4	88 48	122.9	19 48.2	88 48	123.1	19 21.8	88 48	123.4	18 55.5	88 48	123.6	18 29.1	88 48	123.9	18 02.7	88 48	124.1	17 36.3	88 48	124.4	2
3	20 11.6	87 49	121.7	19 45.4	87 49	121.9	19 19.2	87 49	122.2	18 52.9	87 49	122.5	18 26.7	88 48	122.7	18 00.4	88 48	123.0	17 34.1	88 48	123.2	17 07.8	88 48	123.5	3
4	19 42.2	87 50	120.8	19 16.0	87 49	121.0	18 49.9	87 49	121.3	18 23.8	87 49	121.5	17 57.6	87 49	121.8	17 31.4	87 49	122.0	17 05.2	87 49	122.3	16 38.9	87 49	122.6	4
55	19 12.4	87 50	119.8	18 46.4	87 50	120.1	18 20.4	87 50	120.4	17 54.3	87 50	120.6	17 28.2	87 49	120.9	17 02.1	87 49	121.1	16 35.9	87 49	121.4	16 09.8	87 49	121.6	55
6	18 42.5	86 50	118.9	18 16.5	87 50	119.2	17 50.5	87 50	119.4	17 24.5	87 50	119.7	16 58.5	87 50	120.0	16 32.5	87 50	120.2	16 06.4	87 50	120.5	15 40.3	87 50	120.7	6
7	18 12.2	86 51	118.0	17 46.3	86 51	118.3	17 20.4	86 51	118.5	16 54.5	86 50	118.8	16 28.6	87 50	119.1	16 02.6	87 50	119.3	15 36.6	87 50	119.6	15 10.6	87 50	119.8	7
8	17 41.7	86 51	117.1	17 15.9	86 51	117.4	16 50.1	86 51	117.6	16 24.2	86 51	117.9	15 58.4	86 51	118.2	15 32.5	86 51	118.4	15 06.6	86 51	118.7	14 40.6	86 50	119.0	8
9	17 10.9	86 52	116.2	16 45.2	86 52	116.5	16 19.5	86 51	116.7	15 53.7	86 51	117.0	15 27.9	86 51	117.3	15 02.1	86 51	117.5	14 36.2	86 51	117.8	14 10.4	86 51	118.1	9
60	16 39.9	86 52	115.3	16 14.3	86 52	115.6	15 48.6	86 52	115.8	15 22.9	86 52	116.1	14 57.2	86 52	116.4	14 31.4	86 51	116.6	14 05.7	86 51	116.9	13 39.9	86 51	117.2	60
1	16 08.7	85 52	114.4	15 43.1	85 52	114.7	15 17.5	85 52	115.0	14 51.9	85 52	115.2	14 26.2	86 52	115.5	14 00.6	86 52	115.8	13 34.9	86 52	116.0	13 09.2	86 52	116.3	1
2	15 37.3	85 53	113.5	15 11.8	85 53	113.8	14 46.2	85 53	114.1	14 20.6	85 52	114.3	13 55.1	85 52	114.6	13 29.5	85 52	114.9	13 03.8	85 52	115.2	12 38.2	85 52	115.4	2
3	15 05.6	85 53	112.7	14 40.2	85 53	112.9	14 14.7	85 53	113.2	13 49.2	85 53	113.5	13 23.7	85 53	113.7	12 58.1	85 53	114.0	12 32.6	85 52	114.3	12 07.0	85 52	114.5	3
4	14 33.8	85 53	111.8	14 08.4	85 53	112.1	13 42.9	85 53	112.3	13 17.5	85 53	112.6	12 52.1	85 53	112.9	12 26.6	85 53	113.1	12 01.1	85 53	113.4	11 35.6	85 53	113.7	4
65	14 01.7	84 54	110.9	13 36.4	84 54	111.2	13 11.0	85 54	111.5	12 45.6	85 53	111.7	12 20.2	85 53	112.0	11 54.8	85 53	112.3	11 29.4	85 53	112.5	11 04.0	85 53	112.8	65
6	13 29.5	84 54	110.0	13 04.2	84 54	110.3	12 38.9	84 54	110.6	12 13.6	84 54	110.9	11 48.2	84 54	111.1	11 22.9	85 54	111.4	10 57.5	85 58	111.7	10 32.2	85 53	112.0	6
7	12 57.0	84 54	109.2	12 31.8	84 54	109.5	12 06.6	84 54	109.7	11 41.3	84 54	110.0	11 16.0	84 54	110.3	10 50.8	84 54	110.6	10 25.5	84 54	110.8	10 00.1	84 54	111.1	7
8	12 24.5	84 55	108.3	11 59.3	84 54	108.6	11 34.1	84 54	108.9	11 08.9	84 54	109.1	10 43.7	84 54	109.4	10 18.4	84 54	109.7	9 53.2	84 54	110.0	9 27.9	84 54	110.2	8
9	11 51.7	84 55	107.5	11 26.6	84 55	107.7	11 01.5	84 55	108.0	10 36.3	84 55	108.3	10 11.1	84 54	108.6	9 46.0	84 54	108.8	9 20.8	84 54	109.1	8 55.6	84 54	109.4	9
70	11 18.8	84 55	106.6	10 53.7	84 55	106.9	10 28.6	84 55	107.2	10 03.5	84 55	107.4	9 38.4	84 55	107.7	9 13.3	84 55	108.0	8 48.2	84 55	108.3	8 23.0	84 54	108.5	70
1	10 45.7	83 55	105.8	10 20.7	83 55	106.0	9 55.7	83 55	106.3	9 30.6	84 55	106.6	9 05.6	84 55	106.9	8 40.5	84 55	107.1	8 15.4	84 55	107.4	7 50.3	84 55	107.7	1
2	10 12.6	83 56	104.9	9 47.6	83 55	105.2	9 22.6	83 55	105.5	8 57.6	83 55	105.7	8 32.6	83 55	106.0	8 07.5	83 55	106.3	7 42.5	83 55	106.6	7 17.5	84 55	106.9	2
3	9 39.2	83 56	104.1	9 14.3	83 56	104.3	8 49.4	83 56	104.6	8 24.4	83 56	104.9	7 59.4	83 55	105.2	7 34.4	83 55	105.5	7 09.4	83 55	105.7	6 44.4	83 55	106.0	3
4	9 05.8	83 56	103.2	8 40.9	83 56	103.5	8 16.0	83 56	103.8	7 51.1	83 56	104.1	7 26.1	83 56	104.3	7 01.2	83 56	104.6	6 36.3	83 56	104.9	6 11.3	83 55	105.2	4
75	8 32.2	83 56	102.4	8 07.4	83 56	102.7	7 42.5	83 56	102.9	7 17.6	83 56	103.2	6 52.7	83 56	103.5	6 27.8	83 56	103.8	6 02.9	83 56	104.1	5 38.0	83 56	104.3	75
6	7 58.6	83 56	101.5	7 33.7	83 56	101.8	7 08.9	83 56	102.1	6 44.1	83 56	102.4	6 19.2	83 56	102.7	5 54.4	83 56	103.0	5 29.5	83 56	103.2	5 04.6	83 56	103.5	6
7	7 24.8	83 56	100.7	7 00.0	83 56	101.0	6 35.2	83 56	101.3	6 10.4	83 56	101.6	5 45.6	83 56	101.8	5 20.8	83 56	102.1							7
8	6 50.9	83 57	99.9	6 26.2	83 57	100.2	6 01.4	83 56	100.4	5 36.6	83 56	100.7	5 11.9	83 56	101.0										8
9	6 17.0	82 57	99.0	5 52.3	82 57	99.3	5 27.5	82 57	99.6	5 02.8	82 57	99.9													9
80	5 43.0	82 57	98.2	5 18.3	82 57	98.5																			80
1	5 08.9	82 57	97.4																						1

Digitized by Google

Lat. 55°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	39 00.0	1.0 01	180.0	39 30.0	1.0 01	180.0	40 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	41 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	42 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	00
1	38 59.6	1.0 02	178.7	39 29.6	1.0 02	178.7	39 59.6	1.0 02	178.7	40 29.6	1.0 02	178.7	40 59.6	1.0 02	178.7	41 29.6	1.0 02	178.7	41 59.6	1.0 02	178.7	42 29.6	1.0 02	178.7	1
2	38 58.5	1.0 03	177.4	39 28.4	1.0 03	177.4	39 58.4	1.0 03	177.4	40 28.4	1.0 03	177.4	40 58.4	1.0 03	177.4	41 28.4	1.0 03	177.3	41 58.4	1.0 03	177.3	42 28.4	1.0 03	177.3	2
3	38 56.5	1.0 04	176.2	39 26.5	1.0 05	176.1	39 56.5	1.0 05	176.1	40 26.5	1.0 05	176.1	40 56.4	1.0 05	176.0	41 26.4	1.0 05	176.0	41 56.4	1.0 05	176.0	42 26.4	1.0 05	176.0	3
4	38 53.8	1.0 06	174.9	39 23.8	1.0 06	174.8	39 53.8	1.0 06	174.8	40 23.7	1.0 06	174.8	40 53.7	1.0 06	174.7	41 23.6	1.0 06	174.7	41 53.6	1.0 06	174.7	42 23.5	1.0 06	174.6	4
05	38 50.4	1.0 07	173.6	39 20.3	1.0 07	173.5	39 50.3	1.0 07	173.5	40 20.2	1.0 07	173.5	40 50.1	1.0 07	173.4	41 20.1	1.0 07	173.4	41 50.0	1.0 07	173.3	42 19.9	1.0 07	173.3	05
6	38 46.2	1.0 08	172.3	39 16.1	1.0 08	172.3	39 46.0	1.0 08	172.2	40 15.9	1.0 08	172.2	40 45.8	1.0 09	172.1	41 15.7	1.0 09	172.1	41 45.6	1.0 09	172.0	42 15.5	1.0 09	172.0	6
7	38 41.2	1.0 10	171.0	39 11.1	1.0 10	171.0	39 40.9	1.0 10	170.9	40 10.8	1.0 10	170.9	40 40.7	1.0 10	170.8	41 10.6	1.0 10	170.7	41 40.4	1.0 10	170.7	42 10.3	1.0 10	170.6	7
8	38 35.4	99 11	169.8	39 05.3	99 11	169.7	39 35.1	99 11	169.6	40 05.0	99 11	169.6	40 34.8	99 11	169.5	41 04.6	99 11	169.4	41 34.5	99 11	169.4	42 04.3	99 11	169.3	8
9	38 29.0	99 12	168.5	38 58.8	99 12	168.4	39 28.6	99 12	168.4	39 58.3	99 12	168.3	40 28.1	99 12	168.2	40 57.9	99 12	168.1	41 27.7	99 13	168.0	41 57.5	99 13	168.0	9
10	38 21.7	99 13	167.2	38 51.5	99 13	167.2	39 21.2	99 13	167.1	39 51.0	99 14	167.0	40 20.7	99 14	166.9	40 50.5	99 14	166.8	41 20.2	99 14	166.7	41 49.9	99 14	166.6	10
1	38 13.7	99 14	166.0	38 43.5	99 15	165.9	39 13.2	99 15	165.8	39 42.9	99 15	165.7	40 12.5	99 15	165.6	40 42.2	99 15	165.5	41 11.9	99 15	165.4	41 41.6	99 15	165.3	1
2	38 05.0	99 16	164.7	38 34.7	99 16	164.6	39 04.3	99 16	164.5	39 34.0	99 16	164.4	40 03.6	99 16	164.3	40 33.2	99 16	164.2	41 02.9	99 16	164.1	41 32.5	99 16	164.0	2
3	37 55.6	99 17	163.5	38 25.2	99 17	163.4	38 54.8	99 17	163.3	39 24.4	99 17	163.2	39 54.0	99 17	163.0	40 23.5	99 17	162.9	40 53.1	99 18	162.8	41 22.6	99 18	162.7	3
4	37 45.5	98 18	162.2	38 15.0	98 18	162.1	38 44.5	98 18	162.0	39 14.0	98 18	161.9	39 43.6	98 19	161.8	40 13.1	98 19	161.7	40 42.6	98 19	161.5	41 12.0	98 19	161.4	4
15	37 34.6	98 19	161.0	38 04.1	98 19	160.9	38 33.5	98 20	160.7	39 03.0	98 20	160.6	39 32.4	98 20	160.5	40 01.9	98 20	160.4	40 31.3	98 20	160.2	41 00.7	98 20	160.1	15
6	37 23.0	98 20	159.8	37 52.4	98 21	159.6	38 21.8	98 21	159.5	38 51.2	98 21	159.4	39 20.6	98 21	159.2	39 49.9	98 21	159.1	40 19.3	98 21	159.0	40 48.6	98 21	158.8	6
7	37 10.8	98 22	158.5	37 40.1	98 22	158.4	38 09.4	98 22	158.3	38 38.7	98 22	158.1	39 08.0	98 22	158.0	39 37.3	98 22	157.8	40 06.6	98 22	157.7	40 35.9	98 22	157.6	7
8	36 57.9	98 23	157.3	37 27.1	97 23	157.2	37 56.3	97 23	157.0	38 25.6	97 23	156.9	38 54.8	97 23	156.7	39 24.0	97 23	156.6	39 53.2	97 24	156.4	40 22.4	97 24	156.3	8
9	36 44.2	97 24	156.1	37 13.4	97 24	155.9	37 42.6	97 24	155.8	38 11.7	97 24	155.6	38 40.8	97 24	155.5	39 10.0	97 24	155.3	39 39.1	97 25	155.2	40 08.2	97 25	155.0	9
20	36 30.0	97 25	154.9	36 59.0	97 25	154.7	37 28.1	97 25	154.6	37 57.2	97 25	154.4	38 26.2	97 25	154.3	38 55.3	97 26	154.1	39 24.3	97 26	153.9	39 53.3	97 26	153.8	20
1	36 15.0	97 26	153.7	36 44.0	97 26	153.5	37 13.0	97 26	153.4	37 42.0	97 26	153.2	38 11.0	97 27	153.0	38 39.9	96 27	152.9	39 08.8	96 27	152.7	39 37.8	96 27	152.5	1
2	35 59.5	96 27	152.5	36 28.4	96 27	152.3	36 57.3	96 27	152.2	37 26.2	96 27	152.0	37 55.0	96 28	151.8	38 23.9	96 28	151.6	38 52.7	96 28	151.5	39 21.6	96 28	151.3	2
3	35 43.2	96 28	151.3	36 12.1	96 28	151.1	36 40.9	96 28	151.0	37 09.7	96 29	150.8	37 38.5	96 29	150.6	38 07.2	96 29	150.4	38 36.0	96 29	150.2	39 04.7	96 29	150.1	3
4	35 26.4	96 29	150.1	35 55.1	96 29	150.0	36 23.9	96 29	149.8	36 52.6	96 30	149.6	37 21.3	96 30	149.4	37 49.9	96 30	149.2	38 18.6	95 30	149.0	38 47.2	96 30	148.8	4
25	35 09.0	96 30	149.0	35 37.6	95 30	148.8	36 06.2	95 30	148.6	36 34.8	95 31	148.4	37 03.4	95 31	148.2	37 32.0	95 31	148.0	38 00.6	95 31	147.8	38 29.1	95 31	147.6	25
6	34 50.9	95 31	147.8	35 19.5	95 31	147.6	35 48.0	95 31	147.4	36 16.5	95 32	147.2	36 45.0	95 32	147.0	37 13.5	95 32	146.8	37 41.9	95 32	146.6	38 10.4	95 32	146.4	6
7	34 32.3	95 32	146.6	35 00.7	95 32	146.5	35 29.2	95 32	146.3	35 57.6	95 32	146.1	36 26.0	95 33	145.9	36 54.4	95 33	145.7	37 22.7	94 33	145.5	37 51.1	94 33	145.2	7
8	34 13.1	95 33	145.5	34 41.4	94 33	145.3	35 09.8	94 33	145.1	35 38.1	94 33	144.9	36 06.4	94 34	144.7	36 34.7	94 34	144.5	37 02.9	94 34	144.3	37 31.1	94 34	144.1	8
9	33 53.3	94 34	144.4	34 21.6	94 34	144.2	34 49.8	94 34	144.0	35 18.0	94 34	143.8	35 46.2	94 35	143.5	36 14.4	94 35	143.3	36 42.5	94 35	143.1	37 10.7	94 35	142.9	9
30	33 33.0	94 35	143.2	34 01.2	94 35	143.0	34 29.3	94 35	142.8	34 57.4	94 35	142.6	35 25.5	94 35	142.4	35 53.6	94 36	142.2	36 21.6	93 36	142.0	36 49.6	93 36	141.7	30
1	33 12.1	94 36	142.1	33 40.2	93 36	141.9	34 08.2	93 36	141.7	34 36.2	93 36	141.5	35 04.2	93 36	141.3	35 32.2	93 36	141.0	36 00.1	93 37	140.8	36 28.0	93 37	140.6	1
2	32 50.7	93 37	141.0	33 18.7	93 37	140.8	33 46.6	93 37	140.6	34 14.5	93 37	140.4	34 42.4	93 37	140.1	35 10.3	93 37	139.9	35 38.1	93 38	139.7	36 05.9	93 38	139.4	2
3	32 28.8	93 37	139.9	32 56.7	93 38	139.7	33 24.5	93 38	139.5	33 52.3	93 38	139.2	34 20.1	93 38	139.0	34 47.9	92 38	138.8	35 15.6	92 38	138.5	35 43.3	92 39	138.3	3
4	32 06.4	93 38	138.8	32 34.2	92 38	138.6	33 01.9	92 39	138.4	33 29.6	92 39	138.1	33 57.3	92 39	137.9	34 24.9	92 39	137.7	34 52.6	92 39	137.4	35 20.2	92 39	137.2	4
35	31 43.5	92 39	137.7	32 11.2	92 39	137.5	32 38.8	92 39	137.3	33 06.4	92 40	137.0	33 34.0	92 40	136.8	34 01.5	92 40	136.6	34 29.0	92 40	136.3	34 56.5	92 40	136.1	35
6	31 20.1	92 40	136.6	31 47.7	92 40	136.4	32 15.2	92 40	136.2	32 42.7	92 40	135.9	33 10.2	92 40	135.7	33 37.6	91 41	135.5	34 05.0	91 41	135.2	34 32.4	91 41	135.0	6
7	30 56.3	92 41	135.6	31 23.7	91 41	135.3	31 51.1	91 41	135.1	32 18.5	91 41	134.9	32 45.9	91 41	134.6	33 13.2	91 41	134.4	33 40.6	91 42	134.1	34 07.8	91 42	133.9	7
8	30 31.9	91 41	134.5	30 59.3	91 41	134.3	31 26.6	91 42	134.0	31 53.9	91 42	133.8	32 21.2	91 42	133.5	32 48.4	91 42	133.3	33 15.6	91 42	133.0	33 42.8	91 42	132.8	8
9	30 07.2	91 42	133.5	30 34.4	91 42	133.2	31 01.7	91 42	133.0	31 28.8	91 42	132.7	31 56.0	91 43	132.5	32 23.1	90 43	132.2	32 50.3	90 43	132.0	33 17.3	90 43	131.7	9
40	29 42.0	91 43	132.4	30 09.1	90 43	132.2	30 36.3	90 43	131.9	31 03.4	90 43	131.7	31 30.4	90 43	131.4	31 57.5	90 44	131.2	32 24.5	90 44	130.9	32 51.4	90 44	130.7	40
1	29 16.4	90 43	131.4	29 43.4	90 44	131.1	30 10.4	90 44	130.9	30 37.4	90 44	130.6	31 04.4	90 44	130.4	31 31.3	90 44	130.1	31 58.2	90 44	129.9	32 25.1	90 45	129.6	1
2	28 50.4	90 44	130.4	29 17.3	90 44	130.1	29 44.2	90 44	129.9	30 11.1	90 45	129.6	30 38.0	90 45	129.3	31 04.8	89 45	129.1	31 31.6	89 45	128.8	31 58.4	89 45	128.6	2
3	28 23.9	90 45	129.3	28 50.8	89 45	129.1	29 17.6	89 45	128.8	29 44.4	89 45	128.6	30 11.2	89 45	128.3	30 37.9	89 45	128.0	31 04.6	89 46	127.8	31 31.3	89 46	127.5	3
4	27 57.1	89 45	128.3	28 23.9	89 45	128.1	28 50.6	89 46	127.8	29 17.3	89 46	127.6	29 44.0	89 46	127.3	30 10.6	89 46	127.0	30 37.2	89 46	126.8	31 03.8	89 46	126.5	4
45	27 29.9	89 46	127.3	27 56.6	89 46	127.1	28 23.2	89 46	126.8	28 49.8	89 46	126.5	29 16.4	89 47	126.3	29 43.0	88 47	126.0	30 09.5	88 47	125.7	30 36.0	88 47	125.5	45
6	27 02.4	89 46	126.3	27 29.0	89 47	126.1	27 55.5	88 47	125.8	28 22.0	88 47	125.5	28 48.5	88 47	125.3	29 15.0	88 47	125.0	29 41.4	88 47	124.7	30 07.8	88 48	124.5	6
7	26 34.5	88 47	125.3	27 01.0	88 47	125.1	27 27.4	88 47	124.8	27 53.8	88 48	124.5	28 20.2	88 48	124.3	28 46.6	88 48	124.0	29 12.9	88 48	123.7	29 39.2	88 48	123.4	7
8	26 06.2	88 48	124.4	26 32.6	88 48	124.1	26 59.0	88 48	123.8	27 25.3	88 48	123.6	27 51.6	88 48	123.3	28 17.9	88 48	123.0	28 44.1	87 49	122.7	29 10.3	87 49	122.5	8
9	25 37.7	88 48	123.4	26 04.0	88 48	123.1	26 30.2	88 48	122.8	26 56.5	87 49	122.6	27 22.7	87 49	122.3	27 48.9	87 49	122.0	28 15.0	87 49	121.7	28 41.1	87 49	121.5	9
50	25 08.8	87 49	122.4	25 35.0	87 49	122.1	26 01.2	87 49	121.9	26 27.3	87 49	121.6	26 53.5	87 49	121.3	27 19.5	87 49	121.0	27 45.6	87 50	120.8	28 11.6	87 50	120.5	50
1	24 39.6	87 49	121.5	25 05.7	87 49	121.2	25 31.8	87 49	120.9	25 57.9	87 50	120.6	26 23.9	87 50	120.4	26 49.9	87 50	120.1	27 15.9	87 50	119.8	27 41.8	86 50	119.5	1
2	24 10.1	87 50	120.5	24 36.1	87 50	120.2	25 02.1	87 50	120.0	25 28.1	87 50	119.7	25 54.1	86 50	119.4	26 20.0	86 50	119.1	26 45.9	86 50	118.8	27 11.7	86 51	118.6	2
3	23 40.3	87 50	119.6	24 06.2	86 50	119.3	24 32.2	86 50	119.0	24 58.1	86 51	118.7	25 23.9	86 51	118.4	25 49.8	86 51	118.2	26 15.6	86 51	117.9	26 41.4	86 51	117.6	3
4	23 10.2	86 51	118.6	23 36.1	86 51	118.3	24 01.9	86 51	118.1	24 27.8	86 51	117.8	24 53.6	86 51	117.5	25 19.3	86 51	117.2	25 45.0	86 51	116.9	26 10.7	86 51	116.6	4
55	22 39.9	86 51	117.7	23 05.7	86 51	117.4	23 31.4	86 51	117.1	23 57.2	86 51	116.8	24 22.9	86 52	116.6	24 48.6	86 52	116.3	25 14.2	85 52	116.0	25 39.9	85 52	115.7	55
6	22 09.2	86 51	116.8	22 35.0	86 52	116.5	23 00.7	86 52	116.2	23 26.4	86 52	115.9	23 52.0	85 52	115.6	24 17.6	85 52	115.3	24 43.2	85 52	115.1	25 08.7	85 52	114.8	6
7	21 38.4	86 52	115.8	22 04.1	85 52	115.6	22 29.7	85 52	115.3	22 55.3	85 52	115.0	23 20.8	85 52	114.7	23 46.4	85 52	114.4	24 11.9	85 53	114.1	24 37.4	85 53	113.8	7
8	21 07.3	85 52	114.9	21 32.9	85 52	114.6	21 58.4	85 52	114.4	22 24.0	85 53	114.1	22 49.5	85 53	113.8	23 14.9	85 53	113.5	23 40.4	85 53	113.2	24 05.8	85 53	112.9	8
9	20 36.0	85 53	114.0	21 01.5	85 53	113.7	21 27.0	85 53	113.4	21 52.4	85 53	113.2	22 17.9	85 53	112.9	22 43.3	85 53	112.6	23 08.6	85 53	112.3	23 34.0	84 53	112.0	9
60	20 04.4	85 53	113.1	20 29.9	85 53	112.8	20 55.3	85 53	112.5	21 20.7	85 53	112.3	21 46.1	84 53	112.0	22 11.4	84 53	111.7	22 36.7	84 54	111.4	23 02.0	84 54	111.1	60
1	19 32.7	85 53	112.2	19 58.1	85 53	111.9	20 23.4	84 54	111.6	20 48.7	84 54	111.4	21 14.0	84 54	111.1	21 39.3	84 54	110.8	22 04.5	84 54	110.5	22 29.8	84 54	110.2	1
2	19 00.7	84 54	111.3	19 26.0	84 54	111.0	19 51.3	84 54	110.7	20 16.6	84 54	110.5	20 41.8	84 54	110.2	21 07.0	84 54	109.9	21 32.2	84 54	109.6	21 57.4	84 54	109.3	2
3	18 28.6	84 54	110.4	18 53.8	84 54	110.1	19 19.0	84 54	109.9	19 44.3	84 54	109.6	20 09.4	84 54	109.3	20 34.6	84 54	109.0	20 59.7	84 54	108.7	21 24.8	84 55	108.4	3
4	17 56.2	84 54	109.5	18 21.4	84 54	109.3	18 46.6	84 54	109.0	19 11.7	84 54	108.7	19 36.9	84 55	108.4	20 02.0	84 55	108.1	20 27.0	84 55	107.8	20 52.1	83 55	107.5	4
65	17 23.7	84 54	108.7	17 48.8	84 55	108.4	18 14.0	84 55	108.1	18 39.0	84 55	107.8	19 04.1	84 55	107.5	19 29.2	83 55	107.2	19 54.2	83 55	106.9	20 19.2	83 55	106.6	65
6	16 51.0	84 55	107.8	17 16.1	84 55	107.5	17 41.2	84 55	107.2	18 06.2	83 55	106.9	18 31.2	83 55	106.6	18 56.2	83 55	106.3	19 21.2	83 55	106.0	19 46.1	83 55	105.8	6
7	16 18.2	84 55	106.9	16 43.2	83 55	106.6	17 08.2	83 55	106.3	17 33.2	83 55	106.1	17 58.2	83 55	105.8	18 23.1	83 55	105.5	18 48.0	83 55	105.2	19 12.9	83 56	104.9	7
8	15 45.2	83 55	106.0	16 10.1	83 55	105.8	16 35.1	83 55	105.5	17 00.1	83 55	105.2	17 25.0	83 56	104.9	17 49.9	83 56	104.6	18 14.7	83 56	104.3	18 39.6	82 56	104.0	8
9	15 12.0	83 55	105.2	15 37.0	83 56	104.9	16 01.9	83 56	104.6	16 26.8	83 56	104.3	16 51.7	83 56	104.0	17 16.5	83 56	103.7	17 41.3	83 56	103.4	18 06.1	83 56	103.1	9
70	14 38.7	83 56	104.3	15 03.6	83 56	104.0	15 28.5	83 56	103.8	15 53.4	83 56	103.5	16 18.2	83 56	103.2	16 43.0	83 56	102.9	17 07.8	83 56	102.6	17 32.6	82 56	102.3	70
1	14 05.3	83 56	103.5	14 30.2	83 56	103.2	14 55.0	83 56	102.9	15 19.8	83 56	102.6	15 44.6	83 56	102.3	16 09.4	83 56	102.0	16 34.2	82 56	101.7	16 58.9	82 56	101.4	1
2	13 31.8	83 56	102.6	13 56.6	83 56	102.3	14 21.4	83 56	102.0	14 46.2	83 56	101.8	15 11.0	82 56	101.5	15 35.7	82 56	101.2	16 00.4	82 56	100.9	16 25.1	82 56	100.6	2
3	12 58.2	83 56	101.8	13 22.9	83 56	101.5	13 47.7	83 56	101.2	14 12.5	82 56	100.9	14 37.2	82 56	100.6	15 01.9	82 56	100.3	15 26.6	82 57	100.0	15 51.2	82 57	99.7	3
4	12 24.4	83 56	100.9	12 49.2	82 56	100.6	13 13.9	82 56	100.4	13 38.6	82 57	100.1	14 03.3	82 57	99.8	14 28.0	82 57	99.5	14 52.6	82 57	99.2	15 17.3	82 57	98.9	4
75	11 50.6	82 57	100.1	12 15.3	82 57	99.8	12 40.0	82 57	99.5	13 04.7	82 57	99.2	13 29.4	82 57	98.9	13 54.0	82 57	98.6	14 18.6	82 57	98.3	14 43.2	82 57	98.0	75
6	11 16.7	82 57	99.3	11 41.4	82 57	99.0	12 06.0	82 57	98.7	12 30.7	82 57	98.4	12 55.3	82 57	98.1	13 19.9	82 57	97.8	13 44.5	82 57	97.5	14 09.1	82 57	97.2	6
7	10 42.7	82 57	98.4	11 07.3	82 57	98.1	11 32.0	82 57	97.8	11 56.6	82 57	97.5	12 21.2	82 57	97.3	12 45.8	82 57	97.0	13 10.4	82 57	96.7	13 34.9	82 57	96.4	7
8	10 08.6	82 57	97.6	10 33.2	82 57	97.3	10 57.8	82 57	97.0	11 22.5	82 57	96.7	11 47.0	82 57	96.4	12 11.6	82 57	96.1	12 36.2	82 57	95.8	13 00.7	82 57	95.5	8
9	9 34.4	82 57	96.8	9 59.1	82 57	96.5	10 23.7	82 57	96.2	10 48.2	82 57	95.9	11 12.8	82 57	95.6	11 37.4	82 57	95.3	12 01.9	82 57	95.0	12 26.4	82 57	94.7	9
80	9 00.2	82 57	95.9	9 24.8	82 57	95.6	9 49.4	82 57	95.3	10 14.0	82 57	95.0	10 38.5	82 57	94.8	11 03.1	82 57	94.5	11 27.6	82 57	94.2	11 52.1	82 57	93.9	80
1	8 26.0	82 57	95.1	8 50.6	82 57	94.8	9 15.1	82 57	94.5	9 39.7	82 57	94.2	10 04.2	82 57	93.9	10 28.8	82 57	93.6	10 53.3	82 57	93.3	11 17.8	82 57	93.0	1
2	7 51.7	82 57	94.3	8 16.2	82 57	94.0	8 40.8	82 57	93.7	9 05.3	82 57	93.4	9 29.9	82 57	93.1	9 54.4	82 57	92.8	10 18.9	82 57	92.5	10 43.4	82 57	92.2	2
3	7 17.3	82 57	93.4	7 41.9	82 57	93.2	8 06.4	82 57	92.9	8 31.0	82 57	92.6	8 55.5	82 57	92.3	9 20.0	82 57	92.0	9 44.5	82 57	91.7	10 09.0	82 57	91.4	3
4	6 43.0	82 57	92.6	7 07.5	82 57	92.3	7 32.1	82 57	92.0	7 56.6	82 57	91.8	8 21.1	82 57	91.5	8 45.6	82 57	91.2	9 10.1	82 57	90.9	9 34.6	82 57	90.6	4
85	6 08.6	82 57	91.8	6 33.1	82 57	91.5	6 57.7	82 57	91.2	7 22.2	82 57	90.9	7 46.7	82 57	90.6	8 11.2	82 57	90.3	8 35.7	82 57	90.1	9 00.2	82 57	89.8	85
6	5 34.2	82 57	91.0	5 58.7	82 57	90.7	6 23.2	82 57	90.4	6 47.8	82 57	90.1	7 12.3	82 57	89.8	7 36.8	82 57	89.5	8 01.3	82 57	89.2	8 25.8	82 57	88.9	6
7				5 24.3	82 57	89.9	5 48.8	82 57	89.6	6 13.4	82 57	89.3	6 37.9	82 57	89.0	7 02.4	82 57	88.7	7 26.9	82 57	88.4	7 51.4	82 57	88.1	7
8							5 14.4	82 57	88.8	5 39.0	82 57	88.5	6 03.5	82 57	88.2	6 28.0	82 57	87.9	6 52.5	82 57	87.6	7 17.0	82 57	87.3	8
9										5 04.6	82 57	87.7	5 29.1	82 57	87.4	5 53.6	82 57	87.1	6 18.1	82 57	86.8	6 42.6	82 57	86.5	9
90																5 19.2	82 57	86.3	5 43.8	82 57	86.0	6 08.3	82 57	85.7	90

Preview ©OH

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	31 00.0	1.0 01	180.0	30 30.0	1.0 01	180.0	30 00.0	1.0 01	180.0	29 30.0	1.0 01	180.0	29 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	28 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	00
1	30 59.7	1.0 02	178.8	30 29.7	1.0 02	178.8	29 59.7	1.0 02	178.8	29 29.7	1.0 02	178.9	28 59.7	1.0 02	178.9	28 29.7	1.0 02	178.9	27 59.7	1.0 02	178.9	27 29.7	1.0 02	178.9	1
2	30 58.6	1.0 03	177.7	30 28.6	1.0 03	177.7	29 58.6	1.0 03	177.7	29 28.6	1.0 03	177.7	28 58.6	1.0 03	177.7	28 28.6	1.0 03	177.7	27 58.6	1.0 03	177.8	27 28.7	1.0 03	177.8	2
3	30 56.9	1.0 04	176.5	30 26.9	1.0 04	176.5	29 56.9	1.0 04	176.6	29 26.9	1.0 04	176.6	28 56.9	1.0 04	176.6	28 26.9	1.0 04	176.6	27 57.0	1.0 04	176.6	27 27.0	1.0 04	176.6	3
4	30 54.4	1.0 05	175.3	30 24.4	1.0 05	175.4	29 54.5	1.0 05	175.4	29 24.5	1.0 05	175.4	28 54.5	1.0 05	175.5	28 24.6	1.0 05	175.5	27 54.6	1.0 05	175.5	27 24.6	1.0 05	175.5	4
05	30 51.3	1.0 06	174.2	30 21.3	1.0 06	174.2	29 51.4	1.0 06	174.3	29 21.4	1.0 06	174.3	28 51.5	1.0 06	174.3	28 21.5	1.0 06	174.4	27 51.6	1.0 06	174.4	27 21.6	1.0 06	174.4	05
6	30 47.4	1.0 08	173.0	30 17.5	1.0 08	173.1	29 47.6	1.0 07	173.1	29 17.7	1.0 07	173.1	28 47.7	1.0 07	173.2	28 17.8	1.0 07	173.2	27 47.9	1.0 07	173.3	27 17.9	1.0 07	173.3	6
7	30 42.9	1.0 09	171.9	30 13.0	1.0 09	171.9	29 43.1	1.0 09	172.0	29 13.2	1.0 09	172.0	28 43.3	1.0 08	172.1	28 13.4	1.0 08	172.1	27 43.5	1.0 08	172.1	27 13.6	1.0 08	172.2	7
8	30 37.7	1.0 10	170.7	30 07.8	1.0 10	170.8	29 38.0	1.0 10	170.8	29 08.1	1.0 10	170.9	28 38.2	1.0 10	170.9	28 08.3	1.0 10	171.0	27 38.5	1.0 10	171.0	27 08.6	1.0 09	171.1	8
9	30 31.8	99 11	169.6	30 02.0	99 11	169.6	29 32.1	99 11	169.7	29 02.3	99 11	169.7	28 32.5	99 11	169.8	28 02.6	99 11	169.9	27 32.8	99 11	169.9	27 02.9	99 11	170.0	9
10	30 25.2	99 12	168.4	29 55.4	99 12	168.5	29 25.6	99 12	168.5	28 55.8	99 12	168.6	28 26.0	99 12	168.7	27 56.2	99 12	168.7	27 26.4	99 12	168.8	26 56.6	99 12	168.9	10
1	30 18.0	99 13	167.3	29 48.2	99 13	167.3	29 18.5	99 13	167.4	28 48.7	99 13	167.5	28 18.9	99 13	167.6	27 49.2	99 13	167.6	27 19.4	99 13	167.7	26 49.6	99 13	167.8	1
2	30 10.1	99 14	166.1	29 40.4	99 14	166.2	29 10.6	99 14	166.3	28 40.9	99 14	166.4	28 11.2	99 14	166.4	27 41.5	99 14	166.5	27 11.7	99 14	166.6	26 42.0	99 14	166.7	2
3	30 01.5	99 15	165.0	29 31.8	99 15	165.1	29 02.1	99 15	165.1	28 32.5	99 15	165.2	28 02.8	99 15	165.3	27 33.1	99 15	165.4	27 03.4	99 15	165.5	26 33.7	99 15	165.6	3
4	29 52.2	99 16	163.8	29 22.6	99 16	163.9	28 53.0	99 16	164.0	28 23.4	99 16	164.1	27 53.7	99 16	164.2	27 24.1	99 16	164.3	26 54.5	99 16	164.4	26 24.9	99 16	164.5	4
15	29 42.3	99 18	162.7	29 12.8	99 18	162.8	28 43.2	99 17	162.9	28 13.6	99 17	163.0	27 44.1	99 17	163.1	27 14.5	99 17	163.2	26 44.9	99 17	163.3	26 15.3	99 17	163.4	15
6	29 31.8	98 19	161.6	29 02.3	98 19	161.7	28 32.8	98 18	161.8	28 03.3	98 18	161.9	27 33.7	98 18	162.0	27 04.2	98 18	162.1	26 34.7	98 18	162.2	26 05.2	98 18	162.3	6
7	29 20.6	98 20	160.5	28 51.1	98 20	160.6	28 21.7	98 20	160.7	27 52.2	98 19	160.8	27 22.8	98 19	160.9	26 53.3	98 19	161.0	26 23.8	98 19	161.1	25 54.4	98 19	161.2	7
8	29 08.7	98 21	159.3	28 39.4	98 21	159.4	28 10.0	98 21	159.6	27 40.6	98 20	159.7	27 11.2	98 20	159.8	26 41.8	98 20	159.9	26 12.4	98 20	160.0	25 43.0	98 20	160.1	8
9	28 56.3	98 22	158.2	28 27.0	98 22	158.3	27 57.7	98 22	158.5	27 28.3	98 21	158.6	26 59.0	98 21	158.7	26 29.7	98 21	158.8	26 00.3	98 21	158.9	25 31.0	98 21	159.0	9
20	28 43.2	97 23	157.1	28 14.0	97 23	157.2	27 44.7	98 23	157.4	27 15.5	98 22	157.5	26 46.2	98 22	157.6	26 16.9	98 22	157.7	25 47.6	98 22	157.8	25 18.4	98 22	158.0	20
1	28 29.5	97 24	156.0	28 00.3	97 24	156.1	27 31.2	97 24	156.3	27 02.0	97 23	156.4	26 32.8	97 23	156.5	26 03.6	97 23	156.6	25 34.4	97 23	156.8	25 05.2	97 23	156.9	1
2	28 15.2	97 25	154.9	27 46.1	97 25	155.0	27 17.0	97 25	155.2	26 47.9	97 24	155.3	26 18.8	97 24	155.4	25 49.6	97 24	155.6	25 20.5	97 24	155.7	24 51.4	97 24	155.8	2
3	28 00.3	97 26	153.8	27 31.3	97 26	153.9	27 02.3	97 26	154.1	26 33.2	97 25	154.2	26 04.2	97 25	154.4	25 35.1	97 25	154.5	25 06.1	97 25	154.6	24 37.0	97 25	154.8	3
4	27 44.8	96 27	152.7	27 15.9	96 27	152.9	26 46.9	97 26	153.0	26 18.0	97 26	153.2	25 49.0	97 26	153.3	25 20.0	97 26	153.4	24 51.0	97 26	153.6	24 22.0	97 26	153.7	4
25	27 28.8	96 28	151.6	26 59.9	96 28	151.8	26 31.0	96 27	151.9	26 02.1	96 27	152.1	25 33.3	96 27	152.2	25 04.3	96 27	152.4	24 35.4	96 27	152.5	24 06.5	96 27	152.7	25
6	27 12.1	96 29	150.5	26 43.3	96 29	150.7	26 14.6	96 28	150.9	25 45.7	96 28	151.0	25 16.9	96 28	151.2	24 48.1	96 28	151.3	24 19.3	96 28	151.5	23 50.4	96 28	151.6	6
7	26 54.9	96 30	149.5	26 26.2	96 29	149.6	25 57.5	96 29	149.8	25 28.8	96 29	150.0	25 00.1	96 29	150.1	24 31.3	96 29	150.3	24 02.6	96 29	150.4	23 33.8	96 29	150.6	7
8	26 37.2	95 30	148.4	26 08.6	95 30	148.6	25 39.9	95 30	148.7	25 11.3	95 30	148.9	24 42.7	96 30	149.1	24 14.0	96 30	149.2	23 45.3	96 30	149.4	23 16.6	96 30	149.6	8
9	26 18.9	95 31	147.3	25 50.3	95 31	147.5	25 21.8	95 31	147.7	24 53.3	95 31	147.9	24 24.7	95 31	148.0	23 56.1	95 31	148.2	23 27.5	95 31	148.4	22 58.9	95 30	148.5	9
30	26 00.0	95 32	146.3	25 31.6	95 32	146.5	25 03.1	95 32	146.6	24 34.7	95 32	146.8	24 06.2	95 32	147.0	23 37.7	95 32	147.2	23 09.2	95 31	147.3	22 40.7	95 31	147.5	30
1	25 40.7	94 33	145.2	25 12.3	95 33	145.4	24 44.0	95 33	145.6	24 15.6	95 33	145.8	23 47.2	95 33	146.0	23 18.8	95 32	146.1	22 50.4	95 32	146.3	22 22.0	95 32	146.5	1
2	25 20.8	94 34	144.2	24 52.5	94 34	144.4	24 24.3	94 34	144.6	23 56.0	94 34	144.8	23 27.7	94 33	144.9	22 59.4	94 33	145.1	22 31.0	94 33	145.3	22 02.7	94 33	145.5	2
3	25 00.4	94 35	143.2	24 32.3	94 35	143.4	24 04.1	94 34	143.5	23 35.9	94 34	143.7	23 07.7	94 34	143.9	22 39.4	94 34	144.1	22 11.2	94 34	144.3	21 43.0	94 34	144.5	3
4	24 39.5	94 36	142.1	24 11.5	94 35	142.3	23 43.4	94 35	142.5	23 15.3	94 35	142.7	22 47.1	94 35	142.9	22 19.0	94 35	143.1	21 50.9	94 35	143.3	21 22.7	94 35	143.5	4
35	24 18.2	93 36	141.1	23 50.2	93 36	141.3	23 22.2	93 36	141.5	22 54.2	93 36	141.7	22 26.1	93 36	141.9	21 58.1	93 36	142.1	21 30.0	94 36	142.3	21 02.0	94 35	142.5	35
6	23 56.3	93 37	140.1	23 28.4	93 37	140.3	23 00.5	93 37	140.5	22 32.6	93 37	140.7	22 04.7	93 37	140.9	21 36.7	93 36	141.1	21 08.8	93 36	141.3	20 40.8	93 36	141.5	6
7	23 34.0	93 38	139.1	23 06.2	93 38	139.3	22 38.4	93 38	139.5	22 10.6	93 38	139.7	21 42.7	93 37	139.9	21 14.9	93 37	140.1	20 47.0	93 37	140.3	20 19.1	93 37	140.5	7
8	23 11.3	92 39	138.1	22 43.5	92 39	138.3	22 15.8	92 38	138.5	21 48.1	92 38	138.7	21 20.3	93 38	138.9	20 52.6	93 38	139.1	20 24.8	93 38	139.3	19 57.0	93 38	139.5	8
9	22 48.0	92 39	137.1	22 20.4	92 39	137.3	21 52.8	92 39	137.5	21 25.2	92 39	137.7	20 57.5	92 39	137.9	20 29.8	92 39	138.1	20 02.1	92 38	138.3	19 34.4	92 38	138.5	9
40	22 24.4	92 40	136.1	21 56.9	92 40	136.3	21 29.3	92 40	136.5	21 01.8	92 40	136.7	20 34.2	92 40	136.9	20 06.6	92 39	137.1	19 39.0	92 39	137.4	19 11.4	92 39	137.6	40
1	22 00.3	91 41	135.1	21 32.9	91 41	135.3	21 05.4	92 41	135.5	20 38.0	92 40	135.7	20 10.5	92 40	136.0	19 43.0	92 40	136.2	19 15.5	92 40	136.4	18 48.0	92 40	136.6	1
2	21 35.8	91 42	134.1	21 08.5	91 41	134.3	20 41.1	91 41	134.6	20 13.7	91 41	134.8	19 46.4	91 41	135.0	19 19.0	91 41	135.2	18 51.6	91 41	135.4	18 24.1	91 40	135.6	2
3	21 10.9	91 42	133.1	20 43.7	91 42	133.4	20 16.4	91 42	133.6	19 49.1	91 42	133.8	19 21.8	91 42	134.0	18 54.5	91 41	134.3	18 27.2	91 41	134.5	17 59.9	91 41	134.7	3
4	20 45.6	90 43	132.2	20 18.4	91 43	132.4	19 51.3	91 43	132.6	19 24.1	91 42	132.9	18 56.9	91 42	133.1	18 29.7	91 42	133.3	18 02.4	91 42	133.5	17 35.2	91 42	133.7	4
45	20 19.9	90 43	131.2	19 52.8	90 43	131.4	19 25.8	90 43	131.7	18 58.7	90 43	131.9	18 31.6	90 43	132.1	18 04.4	90 43	132.4	17 37.3	90 43	132.6	17 10.1	91 42	132.8	45
6	19 53.8	90 44	130.3	19 26.8	90 44	130.5	18 59.9	90 44	130.7	18 32.9	90 44	131.0	18 05.8	90 43	131.2	17 38.8	90 43	131.4	17 11.8	90 43	131.6	16 44.7	90 43	131.9	6
7	19 27.4	90 45	129.3	19 00.5	90 45	129.5	18 33.6	90 44	129.8	18 06.7	90 44	130.0	17 39.8	90 44	130.2	17 12.8	90 44	130.5	16 45.8	90 44	130.7	16 18.9	90 44	130.9	7
8	19 00.6	89 45	128.4	18 33.8	89 45	128.6	18 07.0	89 45	128.8	17 40.1	89 45	129.1	17 13.3	89 45	129.3	16 46.4	90 45	129.5	16 19.6	90 44	129.8	15 52.7	90 44	130.0	8
9	18 33.4	89 46	127.4	18 06.7	89 46	127.7	17 40.0	89 46	127.9	17 13.2	89 45	128.1	16 46.5	89 45	128.4	16 19.7	89 45	128.6	15 53.0	89 45	128.8	15 26.2	89 45	129.1	9
50	18 05.9	89 46	126.5	17 39.3	89 46	126.7	17 12.7	89 46	127.0	16 46.0	89 46	127.2	16 19.3	89 46	127.5	15 52.7	89 46	127.7	15 26.0	89 46	127.9	14 59.3	89 45	128.2	50
1	17 38.1	88 47	125.6	17 11.5	88 47	125.8	16 45.0	89 47	126.1	16 18.4	89 46	126.3	15 51.9	89 46	126.5	15 25.3	89 46	126.8	14 58.7	89 46	127.0	14 32.0	89 46	127.3	1
2	17 09.9	88 47	124.6	16 43.5	88 47	124.9	16 17.0	88 47	125.1	15 50.5	88 47	125.4	15 24.0	88 47	125.6	14 57.5	88 47	125.9	14 31.0	88 47	126.1	14 04.5	88 46	126.3	2
3	16 41.4	88 48	123.7	16 15.1	88 48	124.0	15 48.7	88 48	124.2	15 22.3	88 48	124.5	14 55.9	88 47	124.7	14 29.5	88 47	125.0	14 03.1	88 47	125.2	13 36.6	88 47	125.4	3
4	16 12.7	88 48	122.8	15 46.4	88 48	123.1	15 20.1	88 48	123.3	14 53.8	88 48	123.6	14 27.5	88 48	123.8	14 01.1	88 48	124.1	13 34.8	88 48	124.3	13 08.4	88 48	124.5	4
55	15 43.6	87 49	121.9	15 17.4	87 49	122.2	14 51.2	87 49	122.4	14 25.0	87 49	122.7	13 58.7	87 48	122.9	13 32.5	88 48	123.2	13 06.2	88 48	123.4	12 39.9	88 48	123.7	55
6	15 14.2	87 49	121.0	14 48.1	87 49	121.3	14 22.0	87 49	121.5	13 55.9	87 49	121.8	13 29.7	87 49	122.0	13 03.5	87 49	122.3	12 37.3	87 49	122.5	12 11.1	87 48	122.8	6
7	14 44.6	87 50	120.1	14 18.6	87 50	120.4	13 52.5	87 50	120.6	13 26.5	87 49	120.9	13 00.4	87 49	121.1	12 34.3	87 49	121.4	12 08.2	87 49	121.6	11 42.0	87 49	121.9	7
8	14 14.7	86 50	119.2	13 48.7	87 50	119.5	13 22.8	87 50	119.7	12 56.8	87 50	120.0	12 30.8	87 50	120.2	12 04.8	87 50	120.5	11 38.7	87 50	120.7	11 12.7	87 49	121.0	8
9	13 44.5	86 51	118.3	13 18.6	86 51	118.6	12 52.8	86 50	118.8	12 26.8	86 50	119.1	12 00.9	86 50	119.4	11 35.0	86 50	119.6	11 09.0	87 50	119.9	10 43.0	87 50	120.1	9
60	13 14.1	86 51	117.4	12 48.3	86 51	117.7	12 22.5	86 51	118.0	11 56.6	86 51	118.2	11 30.8	86 51	118.5	11 04.9	86 50	118.7	10 39.0	86 50	119.0	10 13.1	86 50	119.3	60
1	12 43.4	86 52	116.6	12 17.7	86 51	116.8	11 52.0	86 51	117.1	11 26.2	86 51	117.3	11 00.4	86 51	117.6	10 34.6	86 51	117.9	10 08.8	86 51	118.1	9 43.0	86 51	118.4	1
2	12 12.5	86 52	115.7	11 46.9	86 52	116.0	11 21.2	86 52	116.2	10 55.5	86 52	116.5	10 29.8	86 51	116.7	10 04.1	86 51	117.0	9 38.3	86 51	117.3	9 12.6	86 51	117.5	2
3	11 41.4	85 52	114.8	11 15.8	85 52	115.1	10 50.2	85 52	115.3	10 24.6	85 52	115.6	9 58.9	85 52	115.9	9 33.3	86 52	116.1	9 07.6	86 52	116.4	8 42.0	86 51	116.7	3
4	11 10.1	85 53	113.9	10 44.5	85 52	114.2	10 19.0	85 52	114.5	9 53.4	85 52	114.7	9 27.9	85 52	115.0	9 02.3	85 52	115.3	8 36.7	85 52	115.5	8 11.1	85 52	115.8	4
65	10 38.5	85 53	113.1	10 13.1	85 53	113.4	9 47.6	85 53	113.6	9 22.1	85 53	113.9	8 56.6	85 53	114.2	8 31.1	85 52	114.4	8 05.5	85 52	114.7	7 40.0	85 52	115.0	65
6	10 06.8	85 53	112.2	9 41.4	85 53	112.5	9 15.9	85 53	112.8	8 50.5	85 53	113.0	8 25.1	85 53	113.3	7 59.6	85 53	113.6	7 34.2	85 53	113.8	7 08.7	85 53	114.1	6
7	9 34.8	84 54	111.4	9 09.5	84 53	111.6	8 44.1	85 53	111.9	8 18.7	85 53	112.2	7 53.4	85 53	112.5	7 28.0	85 53	112.7	7 02.6	85 53	113.0	6 37.2	85 53	113.3	7
8	9 02.7	84 54	110.5	8 37.4	84 54	110.8	8 12.1	84 54	111.1	7 46.8	84 54	111.3	7 21.5	84 54	111.6	6 56.1	84 53	111.9	6 30.8	84 53	112.1	6 05.5	84 53	112.4	8
9	8 30.3	84 54	109.7	8 05.1	84 54	109.9	7 39.9	84 54	110.2	7 14.6	84 54	110.5	6 49.4	84 54	110.8	6 24.1	84 54	111.0	5 58.8	84 54	111.3	5 33.5	84 54	111.6	9
70	7 57.9	84 54	108.8	7 32.7	84 54	109.1	7 07.5	84 54	109.4	6 42.3	84 54	109.6	6 17.1	84 54	109.9	5 51.9	84 54	110.2	5 26.7	84 54	110.5	5 01.4	84 54	110.7	70
1	7 25.2	84 55	108.0	7 00.1	84 55	108.3	6 35.0	84 55	108.5	6 09.8	84 54	108.8	5 44.7	84 54	109.1	5 19.5	84 54	109.4							1
2	6 52.4	84 55	107.1	6 27.3	84 55	107.4	6 02.2	84 55	107.7	5 37.2	84 55	108.0	5 12.1	84 54	108.2										2
3	6 19.4	83 55	106.3	5 54.4	83 55	106.6	5 29.4	83 55	106.9	5 04.3	83 55	107.1													3
4	5 46.3	83 55	105.5	5 21.4	83 55	105.7																			4
75	5 13.1	83 56	104.6																						75

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91																			5 09.5	82 57	85.2	5 34.0	82 57	84.9	91

Digitized by Google

Lat. 55°

H.A.	8° 00′ Alt.	Δd	Δt	Az.	8° 30′ Alt.	Δd	Δt	Az.	9° 00′ Alt.	Δd	Δt	Az.	9° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	43 00.0	1.0	01	180.0	43 30.0	1.0	01	180.0	44 00.0	1.0	01	180.0	44 30.0	1.0	01	180.0
1	42 59.6	1.0	02	178.6	43 29.6	1.0	02	178.6	43 59.6	1.0	02	178.6	44 29.6	1.0	02	178.6
2	42 58.4	1.0	03	177.3	43 28.4	1.0	03	177.3	43 58.4	1.0	03	177.3	44 28.3	1.0	03	177.2
3	42 56.3	1.0	05	175.9	43 26.3	1.0	05	175.9	43 56.3	1.0	05	175.9	44 26.3	1.0	05	175.9
4	42 53.5	1.0	06	174.6	43 23.5	1.0	06	174.6	43 53.4	1.0	06	174.5	44 23.4	1.0	06	174.5
05	42 49.9	1.0	07	173.2	43 19.8	1.0	07	173.2	43 49.7	1.0	08	173.1	44 19.6	1.0	08	173.1
6	42 45.4	1.0	09	171.9	43 15.3	1.0	09	171.8	43 45.2	1.0	09	171.8	44 15.1	1.0	09	171.7
7	42 40.2	1.0	10	170.6	43 10.0	1.0	10	170.5	43 39.9	1.0	10	170.4	44 09.7	1.0	10	170.4
8	42 34.1	99	11	169.2	43 03.9	99	11	169.1	43 33.7	99	12	169.1	44 03.6	99	12	169.0
9	42 27.3	99	13	167.9	42 57.0	99	13	167.8	43 26.8	99	13	167.7	43 56.6	99	13	167.6
10	42 19.7	99	14	166.6	42 49.4	99	14	166.5	43 19.1	99	14	166.4	43 48.8	99	14	166.3
1	42 11.3	99	15	165.2	42 40.9	99	15	165.1	43 10.6	99	15	165.0	43 40.3	99	16	164.9
2	42 02.1	99	17	163.9	42 31.7	99	17	163.8	43 01.3	99	17	163.7	43 30.9	99	17	163.6
3	41 52.2	98	18	162.6	42 21.7	98	18	162.5	42 51.3	98	18	162.4	43 20.8	98	18	162.2
4	41 41.5	98	19	161.3	42 11.0	98	19	161.2	42 40.5	98	19	161.0	43 09.9	98	19	160.9
15	41 30.1	98	20	160.0	41 59.5	98	20	159.9	42 28.9	98	20	159.7	42 58.3	98	21	159.6
6	41 18.0	98	21	158.7	41 47.3	98	22	158.6	42 16.6	98	22	158.4	42 45.9	98	22	158.3
7	41 05.1	97	23	157.4	41 34.4	97	23	157.3	42 03.6	97	23	157.1	42 32.8	97	23	157.0
8	40 51.5	97	24	156.1	41 20.7	97	24	156.0	41 49.8	97	24	155.8	42 19.0	97	24	155.7
9	40 37.3	97	25	154.9	41 06.3	97	25	154.7	41 35.4	97	25	154.5	42 04.4	97	25	154.4
20	40 22.3	97	26	153.6	40 51.3	97	26	153.4	41 20.2	97	26	153.3	41 49.2	96	27	153.1
1	40 06.7	96	27	152.4	40 35.6	96	27	152.2	41 04.4	96	28	152.0	41 33.3	96	28	151.8
2	39 50.4	96	28	151.1	40 19.2	96	28	150.9	40 47.9	96	29	150.7	41 16.7	96	29	150.6
3	39 33.4	96	29	149.9	40 02.1	96	29	149.7	40 30.8	96	30	149.5	40 59.4	95	30	149.3
4	39 15.8	95	30	148.7	39 44.4	95	31	148.5	40 13.0	95	31	148.3	40 41.6	95	31	148.1
25	38 57.6	96	31	147.4	39 26.1	95	32	147.2	39 54.6	95	32	147.0	40 23.0	95	32	146.8
6	38 38.8	95	32	146.2	39 07.2	95	33	146.0	39 35.6	95	33	145.8	40 03.9	94	33	145.6
7	38 19.4	94	33	145.0	38 47.7	94	34	144.8	39 15.9	94	34	144.6	39 44.2	94	34	144.4
8	37 59.4	94	34	143.9	38 27.5	94	34	143.6	38 55.7	94	35	143.4	39 23.8	94	35	143.2
9	37 38.8	94	35	142.7	38 06.8	94	35	142.5	38 34.9	93	36	142.2	39 02.9	93	36	142.0
30	37 17.6	93	36	141.5	37 45.6	93	36	141.3	38 13.5	93	36	141.1	38 41.5	93	37	140.8
1	36 55.9	93	37	140.4	37 23.8	93	37	140.1	37 51.6	93	37	139.9	38 19.4	93	38	139.6
2	36 33.7	93	38	139.2	37 01.5	92	38	139.0	37 29.2	92	38	138.7	37 56.9	92	38	138.5
3	36 11.0	92	39	138.1	36 38.6	92	39	137.8	37 06.2	92	39	137.6	37 33.8	92	39	137.3
4	35 47.7	92	40	136.9	36 15.3	92	40	136.7	36 42.8	92	40	136.5	37 10.3	92	40	136.2
35	35 24.0	91	40	135.8	35 51.4	91	41	135.6	36 18.8	91	41	135.3	36 46.2	91	41	135.1
6	34 59.8	91	41	134.7	35 27.1	91	41	134.5	35 54.4	91	42	134.2	36 21.6	91	42	134.0
7	34 35.1	91	42	133.6	35 02.3	91	42	133.4	35 29.5	91	42	133.1	35 56.6	90	42	132.8
8	34 09.9	90	43	132.5	34 37.1	90	43	132.3	35 04.1	90	43	132.0	35 31.2	90	43	131.8
9	33 44.4	90	43	131.5	34 11.4	90	44	131.2	34 38.4	90	44	130.9	35 05.3	90	44	130.7
40	33 18.4	90	44	130.4	33 45.3	90	44	130.1	34 12.1	90	44	129.9	34 39.0	89	45	129.6
1	32 52.0	89	45	129.3	33 18.8	89	45	129.1	33 45.5	89	45	128.8	34 12.3	89	45	128.5
2	32 25.1	89	45	128.3	32 51.8	89	46	128.0	33 18.5	89	46	127.7	33 45.1	89	46	127.5
3	31 57.9	89	46	127.2	32 24.5	89	46	127.0	32 51.1	88	46	126.7	33 17.6	88	46	126.4
4	31 30.3	88	47	126.2	31 56.9	88	47	125.9	32 23.3	88	47	125.7	32 49.8	88	47	125.4
45	31 02.4	88	47	125.2	31 28.8	88	47	124.9	31 55.2	88	48	124.6	32 21.5	88	48	124.3
6	30 34.1	88	48	124.2	31 00.4	88	48	123.9	31 26.7	88	48	123.6	31 52.9	87	48	123.3
7	30 05.5	87	48	123.2	30 31.7	87	48	122.9	30 57.9	87	49	122.6	31 24.0	87	49	122.3
8	29 36.5	87	49	122.2	30 02.6	87	49	121.9	30 28.7	87	49	121.6	30 54.8	87	49	121.3
9	29 07.2	87	49	121.2	29 33.2	87	49	120.9	29 59.2	87	50	120.6	30 25.2	86	50	120.3
50	28 37.6	87	50	120.2	29 03.6	86	50	119.9	29 29.5	86	50	119.6	29 55.4	86	50	119.3
1	28 07.7	86	50	119.2	28 33.6	86	50	118.9	28 59.4	86	51	118.7	29 25.2	86	51	118.4
2	27 37.6	86	51	118.3	28 03.3	86	51	118.0	28 29.1	86	51	117.7	28 54.8	86	51	117.4
3	27 07.1	86	51	117.3	27 32.8	86	51	117.0	27 58.5	85	51	116.7	28 24.1	85	52	116.4
4	26 36.4	85	52	116.4	27 02.0	85	52	116.1	27 27.6	85	52	115.8	27 53.2	85	52	115.5
55	26 05.4	85	52	115.4	26 31.0	85	52	115.1	26 56.5	85	52	114.8	27 22.0	85	52	114.5
6	25 34.2	85	52	114.5	25 59.7	85	53	114.2	26 25.1	85	53	113.9	26 50.6	85	53	113.6
7	25 02.8	85	53	113.6	25 28.2	85	53	113.3	25 53.6	85	53	113.0	26 18.9	84	53	112.7
8	24 31.1	85	53	112.6	24 56.5	84	53	112.3	25 21.8	84	53	112.0	25 47.0	84	53	111.7
9	23 59.3	84	53	111.7	24 24.5	84	54	111.4	24 49.8	84	54	111.1	25 15.0	84	54	110.8
60	23 27.2	84	54	110.8	23 52.4	84	54	110.5	24 17.6	84	54	110.2	24 42.7	84	54	109.9
1	22 54.9	84	54	109.9	23 20.1	84	54	109.6	23 45.2	84	54	109.3	24 10.3	84	54	109.0
2	22 22.5	84	54	109.0	22 47.6	84	54	108.7	23 12.6	83	55	108.4	23 37.6	83	55	108.1
3	21 49.9	83	55	108.1	22 14.9	83	55	107.8	22 39.9	83	55	107.5	23 04.8	83	55	107.2
4	21 17.1	83	55	107.2	21 42.0	83	55	106.9	22 07.0	83	55	106.6	22 31.9	83	55	106.3
65	20 44.1	83	55	106.3	21 09.0	83	55	106.0	21 33.9	83	55	105.7	21 58.8	83	55	105.4
6	20 11.0	83	55	105.5	20 35.9	83	55	105.2	21 00.7	83	56	104.9	21 25.5	83	56	104.6
7	19 37.8	83	56	104.6	20 02.6	83	56	104.3	20 27.4	83	56	104.0	20 52.2	83	56	103.7
8	19 04.4	83	56	103.7	19 29.2	83	56	103.4	19 53.9	82	56	103.1	20 18.7	82	56	102.8
9	18 30.9	83	56	102.8	18 55.7	82	56	102.6	19 20.4	82	56	102.3	19 45.1	82	56	102.0
70	17 57.3	82	56	102.0	18 22.0	82	56	101.7	18 46.7	82	56	101.4	19 11.3	82	56	101.1
1	17 23.6	82	56	101.1	17 48.3	82	56	100.8	18 12.9	82	56	100.5	18 37.5	82	57	100.2
2	16 49.8	82	56	100.3	17 14.4	82	57	100.0	17 39.0	82	57	99.7	18 03.6	82	57	99.4
3	16 15.9	82	57	99.4	16 40.5	82	57	99.1	17 05.1	82	57	98.8	17 29.6	82	57	98.5
4	15 41.9	82	57	98.6	16 06.5	82	57	98.3	16 31.0	82	57	98.0	16 55.5	82	57	97.7
75	15 07.8	82	57	97.7	15 32.4	82	57	97.4	15 56.9	82	57	97.2	16 21.4	82	57	96.8
6	14 33.7	82	57	96.9	14 58.2	82	57	96.6	15 22.7	82	57	96.3	15 47.2	82	57	96.0
7	13 59.5	82	57	96.1	14 24.0	82	57	95.8	14 48.5	82	57	95.5	15 13.0	82	57	95.2
8	13 25.2	82	57	95.2	13 49.7	82	57	94.9	14 14.2	82	57	94.6	14 38.7	81	57	94.3
9	12 50.9	82	57	94.4	13 15.4	82	57	94.1	13 39.9	82	57	93.8	14 04.3	81	57	93.5
80	12 16.6	82	57	93.6	12 41.1	82	57	93.3	13 05.5	81	57	93.0	13 30.0	81	57	92.7
1	11 42.2	82	57	92.8	12 06.7	82	57	92.5	12 31.1	81	57	92.2	12 55.6	81	57	91.9
2	11 07.9	82	57	91.9	11 32.3	81	57	91.6	11 56.8	81	57	91.3	12 21.2	81	57	91.0
3	10 33.5	82	57	91.1	10 57.9	81	57	90.8	11 22.3	81	57	90.5	11 46.8	81	57	90.2
4	9 59.0	82	57	90.3	10 23.5	81	57	90.0	10 47.9	81	57	89.7	11 12.3	81	57	89.4
85	9 24.6	82	57	89.5	9 49.1	81	57	89.2	10 13.5	81	57	88.9	10 37.9	81	57	88.6
6	8 50.2	82	57	88.7	9 14.7	81	57	88.4	9 39.1	81	57	88.1	10 03.5	81	57	87.8
7	8 15.8	82	57	87.8	8 40.3	82	57	87.5	9 04.7	81	57	87.2	9 29.2	81	57	87.0
8	7 41.4	82	57	87.0	8 05.9	82	57	86.7	8 30.4	81	57	86.4	8 54.8	81	57	86.1
9	7 07.1	82	57	86.2	7 31.6	82	57	85.9	7 56.0	82	57	85.6	8 20.5	81	57	85.3
90	6 32.8	82	57	85.4	6 57.3	82	57	85.1	7 21.7	82	57	84.8	7 46.2	82	57	84.5

H.A.	10° 00′ Alt.	Δd	Δt	Az.	10° 30′ Alt.	Δd	Δt	Az.	11° 00′ Alt.	Δd	Δt	Az.	11° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	45 00.0	1.0	01	180.0	45 30.0	1.0	01	180.0	46 00.0	1.0	01	180.0	46 30.0	1.0	01	180.0	00
1	44 59.6	1.0	02	178.6	45 29.6	1.0	02	178.6	45 59.6	1.0	02	178.6	46 29.6	1.0	02	178.6	1
2	44 58.3	1.0	04	177.2	45 28.3	1.0	04	177.2	45 58.3	1.0	04	177.2	46 28.3	1.0	04	177.2	2
3	44 56.2	1.0	05	175.8	45 26.2	1.0	05	175.8	45 56.2	1.0	05	175.8	46 26.2	1.0	05	175.7	3
4	44 53.3	1.0	06	174.4	45 23.3	1.0	06	174.4	45 53.2	1.0	06	174.4	46 23.2	1.0	06	174.3	4
05	44 49.6	1.0	08	173.0	45 19.5	1.0	08	173.0	45 49.4	1.0	08	172.9	46 19.3	1.0	08	172.9	05
6	44 45.0	1.0	09	171.7	45 14.9	1.0	09	171.6	45 44.8	1.0	09	171.5	46 14.7	1.0	09	171.5	6
7	44 39.6	1.0	10	170.3	45 09.4	1.0	10	170.2	45 39.3	99	10	170.1	46 09.1	99	11	170.1	7
8	44 33.4	99	12	168.9	45 03.2	99	12	168.8	45 33.0	99	12	168.8	46 02.8	99	12	168.7	8
9	44 26.4	99	13	167.5	44 55.1	99	13	167.5	45 25.9	99	13	167.4	45 55.6	99	13	167.3	9
10	44 18.5	99	14	166.2	44 48.2	99	14	166.1	45 17.9	99	15	166.0	45 47.6	99	15	165.9	10
1	44 09.9	99	16	164.8	44 39.6	99	16	164.7	45 09.2	99	16	164.6	45 38.8	99	16	164.5	1
2	44 00.5	99	17	163.5	44 30.1	99	17	163.3	44 59.7	99	17	163.2	45 29.2	99	17	163.1	2
3	43 50.3	98	18	162.1	44 19.8	98	18	162.0	44 49.3	98	18	161.9	45 18.8	98	19	161.7	3
4	43 39.4	98	20	160.8	44 08.8	98	20	160.6	44 38.2	98	20	160.5	45 07.7	98	20	160.4	4
15	43 27.7	98	21	159.4	43 57.0	98	21	159.3	44 26.4	98	21	159.2	44 55.7	98	21	159.0	15
6	43 15.2	98	22	158.1	43 44.5	98	22	158.0	44 13.7	98	22	157.8	44 42.0	97	22	157.7	6
7	43 02.0	97	23	156.8	43 31.2	97	23	156.6	44 00.4	97	24	156.5	44 29.5	97	24	156.3	7
8	42 48.1	97	24	155.5	43 17.2	97	25	155.3	43 46.3	97	25	155.2	44 15.4	97	25	155.0	8
9	42 33.5	97	26	154.2	43 02.5	97	26	154.0	43 31.5	97	26	153.8	44 00.4	97	26	153.7	9
20	42 18.1	96	27	152.9	42 47.1	96	27	152.7	43 16.0	96	27	152.5	43 44.8	96	27	152.4	20
1	42 02.1	96	28	151.6	42 30.9	96	28	151.4	42 59.7	96	28	151.3	43 28.5	96	28	151.1	1
2	41 45.4	96	29	150.4	42 14.2	96	29	150.2	42 42.8	96	29	150.0	43 11.5	96	29	149.8	2
3	41 28.1	95	30	149.1	41 56.7	95	30	148.9	42 25.3	95	30	148.7	42 53.9	95	30	148.5	3
4	41 10.1	95	31	147.9	41 38.6	95	31	147.6	42 07.1	95	31	147.4	42 35.6	95	32	147.2	4
25	40 51.5	95	32	146.6	41 19.9	95	32	146.4	41 48.3	95	32	146.2	42 16.6	94	33	146.0	25
6	40 32.2	94	33	145.4	41 00.5	94	33	145.2	41 28.8	94	33	144.9	41 57.0	94	34	144.7	6
7	40 12.4	94	34	144.2	40 40.6	94	34	143.9	41 08.7	94	34	143.7	41 36.9	94	35	143.5	7
8	39 51.9	94	35	143.0	40 20.0	94	35	142.7	40 48.1	93	35	142.5	41 16.1	93	36	142.3	8
9	39 30.9	93	36	141.8	39 58.9	93	36	141.5	40 26.8	93	36	141.3	40 54.7	93	27	141.1	9
30	39 09.3	93	37	140.6	39 37.2	93	37	140.3	40 05.0	93	37	140.1	40 32.8	93	37	139.9	30
1	38 47.2	93	38	139.4	39 15.0	92	38	139.2	39 42.7	92	38	138.9	40 10.4	92	38	138.7	1
2	38 24.6	92	39	138.2	38 52.2	92	39	138.0	39 19.8	92	39	137.7	39 47.4	92	39	137.5	2
3	38 01.4	92	39	137.1	38 28.9	92	40	136.8	38 56.4	92	40	136.6	39 23.9	91	40	136.3	3
4	37 37.7	91	40	135.9	38 05.1	91	40	135.7	38 32.5	91	41	135.4	38 59.8	91	41	135.2	4
35	37 13.5	91	41	134.8	37 40.8	91	41	134.6	38 08.1	91	41	134.3	38 35.3	91	42	134.0	35
6	36 48.9	91	42	133.7	37 16.1	91	42	133.4	37 43.2	90	42	133.2	38 10.3	90	42	132.9	6
7	36 23.8	90	43	132.6	36 50.8	90	43	132.3	37 17.9	90	43	132.0	37 44.9	90	43	131.8	7
8	35 58.2	90	43	131.5	36 25.2	90	44	131.2	36 52.1	90	44	130.9	37 19.0	90	44	130.7	8
9	35 32.2	90	44	130.4	35 59.1	89	44	130.1	36 25.9	89	44	129.8	36 52.7	89	45	129.6	9
40	35 05.8	89	45	129.3	35 32.5	89	45	129.0	35 59.3	89	45	128.8	36 26.0	89	45	128.5	40
1	34 39.0	89	45	128.2	35 05.6	89	46	128.0	35 32.2	89	46	127.7	35 58.8	89	46	127.4	1
2	34 11.7	89	46	127.2	34 38.3	88	46	126.9	35 04.8	88	46	126.6	35 31.3	88	47	126.3	2
3	33 44.1	88	47	126.1	34 10.6	88	47	125.8	34 37.0	88	47	125.6	35 03.4	88	47	125.3	3
4	33 16.1	88	47	125.1	33 42.5	88	47	124.8	34 08.8	88	48	124.5	34 35.1	88	48	124.2	4
45	32 47.8	88	48	124.1	33 14.1	87	48	123.8	33 40.3	87	48	123.5	34 06.5	87	48	123.2	45
6	32 19.1	87	48	123.0	32 45.3	87	49	122.8	33 11.4	87	49	122.5	33 37.5	87	49	122.2	6
7	31 50.1	87	49	122.0	32 16.2	87	49	121.7	32 42.2	87	49	121.4	33 08.2	87	49	121.1	7
8	31 20.8	87	49	121.0	31 46.8	87	50	120.7	32 12.7	86	50	120.4	32 38.6	86	50	120.1	8
9	30 51.1	86	50	120.0	31 17.0	86	50	119.7	31 42.9	86	50	119.4	32 08.7	86	50	119.1	9
50	30 21.2	86	50	119.0	30 47.0	86	51	118.7	31 12.8	86	51	118.4	31 38.5	86	51	118.1	50
1	29 51.0	86	51	118.1	30 16.7	86	51	117.8	30 42.4	86	51	117.5	31 08.0	85	51	117.2	1
2	29 20.5	86	51	117.1	29 46.1	85	51	116.8	30 11.7	85	52	116.5	30 37.2	85	52	116.2	2
3	28 49.7	85	52	116.1	29 15.3	85	52	115.8	29 40.8	85	52	115.5	30 06.2	85	52	115.2	3
4	28 18.7	85	52	115.2	28 44.2	85	52	114.9	29 09.6	85	52	114.6	29 35.0	85	52	114.3	4
55	27 47.4	85	52	114.2	28 12.8	85	53	113.9	28 38.2	84	53	113.6	29 03.5	84	53	113.3	55
6	27 15.9	84	53	113.3	27 41.2	84	53	113.0	28 06.5	84	53	112.7	28 31.8	84	53	112.4	6
7	26 44.2	84	53	112.4	27 09.5	84	53	112.1	27 34.7	84	53	111.8	27 59.9	84	54	111.4	7
8	26 12.3	84	54	111.4	26 37.5	84	54	111.1	27 02.6	84	54	110.8	27 27.7	84	54	110.5	8
9	25 40.1	84	54	110.5	26 05.3	84	54	110.2	26 30.3	84	54	109.9	26 55.4	83	54	109.6	9
60	25 07.8	84	54	109.6	25 32.9	83	54	109.3	25 57.9	83	54	109.0	26 22.9	83	54	108.7	60
1	24 35.3	83	54	108.7	25 00.3	83	55	108.4	25 25.3	83	55	108.1	25 50.2	83	55	107.8	1
2	24 02.6	83	55	107.8	24 27.6	83	55	107.5	24 52.5	83	56	107.2	25 17.3	83	55	106.9	2
3	23 29.8	83	55	106.9	23 54.7	83	55	106.6	24 19.5	83	55	106.3	24 44.3	83	55	106.0	3
4	22 56.8	83	55	106.0	23 21.6	83	55	105.7	23 46.4	83	55	105.4	24 11.2	82	56	105.1	4
65	22 23.6	83	56	105.1	22 48.4	83	56	104.8	23 13.2	82	56	104.5	23 37.9	82	56	104.2	65
6	21 50.3	83	56	104.3	22 15.1	82	56	103.9	22 39.8	82	56	103.6	23 04.5	82	56	103.3	6
7	21 16.9	82	56	103.4	21 41.6	82	56	103.1	22 06.3	82	56	102.8	22 30.9	82	56	102.5	7
8	20 43.4	82	56	102.5	21 08.0	82	56	102.2	21 32.7	82	56	101.9	21 57.3	82	56	101.6	8
9	20 09.7	82	56	101.6	20 34.3	82	56	101.3	20 58.9	82	56	101.0	21 23.5	82	56	100.7	9
70	19 36.0	82	56	100.8	20 00.5	82	56	100.5	20 25.1	82	57	100.2	20 49.6	82	57	99.9	70
1	19 02.1	82	57	99.9	19 26.7	82	57	99.6	19 51.2	82	57	99.3	20 15.7	82	57	99.0	1
2	18 28.2	82	57	99.1	18 52.7	82	57	98.8	19 17.2	82	57	98.5	19 41.6	82	57	98.2	2
3	17 54.1	82	57	98.2	18 18.6	82	57	97.9	18 43.1	82	57	97.6	19 07.5	81	57	97.3	3
4	17 20.0	82	57	97.4	17 44.5	82	57	97.1	18 09.0	81	57	96.8	18 33.4	81	57	96.5	4
75	16 45.9	82	57	96.5	17 10.3	81	57	96.2	17 34.8	81	57	95.9	17 59.2	81	57	95.6	75
6	16 11.7	81	57	95.7	16 36.1	81	57	95.4	17 00.5	81	57	95.1	17 24.9	81	57	94.8	6
7	15 37.4	81	57	94.9	16 01.8	81	57	94.6	16 26.2	81	57	94.3	16 50.6	81	57	94.0	7
8	15 03.1	81	57	94.0	15 27.5	81	57	93.7	15 51.9	81	57	93.4	16 16.2	81	57	93.1	8
9	14 28.7	81	57	93.2	14 53.1	81	57	92.9	15 17.5	81	57	92.6	15 41.9	81	57	92.3	9
80	13 54.4	81	57	92.4	14 18.8	81	57	92.1	14 43.1	81	57	91.8	15 07.5	81	57	91.5	80
1	13 20.0	81	57	91.6	13 44.4	81	57	91.3	14 08.7	81	57	91.0	14 33.0	81	57	90.7	1
2	12 45.6	81	57	90.7	13 09.9	81	57	90.4	13 34.3	81	57	90.1	13 58.6	81	57	89.8	2
3	12 11.2	81	57	89.9	12 35.5	81	57	89.6	12 59.9	81	57	89.3	13 24.2	81	57	89.0	3
4	11 36.7	81	57	89.1	12 01.1	81	57	88.8	12 25.5	81	57	88.5	12 49.8	81	57	88.2	4
85	11 02.3	81	57	88.3	11 26.7	81	57	88.0	11 51.1	81	57	87.7	12 15.4	81	57	87.4	85
6	10 27.9	81	57	87.5	10 52.3	81	57	87.2	11 16.7	81	57	86.9	11 41.1	81	57	86.6	6
7	9 53.6	81	57	86.7	10 18.0	81	57	86.4	10 42.4	81	57	86.1	11 06.7	81	57	85.8	7
8	9 19.2	81	57	85.8	9 43.6	81	57	85.6	10 08.0	81	57	85.3	10 32.4	81	57	85.0	8
9	8 44.9	81	57	85.0	9 09.4	81	57	84.7	9 33.8	81	57	84.4	9 58.2	81	57	84.2	9
90	8 10.7	81	57	84.2	8 35.1	81	57	83.9	8 59.5	81	57	83.6	9 24.0	81	57	83.3	90

Digitized by Google

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	27 00.0	1.0 01	180.0	26 30.0	1.0 01	180.0	26 00.0	1.0 01	180.0	25 30.0	1.0 01	180.0	25 00.0	1.0 01	180.0	24 30.0	1.0 01	180.0	24 00.0	1.0 01	180.0	23 30.0	1.0 01	180.0	00
1	26 59.7	1.0 02	178.9	26 29.7	1.0 02	178.9	25 59.7	1.0 02	178.9	25 29.7	1.0 02	178.9	24 59.7	1.0 02	178.9	24 29.7	1.0 02	178.9	23 59.7	1.0 02	178.9	23 29.7	1.0 02	178.9	1
2	26 58.7	1.0 03	177.8	26 28.7	1.0 03	177.8	25 58.7	1.0 03	177.8	25 28.7	1.0 03	177.8	24 58.7	1.0 03	177.8	24 28.7	1.0 03	177.8	23 58.7	1.0 03	177.9	23 28.7	1.0 03	177.9	2
3	26 57.0	1.0 04	176.7	26 27.0	1.0 04	176.7	25 57.0	1.0 04	176.7	25 27.0	1.0 04	176.7	24 57.1	1.0 04	176.7	24 27.1	1.0 04	176.8	23 57.1	1.0 04	176.8	23 27.1	1.0 04	176.8	3
4	26 54.7	1.0 05	175.6	26 24.7	1.0 05	175.6	25 54.7	1.0 05	175.6	25 24.8	1.0 05	175.6	24 54.8	1.0 05	175.7	24 24.8	1.0 05	175.7	23 54.8	1.0 05	175.7	23 24.9	1.0 05	175.7	4
05	26 51.7	1.0 06	174.4	26 21.7	1.0 06	174.5	25 51.8	1.0 06	174.5	25 21.8	1.0 06	174.5	24 51.9	1.0 06	174.6	24 21.9	1.0 06	174.6	23 51.9	1.0 06	174.6	23 22.0	1.0 06	174.7	05
6	26 48.0	1.0 07	173.3	26 18.1	1.0 07	173.4	25 48.1	1.0 07	173.4	25 18.2	1.0 07	173.5	24 48.3	1.0 07	173.5	24 18.3	1.0 07	173.5	23 48.4	1.0 07	173.6	23 18.5	1.0 07	173.6	6
7	26 43.7	1.0 08	172.2	26 13.8	1.0 08	172.3	25 43.9	1.0 08	172.3	25 14.0	1.0 08	172.4	24 44.0	1.0 08	172.4	24 14.1	1.0 08	172.4	23 44.2	1.0 08	172.5	23 14.3	1.0 08	172.5	7
8	26 38.7	1.0 09	171.1	26 08.8	1.0 09	171.2	25 38.9	1.0 09	171.2	25 09.1	1.0 09	171.3	24 39.2	1.0 09	171.3	24 09.3	1.0 09	171.4	23 39.4	1.0 09	171.4	23 09.5	1.0 09	171.5	8
9	26 33.1	99 10	170.0	26 03.2	99 10	170.1	25 33.4	1.0 10	170.1	25 03.5	1.0 10	170.2	24 33.7	1.0 10	170.2	24 03.8	1.0 10	170.3	23 34.0	1.0 10	170.4	23 04.1	1.0 10	170.4	9
10	26 26.8	99 12	168.9	25 57.0	99 11	169.0	25 27.2	99 11	169.1	24 57.3	99 11	169.1	24 27.5	99 11	169.2	23 57.7	99 11	169.2	23 27.9	99 11	169.3	22 58.1	99 11	169.3	10
1	26 19.9	99 13	167.8	25 50.1	99 13	167.9	25 20.3	99 12	168.0	24 50.5	99 12	168.0	24 20.7	99 12	168.1	23 51.0	99 12	168.2	23 21.2	99 12	168.2	22 51.4	99 12	168.3	1
2	26 12.3	99 14	166.7	25 42.5	99 14	166.8	25 12.8	99 14	166.9	24 43.1	99 13	167.0	24 13.3	99 13	167.0	23 43.6	99 13	167.1	23 13.8	99 13	167.2	22 44.1	99 13	167.2	2
3	26 04.1	99 15	165.6	25 34.4	99 15	165.7	25 04.7	99 15	165.8	24 35.0	99 14	165.9	24 05.3	99 14	166.0	23 35.6	99 14	166.0	23 05.9	99 14	166.1	22 36.2	99 14	166.2	3
4	25 55.2	99 16	164.6	25 25.6	99 16	164.6	24 55.9	99 16	164.7	24 26.3	99 16	164.8	23 56.6	99 15	164.9	23 27.0	99 15	165.0	22 57.3	99 15	165.1	22 27.7	99 15	165.1	4
15	25 45.7	99 17	163.5	25 16.1	99 17	163.6	24 46.5	99 17	163.6	24 16.9	99 17	163.7	23 47.3	99 16	163.8	23 17.7	99 16	163.9	22 48.1	99 16	164.0	22 18.5	99 16	164.1	15
6	25 35.6	98 18	162.4	25 06.1	98 18	162.5	24 36.5	98 18	162.6	24 07.0	98 18	162.7	23 37.5	98 18	162.8	23 07.9	99 17	162.9	22 38.3	99 17	163.0	22 08.8	99 17	163.0	6
7	25 24.9	98 19	161.3	24 55.4	98 19	161.4	24 25.9	98 19	161.5	23 56.4	98 19	161.6	23 27.0	98 18	161.7	22 57.5	98 18	161.8	22 28.0	98 18	161.9	21 58.5	98 18	162.0	7
8	25 13.6	98 20	160.2	24 44.1	98 20	160.3	24 14.7	98 20	160.4	23 45.3	98 20	160.5	23 15.9	98 20	160.7	22 46.4	98 19	160.8	22 17.0	98 19	160.9	21 47.5	98 19	161.0	8
9	25 01.6	98 21	159.2	24 32.3	98 21	159.3	24 02.9	98 21	159.4	23 33.5	98 21	159.5	23 04.2	98 20	159.6	22 34.8	98 20	159.7	22 05.4	98 20	159.8	21 36.0	98 20	159.9	9
20	24 49.1	98 22	158.1	24 19.8	98 22	158.2	23 50.5	98 22	158.3	23 21.2	98 22	158.4	22 51.9	98 21	158.6	22 22.6	98 21	158.7	21 53.2	98 21	158.8	21 23.9	98 21	158.9	20
1	24 35.9	97 23	157.0	24 06.7	97 23	157.2	23 37.5	97 23	157.3	23 08.2	97 23	157.4	22 39.0	97 22	157.5	22 09.7	98 22	157.6	21 40.5	98 22	157.8	21 11.2	98 22	157.9	1
2	24 22.2	97 24	156.0	23 53.1	97 24	156.1	23 23.9	97 24	156.2	22 54.7	97 23	156.4	22 25.5	97 23	156.5	21 56.4	97 23	156.6	21 27.2	97 23	156.7	20 58.0	97 23	156.9	2
3	24 07.9	97 25	154.9	23 38.8	97 25	155.0	23 09.7	97 25	155.2	22 40.6	97 24	155.3	22 11.5	97 24	155.4	21 42.4	97 24	155.6	21 13.3	97 24	155.7	20 44.2	97 24	155.8	3
4	23 53.0	97 26	153.9	23 24.0	97 26	154.0	22 55.0	97 25	154.1	22 26.0	97 25	154.3	21 56.9	97 25	154.4	21 27.9	97 25	154.5	20 58.9	97 25	154.7	20 29.8	97 25	154.8	4
25	23 37.6	96 27	152.8	23 08.7	96 27	153.0	22 39.7	96 26	153.1	22 10.8	97 26	153.2	21 41.8	97 26	153.4	21 12.8	97 26	153.5	20 43.9	97 26	153.7	20 14.9	97 26	153.8	25
6	23 21.6	96 28	151.8	22 52.7	96 27	151.9	22 23.9	96 27	152.1	21 55.0	96 27	152.2	21 26.1	96 27	152.4	20 57.2	96 27	152.5	20 28.3	96 27	152.7	19 59.4	96 27	152.8	6
7	23 05.1	96 28	150.7	22 36.3	96 28	150.9	22 07.5	96 28	151.1	21 38.7	96 28	151.2	21 09.9	96 28	151.4	20 41.1	96 28	151.5	20 12.3	96 28	151.6	19 43.4	96 28	151.8	7
8	22 48.0	96 29	149.7	22 19.3	96 29	149.9	21 50.6	96 29	150.0	21 21.8	96 29	150.2	20 53.1	96 29	150.3	20 24.4	96 29	150.5	19 55.7	96 29	150.6	19 26.9	96 28	150.8	8
9	22 30.3	95 30	148.7	22 01.7	95 30	148.9	21 33.1	95 30	149.0	21 04.5	95 30	149.2	20 35.8	95 30	149.3	20 07.2	96 30	149.5	19 38.5	96 29	149.6	19 09.9	96 29	149.8	9
30	22 12.2	95 31	147.7	21 43.7	95 31	147.8	21 15.1	95 31	148.0	20 46.6	95 31	148.2	20 18.0	95 31	148.3	19 49.5	95 30	148.5	19 20.9	95 30	148.7	18 52.3	95 30	148.8	30
1	21 53.5	95 32	146.7	21 25.1	95 32	146.8	20 56.6	95 32	147.0	20 28.2	95 32	147.2	19 59.7	95 31	147.3	19 31.2	95 31	147.5	19 02.7	95 31	147.7	18 34.2	95 31	147.8	1
2	21 34.4	95 33	145.6	21 06.0	95 33	145.8	20 37.6	95 32	146.0	20 09.3	95 32	146.2	19 40.9	95 32	146.3	19 12.5	95 32	146.5	18 44.1	95 32	146.7	18 15.6	95 32	146.9	2
3	21 14.7	94 34	144.6	20 46.4	94 33	144.8	20 18.1	94 33	145.0	19 49.9	94 33	145.2	19 21.6	94 33	145.4	18 53.2	94 33	145.5	18 24.9	94 33	145.7	17 56.6	94 33	145.9	3
4	20 54.5	94 34	143.6	20 26.4	94 34	143.8	19 58.2	94 34	144.0	19 30.0	94 34	144.2	19 01.7	94 34	144.4	18 33.5	94 34	144.6	18 05.3	94 34	144.7	17 37.0	94 33	144.9	4
35	20 33.9	94 35	142.7	20 05.8	94 35	142.8	19 37.7	94 35	143.0	19 09.6	94 35	143.2	18 41.5	94 35	143.4	18 13.3	94 34	143.6	17 45.2	94 34	143.8	17 17.0	94 34	143.9	35
6	20 12.8	93 36	141.7	19 44.8	93 36	141.9	19 16.8	93 36	142.0	18 48.7	93 36	142.2	18 20.7	93 35	142.4	17 52.7	94 35	142.6	17 24.6	94 35	142.8	16 56.5	94 35	143.0	6
7	19 51.2	93 37	140.7	19 23.3	93 37	140.9	18 55.4	93 36	141.1	18 27.4	93 36	141.3	17 59.5	93 36	141.5	17 31.5	93 36	141.6	17 03.6	93 36	141.8	16 35.6	93 36	142.0	7
8	19 29.2	93 37	139.7	19 01.4	93 37	139.9	18 33.5	93 37	140.1	18 05.7	93 37	140.3	17 37.8	93 37	140.5	17 09.9	93 37	140.7	16 42.1	93 37	140.9	16 14.2	93 36	141.1	8
9	19 06.7	92 38	138.7	18 39.0	92 38	138.9	18 11.2	93 38	139.1	17 43.5	93 38	139.3	17 15.7	93 38	139.5	16 47.9	93 37	139.7	16 20.1	93 37	139.9	15 52.3	93 37	140.1	9
40	18 43.8	92 39	137.8	18 16.1	92 39	138.0	17 48.5	92 39	138.2	17 20.8	92 38	138.4	16 53.2	92 38	138.6	16 25.5	92 38	138.8	15 57.8	92 38	139.0	15 30.0	92 38	139.2	40
1	18 20.4	92 40	136.8	17 52.9	92 39	137.0	17 25.3	92 39	137.2	16 57.8	92 39	137.4	16 30.2	92 39	137.6	16 02.6	92 39	137.8	15 35.0	92 39	138.0	15 07.3	92 39	138.2	1
2	17 56.7	92 40	135.9	17 29.2	92 40	136.1	17 01.8	92 40	136.3	16 34.3	92 40	136.5	16 06.8	92 40	136.7	15 39.3	92 40	136.9	15 11.7	92 39	137.1	14 44.2	92 39	137.3	2
3	17 32.5	91 41	134.9	17 05.1	91 41	135.1	16 37.8	91 41	135.3	16 10.4	91 40	135.5	15 43.0	91 40	135.8	15 15.5	91 40	136.0	14 48.1	91 40	136.2	14 20.7	91 40	136.4	3
4	17 07.9	91 42	134.0	16 40.7	91 41	134.2	16 13.4	91 41	134.4	15 46.1	91 41	134.6	15 18.8	91 41	134.8	14 51.4	91 41	135.0	14 24.1	91 41	135.2	13 56.7	91 41	135.5	4
45	16 43.0	91 42	133.0	16 15.8	91 42	133.2	15 48.6	91 42	133.5	15 21.4	91 42	133.7	14 54.1	91 42	133.9	14 26.9	91 42	134.1	13 59.7	91 41	134.3	13 32.4	91 41	134.5	45
6	16 17.6	90 43	132.1	15 50.5	90 43	132.3	15 23.4	90 43	132.5	14 56.3	90 42	132.8	14 29.2	90 42	133.0	14 02.0	91 42	133.2	13 34.9	91 42	133.4	13 07.7	91 42	133.6	6
7	15 51.9	90 43	131.2	15 24.9	90 43	131.4	14 57.9	90 43	131.6	14 30.8	90 43	131.8	14 03.8	90 43	132.1	13 36.7	90 43	132.3	13 09.7	90 43	132.5	12 42.6	90 42	132.7	7
8	15 25.8	90 44	130.2	14 58.9	90 44	130.5	14 31.9	90 44	130.7	14 05.0	90 44	130.9	13 38.1	90 43	131.1	13 11.1	90 43	131.4	12 44.1	90 43	131.6	12 17.1	90 43	131.8	8
9	14 59.3	89 45	129.3	14 32.5	89 45	129.5	14 05.7	89 44	129.8	13 38.8	90 44	130.0	13 12.0	90 44	130.2	12 45.1	90 44	130.5	12 18.2	90 44	130.7	11 51.3	90 44	130.9	9
50	14 32.5	89 45	128.4	14 05.8	89 45	128.6	13 39.1	89 45	128.9	13 12.3	89 45	129.1	12 45.5	89 45	129.3	12 18.7	89 44	129.6	11 51.9	89 44	129.8	11 25.1	89 44	130.0	50
1	14 05.4	89 46	127.5	13 38.8	89 46	127.7	13 12.1	89 46	128.0	12 45.4	89 45	128.2	12 18.7	89 45	128.4	11 52.0	89 45	128.7	11 25.3	89 45	128.9	10 58.6	89 45	129.1	1
2	13 37.9	89 46	126.6	13 11.4	89 46	126.8	12 44.8	89 46	127.1	12 18.2	89 46	127.3	11 51.6	89 46	127.5	11 25.0	89 46	127.8	10 58.4	89 45	128.0	10 31.7	89 45	128.2	2
3	13 10.1	88 47	125.7	12 43.7	88 47	125.9	12 17.2	88 47	126.2	11 50.7	88 46	126.4	11 24.1	88 46	126.6	10 57.6	88 46	126.9	10 31.1	88 46	127.1	10 04.5	89 46	127.4	3
4	12 42.0	88 47	124.8	12 15.6	88 47	125.0	11 49.2	88 47	125.3	11 22.8	88 47	125.5	10 56.4	88 47	125.8	10 29.9	88 47	126.0	10 03.5	88 47	126.2	9 37.0	88 46	126.5	4
55	12 13.6	88 48	123.9	11 47.3	88 48	124.1	11 21.0	88 48	124.4	10 54.6	88 47	124.6	10 28.3	88 47	124.9	10 01.9	88 47	125.1	9 35.6	88 47	125.4	9 09.2	88 47	125.6	55
6	11 44.9	87 48	123.0	11 18.7	87 48	123.3	10 52.4	87 48	123.5	10 26.2	88 48	123.8	9 59.9	88 48	124.0	9 33.6	88 48	124.2	9 07.3	88 48	124.5	8 41.1	88 47	124.7	6
7	11 15.9	87 49	122.1	10 49.8	87 49	122.4	10 23.6	87 49	122.6	9 57.4	87 48	122.9	9 31.2	87 48	123.1	9 05.0	87 48	123.4	8 38.8	87 48	123.6	8 12.6	87 48	123.9	7
8	10 46.6	87 49	121.3	10 20.6	87 49	121.5	9 54.5	87 49	121.8	9 28.4	87 49	122.0	9 02.3	87 49	122.3	8 36.2	87 49	122.5	8 10.0	87 48	122.8	7 43.9	87 48	123.0	8
9	10 17.1	87 50	120.4	9 51.1	87 50	120.6	9 25.1	87 49	120.9	8 59.1	87 49	121.1	8 33.0	87 49	121.4	8 07.0	87 49	121.6	7 41.0	87 49	121.9	7 14.9	87 49	122.1	9
60	9 47.2	86 50	119.5	9 21.3	86 50	119.8	8 55.4	86 50	120.0	8 29.5	86 50	120.3	8 03.5	87 50	120.5	7 37.6	87 50	120.8	7 11.6	87 49	121.0	6 45.6	87 49	121.3	60
1	9 17.2	86 51	118.6	8 51.3	86 50	118.9	8 25.5	86 50	119.2	7 59.6	86 50	119.4	7 33.7	86 50	119.7	7 07.9	86 50	119.9	6 42.0	86 50	120.2	6 16.1	86 50	120.4	1
2	8 46.8	86 51	117.8	8 21.1	86 51	118.0	7 55.3	86 51	118.3	7 29.5	86 51	118.6	7 03.7	86 50	118.8	6 37.9	86 50	119.1	6 12.1	86 50	119.3	5 46.3	86 50	119.6	2
3	8 16.3	86 51	116.9	7 50.6	86 51	117.2	7 24.9	86 51	117.4	6 59.2	86 51	117.7	6 33.4	86 51	118.0	6 07.7	86 51	118.2	5 42.0	86 51	118.5	5 16.2	86 50	118.7	3
4	7 45.5	85 52	116.1	7 19.9	85 52	116.3	6 54.2	85 51	116.6	6 28.6	85 51	116.9	6 02.9	86 51	117.1	5 37.3	86 51	117.4	5 11.6	86 51	117.6				4
65	7 14.5	85 52	115.2	6 48.9	85 52	115.5	6 23.3	85 52	115.7	5 57.8	85 52	116.0	5 32.2	85 52	116.3	5 06.6	85 52	116.5							65
6	6 43.2	85 52	114.4	6 17.7	85 52	114.6	5 52.2	85 52	114.9	5 26.7	85 52	115.2	5 01.2	85 52	115.4										6
7	6 11.8	85 53	113.5	5 46.3	85 53	113.8	5 20.9	85 52	114.1																7
8	5 40.1	85 53	112.7	5 14.7	85 53	112.9																			8
9	5 08.3	84 53	111.8																						9

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	5 58.5	82 57	84.6	6 23.0	82 57	84.3	6 47.5	82 57	84.0	7 12.0	82 57	83.7	7 36.4	82 57	83.4	8 00.9	82 57	83.1	8 25.4	81 57	82.8	8 49.8	81 57	82.5	91
2	5 24.3	82 57	83.8	5 48.8	82 57	83.5	6 13.3	82 57	83.2	6 37.8	82 57	82.9	7 02.3	82 57	82.6	7 26.8	82 57	82.3	7 51.2	82 57	82.0	8 15.7	82 57	81.7	2
3				5 14.6	82 57	82.7	5 39.1	82 57	82.4	6 03.7	82 57	82.1	6 28.2	82 57	81.8	6 52.7	82 57	81.5	7 17.2	82 57	81.2	7 41.7	82 57	80.9	3
4							5 05.1	82 57	81.6	5 29.6	82 57	81.3	5 54.2	82 57	81.0	6 18.7	82 57	80.7	6 43.2	82 56	80.4	7 07.7	82 56	80.1	4
95													5 20.2	82 56	80.2	5 44.8	82 56	79.9	6 09.3	82 56	79.6	6 33.9	82 56	79.3	95
6																5 10.9	82 56	79.1	5 35.5	82 56	78.8	6 00.1	82 56	78.5	6
7																			5 01.8	82 56	78.0	5 26.4	82 56	77.7	7

Digitized by Google

Lat. 55°

H.A.	12° 00′ Alt.	Δd Δt	Az.	12° 30′ Alt.	Δd Δt	Az.	13° 00′ Alt.	Δd Δt	Az.	13° 30′ Alt.	Δd Δt	Az.	14° 00′ Alt.	Δd Δt	Az.	14° 30′ Alt.	Δd Δt	Az.	15° 00′ Alt.	Δd Δt	Az.	15° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	47 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	48 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0	49 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	00
1	46 59.6	1.0 02	178.6	47 29.6	1.0 02	178.6	47 59.6	1.0 02	178.5	48 29.6	1.0 02	178.5	48 59.6	1.0 02	178.5	49 29.6	1.0 02	178.5	49 59.5	1.0 02	178.5	50 29.5	1.0 02	178.5	1
2	46 58.3	1.0 04	177.1	47 28.3	1.0 04	177.1	47 58.3	1.0 04	177.1	48 28.2	1.0 04	177.1	48 58.2	1.0 04	177.0	49 28.2	1.0 04	177.0	49 58.2	1.0 04	177.0	50 28.2	1.0 04	177.0	2
3	46 56.1	1.0 05	175.7	47 26.1	1.0 05	175.7	47 56.1	1.0 06	175.6	48 26.0	1.0 06	175.6	48 56.0	1.0 06	175.6	49 26.0	1.0 06	175.5	49 55.9	1.0 06	175.5	50 25.9	1.0 06	175.5	3
4	46 53.1	1.0 06	174.3	47 23.1	1.0 06	174.2	47 53.0	1.0 07	174.2	48 23.0	1.0 07	174.1	48 52.9	1.0 07	174.1	49 22.8	1.0 07	174.0	49 52.8	1.0 07	174.0	50 22.7	1.0 07	173.9	4
05	46 49.3	1.0 08	172.8	47 19.2	1.0 08	172.8	47 49.1	1.0 08	172.7	48 19.0	1.0 08	172.7	48 48.9	1.0 08	172.6	49 18.8	1.0 08	172.6	49 48.7	1.0 08	172.5	50 18.7	1.0 08	172.4	05
6	46 44.5	1.0 09	171.4	47 14.4	1.0 09	171.4	47 44.3	1.0 09	171.3	48 14.2	1.0 09	171.2	48 44.1	1.0 10	171.2	49 13.9	1.0 10	171.1	49 43.8	1.0 10	171.0	50 13.7	1.0 10	170.9	6
7	46 39.0	99 11	170.0	47 08.8	99 11	169.9	47 38.7	99 11	169.8	48 08.5	99 11	169.8	48 38.3	99 11	169.7	49 08.2	99 11	169.6	49 38.0	99 11	169.5	50 07.8	99 11	169.4	7
8	46 32.6	99 12	168.6	47 02.4	99 12	168.5	47 32.2	99 12	168.4	48 02.0	99 12	168.3	48 31.8	99 12	168.2	49 01.5	99 12	168.1	49 31.3	99 13	168.0	50 01.1	99 13	168.0	8
9	46 25.4	99 13	167.2	46 55.1	99 14	167.1	47 24.8	99 14	167.0	47 54.6	99 14	166.9	48 24.3	99 14	166.8	48 54.0	99 14	166.7	49 23.7	99 14	166.6	49 53.5	99 14	166.5	9
10	46 17.3	99 15	165.8	46 47.0	99 15	165.7	47 16.7	99 15	165.6	47 46.4	99 15	165.4	48 16.0	99 15	165.3	48 45.7	99 15	165.2	49 15.3	99 15	165.1	49 45.0	99 16	165.0	10
1	46 08.5	99 16	164.4	46 38.1	99 16	164.3	47 07.7	99 16	164.1	47 37.3	99 16	164.0	48 06.9	99 17	163.9	48 36.5	99 17	163.8	49 06.1	99 17	163.6	49 35.6	99 17	163.5	1
2	45 58.8	99 17	163.0	46 28.3	98 18	162.9	46 57.9	98 18	162.7	47 27.4	98 18	162.6	47 56.9	98 18	162.5	48 26.5	98 18	162.3	48 56.0	98 18	162.2	49 25.5	98 18	162.1	2
3	45 48.3	98 19	161.6	46 17.8	98 19	161.5	46 47.3	98 19	161.3	47 16.7	98 19	161.2	47 46.2	98 19	161.0	48 15.6	98 19	160.9	48 45.0	98 20	160.8	49 14.4	98 20	160.6	3
4	45 37.1	98 20	160.2	46 06.5	98 20	160.1	46 35.8	98 20	159.9	47 05.2	98 20	159.8	47 34.6	98 21	159.6	48 03.9	98 21	159.5	48 33.3	98 21	159.3	49 02.6	98 21	159.2	4
15	45 25.0	98 21	158.9	45 54.3	98 21	158.7	46 23.7	98 22	158.6	46 52.9	98 22	158.4	47 22.2	98 22	158.2	47 51.5	98 22	158.1	48 20.7	97 22	157.9	48 50.0	97 22	157.7	15
6	45 12.2	97 23	157.5	45 41.5	97 23	157.3	46 10.7	97 23	157.2	46 39.9	97 23	157.0	47 09.1	97 23	156.8	47 38.2	97 23	156.7	48 07.4	97 24	156.5	48 36.5	97 24	156.3	6
7	44 58.7	97 24	156.2	45 27.8	97 24	156.0	45 57.0	97 24	155.8	46 26.1	97 24	155.6	46 55.2	97 24	155.5	47 24.2	97 25	155.3	47 53.3	97 25	155.1	48 22.3	97 25	154.9	7
8	44 44.4	97 25	154.8	45 13.5	97 25	154.6	45 42.5	97 25	154.5	46 11.5	97 26	154.3	46 40.5	97 26	154.1	47 09.5	97 26	153.9	47 38.4	96 26	153.7	48 07.3	96 26	153.5	8
9	44 29.4	97 26	153.5	44 58.4	96 26	153.3	45 27.3	96 27	153.1	45 56.2	96 27	152.9	46 25.1	96 27	152.7	46 53.9	96 27	152.5	47 22.8	96 27	152.3	47 51.6	96 27	152.1	9
20	44 13.7	96 27	152.2	44 42.5	96 28	152.0	45 11.4	96 28	151.8	45 40.2	96 28	151.6	46 09.0	96 28	151.4	46 37.7	96 28	151.2	47 06.5	96 28	151.0	47 35.2	96 29	150.7	20
1	43 57.3	96 28	150.9	44 26.0	96 29	150.7	44 54.7	96 29	150.5	45 23.4	96 29	150.3	45 52.1	96 29	150.0	46 20.8	95 29	149.8	46 49.4	95 30	149.6	47 18.0	95 30	149.4	1
2	43 40.2	95 30	149.6	44 08.8	95 30	149.4	44 37.4	95 30	149.1	45 06.0	95 30	148.9	45 34.6	95 30	148.7	46 03.1	95 31	148.5	46 31.6	95 31	148.3	47 00.1	95 31	148.0	2
3	43 22.4	95 31	148.3	43 50.9	95 31	148.1	44 19.4	95 31	147.8	44 47.9	95 31	147.6	45 16.4	95 31	147.4	45 44.8	95 32	147.2	46 13.2	95 32	146.9	46 41.6	95 32	146.7	3
4	43 04.0	95 32	147.0	43 32.4	95 32	146.8	44 00.8	95 32	146.6	44 29.2	95 32	146.3	44 57.5	94 33	146.1	45 25.8	94 33	145.9	45 54.1	94 33	145.6	46 22.3	94 33	145.4	4
25	42 44.9	94 33	145.7	43 13.2	94 33	145.5	43 41.5	94 33	145.3	44 09.8	94 33	145.1	44 38.0	94 34	144.8	45 06.2	94 34	144.6	45 34.3	94 34	144.3	46 02.5	94 34	144.1	25
6	42 25.3	94 34	144.5	42 53.5	94 34	144.3	43 21.6	94 34	144.0	43 49.7	94 34	143.8	44 17.9	94 35	143.5	44 45.9	94 35	143.3	45 14.0	93 35	143.0	45 42.0	93 35	142.8	6
7	42 05.0	94 35	143.2	42 33.0	94 35	143.0	43 01.1	93 35	142.8	43 29.1	93 35	142.5	43 57.1	93 36	142.3	44 25.0	93 36	142.0	44 53.0	93 36	141.8	45 20.8	93 36	141.5	7
8	41 44.1	93 36	142.0	42 12.0	93 36	141.8	42 40.0	93 36	141.5	43 07.9	93 36	141.3	43 35.7	93 37	141.0	44 03.6	93 37	140.8	44 31.4	93 37	140.5	44 59.1	92 37	140.2	8
9	41 22.6	93 37	140.8	41 50.5	93 37	140.6	42 18.3	93 37	140.3	42 46.1	93 37	140.0	43 13.8	92 38	139.8	43 41.5	92 38	139.5	44 09.2	92 38	139.3	44 36.8	92 38	139.0	9
30	41 00.6	92 38	139.6	41 28.3	92 38	139.3	41 56.0	92 38	139.1	42 23.7	92 38	138.8	42 51.3	92 38	138.6	43 18.9	92 39	138.3	43 46.5	92 39	138.0	44 14.0	92 39	137.7	30
1	40 38.0	92 39	138.4	41 05.6	92 39	138.1	41 33.2	92 39	137.9	42 00.8	92 39	137.6	42 28.3	92 39	137.4	42 55.7	91 40	137.1	43 23.2	91 40	136.8	43 50.6	91 40	136.5	1
2	40 14.9	92 39	137.2	40 42.4	92 40	137.0	41 09.9	91 40	136.7	41 37.3	91 40	136.4	42 04.7	91 40	136.2	42 32.0	91 40	135.9	42 59.3	91 41	135.6	43 26.6	91 41	135.3	2
3	39 51.3	91 40	136.1	40 18.7	91 40	135.8	40 46.0	91 41	135.5	41 13.3	91 41	135.2	41 40.6	91 41	135.0	42 07.8	91 41	134.7	42 35.0	91 41	134.4	43 02.1	90 42	134.1	3
4	39 27.1	91 41	134.9	39 54.4	91 41	134.6	40 21.6	91 41	134.4	40 48.8	91 42	134.1	41 16.0	90 42	133.8	41 43.1	90 42	133.5	42 10.2	90 42	133.2	42 37.2	90 42	132.9	4
35	39 02.5	91 42	133.8	39 29.7	90 42	133.5	39 56.8	90 42	133.2	40 23.9	90 42	132.9	40 50.9	90 43	132.6	41 17.9	90 43	132.3	41 44.8	90 43	132.0	42 11.8	90 43	131.8	35
6	38 37.4	90 43	132.6	39 04.5	90 43	132.3	39 31.5	90 43	132.1	39 58.4	90 43	131.8	40 25.4	90 43	131.5	40 52.2	90 44	131.2	41 19.1	89 44	130.9	41 45.8	89 44	130.6	6
7	38 11.9	90 43	131.5	38 38.8	90 44	131.2	39 05.7	90 44	130.9	39 32.5	89 44	130.6	39 59.3	89 44	130.3	40 26.1	89 44	130.0	40 52.8	89 44	129.7	41 19.5	89 45	129.4	7
8	37 45.9	89 44	130.4	38 12.7	89 44	130.1	38 39.5	89 44	129.8	39 06.2	89 45	129.5	39 32.9	89 45	129.2	39 59.5	89 45	128.9	40 26.1	89 45	128.6	40 52.7	88 45	128.3	8
9	37 19.4	89 45	129.3	37 46.2	89 45	129.0	38 12.8	89 45	128.7	38 39.5	89 45	128.4	39 06.0	89 45	128.1	39 32.6	88 46	127.8	39 59.1	88 46	127.5	40 25.5	88 46	127.2	9
40	36 52.6	89 45	128.2	37 19.2	89 46	127.9	37 45.8	88 46	127.6	38 12.3	88 46	127.3	38 38.7	88 46	127.0	39 05.2	88 46	126.7	39 31.5	88 46	126.4	39 57.9	88 47	126.1	40
1	36 25.4	88 46	127.1	36 51.8	88 46	126.8	37 18.3	88 46	126.5	37 44.7	88 47	126.2	38 11.1	88 47	125.9	38 37.4	88 47	125.6	39 03.7	87 47	125.3	39 29.9	87 47	125.0	1
2	35 57.7	88 47	126.0	36 24.1	88 47	125.7	36 50.5	88 47	125.4	37 16.8	88 47	125.1	37 43.0	87 47	124.8	38 09.2	87 48	124.5	38 35.4	87 48	124.2	39 01.5	87 48	123.9	2
3	35 29.7	88 47	125.0	35 56.0	88 47	124.7	36 22.2	87 48	124.4	36 48.4	87 48	124.1	37 14.6	87 48	123.8	37 40.7	87 48	123.5	38 06.7	87 48	123.1	38 32.7	87 48	122.8	3
4	35 01.3	87 48	123.9	35 27.5	87 48	123.6	35 53.7	87 48	123.3	36 19.8	87 48	123.0	36 45.8	87 49	122.7	37 11.8	87 49	122.4	37 37.8	86 49	122.1	38 03.7	86 49	121.8	4
45	34 32.6	87 48	122.9	34 58.7	87 49	122.6	35 24.7	87 49	122.3	35 50.7	87 49	122.0	36 16.7	86 49	121.7	36 42.6	86 49	121.4	37 08.4	86 49	121.0	37 34.2	86 50	120.7	45
6	34 03.5	87 49	121.9	34 29.5	87 49	121.6	34 55.5	86 49	121.3	35 21.4	86 49	120.9	35 47.2	86 50	120.6	36 13.0	86 50	120.3	36 38.8	86 50	120.0	37 04.5	86 50	119.7	6
7	33 34.1	86 50	120.8	34 00.0	86 50	120.5	34 25.9	86 50	120.2	34 51.7	86 50	119.9	35 17.5	86 50	119.6	35 43.2	86 50	119.3	36 08.8	85 50	119.0	36 34.4	85 51	118.7	7
8	33 04.4	86 50	119.8	33 30.2	86 50	119.5	33 56.0	86 50	119.2	34 21.7	86 50	118.9	34 47.4	85 51	118.6	35 13.0	85 51	118.3	35 38.6	85 51	118.0	36 04.1	85 51	117.6	8
9	32 34.4	86 50	118.8	33 00.2	86 51	118.5	33 25.8	85 51	118.2	33 51.5	85 51	117.9	34 17.0	85 51	117.6	34 42.6	85 51	117.3	35 08.0	85 51	117.0	35 33.5	85 52	116.6	9
50	32 04.1	86 51	117.8	32 29.8	85 51	117.5	32 55.4	85 51	117.2	33 20.9	85 51	116.9	33 46.4	85 52	116.6	34 11.8	85 52	116.3	34 37.2	85 52	116.0	35 02.6	84 52	115.6	50
1	31 33.6	85 51	116.9	31 59.1	85 52	116.6	32 24.6	85 52	116.2	32 50.1	85 52	115.9	33 15.5	85 52	115.6	33 40.8	84 52	115.3	34 06.2	84 52	115.0	34 31.4	84 52	114.6	1
2	31 02.7	85 52	115.9	31 28.2	85 52	115.6	31 53.6	85 52	115.3	32 19.0	84 52	114.9	32 44.3	84 52	114.6	33 09.6	84 52	114.3	33 34.8	84 53	114.0	34 00.0	84 53	113.7	2
3	30 31.7	85 52	114.9	30 57.0	85 52	114.6	31 22.4	84 52	114.3	31 47.7	84 53	114.0	32 12.9	84 53	113.7	32 38.1	84 53	113.3	33 03.3	84 53	113.0	33 28.4	84 53	112.7	3
4	30 00.3	84 53	114.0	30 25.6	84 53	113.7	30 50.9	84 53	113.3	31 16.1	84 53	113.0	31 41.3	84 53	112.7	32 06.4	84 53	112.4	32 31.5	83 53	112.1	32 56.5	83 53	111.7	4
55	29 28.8	84 53	113.0	29 54.0	84 53	112.7	30 19.2	84 53	112.4	30 44.3	84 53	112.1	31 09.4	84 53	111.8	31 34.5	83 54	111.4	31 59.5	83 54	111.1	32 24.4	83 54	110.8	55
6	28 57.0	84 53	112.1	29 22.1	84 53	111.8	29 47.3	84 54	111.4	30 12.3	84 54	111.1	30 37.4	83 54	110.8	31 02.3	83 54	110.5	31 27.3	83 54	110.2	31 52.2	83 54	109.8	6
7	28 25.0	84 54	111.1	28 50.1	84 54	110.8	29 15.1	83 54	110.5	29 40.1	83 54	110.2	30 05.1	83 54	109.9	30 30.0	83 54	109.5	30 54.9	83 54	109.2	31 19.7	83 54	108.9	7
8	27 52.8	83 54	110.2	28 17.8	83 54	109.9	28 42.8	83 54	109.6	29 07.7	83 54	109.3	29 32.6	83 54	108.9	29 57.5	83 54	108.6	30 22.3	83 55	108.3	30 47.0	82 55	108.0	8
9	27 20.4	83 54	109.3	27 45.4	83 54	109.0	28 10.3	83 54	108.7	28 35.2	83 55	108.3	29 00.0	83 55	108.0	29 24.8	83 55	107.7	29 49.5	82 55	107.4	30 14.2	82 55	107.0	9
60	26 47.8	83 55	108.4	27 12.7	83 55	108.1	27 37.6	83 55	107.7	28 02.4	83 55	107.4	28 27.2	83 55	107.1	28 51.9	82 55	106.8	29 16.6	82 55	106.5	29 41.2	82 55	106.1	60
1	26 15.1	83 55	107.5	26 39.9	83 55	107.2	27 04.7	83 55	106.8	27 29.5	82 55	106.5	27 54.2	82 55	106.2	28 18.9	82 55	105.9	28 43.5	82 55	105.6	29 08.1	82 55	105.2	1
2	25 42.2	83 55	106.6	26 07.0	83 55	106.3	26 31.7	82 55	105.9	26 56.4	82 56	105.6	27 21.1	82 55	105.3	27 45.7	82 56	105.0	28 10.3	82 56	104.7	28 34.8	82 56	104.3	2
3	25 09.1	83 55	105.7	25 33.9	82 55	105.4	25 58.6	82 56	105.0	26 23.2	82 56	104.7	26 47.8	82 56	104.4	27 12.4	82 56	104.1	27 36.9	82 56	103.8	28 01.4	82 56	103.4	3
4	24 35.9	82 56	104.8	25 00.6	82 56	104.5	25 25.3	82 56	104.2	25 49.9	82 56	103.8	26 14.4	82 56	103.5	26 39.0	82 56	103.2	27 03.4	82 56	102.9	27 27.9	81 56	102.5	4
65	24 02.6	82 56	103.9	24 27.2	82 56	103.6	24 51.8	82 56	103.3	25 16.4	82 56	103.0	25 40.9	82 56	102.6	26 05.4	82 56	102.3	26 29.8	81 56	102.0	26 54.2	81 56	101.7	65
6	23 29.1	82 56	103.0	23 53.7	82 56	102.7	24 18.3	82 56	102.4	24 42.8	82 56	102.1	25 07.3	82 56	101.8	25 31.7	81 56	101.4	25 56.1	81 56	101.1	26 20.5	81 56	100.8	6
7	22 55.5	82 56	102.1	23 20.1	82 56	101.8	23 44.6	82 56	101.5	24 09.1	82 56	101.2	24 33.5	81 56	100.9	24 57.9	81 56	100.6	25 22.3	81 56	100.2	25 46.6	81 57	99.9	7
8	22 21.8	82 56	101.3	22 46.3	82 56	101.0	23 10.8	82 56	100.7	23 35.3	81 56	100.3	23 59.7	81 57	100.0	24 24.1	81 57	99.7	24 48.4	81 57	99.4	25 12.7	81 57	99.1	8
9	21 48.0	82 56	100.4	22 12.5	82 57	100.1	22 37.0	81 57	99.8	23 01.4	81 57	99.5	23 25.8	81 57	99.2	23 50.1	81 57	98.8	24 14.4	81 57	98.5	24 38.7	81 57	98.2	9
70	21 14.1	82 57	99.6	21 38.6	81 57	99.2	22 03.0	81 57	98.9	22 27.4	81 57	98.6	22 51.7	81 57	98.3	23 16.1	81 57	98.0	23 40.3	81 57	97.7	24 04.6	81 57	97.3	70
1	20 40.1	81 57	98.7	21 04.6	81 57	98.4	21 29.0	81 57	98.1	21 53.3	81 57	97.8	22 17.7	81 57	97.5	22 41.9	81 57	97.1	23 06.2	81 57	96.8	23 30.4	81 57	96.5	1
2	20 06.1	81 57	97.9	20 30.5	81 57	97.5	20 54.9	81 57	97.2	21 19.2	81 57	96.9	21 43.5	81 57	96.6	22 07.8	81 57	96.3	22 32.0	81 57	96.0	22 56.2	81 57	95.6	2
3	19 32.0	81 57	97.0	19 56.3	81 57	96.7	20 20.7	81 57	96.4	20 45.0	81 57	96.1	21 09.3	81 57	95.8	21 33.5	81 57	95.4	21 57.7	81 57	95.1	22 21.9	81 57	94.8	3
4	18 57.8	81 57	96.2	19 22.1	81 57	95.9	19 46.5	81 57	95.5	20 10.8	81 57	95.2	20 35.0	81 57	94.9	20 59.2	81 57	94.6	21 23.4	81 57	94.3	21 47.6	80 57	94.0	4
75	18 23.5	81 57	95.3	18 47.9	81 57	95.0	19 12.2	81 57	94.7	19 36.5	81 57	94.4	20 00.7	81 57	94.1	20 24.9	81 57	93.8	20 49.1	81 57	93.5	21 13.2	80 57	93.1	75
6	17 49.2	81 57	94.5	18 13.6	81 57	94.2	18 37.9	81 57	93.9	19 02.1	81 57	93.6	19 26.4	81 57	93.3	19 50.6	81 57	92.9	20 14.7	81 57	92.6	20 38.9	80 57	92.3	6
7	17 14.9	81 57	93.7	17 39.2	81 57	93.4	18 03.5	81 57	93.0	18 27.8	81 57	92.7	18 52.0	81 57	92.4	19 16.2	81 57	92.1	19 40.3	80 57	91.8	20 04.5	80 57	91.5	7
8	16 40.6	81 57	92.8	17 04.9	81 57	92.5	17 29.1	81 57	92.2	17 53.4	81 57	91.9	18 17.6	81 57	91.6	18 41.8	81 57	91.3	19 05.9	80 57	91.0	19 30.1	80 57	90.7	8
9	16 06.2	81 57	92.0	16 30.5	81 57	91.7	16 54.7	81 57	91.4	17 19.0	81 57	91.1	17 43.2	81 57	90.8	18 07.4	81 57	90.5	18 31.5	80 57	90.2	18 55.7	80 57	89.8	9
80	15 31.8	81 57	91.2	15 56.1	81 57	90.9	16 20.3	81 57	90.6	16 44.6	81 57	90.3	17 08.8	81 57	90.0	17 33.0	81 57	89.6	17 57.1	80 57	89.3	18 21.2	80 57	89.0	80
1	14 57.4	81 57	90.4	15 21.7	81 57	90.1	15 45.9	81 57	89.8	16 10.2	81 57	89.4	16 34.4	81 57	89.1	16 58.6	81 57	88.8	17 22.7	80 57	88.5	17 46.8	80 57	88.2	1
2	14 22.9	81 57	89.5	14 47.2	81 57	89.2	15 11.5	81 57	88.9	15 35.7	81 57	88.6	16 00.0	81 57	88.3	16 24.1	81 57	88.0	16 48.3	80 57	87.7	17 12.4	80 57	87.4	2
3	13 48.5	81 57	88.7	14 12.8	81 57	88.4	14 37.1	81 57	88.1	15 01.3	81 57	87.8	15 25.6	81 57	87.5	15 49.8	81 57	87.2	16 13.9	81 57	86.9	16 38.1	80 57	86.6	3
4	13 14.1	81 57	87.9	13 38.4	81 57	87.6	14 02.7	81 57	87.3	14 27.0	81 57	87.0	14 51.2	81 57	86.7	15 15.4	81 57	86.4	15 39.6	81 57	86.1	16 03.7	80 57	85.8	4
85	12 39.8	81 57	87.1	13 04.1	81 57	86.8	13 28.3	81 57	86.5	13 52.6	81 57	86.2	14 16.9	81 57	85.9	14 41.1	81 57	85.6	15 05.3	81 57	85.3	15 29.4	81 57	85.0	85
6	12 05.4	81 57	86.3	12 29.7	81 57	86.0	12 54.0	81 57	85.7	13 18.3	81 57	85.4	13 42.5	81 57	85.1	14 06.8	81 57	84.8	14 31.0	81 57	84.5	14 55.2	81 57	84.2	6
7	11 31.1	81 57	85.5	11 55.4	81 57	85.2	12 19.7	81 57	84.9	12 44.0	81 57	84.6	13 08.3	81 57	84.3	13 32.5	81 57	84.0	13 56.8	81 57	83.7	14 21.0	81 57	83.4	7
8	10 56.8	81 57	84.7	11 21.1	81 57	84.4	11 45.5	81 57	84.1	12 09.8	81 57	83.8	12 34.1	81 57	83.5	12 58.3	81 57	83.2	13 22.6	81 57	82.9	13 46.8	81 57	82.6	8
9	10 22.5	81 57	83.9	10 46.9	81 57	83.6	11 11.3	81 57	83.3	11 35.6	81 57	83.0	11 59.9	81 57	82.7	12 24.2	81 57	82.4	12 48.5	81 57	82.1	13 12.7	81 57	81.8	9
90	9 48.4	81 57	83.0	10 12.7	81 57	82.8	10 37.1	81 57	82.5	11 01.5	81 57	82.2	11 25.8	81 57	81.9	11 50.1	81 57	81.6	12 14.4	81 57	81.3	12 38.7	81 57	81.0	90

Digitized by Google

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	23 00.0	1.0	01	180.0	22 30.0	1.0	01	180.0	22 00.0	1.0	01	180.0	21 30.0	1.0	01	180.0	21 00.0	1.0	01	180.0	20 30.0	1.0	01	180.0	20 00.0	1.0	01	180.0	19 30.0	1.0	00	180.0	00
1	22 59.7	1.0	02	178.9	22 29.7	1.0	02	178.9	21 59.7	1.0	02	178.9	21 29.7	1.0	02	179.0	20 59.7	1.0	02	179.0	20 29.7	1.0	02	179.0	19 59.7	1.0	02	179.0	19 29.7	1.0	02	179.0	1
2	22 58.7	1.0	03	177.9	22 28.7	1.0	03	177.9	21 58.7	1.0	03	177.9	21 28.7	1.0	03	177.9	20 58.8	1.0	03	177.9	20 28.8	1.0	03	177.9	19 58.8	1.0	03	177.9	19 28.8	1.0	03	178.0	2
3	22 57.1	1.0	04	176.8	22 27.1	1.0	04	176.8	21 57.2	1.0	04	176.8	21 27.2	1.0	04	176.9	20 57.2	1.0	04	176.9	20 27.2	1.0	04	176.9	19 57.2	1.0	04	176.9	19 27.2	1.0	04	176.9	3
4	22 54.9	1.0	05	175.8	22 24.9	1.0	05	175.8	21 55.0	1.0	05	175.8	21 25.0	1.0	05	175.8	20 55.0	1.0	05	175.8	20 25.0	1.0	05	175.9	19 55.1	1.0	05	175.9	19 25.1	1.0	05	175.9	4
05	22 52.0	1.0	06	174.7	22 22.1	1.0	06	174.7	21 52.1	1.0	06	174.8	21 22.2	1.0	06	174.8	20 52.2	1.0	06	174.8	20 22.2	1.0	06	174.8	19 52.3	1.0	06	174.9	19 22.3	1.0	06	174.9	05
6	22 48.5	1.0	07	173.6	22 18.6	1.0	07	173.7	21 48.7	1.0	07	173.7	21 18.7	1.0	07	173.7	20 48.8	1.0	07	173.8	20 18.8	1.0	07	173.8	19 48.9	1.0	07	173.8	19 19.0	1.0	07	173.9	6
7	22 44.4	1.0	08	172.6	22 14.5	1.0	08	172.6	21 44.6	1.0	08	172.7	21 14.7	1.0	08	172.7	20 44.7	1.0	08	172.7	20 14.8	1.0	08	172.8	19 44.9	1.0	08	172.8	19 15.0	1.0	08	172.9	7
8	22 39.6	1.0	09	171.5	22 09.7	1.0	09	171.6	21 39.9	1.0	09	171.6	21 10.0	1.0	09	171.7	20 40.1	1.0	09	171.7	20 10.2	1.0	09	171.7	19 40.3	1.0	09	171.8	19 10.4	1.0	09	171.8	8
9	22 34.2	1.0	10	170.5	22 04.4	1.0	10	170.5	21 34.5	1.0	10	170.6	21 04.7	1.0	10	170.6	20 34.8	1.0	10	170.7	20 04.9	1.0	10	170.7	19 35.1	1.0	10	170.8	19 05.2	1.0	10	170.8	9
10	22 28.2	99	11	169.4	21 58.4	99	11	169.5	21 28.6	99	11	169.5	20 58.7	99	11	169.6	20 28.9	99	11	169.6	19 59.1	99	11	169.7	19 29.3	99	11	169.8	18 59.4	99	11	169.8	10
1	22 21.6	99	12	168.4	21 51.8	99	12	168.4	21 22.0	99	12	168.5	20 52.2	99	12	168.5	20 22.4	99	12	168.6	19 52.6	99	12	168.7	19 22.8	99	12	168.7	18 53.0	99	12	168.8	1
2	22 14.3	99	13	167.3	21 44.6	99	13	167.4	21 14.8	99	13	167.4	20 45.1	99	13	167.5	20 15.3	99	13	167.6	19 45.6	99	13	167.6	19 15.8	99	13	167.7	18 46.1	99	13	167.8	2
3	22 06.5	99	14	166.3	21 36.8	99	14	166.3	21 07.1	99	14	166.4	20 37.3	99	14	166.5	20 07.6	99	14	166.6	19 37.9	99	14	166.6	19 08.2	99	14	166.7	18 38.5	99	14	166.8	3
4	21 58.0	99	15	165.2	21 28.3	99	15	165.3	20 58.7	99	15	165.4	20 29.0	99	15	165.5	19 59.3	99	15	165.5	19 29.7	99	15	165.6	19 00.0	99	15	165.7	18 30.3	99	15	165.8	4
15	21 48.9	99	16	164.2	21 19.3	99	16	164.3	20 49.7	99	16	164.3	20 20.1	99	16	164.4	19 50.4	99	16	164.5	19 20.8	99	16	164.6	18 51.2	99	16	164.7	18 21.6	99	16	164.8	15
6	21 39.2	99	17	163.1	21 09.7	99	17	163.2	20 40.1	99	17	163.3	20 10.5	99	17	163.4	19 41.0	99	17	163.5	19 11.4	99	17	163.6	18 41.8	99	17	163.7	18 12.2	99	16	163.8	6
7	21 28.9	98	18	162.1	20 59.4	98	18	162.2	20 29.9	98	18	162.3	20 00.4	98	18	162.4	19 30.9	98	18	162.5	19 01.4	98	18	162.6	18 31.8	98	18	162.7	18 02.3	98	17	162.8	7
8	21 18.1	98	19	161.1	20 48.6	98	19	161.2	20 19.2	98	19	161.3	19 49.7	98	19	161.4	19 20.2	98	19	161.5	18 50.8	98	19	161.6	18 21.3	98	18	161.7	17 51.8	98	18	161.8	8
9	21 06.6	98	20	160.0	20 37.2	98	20	160.1	20 07.8	98	20	160.3	19 38.4	98	20	160.4	19 09.0	98	20	160.5	18 39.6	98	20	160.6	18 10.2	98	19	160.7	17 40.8	98	19	160.8	9
20	20 54.6	98	21	159.0	20 25.2	98	21	159.1	19 55.9	98	21	159.2	19 26.6	98	21	159.3	18 57.2	98	21	159.5	18 27.9	98	20	159.6	17 58.5	98	20	159.7	17 29.2	98	20	159.8	20
1	20 42.0	98	22	158.0	20 12.7	98	22	158.1	19 43.4	98	22	158.2	19 14.1	98	22	158.3	18 44.9	98	22	158.5	18 15.6	98	21	158.6	17 46.3	98	21	158.7	17 17.0	98	21	158.8	1
2	20 28.8	97	23	157.0	19 59.6	97	23	157.1	19 30.4	97	23	157.2	19 01.2	97	23	157.3	18 32.0	97	22	157.5	18 02.7	97	22	157.6	17 33.5	97	22	157.7	17 04.3	97	22	157.8	2
3	20 15.1	97	24	156.0	19 45.9	97	24	156.1	19 16.8	97	24	156.2	18 47.6	97	23	156.3	18 18.5	97	23	156.5	17 49.3	97	23	156.6	17 20.2	97	23	156.7	16 51.0	97	23	156.8	3
4	20 00.8	97	25	154.9	19 31.7	97	25	155.1	19 02.6	97	24	155.2	18 33.5	97	24	155.3	18 04.5	97	24	155.5	17 35.4	97	24	155.6	17 06.3	97	24	155.7	16 37.2	97	24	155.9	4
25	19 45.9	97	26	153.9	19 16.9	97	26	154.1	18 47.9	97	25	154.2	18 18.9	97	25	154.4	17 49.9	97	25	154.5	17 20.9	97	25	154.6	16 51.9	97	25	154.7	16 22.9	97	25	154.9	25
6	19 30.5	96	27	152.9	19 01.6	96	26	153.1	18 32.7	96	26	153.2	18 03.8	96	26	153.4	17 34.8	96	26	153.5	17 05.9	96	26	153.6	16 36.9	96	26	153.8	16 08.0	97	26	153.9	6
7	19 14.6	96	27	151.9	18 45.8	96	27	152.1	18 16.9	96	27	152.2	17 48.1	96	27	152.4	17 19.2	96	27	152.5	16 50.3	96	27	152.7	16 21.5	96	27	152.8	15 52.6	96	26	152.9	7
8	18 58.2	96	28	150.9	18 29.4	96	28	151.1	18 00.6	96	28	151.2	17 31.8	96	28	151.4	17 03.1	96	28	151.5	16 34.3	96	28	151.7	16 05.5	96	28	151.8	15 36.7	96	27	152.0	8
9	18 41.2	96	29	150.0	18 12.5	96	29	150.1	17 43.8	96	29	150.3	17 15.1	96	29	150.4	16 46.4	96	29	150.6	16 17.7	96	28	150.7	15 49.0	96	28	150.9	15 20.3	96	28	151.0	9
30	18 23.7	95	30	149.0	17 55.1	95	30	149.1	17 26.5	95	30	149.3	16 57.9	95	30	149.4	16 29.2	95	29	149.6	16 00.6	95	29	149.8	15 32.0	95	29	149.9	15 03.3	95	29	150.1	30
1	18 05.7	95	31	148.0	17 37.2	95	31	148.2	17 08.7	95	31	148.3	16 40.1	95	30	148.5	16 11.6	95	30	148.6	15 43.0	95	30	148.8	15 14.5	95	30	149.0	14 45.9	95	30	149.1	1
2	17 47.2	95	32	147.0	17 18.8	95	31	147.2	16 50.3	95	31	147.4	16 21.9	95	31	147.5	15 53.4	95	31	147.7	15 25.0	95	31	147.8	14 56.5	95	31	148.0	14 28.0	95	31	148.2	2
3	17 28.2	94	32	146.0	16 59.9	95	32	146.2	16 31.5	95	32	146.4	16 03.2	95	32	146.6	15 34.8	95	32	146.7	15 06.4	95	32	146.9	14 38.0	95	32	147.1	14 09.6	95	31	147.2	3
4	17 08.8	94	33	145.1	16 40.5	94	33	145.3	16 12.2	94	33	145.4	15 44.0	94	33	145.6	15 15.7	94	33	145.8	14 47.4	94	33	145.9	14 19.1	94	32	146.1	13 50.8	94	32	146.3	4
35	16 48.8	94	34	144.1	16 20.7	94	34	144.3	15 52.5	94	34	144.5	15 24.3	94	34	144.7	14 56.1	94	33	144.8	14 27.9	94	33	145.0	13 59.7	94	33	145.2	13 31.4	94	33	145.4	35
6	16 28.4	94	35	143.2	16 00.4	94	35	143.3	15 32.3	94	34	143.5	15 04.1	94	34	143.7	14 36.0	94	34	143.9	14 07.9	94	34	144.1	13 39.8	94	34	144.2	13 11.6	94	34	144.4	6
7	16 07.6	93	36	142.2	15 39.6	93	35	142.4	15 11.6	93	35	142.6	14 43.6	93	35	142.8	14 15.5	93	35	143.0	13 47.5	93	35	143.1	13 19.4	93	35	143.3	12 51.4	94	34	143.5	7
8	15 46.3	93	36	141.3	15 18.4	93	36	141.5	14 50.4	93	36	141.6	14 22.5	93	36	141.8	13 54.6	93	36	142.0	13 26.6	93	36	142.2	12 58.7	93	35	142.4	12 30.7	93	35	142.6	8
9	15 24.5	93	37	140.3	14 56.7	93	37	140.5	14 28.9	93	37	140.7	14 01.0	93	37	140.9	13 33.2	93	36	141.1	13 05.3	93	36	141.3	12 37.4	93	36	141.5	12 09.6	93	36	141.7	9
40	15 02.3	92	38	139.4	14 34.6	92	38	139.6	14 06.8	92	37	139.8	13 39.1	93	37	140.0	13 11.3	93	37	140.2	12 43.6	93	37	140.4	12 15.8	93	37	140.6	11 48.0	93	37	140.7	40
1	14 39.7	92	38	138.4	14 12.1	92	38	138.6	13 44.4	92	38	138.8	13 16.7	92	38	139.0	12 49.1	92	38	139.2	12 21.4	92	38	139.4	11 53.7	92	38	139.6	11 26.0	92	37	139.8	1
2	14 16.7	92	39	137.5	13 49.1	92	39	137.7	13 21.6	92	39	137.9	12 54.0	92	39	138.1	12 26.4	92	38	138.3	11 58.8	92	38	138.5	11 31.2	92	38	138.7	11 03.6	92	38	138.9	2
3	13 53.2	92	40	136.6	13 25.8	92	40	136.8	12 58.3	92	39	137.0	12 30.8	92	39	137.2	12 03.3	92	39	137.4	11 35.8	92	39	137.6	11 08.3	92	39	137.8	10 40.8	92	39	138.0	3
4	13 29.4	91	40	135.7	13 02.0	91	40	135.9	12 34.6	91	40	136.1	12 07.2	91	40	136.3	11 39.8	91	40	136.5	11 12.4	91	40	136.7	10 45.0	91	40	136.9	10 17.6	91	39	137.1	4
45	13 05.1	91	41	134.8	12 37.9	91	41	135.0	12 10.6	91	41	135.2	11 43.3	91	41	135.4	11 16.0	91	40	135.6	10 48.6	91	40	135.8	10 21.3	91	40	136.0	9 54.0	91	40	136.2	45
6	12 40.5	91	42	133.8	12 13.3	91	42	134.1	11 46.1	91	41	134.3	11 18.9	91	41	134.5	10 51.7	91	41	134.7	10 24.5	91	41	134.9	9 57.2	91	41	135.1	9 30.0	91	41	135.3	6
7	12 15.5	90	42	132.9	11 48.4	90	42	133.2	11 21.3	90	42	133.4	10 54.2	90	42	133.6	10 27.0	90	42	133.8	9 59.9	90	42	134.0	9 32.8	91	41	134.2	9 05.6	91	41	134.5	7
8	11 50.1	90	43	132.0	11 23.1	90	43	132.3	10 56.1	90	43	132.5	10 29.1	90	42	132.7	10 02.0	90	42	132.9	9 35.0	90	42	133.1	9 07.9	90	42	133.4	8 40.8	90	42	133.6	8
9	11 24.4	90	44	131.1	10 57.5	90	43	131.4	10 30.5	90	43	131.6	10 03.6	90	43	131.8	9 36.6	90	43	132.0	9 09.7	90	43	132.3	8 42.7	90	43	132.5	8 15.7	90	42	132.7	9
50	10 58.3	89	44	130.2	10 31.5	89	44	130.5	10 04.6	89	44	130.7	9 37.8	90	44	130.9	9 10.9	90	43	131.2	8 44.0	90	43	131.4	8 17.2	90	43	131.6	7 50.3	90	43	131.8	50
1	10 31.8	89	45	129.4	10 05.1	89	44	129.6	9 38.4	89	44	129.8	9 11.6	89	44	130.0	8 44.8	89	44	130.3	8 18.0	89	44	130.5	7 51.2	89	44	130.7	7 24.5	89	44	131.0	1
2	10 05.1	89	45	128.5	9 38.4	89	45	128.7	9 11.7	89	45	128.9	8 45.1	89	45	129.2	8 18.4	89	45	129.4	7 51.7	89	44	129.6	7 25.0	89	44	129.9	6 58.3	89	44	130.1	2
3	9 38.0	89	46	127.6	9 11.4	89	46	127.8	8 44.8	89	45	128.1	8 18.2	89	45	128.3	7 51.6	89	45	128.5	7 25.0	89	45	128.8	6 58.4	89	45	129.0	6 31.8	89	45	129.2	3
4	9 10.5	88	46	126.7	8 44.1	88	46	127.0	8 17.6	88	46	127.2	7 51.1	88	46	127.4	7 24.6	88	46	127.7	6 58.0	88	46	127.9	6 31.5	88	45	128.1	6 05.0	88	45	128.4	4
55	8 42.8	88	47	125.8	8 16.4	88	47	126.1	7 50.0	88	46	126.3	7 23.6	88	46	126.6	6 57.2	88	46	126.8	6 30.7	88	46	127.0	6 04.3	88	46	127.3	5 37.8	88	46	127.5	55
6	8 14.7	88	47	125.0	7 48.4	88	47	125.2	7 22.1	88	47	125.5	6 55.8	88	47	125.7	6 29.4	88	47	125.9	6 03.1	88	47	126.2	5 36.7	88	46	126.4	5 10.4	88	46	126.7	6
7	7 46.4	87	48	124.1	7 20.2	87	48	124.4	6 53.9	87	47	124.6	6 27.7	88	47	124.8	6 01.4	88	47	125.1	5 35.2	88	47	125.3	5 08.9	88	47	125.6					7
8	7 17.8	87	48	123.2	6 51.6	87	48	123.5	6 25.5	87	48	123.7	5 59.3	87	48	124.0	5 33.1	87	48	124.2	5 06.9	87	48	124.5									8
9	6 48.8	87	49	122.4	6 22.8	87	49	122.6	5 56.7	87	48	122.9	5 30.6	87	48	123.1	5 04.5	87	48	123.4													9
60	6 19.6	87	49	121.5	5 53.7	87	49	121.8	5 27.7	87	49	122.0	5 01.7	87	49	122.3																	60
1	5 50.2	86	50	120.7	5 24.3	86	50	120.9																									1
2	5 20.5	86	50	119.8																													2

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	9 14.2	81	57	82.2	9 38.6	81	57	81.9	10 03.0	81	57	81.7	10 27.4	81	57	81.4	10 51.8	81	57	81.1	11 16.1	81	57	80.8	11 40.4	81	56	80.5	12 04.7	81	56	80.2	91
2	8 40.2	81	57	81.4	9 04.6	81	57	81.1	9 29.0	81	57	80.8	9 53.4	81	56	80.6	10 17.8	81	56	80.3	10 42.2	81	56	80.0	11 06.5	81	56	79.7	11 30.9	81	56	79.4	2
3	8 06.2	82	57	80.6	8 30.6	82	56	80.3	8 55.1	81	56	80.0	9 19.5	81	56	79.8	9 43.9	81	56	79.5	10 08.3	81	56	79.2	10 32.7	81	56	78.9	10 57.1	81	56	78.6	3
4	7 32.2	82	56	79.8	7 56.7	82	56	79.5	8 21.2	82	56	79.2	8 45.7	82	56	78.9	9 10.1	81	56	78.7	9 34.6	81	56	78.4	9 59.0	81	56	78.1	10 23.4	81	56	77.8	4
95	6 58.4	82	56	79.0	7 22.9	82	56	78.7	7 47.5	82	56	78.4	8 12.0	82	56	78.1	8 36.5	82	56	77.9	9 00.9	82	56	77.6	9 25.4	82	56	77.3	9 49.8	81	56	77.0	95
6	6 24.7	82	56	78.2	6 49.2	82	56	77.9	7 13.8	82	56	77.6	7 38.3	82	56	77.3	8 02.9	82	56	77.1	8 27.4	82	56	76.8	8 51.9	82	56	76.5	9 16.4	82	56	76.2	6
7	5 51.0	82	56	77.4	6 15.6	82	56	77.1	6 40.2	82	56	76.8	7 04.8	82	56	76.5	7 29.4	82	56	76.3	7 53.9	82	56	76.0	8 18.5	82	55	75.7	8 43.0	82	55	75.4	7
8	5 17.5	82	56	76.6	5 42.1	82	56	76.3	6 06.8	82	56	76.0	6 31.4	82	56	75.7	6 56.0	82	55	75.5	7 20.6	82	55	75.2	7 45.2	82	55	74.9	8 09.8	82	55	74.6	8
9					5 08.8	82	56	75.5	5 33.4	82	55	75.2	5 58.1	82	55	74.9	6 22.8	82	55	74.6	6 47.4	82	55	74.4	7 12.0	82	55	74.1	7 36.7	82	55	73.8	9
100									5 00.2	82	55	74.4	5 24.9	82	55	74.1	5 49.6	82	55	73.8	6 14.3	82	55	73.6	6 39.0	82	55	73.3	7 03.7	82	55	73.0	100
1																	5 16.6	82	55	73.0	5 41.4	82	55	72.8	6 06.1	82	55	72.5	6 30.8	82	54	72.2	1
2																					5 08.6	83	55	72.0	5 33.4	83	54	71.7	5 58.1	83	54	71.4	2
3																									5 00.8	83	54	70.9	5 25.6	83	54	70.6	3

Digitized by Google

Lat. 55°

H.A.	16° 00′ Alt.	Δd Δt	Az.	16° 30′ Alt.	Δd Δt	Az.	17° 00′ Alt.	Δd Δt	Az.	17° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	51 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0
1	50 59.5	1.0 02	178.5	51 29.5	1.0 02	178.5	51 59.5	1.0 02	178.4	52 29.5	1.0 02	178.4
2	50 58.2	1.0 04	176.9	51 28.2	1.0 04	176.9	51 58.1	1.0 04	176.9	52 28.1	1.0 04	176.9
3	50 55.9	1.0 05	175.4	51 25.8	1.0 05	175.4	51 55.8	1.0 05	175.3	52 25.8	1.0 05	175.3
4	50 52.7	1.0 07	173.9	51 22.6	1.0 07	173.8	51 52.5	1.0 07	173.8	52 22.5	1.0 07	173.7
05	50 48.6	1.0 08	172.4	51 18.5	1.0 08	172.3	51 48.4	1.0 08	172.3	52 18.3	1.0 09	172.2
6	50 43.5	1.0 10	170.9	51 13.4	1.0 10	170.8	51 43.3	1.0 10	170.7	52 13.1	1.0 10	170.6
7	50 37.6	99 11	169.4	51 07.5	99 11	169.3	51 37.3	99 12	169.2	52 07.1	99 12	169.1
8	50 30.8	99 13	167.9	51 00.6	99 13	167.8	51 30.4	99 13	167.7	52 00.1	99 13	167.5
9	50 23.2	99 14	166.4	50 52.9	99 14	166.2	51 22.6	99 14	166.1	51 52.2	99 15	166.0
10	50 14.6	99 16	164.9	50 44.2	99 16	164.7	51 13.9	99 16	164.6	51 43.5	99 16	164.5
1	50 05.2	99 17	163.4	50 34.8	99 17	163.3	51 04.3	98 17	163.1	51 33.8	98 18	163.0
2	49 54.9	98 18	161.9	50 24.4	98 19	161.8	50 53.9	98 19	161.6	51 23.3	98 19	161.5
3	49 43.8	98 20	160.5	50 13.2	98 20	160.3	50 42.6	98 20	160.1	51 12.0	98 20	160.0
4	49 31.9	98 21	159.0	50 01.2	98 21	158.8	50 30.5	98 22	158.7	50 59.8	98 22	158.5
15	49 19.2	97 23	157.6	49 48.4	97 23	157.4	50 17.6	97 23	157.2	50 46.7	97 23	157.0
6	49 05.7	97 24	156.1	49 34.8	97 24	155.9	50 03.8	97 24	155.8	50 32.9	97 24	155.6
7	48 51.3	97 25	154.7	49 20.3	97 25	154.5	49 49.3	97 26	154.3	50 18.3	96 26	154.1
8	48 36.3	96 26	153.3	49 05.1	96 27	153.1	49 34.0	96 27	152.9	50 02.9	96 27	152.7
9	48 20.4	96 28	151.9	48 49.2	96 28	151.7	49 18.0	96 28	151.5	49 46.7	96 28	151.3
20	48 03.9	96 29	150.5	48 32.5	96 29	150.3	49 01.2	95 29	150.1	49 29.8	95 29	149.9
1	47 46.6	95 30	149.2	48 15.1	95 30	148.9	48 43.6	95 30	148.7	49 12.1	95 31	148.5
2	47 28.6	95 31	147.8	47 57.0	95 31	147.6	48 25.4	95 32	147.3	48 53.8	95 32	147.1
3	47 09.9	94 32	146.5	47 38.2	94 32	146.2	48 06.5	94 33	146.0	48 34.7	94 33	145.7
4	46 50.6	94 33	145.1	47 18.7	94 34	144.9	47 46.9	94 34	144.6	48 15.0	94 34	144.4
25	46 30.6	94 34	143.8	46 58.6	93 35	143.6	47 26.7	93 35	143.3	47 54.6	93 35	143.0
6	46 09.9	93 35	142.5	46 37.9	93 36	142.3	47 05.8	93 36	142.0	47 33.6	93 36	141.7
7	45 48.7	93 36	141.2	46 16.5	93 37	141.0	46 44.3	93 37	140.7	47 12.0	92 37	140.4
8	45 26.9	92 37	140.0	45 54.5	92 38	139.7	46 22.2	92 38	139.4	46 49.8	92 38	139.1
9	45 04.4	92 38	138.7	45 32.0	92 39	138.4	45 59.5	92 39	138.1	46 27.0	91 39	137.8
30	44 41.4	92 39	137.5	45 08.9	91 39	137.2	45 36.3	91 40	136.9	46 03.6	91 40	136.6
1	44 17.9	91 40	136.2	44 45.2	91 40	135.9	45 12.5	91 41	135.6	45 39.7	91 41	135.3
2	43 53.8	91 41	135.0	44 21.0	91 41	134.7	44 48.1	90 41	134.4	45 15.2	90 42	134.1
3	43 29.2	90 42	133.8	43 56.3	90 42	133.5	44 23.3	90 42	133.2	44 50.3	90 42	132.9
4	43 04.2	90 43	132.6	43 31.1	90 43	132.3	43 58.0	90 43	132.0	44 24.8	89 43	131.7
35	42 38.6	89 43	131.4	43 05.4	89 44	131.1	43 32.2	89 44	130.8	43 58.9	89 44	130.5
6	42 12.6	89 44	130.3	42 39.3	89 44	130.0	43 05.9	89 44	129.7	43 32.5	89 45	129.3
7	41 46.1	89 45	129.1	42 12.7	88 45	128.8	42 39.2	88 45	128.5	43 05.7	88 45	128.2
8	41 19.2	88 46	128.0	41 45.7	88 46	127.7	42 12.1	88 46	127.4	42 38.4	88 46	127.0
9	40 51.9	88 46	126.9	41 18.2	88 46	126.6	41 44.5	88 47	126.2	42 10.7	87 47	125.9
40	40 24.1	87 47	125.8	40 50.4	87 47	125.4	41 16.5	87 47	125.1	41 42.7	87 47	124.8
1	39 56.0	87 47	124.7	40 22.1	87 48	124.3	40 48.2	87 48	124.0	41 14.2	87 48	123.7
2	39 27.5	87 48	123.6	39 53.5	87 48	123.3	40 19.5	86 48	122.9	40 45.4	86 49	122.6
3	38 58.7	86 49	122.5	39 24.6	86 49	122.2	39 50.4	86 49	121.9	40 16.2	86 49	121.5
4	38 29.5	86 49	121.4	38 55.3	86 49	121.1	39 21.0	86 50	120.8	39 46.7	86 50	120.5
45	38 00.0	86 50	120.4	38 25.7	86 50	120.1	38 51.3	85 50	119.7	39 16.9	85 50	119.4
6	37 30.1	85 50	119.4	37 55.7	85 50	119.0	38 21.3	85 51	118.7	38 46.8	85 51	118.4
7	37 00.0	85 51	118.3	37 25.5	85 51	118.0	37 50.9	85 51	117.7	38 16.3	85 51	117.3
8	36 29.6	85 51	117.3	36 55.0	85 51	117.0	37 20.3	84 52	116.6	37 45.6	84 52	116.3
9	35 58.8	84 52	116.3	36 24.2	84 52	116.0	36 49.4	84 52	115.6	37 14.6	84 52	115.3
50	35 27.9	84 52	115.3	35 53.1	84 52	115.0	36 18.3	84 52	114.6	36 43.4	84 52	114.3
1	34 56.6	84 52	114.3	35 21.8	84 53	114.0	35 46.9	84 53	113.6	36 11.9	83 53	113.3
2	34 25.1	84 53	113.3	34 50.2	83 53	113.0	35 15.2	83 53	112.7	35 40.2	83 53	112.3
3	33 53.4	83 53	112.4	34 18.4	83 53	112.0	34 43.3	83 53	111.7	35 08.2	83 54	111.3
4	33 21.5	83 54	111.4	33 46.4	83 54	111.1	34 11.3	83 54	110.7	34 36.1	83 54	110.4
55	32 49.3	83 54	110.4	33 14.2	83 54	110.1	33 39.0	83 54	109.8	34 03.7	82 54	109.4
6	32 17.0	83 54	109.5	32 41.8	83 54	109.2	33 06.5	82 54	108.8	33 31.2	82 55	108.5
7	31 44.5	82 54	108.6	32 09.2	82 55	108.2	32 33.8	82 55	107.9	32 58.4	82 55	107.6
8	31 11.7	82 55	107.6	31 36.4	82 55	107.3	32 01.0	82 55	107.0	32 25.5	82 55	106.6
9	30 38.9	82 55	106.7	31 03.5	82 55	106.4	31 28.0	82 55	106.0	31 52.5	82 55	105.7
60	30 05.8	82 55	105.8	30 30.4	82 55	105.5	30 54.9	82 55	105.1	31 19.3	81 56	104.8
1	29 32.6	82 56	104.9	29 57.1	82 56	104.6	30 21.6	81 56	104.2	30 45.9	81 56	103.9
2	28 59.3	82 56	104.0	29 23.8	81 56	103.7	29 48.1	81 56	103.3	30 12.5	81 56	103.0
3	28 25.9	81 56	103.1	28 50.2	81 56	102.8	29 14.6	81 56	102.4	29 38.9	81 56	102.1
4	27 52.3	81 56	102.2	28 16.6	81 56	101.9	28 40.9	81 56	101.6	29 05.2	81 56	101.2
65	27 18.6	81 56	101.3	27 42.9	81 56	101.0	28 07.2	81 56	100.7	28 31.4	81 56	100.3
6	26 44.8	81 56	100.5	27 09.1	81 57	100.1	27 33.3	81 57	99.8	27 57.5	81 57	99.5
7	26 10.9	81 57	99.6	26 35.1	81 57	99.3	26 59.3	81 57	98.9	27 23.5	80 57	98.6
8	25 36.9	81 57	98.7	26 01.1	81 57	98.4	26 25.3	80 57	98.1	26 49.4	80 57	97.7
9	25 02.9	81 57	97.9	25 27.1	81 57	97.5	25 51.2	80 57	97.2	26 15.3	80 57	96.9
70	24 28.8	81 57	97.0	24 52.9	80 57	96.7	25 17.0	80 57	96.4	25 41.1	80 57	96.0
1	23 54.6	81 57	96.2	24 18.7	80 57	95.8	24 42.8	80 57	95.5	25 06.8	80 57	95.2
2	23 20.3	80 57	95.3	23 44.4	80 57	95.0	24 08.5	80 57	94.7	24 32.5	80 57	94.3
3	22 46.0	80 57	94.5	23 10.1	80 57	94.2	23 34.2	80 57	93.8	23 58.2	80 57	93.5
4	22 11.7	80 57	93.7	22 35.8	80 57	93.3	22 59.8	80 57	93.0	23 23.8	80 57	92.7
75	21 37.4	80 57	92.8	22 01.4	80 57	92.5	22 25.5	80 57	92.2	22 49.5	80 57	91.8
6	21 03.0	80 57	92.0	21 27.0	80 57	91.7	21 51.1	80 57	91.3	22 15.1	80 57	91.0
7	20 28.6	80 57	91.2	20 52.6	80 57	90.8	21 16.7	80 57	90.5	21 40.6	80 57	90.2
8	19 54.2	80 57	90.3	20 18.2	80 57	90.0	20 42.2	80 57	89.7	21 06.2	80 57	89.4
9	19 19.7	80 57	89.5	19 43.8	80 57	89.2	20 07.8	80 57	88.9	20 31.8	80 57	88.6
80	18 45.3	80 57	88.7	19 09.4	80 57	88.4	19 33.4	80 57	88.1	19 57.4	80 57	87.8
1	18 10.9	80 57	87.9	18 35.0	80 57	87.6	18 59.0	80 57	87.3	19 23.0	80 57	86.9
2	17 36.6	80 57	87.1	18 00.6	80 57	86.8	18 24.7	80 57	86.5	18 48.7	80 57	86.1
3	17 02.2	80 57	86.3	17 26.3	80 57	86.0	17 50.3	80 57	85.6	18 14.4	80 57	85.3
4	16 27.9	80 57	85.5	16 52.0	80 57	85.2	17 16.0	80 57	84.8	17 40.1	80 57	84.5
85	15 53.6	80 57	84.7	16 17.7	80 57	84.4	16 41.8	80 57	84.0	17 05.9	80 57	83.7
6	15 19.3	80 57	83.9	15 43.5	80 57	83.6	16 07.6	80 57	83.2	16 31.7	80 57	82.9
7	14 45.2	81 57	83.1	15 09.3	80 57	82.8	15 33.4	80 57	82.4	15 57.6	80 57	82.1
8	14 11.0	81 57	82.3	14 35.2	81 57	82.0	14 59.4	80 57	81.6	15 23.5	80 57	81.3
9	13 37.0	81 57	81.5	14 01.2	81 57	81.2	14 25.3	81 57	80.8	14 49.5	81 57	80.5
90	13 03.0	81 57	80.7	13 27.2	81 56	80.4	13 51.4	81 56	80.1	14 15.6	81 56	79.7

H.A.	18° 00′ Alt.	Δd Δt	Az.	18° 30′ Alt.	Δd Δt	Az.	19° 00′ Alt.	Δd Δt	Az.	19° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	53 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	54 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	00
1	52 59.5	1.0 02	178.4	53 29.5	1.0 02	178.4	53 59.5	1.0 02	178.4	54 29.5	1.0 02	178.4	1
2	52 58.1	1.0 04	176.8	53 28.1	1.0 04	176.8	53 58.1	1.0 04	176.8	54 28.1	1.0 04	176.8	2
3	52 55.7	1.0 06	175.3	53 25.7	1.0 06	175.2	53 55.7	1.0 06	175.2	54 25.6	1.0 06	175.1	3
4	52 52.4	1.0 07	173.7	53 22.4	1.0 07	173.6	53 52.3	1.0 07	173.6	54 22.2	1.0 07	173.5	4
05	52 48.2	1.0 09	172.1	53 18.1	1.0 09	172.1	53 48.0	1.0 09	172.0	54 17.9	1.0 09	171.9	05
6	52 43.0	1.0 10	170.6	53 12.8	99 10	170.5	53 42.7	99 10	170.4	54 12.5	99 10	170.3	6
7	52 36.9	99 12	169.0	53 06.7	99 12	168.9	53 36.5	.99 12	168.8	54 06.3	99 12	168.7	7
8	52 29.8	99 13	167.4	52 59.6	99 13	167.3	53 29.3	99 13	167.2	53 59.0	99 14	167.1	8
9	52 21.9	99 15	165.9	52 51.6	99 15	165.8	53 21.2	99 15	165.7	53 50.9	99 15	165.5	9
10	52 13.1	99 16	164.4	52 42.7	99 16	164.2	53 12.3	99 16	164.1	53 41.8	99 17	164.0	10
1	52 03.4	98 18	162.8	52 32.9	98 18	162.7	53 02.4	98 18	162.5	53 31.9	98 18	162.4	1
2	51 52.8	98 19	161.3	52 22.2	98 19	161.2	52 51.6	98 19	161.0	53 21.0	98 20	160.8	2
3	51 41.3	98 20	159.8	52 10.7	98 21	159.6	52 40.0	98 21	159.5	53 09.3	98 21	159.3	3
4	51 29.0	97 22	158.3	51 58.3	97 22	158.1	52 27.5	97 22	158.0	52 56.7	97 22	157.8	4
15	51 15.9	97 23	156.8	51 45.0	97 23	156.6	52 14.1	97 24	156.4	52 43.2	97 24	156.2	15
6	51 02.0	97 25	155.4	51 31.0	97 25	155.2	52 00.0	97 25	155.0	52 29.0	97 25	154.7	6
7	50 47.2	96 26	153.9	51 16.1	96 26	153.7	51 45.0	96 26	153.5	52 13.9	96 26	153.3	7
8	50 31.7	96 27	152.5	51 00.5	96 27	152.2	51 29.3	96 28	152.0	51 58.0	96 28	151.8	8
9	50 15.4	96 28	151.0	50 44.1	96 29	150.8	51 12.7	95 29	150.6	51 41.3	95 29	150.3	9
20	49 58.4	95 30	149.6	50 26.9	95 30	149.4	50 55.4	95 30	149.1	51 23.9	95 30	148.9	20
1	49 40.6	95 31	148.2	50 09.0	95 31	148.0	50 37.4	95 31	147.7	51 05.8	94 31	147.5	1
2	49 22.1	94 32	146.8	49 50.4	94 32	146.6	50 18.7	94 32	146.3	50 46.9	94 33	146.0	2
3	49 02.9	94 33	145.5	49 31.1	94 33	145.2	49 59.3	94 34	144.9	50 27.4	94 34	144.7	3
4	48 43.1	94 34	144.1	49 11.1	93 34	143.8	49 39.1	93 35	143.6	50 07.1	93 35	143.3	4
25	48 22.6	93 35	142.8	48 50.5	93 35	142.5	49 18.4	93 36	142.2	49 46.2	93 36	141.9	25
6	48 01.5	93 36	141.4	48 29.2	93 36	141.2	48 57.0	92 37	140.9	49 24.7	92 37	140.6	6
7	47 39.7	92 37	140.1	48 07.3	92 37	139.8	48 34.9	92 38	139.5	49 02.5	92 38	139.2	7
8	47 17.3	92 38	138.8	47 44.8	92 38	138.5	48 12.3	91 39	138.2	48 39.7	91 39	137.9	8
9	46 54.4	91 39	137.6	47 21.8	91 39	137.3	47 49.1	91 40	136.9	48 16.4	91 40	136.6	9
30	46 30.9	91 40	136.3	46 58.1	91 40	136.0	47 25.3	91 41	135.7	47 52.5	90 41	135.4	30
1	46 06.8	90 41	135.0	46 34.0	90 41	134.7	47 01.0	90 41	134.4	47 28.0	90 42	134.1	1
2	45 42.3	90 42	133.8	46 09.2	90 42	133.5	46 36.2	90 42	133.2	47 03.1	89 42	132.8	2
3	45 17.2	90 43	132.6	45 44.0	89 43	132.3	46 10.8	89 43	131.9	46 37.6	89 43	131.6	3
4	44 51.6	89 43	131.4	45 18.3	89 44	131.1	45 45.0	89 44	130.7	46 11.6	89 44	130.4	4
35	44 25.5	89 44	130.2	44 52.1	89 44	129.9	45 18.7	88 45	129.5	45 45.2	88 45	129.2	35
6	43 59.0	88 45	129.0	44 25.5	88 45	128.7	44 51.9	88 45	128.4	45 18.3	88 46	128.0	6
7	43 32.1	88 46	127.9	43 58.4	88 46	127.5	44 24.7	88 46	127.2	44 50.9	87 46	126.9	7
8	43 04.7	88 46	126.7	43 30.9	87 46	126.4	43 57.1	87 47	126.0	44 23.2	87 47	125.7	8
9	42 36.9	87 47	125.6	43 03.0	87 47	125.2	43 29.1	87 47	124.9	43 55.1	87 48	124.6	9
40	42 08.7	87 48	124.5	42 34.7	87 48	124.1	43 00.6	86 48	123.8	43 26.5	86 48	123.4	40
1	41 40.2	86 48	123.4	42 06.0	86 48	123.0	42 31.9	86 49	122.7	42 57.6	86 49	122.3	1
2	41 11.2	86 49	122.3	41 37.0	86 49	121.9	42 02.7	86 49	121.6	42 28.4	85 49	121.2	2
3	40 42.0	86 49	121.2	41 07.6	85 50	120.8	41 33.2	85 50	120.5	41 58.8	85 50	120.1	3
4	40 12.3	85 50	120.1	40 37.9	85 50	119.8	41 03.4	85 50	119.4	41 28.8	85 50	119.1	4
45	39 42.4	85 50	119.1	40 07.9	85 51	118.7	40 33.3	85 51	118.4	40 58.6	84 51	118.0	45
6	39 12.2	85 51	118.0	39 37.5	84 51	117.7	40 02.8	84 51	117.3	40 28.1	84 51	117.0	6
7	38 41.7	84 51	117.0	39 06.9	84 52	116.6	39 32.1	84 52	116.3	39 57.3	84 52	115.9	7
8	38 10.8	84 52	116.0	38 36.0	84 52	115.6	39 01.1	84 52	115.3	39 26.2	83 52	114.9	8
9	37 39.8	84 52	114.9	38 04.9	84 52	114.6	38 29.9	83 52	114.2	38 54.8	83 53	113.9	9
50	37 08.4	83 53	113.9	37 33.4	83 53	113.6	37 58.4	83 53	113.2	38 23.3	83 53	112.9	50
1	36 36.9	83 53	113.0	37 01.8	83 53	112.6	37 26.6	83 53	112.3	37 51.4	83 53	111.9	1
2	36 05.1	83 53	112.0	36 29.9	83 53	111.6	36 54.7	82 54	111.3	37 19.4	82 54	110.9	2
3	35 33.0	83 54	111.0	35 57.8	82 54	110.7	36 22.5	82 54	110.3	36 47.2	82 54	109.9	3
4	35 00.8	82 54	110.0	35 25.5	82 54	109.7	35 50.1	82 54	109.3	36 14.7	82 54	109.0	4
55	34 28.4	82 54	109.1	34 53.0	82 54	108.7	35 17.6	82 55	108.4	35 42.1	82 55	108.0	55
6	33 55.8	82 55	108.1	34 20.3	82 55	107.8	34 44.8	82 55	107.4	35 09.3	81 55	107.1	6
7	33 23.0	82 55	107.2	33 47.5	82 55	106.9	34 11.9	81 55	106.5	34 36.3	81 55	106.2	7
8	32 50.0	82 55	106.3	33 14.5	81 55	105.9	33 38.8	81 55	105.6	34 03.2	81 55	105.2	8
9	32 16.9	81 55	105.4	32 41.3	81 56	105.0	33 05.6	81 56	104.7	33 29.9	81 56	104.3	9
60	31 43.7	81 56	104.5	32 08.0	81 56	104.1	32 32.3	81 56	103.8	32 56.5	81 56	103.4	60
1	31 10.3	81 56	103.5	31 34.5	81 56	103.2	31 58.8	81 56	102.9	32 22.9	80 56	102.5	1
2	30 36.8	81 56	102.7	31 01.0	81 56	102.3	31 25.2	80 56	102.0	31 49.3	80 56	101.6	2
3	30 03.1	81 56	101.8	30 27.3	81 56	101.4	30 51.4	80 56	101.1	31 15.5	80 56	100.7	3
4	29 29.4	81 56	100.9	29 53.5	80 56	100.5	30 17.6	80 57	100.2	30 41.7	80 57	99.8	4
65	28 55.5	80 57	100.0	29 19.6	80 57	99.7	29 43.7	80 57	99.3	30 07.7	80 57	99.0	65
6	28 21.6	80 57	99.1	28 45.7	80 57	98.8	29 09.7	80 57	98.4	29 33.7	80 57	98.1	6
7	27 47.6	80 57	98.3	28 11.6	80 57	97.9	28 35.6	80 57	97.6	28 59.6	80 57	97.2	7
8	27 13.5	80 57	97.4	27 37.5	80 57	97.1	28 01.5	80 57	96.7	28 25.4	80 57	96.4	8
9	26 39.3	80 57	96.6	27 03.3	80 57	96.2	27 27.3	80 57	95.9	27 51.2	80 57	95.5	9
70	26 05.1	80 57	95.7	26 29.1	80 57	95.4	26 53.0	80 57	95.0	27 16.9	80 57	94.7	70
1	25 30.8	80 57	94.9	25 54.8	80 57	94.5	26 18.7	80 57	94.2	26 42.6	79 57	93.8	1
2	24 56.5	80 57	94.0	25 20.5	80 57	93.7	25 44.4	80 57	93.3	26 08.2	79 57	93.0	2
3	24 22.2	80 57	93.2	24 46.1	80 57	92.8	25 10.0	80 57	92.5	25 33.8	79 57	92.2	3
4	23 47.8	80 57	92.3	24 11.7	80 57	92.0	24 35.6	80 57	91.7	24 59.4	79 57	91.4	4
75	23 13.4	80 57	91.5	23 37.3	80 57	91.2	24 01.2	80 57	90.9	24 25.0	79 57	90.5	75
6	22 39.0	80 57	90.7	23 02.9	80 57	90.4	23 26.8	79 57	90.0	23 50.6	79 57	89.7	6
7	22 04.6	80 57	89.9	22 28.5	80 57	89.6	22 52.4	80 57	89.2	23 16.2	79 57	88.9	7
8	21 30.2	80 57	89.1	21 54.1	80 57	88.7	22 18.0	80 57	88.4	22 41.8	79 57	88.1	8
9	20 55.8	80 57	88.2	21 19.7	80 57	87.9	21 43.6	80 57	87.6	22 07.4	79 57	87.3	9
80	20 21.4	80 57	87.4	20 45.3	80 57	87.1	21 09.2	80 57	86.8	21 33.0	79 57	86.5	80
1	19 47.0	80 57	86.6	20 10.9	80 57	86.3	20 34.8	80 57	86.0	20 58.7	79 57	85.7	1
2	19 12.7	80 57	85.8	19 36.6	80 57	85.5	20 00.5	80 57	85.2	20 24.4	80 57	84.9	2
3	18 38.4	80 57	85.0	19 02.3	80 57	84.7	19 26.3	80 57	84.4	19 50.2	80 57	84.1	3
4	18 04.1	80 57	84.2	18 28.1	80 57	83.9	18 52.0	80 57	83.6	19 16.0	80 57	83.3	4
85	17 29.9	80 57	83.4	17 53.9	80 57	83.1	18 17.9	80 57	82.8	18 41.8	80 57	82.5	85
6	16 55.7	80 57	82.6	17 19.8	80 57	82.3	17 43.8	80 57	82.0	18 07.7	80 57	81.7	6
7	16 21.6	80 57	81.8	16 45.7	80 57	81.5	17 09.7	80 57	81.2	17 33.7	80 57	80.9	7
8	15 47.6	80 57	81.0	16 11.7	80 57	80.7	16 35.7	80 56	80.4	16 59.8	80 56	80.1	8
9	15 13.6	80 56	80.2	15 37.8	80 56	79.9	16 01.9	80 56	79.6	16 25.9	80 56	79.3	9
90	14 39.8	81 56	79.4	15 03.9	80 56	79.1	15 28.0	80 56	78.8	15 52.1	80 56	78.5	90

Digitized by Google

Lat. 55°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	19 00.0	1.0	00	180.0	18 30.0	1.0	00	180.0	18 00.0	1.0	00	180.0	17 30.0	1.0	00	180.0	17 00.0	1.0	00	180.0	16 30.0	1.0	00	180.0	16 00.0	1.0	00	180.0	15 30.0	1.0	00	180.0	00
1	18 59.7	1.0	02	179.0	18 29.7	1.0	02	179.0	17 59.7	1.0	02	179.0	17 29.7	1.0	02	179.0	16 59.7	1.0	02	179.0	16 29.7	1.0	01	179.0	15 59.7	1.0	01	179.0	15 29.7	1.0	01	179.0	1
2	18 58.8	1.0	03	178.0	18 28.8	1.0	03	178.0	17 58.8	1.0	02	178.0	17 28.8	1.0	02	178.0	16 58.8	1.0	02	178.0	16 28.8	1.0	02	178.0	15 58.8	1.0	02	178.0	15 28.8	1.0	02	178.0	2
3	18 57.3	1.0	04	177.0	18 27.3	1.0	04	177.0	17 57.3	1.0	04	177.0	17 27.3	1.0	04	177.0	16 57.3	1.0	04	177.0	16 27.3	1.0	03	177.0	15 57.3	1.0	03	177.0	15 27.4	1.0	03	177.1	3
4	18 55.1	1.0	05	175.9	18 25.1	1.0	05	176.0	17 55.2	1.0	05	176.0	17 25.2	1.0	04	176.0	16 55.2	1.0	04	176.0	16 25.2	1.0	04	176.0	15 55.3	1.0	04	176.1	15 25.3	1.0	04	176.1	4
05	18 52.4	1.0	06	174.9	18 22.4	1.0	06	174.9	17 52.5	1.0	06	175.0	17 22.5	1.0	06	175.0	16 52.5	1.0	05	175.0	16 22.6	1.0	05	175.1	15 52.6	1.0	05	175.1	15 22.7	1.0	05	175.1	05
6	18 49.0	1.0	07	173.9	18 19.1	1.0	07	173.9	17 49.1	1.0	07	174.0	17 19.2	1.0	06	174.0	16 49.3	1.0	06	174.0	16 19.3	1.0	06	174.1	15 49.4	1.0	06	174.1	15 19.4	1.0	06	174.1	6
7	18 45.1	1.0	08	172.9	18 15.2	1.0	08	172.9	17 45.2	1.0	08	173.0	17 15.3	1.0	07	173.0	16 45.4	1.0	07	173.0	16 15.5	1.0	07	173.1	15 45.6	1.0	07	173.1	15 15.6	1.0	07	173.2	7
8	18 40.5	1.0	09	171.9	18 10.6	1.0	09	171.9	17 40.7	1.0	08	172.0	17 10.8	1.0	08	172.0	16 40.9	1.0	08	172.1	16 11.0	1.0	08	172.1	15 41.1	1.0	08	172.1	15 11.2	1.0	08	172.2	8
9	18 35.3	1.0	10	170.9	18 05.5	1.0	10	170.9	17 35.6	1.0	10	171.0	17 05.8	1.0	09	171.0	16 35.9	1.0	09	171.1	16 06.0	1.0	09	171.1	15 36.1	1.0	09	171.2	15 06.3	1.0	09	171.2	9
10	18 29.6	99	11	169.9	17 59.8	99	11	169.9	17 29.9	99	10	170.0	17 00.1	99	10	170.0	16 30.2	99	10	170.1	16 00.4	99	10	170.1	15 30.6	99	10	170.2	15 00.7	99	10	170.2	10
1	18 23.2	99	12	168.9	17 53.4	99	12	168.9	17 23.6	99	11	169.0	16 53.8	99	11	169.0	16 24.0	99	11	169.1	15 54.2	99	11	169.2	15 24.4	99	11	169.2	14 54.6	99	11	169.3	1
2	18 16.3	99	13	167.8	17 46.5	99	12	167.9	17 16.8	99	12	168.0	16 47.0	99	12	168.0	16 17.2	99	12	168.1	15 47.5	99	12	168.2	15 17.7	99	12	168.2	14 47.9	99	12	168.3	2
3	18 08.8	99	14	166.8	17 39.0	99	13	166.9	17 09.3	99	13	167.0	16 39.6	99	13	167.1	16 09.9	99	13	167.1	15 40.1	99	13	167.2	15 10.4	99	13	167.3	14 40.7	99	13	167.3	3
4	18 00.6	99	15	165.8	17 30.9	99	14	165.9	17 01.3	99	14	166.0	16 31.6	99	14	166.1	16 01.9	99	14	166.1	15 32.2	99	14	166.2	15 02.5	99	14	166.3	14 32.8	99	14	166.4	4
15	17 51.9	99	15	164.8	17 22.3	99	15	164.9	16 52.7	99	15	165.0	16 23.0	99	15	165.1	15 53.4	99	15	165.2	15 23.7	99	15	165.3	14 54.1	99	15	165.3	14 24.4	99	15	165.4	15
6	17 42.6	99	16	163.9	17 13.1	99	16	163.9	16 43.5	99	16	164.0	16 13.9	99	16	164.1	15 44.3	99	16	164.2	15 14.7	99	16	164.3	14 45.1	99	16	164.4	14 15.5	99	16	164.4	6
7	17 32.8	98	17	162.9	17 03.2	98	17	162.9	16 33.7	98	17	163.0	16 04.2	98	17	163.1	15 34.6	98	17	163.2	15 05.1	98	17	163.3	14 35.5	98	17	163.4	14 06.0	98	17	163.5	7
8	17 22.3	98	18	161.9	16 52.9	98	18	162.0	16 23.4	98	18	162.1	15 53.9	98	18	162.2	15 24.4	98	18	162.3	14 54.9	98	18	162.3	14 25.4	98	18	162.4	13 55.9	98	18	162.5	8
9	17 11.4	98	19	160.9	16 41.9	98	19	161.0	16 12.5	98	19	161.1	15 43.1	98	19	161.2	15 13.6	98	19	161.3	14 44.2	98	19	161.4	14 14.8	98	19	161.5	13 45.3	98	19	161.6	9
20	16 59.8	98	20	159.9	16 30.4	98	20	160.0	16 01.1	98	20	160.1	15 31.7	98	20	160.2	15 02.3	98	20	160.3	14 33.0	98	20	160.4	14 03.6	98	20	160.5	13 34.2	98	19	160.6	20
1	16 47.7	98	21	158.9	16 18.4	98	21	159.0	15 49.1	98	21	159.1	15 19.8	98	21	159.2	14 50.5	98	21	159.4	14 21.2	98	21	159.5	13 51.8	98	20	159.6	13 22.5	98	20	159.7	1
2	16 35.0	97	22	157.9	16 05.8	97	22	158.0	15 36.6	97	22	158.2	15 07.3	97	22	158.3	14 38.1	98	22	158.4	14 08.8	98	21	158.5	13 39.6	98	21	158.6	13 10.3	98	21	158.7	2
3	16 21.8	97	23	157.0	15 52.7	97	23	157.1	15 23.5	97	23	157.2	14 54.3	97	23	157.3	14 25.1	97	22	157.4	13 55.9	97	22	157.6	13 26.7	97	22	157.7	12 57.6	97	22	157.8	3
4	16 08.1	97	24	156.0	15 39.0	97	24	156.1	15 09.9	97	24	156.2	14 40.8	97	23	156.4	14 11.7	97	23	156.5	13 42.5	97	23	156.6	13 13.4	97	23	156.7	12 44.3	97	23	156.9	4
25	15 53.8	97	25	155.0	15 24.8	97	25	155.1	14 55.8	97	24	155.3	14 26.7	97	24	155.4	13 57.7	97	24	155.5	13 28.6	97	24	155.7	12 59.6	97	24	155.8	12 30.5	97	24	155.9	25
6	15 39.0	97	26	154.0	15 10.1	97	25	154.2	14 41.1	97	25	154.3	14 12.1	97	25	154.5	13 43.2	97	25	154.6	13 14.2	97	25	154.7	12 45.2	97	25	154.9	12 16.2	97	25	155.0	6
7	15 23.7	96	26	153.1	14 54.8	96	26	153.2	14 25.9	96	26	153.4	13 57.0	96	26	153.5	13 28.1	96	26	153.6	12 59.2	96	26	153.8	12 30.3	96	26	153.9	12 01.4	96	26	154.1	7
8	15 07.9	96	27	152.1	14 39.1	96	27	152.3	14 10.2	96	27	152.4	13 41.4	96	27	152.6	13 12.6	96	27	152.7	12 43.8	96	27	152.8	12 14.9	96	26	153.0	11 46.1	96	26	153.1	8
9	14 51.5	96	28	151.2	14 22.8	96	28	151.3	13 54.1	96	28	151.5	13 25.3	96	28	151.6	12 56.6	96	28	151.8	12 27.8	96	27	151.9	11 59.0	96	27	152.1	11 30.3	96	27	152.2	9
30	14 34.7	96	29	150.2	14 06.0	96	29	150.4	13 37.4	96	29	150.5	13 08.7	96	28	150.7	12 40.0	96	28	150.8	12 11.4	96	28	151.0	11 42.7	96	28	151.1	11 14.0	96	28	151.3	30
1	14 17.4	95	30	149.3	13 48.8	95	30	149.4	13 20.2	95	29	149.6	12 51.6	95	29	149.7	12 23.0	95	29	149.9	11 54.4	95	29	150.1	11 25.8	95	29	150.2	10 57.2	95	29	150.4	1
2	13 59.5	95	31	148.3	13 31.0	95	30	148.5	13 02.5	95	30	148.7	12 34.4	95	30	148.8	12 05.5	95	30	149.0	11 37.0	95	30	149.1	11 08.5	95	30	149.3	10 40.0	95	30	149.4	2
3	13 41.2	95	31	147.4	13 12.8	95	31	147.6	12 44.4	95	31	147.7	12 16.0	95	31	147.9	11 47.5	95	31	148.1	11 19.1	95	31	148.2	10 50.7	95	30	148.4	10 22.2	95	30	148.5	3
4	13 22.4	94	32	146.5	12 54.1	94	32	146.6	12 25.8	94	32	146.8	11 57.4	94	32	147.0	11 29.1	94	32	147.1	11 00.7	95	31	147.3	10 32.4	95	31	147.5	10 04.0	95	31	147.6	4
35	13 03.2	94	33	145.5	12 35.0	94	33	145.7	12 06.7	94	33	145.9	11 38.5	94	32	146.0	11 10.2	94	32	146.2	10 41.9	94	32	146.4	10 13.7	94	32	146.6	9 45.4	94	32	146.7	35
6	12 43.5	94	34	144.6	12 15.3	94	33	144.8	11 47.2	94	33	145.0	11 19.0	94	33	145.1	10 50.8	94	33	145.3	10 22.6	94	33	145.5	9 54.5	94	33	145.7	9 26.3	94	33	145.8	6
7	12 23.3	94	34	143.7	11 55.3	94	34	143.9	11 27.2	94	34	144.0	10 59.1	94	34	144.2	10 31.0	94	34	144.4	10 02.9	94	34	144.6	9 34.8	94	33	144.8	9 06.7	94	33	144.9	7
8	12 02.7	93	35	142.8	11 34.7	93	35	142.9	11 06.8	93	35	143.1	10 38.8	93	35	143.3	10 10.8	93	34	143.5	9 42.8	93	34	143.7	9 14.7	93	34	143.9	8 46.7	93	34	144.0	8
9	11 41.7	93	36	141.8	11 13.8	93	36	142.0	10 45.9	93	35	142.2	10 18.0	93	35	142.4	9 50.1	93	35	142.6	9 22.2	93	35	142.8	8 54.2	93	35	143.0	8 26.3	93	35	143.2	9
40	11 20.2	93	36	140.9	10 52.4	93	36	141.1	10 24.6	93	36	141.3	9 56.8	93	36	141.5	9 29.0	93	36	141.7	9 01.1	93	36	141.9	8 33.3	93	36	142.1	8 05.5	93	35	142.3	40
1	10 58.3	92	37	140.0	10 30.6	92	37	140.2	10 02.9	92	37	140.4	9 35.1	92	37	140.6	9 07.4	92	37	140.8	8 39.7	92	36	141.0	8 11.9	92	36	141.2	7 44.2	93	36	141.4	1
2	10 36.0	92	38	139.1	10 08.4	92	38	139.3	9 40.7	92	38	139.5	9 13.1	92	37	139.7	8 45.5	92	37	139.9	8 17.8	92	37	140.1	7 50.2	92	37	140.3	7 22.5	92	37	140.5	2
3	10 13.3	92	39	138.2	9 45.7	92	38	138.4	9 18.2	92	38	138.6	8 50.7	92	38	138.8	8 23.1	92	38	139.0	7 55.5	92	38	139.2	7 28.0	92	38	139.4	7 00.4	92	38	139.6	3
4	9 50.1	91	39	137.3	9 22.7	91	39	137.5	8 55.3	92	39	137.7	8 27.8	92	39	137.9	8 00.3	92	39	138.2	7 32.9	92	38	138.4	7 05.4	92	38	138.6	6 37.9	92	38	138.8	4
45	9 26.6	91	40	136.4	8 59.3	91	40	136.7	8 31.9	91	40	136.9	8 04.6	91	39	137.1	7 37.2	91	39	137.3	7 09.8	91	39	137.5	6 42.4	91	39	137.7	6 15.0	91	39	137.9	45
6	9 02.7	91	40	135.6	8 35.5	91	40	135.8	8 08.2	91	40	136.0	7 40.9	91	40	136.2	7 13.6	91	40	136.4	6 46.4	91	40	136.6	6 19.1	91	40	136.8	5 51.8	91	39	137.0	6
7	8 38.4	91	41	134.7	8 11.3	91	41	134.9	7 44.1	91	41	135.1	7 16.9	91	41	135.3	6 49.7	91	40	135.5	6 22.5	91	40	135.7	5 55.4	91	40	136.0	5 28.1	91	40	136.2	7
8	8 13.8	90	42	133.8	7 46.7	90	42	134.0	7 19.6	90	41	134.2	6 52.5	90	41	134.4	6 25.4	90	41	134.7	5 58.3	90	41	134.9	5 31.2	90	41	135.1	5 04.1	90	41	135.3	8
9	7 48.8	90	42	132.9	7 21.8	90	42	133.1	6 54.8	90	42	133.4	6 27.8	90	42	133.6	6 00.8	90	42	133.8	5 33.8	90	42	134.0	5 06.7	90	41	134.2					9
50	7 23.4	90	43	132.1	6 56.5	90	43	132.3	6 29.6	90	43	132.5	6 02.7	90	42	132.7	5 35.8	90	42	132.9	5 08.8	90	42	133.2									50
1	6 57.7	89	43	131.2	6 30.8	89	43	131.4	6 04.0	89	43	131.6	5 37.2	89	43	131.9	5 10.4	89	43	132.1													1
2	6 31.6	89	44	130.3	6 04.9	89	44	130.6	5 38.1	89	44	130.8	5 11.4	89	44	131.0																	2
3	6 05.2	89	45	129.5	5 38.5	89	44	129.7	5 11.9	89	44	129.9																					3
4	5 38.4	88	45	128.6	5 11.9	88	45	128.8																									4
55	5 11.4	88	46	127.8																													55

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	12 29.0	81	56	79.9	12 53.3	81	56	79.6	13 17.6	81	56	79.3	13 41.8	81	56	79.0	14 06.0	81	56	78.7	14 30.2	81	56	78.3	14 54.3	80	56	78.0	15 18.5	80	56	77.7	91
2	11 55.2	81	56	79.1	12 19.5	81	56	78.8	12 43.8	81	56	78.5	13 08.1	81	56	78.2	13 32.3	81	56	77.9	13 56.5	81	56	77.6	14 20.7	81	56	77.3	14 44.9	81	56	76.9	2
3	11 21.5	81	56	78.3	11 45.8	81	56	78.0	12 10.1	81	56	77.7	12 34.4	81	56	77.4	12 58.7	81	56	77.1	13 23.0	81	56	76.8	13 47.2	81	56	76.5	14 11.4	81	56	76.2	3
4	10 47.8	81	56	77.5	11 12.2	81	56	77.2	11 36.5	81	56	76.9	12 00.9	81	56	76.6	12 25.2	81	56	76.3	12 49.5	81	56	76.0	13 13.8	81	56	75.7	13 38.1	81	55	75.4	4
95	10 14.3	81	56	76.7	10 38.7	81	56	76.4	11 03.1	81	56	76.1	11 27.5	81	56	75.8	11 51.8	81	55	75.5	12 16.2	81	55	75.2	12 40.5	81	55	74.9	13 04.8	81	55	74.6	95
6	9 40.8	82	56	75.9	10 05.3	82	55	75.6	10 29.7	81	55	75.3	10 54.2	81	55	75.0	11 18.6	81	55	74.7	11 43.0	81	55	74.4	12 07.3	81	55	74.1	12 31.7	81	55	73.8	6
7	9 07.5	82	55	75.1	9 32.0	82	55	74.8	9 56.5	82	55	74.5	10 21.0	82	55	74.2	10 45.4	81	55	73.9	11 09.9	81	55	73.6	11 34.3	81	55	73.3	11 58.7	81	55	73.0	7
8	8 34.3	82	55	74.3	8 58.9	82	55	74.0	9 23.4	82	55	73.7	9 47.9	82	55	73.4	10 12.4	82	55	73.1	10 36.9	82	55	72.8	11 01.4	82	55	72.5	11 25.9	81	54	72.2	8
9	8 01.3	82	55	73.5	8 25.9	82	55	73.2	8 50.5	82	55	72.9	9 15.0	82	55	72.6	9 39.6	82	55	72.3	10 04.1	82	54	72.0	10 28.7	82	54	71.8	10 53.2	82	54	71.5	9
100	7 28.3	82	55	72.7	7 53.0	82	55	72.4	8 17.6	82	54	72.1	8 42.3	82	54	71.8	9 06.9	82	54	71.5	9 31.5	82	54	71.3	9 56.0	82	54	71.0	10 20.6	82	54	70.7	100
1	6 55.6	82	54	71.9	7 20.3	82	54	71.6	7 44.9	82	54	71.3	8 09.6	82	54	71.0	8 34.3	82	54	70.8	8 58.9	82	54	70.5	9 23.6	82	54	70.2	9 48.2	82	54	69.9	1
2	6 22.9	83	54	71.1	6 47.7	83	54	70.8	7 12.4	82	54	70.5	7 37.2	82	54	70.3	8 01.9	82	54	70.0	8 26.6	82	54	69.7	8 51.3	82	54	69.4	9 16.0	82	53	69.1	2
3	5 50.4	83	54	70.3	6 15.2	83	54	70.0	6 40.1	83	54	69.7	7 04.8	83	54	69.5	7 29.6	83	53	69.2	7 54.4	83	53	68.9	8 19.2	83	53	68.6	8 43.9	82	53	68.3	3
4	5 18.1	83	54	69.5	5 43.0	83	53	69.2	6 07.9	83	53	68.9	6 32.7	83	53	68.7	6 57.6	83	53	68.4	7 22.4	83	53	68.1	7 47.2	83	53	67.8	8 12.0	83	53	67.5	4
105					5 10.9	83	53	68.4	5 35.8	83	53	68.1	6 00.7	83	53	67.9	6 25.6	83	53	67.6	6 50.5	83	53	67.3	7 15.4	83	53	67.0	7 40.3	83	53	66.7	105
6									5 04.0	83	53	67.3	5 29.0	83	53	67.1	5 53.9	83	53	66.8	6 18.9	83	52	66.5	6 43.8	83	52	66.2	7 08.8	83	52	66.0	6
7																	5 22.4	83	52	66.0	5 47.4	83	52	65.7	6 12.4	83	52	65.4	6 37.5	83	52	65.2	7
8																					5 16.2	84	52	64.9	5 41.2	84	52	64.6	6 06.3	84	52	64.4	8
9																									5 10.2	84	51	63.9	5 35.4	84	51	63.6	9
110																													5 04.7	84	51	62.8	110

Digitized by Google

Lat. 55°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	55 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	56 00.0	1.0 01	180.0	56 30.0	1.0 01	180.0
1	54 59.5	1.0 02	178.4	55 29.5	1.0 02	178.3	55 59.5	1.0 02	178.3	56 29.5	1.0 03	178.3
2	54 58.0	1.0 04	176.7	55 28.0	1.0 04	176.7	55 58.0	1.0 04	176.7	56 28.0	1.0 04	176.6
3	54 55.6	1.0 06	175.1	55 25.5	1.0 06	175.0	55 55.5	1.0 06	175.0	56 25.4	1.0 06	174.9
4	54 52.1	1.0 07	173.5	55 22.1	1.0 07	173.4	55 52.0	1.0 08	173.3	56 21.9	1.0 08	173.3
05	54 47.7	1.0 09	171.8	55 17.6	1.0 09	171.8	55 47.5	1.0 09	171.7	56 17.4	1.0 09	171.6
6	54 42.4	99 11	170.2	55 12.2	99 11	170.1	55 42.0	99 11	170.0	56 11.9	99 11	169.9
7	54 36.0	99 12	168.6	55 05.8	99 12	168.5	55 35.6	99 12	168.4	56 05.4	99 12	168.3
8	54 28.8	99 14	167.0	54 58.5	99 14	166.9	55 28.2	99 14	166.7	55 57.9	99 14	166.6
9	54 20.6	99 15	165.4	54 50.2	99 15	165.3	55 19.8	99 16	165.1	55 49.4	99 16	165.0
10	54 11.4	99 17	163.8	54 41.0	99 17	163.7	55 10.5	98 17	163.5	55 40.0	98 17	163.4
1	54 01.4	98 18	162.2	54 30.8	98 18	162.1	55 00.3	98 19	161.9	55 29.7	98 19	161.7
2	53 50.4	98 20	160.7	54 19.8	98 20	160.5	54 49.1	98 20	160.3	55 18.5	98 20	160.1
3	53 38.6	98 21	159.1	54 07.8	98 21	158.9	54 37.1	97 22	158.7	55 06.3	97 22	158.5
4	53 25.9	97 23	157.6	53 55.0	97 23	157.4	54 24.2	97 23	157.2	54 53.3	97 23	157.0
15	53 12.3	97 24	156.0	53 41.4	97 24	155.8	54 10.4	97 24	155.6	54 39.4	97 25	155.4
6	52 57.9	96 25	154.5	53 26.9	96 26	154.3	53 55.8	96 26	154.1	54 24.7	96 26	153.9
7	52 42.7	96 27	153.0	53 11.5	96 27	152.8	53 40.3	96 27	152.6	54 09.1	96 27	152.3
8	52 26.7	96 28	151.5	52 55.4	96 28	151.3	53 24.1	95 28	151.1	53 52.7	95 29	150.8
9	52 09.9	95 29	150.1	52 38.5	95 29	149.8	53 07.0	95 30	149.6	53 35.5	95 30	149.3
20	51 52.4	95 30	148.6	52 20.8	95 31	148.4	52 49.2	95 31	148.1	53 17.6	94 31	147.8
1	51 34.1	94 32	147.2	52 02.4	94 32	146.9	52 30.7	94 32	146.7	52 58.9	94 32	146.4
2	51 15.1	94 33	145.8	51 43.3	94 33	145.5	52 11.4	94 33	145.2	52 39.5	94 34	144.9
3	50 55.4	93 34	144.4	51 23.4	93 34	144.1	51 51.4	93 34	143.8	52 19.3	93 35	143.5
4	50 35.0	93 35	143.0	51 02.9	93 35	142.7	51 30.7	93 36	142.4	51 58.5	93 36	142.1
25	50 14.0	93 36	141.6	50 41.7	92 36	141.3	51 09.4	92 36	141.0	51 37.1	92 37	140.7
6	49 52.3	92 37	140.3	50 19.9	92 37	140.0	50 47.5	92 38	139.7	51 15.0	92 38	139.3
7	49 30.0	92 38	138.9	49 57.5	91 38	138.6	50 24.9	91 39	138.3	50 52.2	91 39	138.0
8	49 07.1	91 39	137.6	49 34.4	91 39	137.3	50 01.7	91 40	137.0	50 28.9	91 40	136.7
9	48 43.6	91 40	136.3	49 10.8	91 40	136.0	49 37.9	90 40	135.7	50 05.0	90 41	135.3
30	48 19.6	90 41	135.0	48 46.6	90 41	134.7	49 13.6	90 42	134.4	49 40.5	90 42	134.0
1	47 55.0	90 42	133.8	48 21.9	90 42	133.4	48 48.7	89 42	133.1	49 15.5	89 43	132.8
2	47 29.9	89 43	132.5	47 56.6	89 43	132.2	48 23.3	89 43	131.8	48 50.0	89 43	131.5
3	47 04.3	89 44	131.3	47 30.9	89 44	130.9	47 57.5	88 44	130.6	48 24.0	88 44	130.3
4	46 38.2	88 44	130.1	47 04.7	88 44	129.7	47 31.1	88 45	129.4	47 57.5	88 45	129.0
35	46 11.6	88 45	128.9	46 38.0	88 45	128.5	47 04.3	88 46	128.2	47 30.5	87 46	127.8
6	45 44.6	88 46	127.7	46 10.8	87 46	127.3	46 37.0	87 46	127.0	47 03.1	87 46	126.6
7	45 17.1	87 46	126.5	45 43.2	87 47	126.2	46 09.3	87 47	125.8	46 35.2	86 47	125.4
8	44 49.3	87 47	125.4	45 15.2	87 47	125.0	45 41.2	86 48	124.6	46 07.0	86 48	124.3
9	44 21.0	86 48	124.2	44 46.9	86 48	123.9	45 12.7	86 48	123.5	45 38.4	86 48	123.1
40	43 52.3	86 48	123.1	44 18.1	86 49	122.7	44 43.8	85 49	122.4	45 09.4	85 49	122.0
1	43 23.3	86 49	122.0	43 49.0	85 49	121.6	44 14.5	85 49	121.2	44 40.0	85 50	120.9
2	42 54.0	85 50	120.9	43 19.5	85 50	120.5	43 44.9	85 50	120.1	44 10.3	84 50	119.8
3	42 24.2	85 50	119.8	42 49.7	85 50	119.4	43 15.0	84 50	119.1	43 40.3	84 51	118.7
4	41 54.2	84 51	118.7	42 19.5	84 51	118.3	42 44.8	84 51	118.0	43 09.9	84 51	117.6
45	41 23.9	84 51	117.7	41 49.1	84 51	117.3	42 14.2	84 51	116.9	42 39.3	83 52	116.5
6	40 53.3	84 52	116.6	41 18.4	84 52	116.2	41 43.4	83 52	115.9	42 08.4	83 52	115.5
7	40 22.3	83 52	115.6	40 47.4	83 52	115.2	41 12.3	83 52	114.8	41 37.2	83 52	114.5
8	39 51.2	83 52	114.5	40 16.1	83 53	114.2	40 40.9	83 53	113.8	41 05.7	82 53	113.4
9	39 19.7	83 53	113.5	39 44.6	83 53	113.2	40 09.3	82 53	112.8	40 34.0	82 53	112.4
50	38 48.1	83 53	112.5	39 12.8	82 53	112.2	39 37.5	82 54	111.8	40 02.1	82 54	111.4
1	38 16.2	82 54	111.5	38 40.8	82 54	111.2	39 05.4	82 54	110.8	39 29.9	82 54	110.4
2	37 44.1	82 54	110.6	38 08.6	82 54	110.2	38 33.2	82 54	109.8	38 57.6	81 54	109.5
3	37 11.7	82 54	109.6	37 36.2	82 54	109.2	38 00.7	81 54	108.9	38 25.1	81 55	108.5
4	36 39.2	82 54	108.6	37 03.6	81 55	108.3	37 28.0	81 55	107.9	37 52.3	81 55	107.5
55	36 06.5	81 55	107.7	36 30.9	81 55	107.3	36 55.2	81 55	107.0	37 19.4	81 55	106.6
6	35 33.6	81 55	106.7	35 57.9	81 55	106.4	36 22.2	81 55	106.0	36 46.4	80 55	105.6
7	35 00.6	81 55	105.8	35 24.8	81 55	105.4	35 49.0	81 56	105.1	36 13.1	80 56	104.7
8	34 27.4	81 56	104.9	34 51.6	81 56	104.5	35 15.7	80 56	104.2	35 39.8	80 56	103.8
9	33 54.1	81 56	104.0	34 18.2	80 56	103.6	34 42.3	80 56	103.2	35 06.3	80 56	102.9
60	33 20.6	80 56	103.1	33 44.7	80 56	102.7	34 08.7	80 56	102.3	34 32.7	80 56	102.0
1	32 47.0	80 56	102.2	33 11.1	80 56	101.8	33 35.1	80 56	101.4	33 59.0	80 56	101.1
2	32 13.3	80 56	101.3	32 37.3	80 56	100.9	33 01.3	80 56	100.5	33 25.2	79 57	100.2
3	31 39.5	80 56	100.4	32 03.5	80 57	100.0	32 27.4	80 57	99.7	32 51.2	79 57	99.3
4	31 05.6	80 57	99.5	31 29.6	80 57	99.1	31 53.4	79 57	98.8	32 17.2	79 57	98.4
65	30 31.6	80 57	98.6	30 55.5	80 57	98.3	31 19.4	79 57	97.9	31 43.2	79 57	97.6
6	29 57.6	80 57	97.8	30 21.4	79 57	97.4	30 45.3	79 57	97.1	31 09.0	79 57	96.7
7	29 23.5	80 57	96.9	29 47.3	79 57	96.5	30 11.1	79 57	96.2	30 34.8	79 57	95.8
8	28 49.3	79 57	96.0	29 13.1	79 57	95.7	29 36.8	79 57	95.3	30 00.5	79 57	95.0
9	28 15.0	79 57	95.2	28 38.8	79 57	94.8	29 02.5	79 57	94.5	29 26.2	79 57	94.1
70	27 40.7	79 57	94.3	28 04.5	79 57	94.0	28 28.2	79 57	93.7	28 51.9	79 57	93.3
1	27 06.4	79 57	93.5	27 30.1	79 57	93.2	27 53.9	79 57	92.8	28 17.5	79 57	92.5
2	26 32.0	79 57	92.7	26 55.8	79 57	92.3	27 19.5	79 57	92.0	27 43.1	79 57	91.6
3	25 57.6	79 57	91.8	26 21.4	79 57	91.5	26 45.1	79 57	91.2	27 08.7	79 57	90.8
4	25 23.2	79 57	91.0	25 47.0	79 57	90.7	26 10.7	79 57	90.3	26 34.3	79 57	90.0
75	24 48.8	79 57	90.2	25 12.6	79 57	89.9	25 36.2	79 57	89.5	25 59.9	79 57	89.2
6	24 14.4	79 57	89.4	24 38.1	79 57	89.0	25 01.8	79 57	88.7	25 25.5	79 57	88.4
7	23 40.0	79 57	88.6	24 03.7	79 57	88.2	24 27.4	79 57	87.9	24 51.1	79 57	87.6
8	23 05.6	79 57	87.7	23 29.3	79 57	87.4	23 53.1	79 57	87.1	24 16.7	79 57	86.7
9	22 31.2	79 57	86.9	22 55.0	79 57	86.6	23 18.7	79 57	86.3	23 42.4	79 57	85.9
80	21 56.9	79 57	86.1	22 20.6	79 57	85.8	22 44.4	79 57	85.5	23 08.1	79 57	85.1
1	21 22.5	79 57	85.3	21 46.3	79 57	85.0	22 10.1	79 57	84.7	22 33.8	79 57	84.3
2	20 48.3	79 57	84.5	21 12.1	79 57	84.2	21 35.8	79 57	83.9	21 59.6	79 57	83.6
3	20 14.0	79 57	83.7	20 37.9	79 57	83.4	21 01.7	79 57	83.1	21 25.4	79 57	82.8
4	19 39.8	80 57	82.9	20 03.7	79 57	82.6	20 27.5	79 57	82.3	20 51.3	79 57	82.0
85	19 05.7	80 57	82.1	19 29.6	80 57	81.8	19 53.4	79 57	81.5	20 17.3	79 57	81.2
6	18 31.7	80 57	81.4	18 55.6	80 57	81.0	19 19.4	80 56	80.7	19 43.3	79 56	80.4
7	17 57.7	80 57	80.6	18 21.6	80 56	80.[illegible]	18 45.5	80 56	79.9	19 09.4	80 56	79.6
8	17 23.8	80 56	79.8	17 47.7	80 56	79.5	18 11.7	80 56	79.1	18 35.6	80 56	78.8
9	16 49.9	80 56	79.0	17 13.9	80 56	78.7	17 37.9	80 56	78.4	18 01.9	80 56	78.0
90	16 16.2	80 56	78.2	16 40.3	80 56	77.9	17 04.3	80 56	77.6	17 28.2	80 56	77.3

H.A.	22° 00′			22° 30′			23° 00′			23° 30′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	57 00.0	1.0 01	180.0	57 30.0	1.0 01	180.0	58 00.0	1.0 01	180.0	58 30.0	1.0 01	180.0
1	56 59.5	1.0 02	178.3	57 29.5	1.0 03	178.3	57 59.5	1.0 03	178.3	58 29.5	1.0 03	178.2
2	56 58.0	1.0 04	176.6	57 27.9	1.0 04	176.6	57 57.9	1.0 04	176.5	58 27.9	1.0 04	176.5
3	56 55.4	1.0 06	174.9	57 25.4	1.0 06	174.8	57 55.3	1.0 06	174.8	58 25.3	1.0 06	174.7
4	56 51.8	1.0 08	173.2	57 21.8	1.0 08	173.1	57 51.7	1.0 08	173.1	58 21.6	1.0 08	173.0
05	56 47.3	1.0 09	171.5	57 17.1	1.0 09	171.4	57 47.0	1.0 10	171.3	58 16.9	1.0 10	171.3
6	56 41.7	99 11	169.8	57 11.5	99 11	169.7	57 41.3	99 11	169.6	58 11.1	99 11	169.5
7	56 35.1	99 13	168.2	57 04.9	99 13	168.0	57 34.6	99 13	167.9	58 04.4	99 13	167.8
8	56 27.6	99 14	166.5	56 57.2	99 14	166.4	57 26.9	99 14	166.2	57 56.6	99 15	166.1
9	56 19.0	99 16	164.8	56 48.6	99 16	164.7	57 18.2	99 16	164.5	57 47.8	99 16	164.4
10	56 09.6	98 17	163.2	56 39.1	98 18	163.0	57 08.6	98 18	162.9	57 38.1	98 18	162.7
1	55 59.2	98 19	161.6	56 28.6	98 19	161.4	56 58.0	98 19	161.2	57 27.3	98 19	161.0
2	55 47.8	98 20	159.9	56 17.1	98 21	159.8	56 46.4	98 21	159.6	57 15.7	98 21	159.4
3	55 35.6	97 22	158.3	56 04.8	97 22	158.1	56 33.9	97 22	157.9	57 03.1	97 22	157.7
4	55 22.4	97 23	156.8	55 51.5	97 24	156.5	56 20.5	97 24	156.3	56 49.6	97 24	156.1
15	55 08.4	97 25	155.2	55 37.3	96 25	154.9	56 06.3	96 25	154.7	56 35.2	96 25	154.5
6	54 53.5	96 26	153.6	55 22.3	96 26	153.4	55 51.1	96 27	153.1	56 19.9	96 27	152.9
7	54 37.8	96 28	152.1	55 06.5	96 28	151.8	55 35.2	95 28	151.6	56 03.8	95 28	151.3
8	54 21.3	95 29	150.6	54 49.9	95 29	150.3	55 18.4	95 29	150.0	55 46.9	95 30	149.7
9	54 04.0	95 30	149.0	54 32.4	95 30	148.8	55 00.8	95 31	148.5	55 29.1	94 31	148.2
20	53 45.9	94 31	147.6	54 14.2	94 32	147.3	54 42.4	94 32	147.0	55 10.6	94 32	146.7
1	53 27.1	94 33	146.1	53 55.2	94 33	145.8	54 23.3	94 33	145.5	54 51.3	93 33	145.2
2	53 07.5	93 34	144.6	53 35.5	93 34	144.3	54 03.4	93 34	144.0	54 31.3	93 35	143.7
3	52 47.2	93 35	143.2	53 15.1	93 35	142.9	53 42.9	93 36	142.6	54 10.6	92 36	142.2
4	52 26.3	92 36	141.8	52 54.0	92 36	141.5	53 21.6	92 36	141.1	53 49.2	92 37	140.8
25	52 04.7	92 37	140.4	52 32.2	92 37	140.1	52 59.7	92 38	139.7	53 27.1	91 38	139.4
6	51 42.4	91 38	139.0	52 09.8	91 38	138.7	52 37.1	91 39	138.3	53 04.4	91 39	138.0
7	51 19.5	91 39	137.7	51 46.8	91 39	137.3	52 13.9	91 40	137.0	52 41.1	90 40	136.6
8	50 56.0	90 40	136.3	51 23.1	90 40	136.0	51 50.2	90 41	135.6	52 17.1	90 41	135.3
9	50 32.0	90 41	135.0	50 58.9	90 41	134.6	51 25.8	90 42	134.3	51 52.6	89 42	133.9
30	50 07.4	89 42	133.7	50 34.2	89 42	133.3	51 00.9	89 42	133.0	51 27.6	89 43	132.6
1	49 42.2	89 43	132.4	50 08.9	89 43	132.1	50 35.5	89 43	131.7	51 02.0	88 44	131.3
2	49 16.6	88 44	131.1	49 43.1	88 44	130.8	50 09.5	88 44	130.4	50 35.9	88 44	130.0
3	48 50.4	88 44	129.9	49 16.8	88 45	129.5	49 43.1	88 45	129.2	50 09.3	87 45	128.8
4	48 23.8	88 45	128.7	48 50.0	87 45	128.3	49 16.2	87 46	127.9	49 42.2	87 46	127.5
35	47 56.7	87 46	127.4	48 22.8	87 46	127.1	48 48.8	87 46	126.7	49 14.7	86 47	126.3
6	47 29.1	87 47	126.2	47 55.1	86 47	125.9	48 21.0	86 47	125.5	48 46.8	86 47	125.1
7	47 01.2	86 47	125.1	47 27.0	86 47	124.7	47 52.7	86 48	124.3	48 18.4	85 48	123.9
8	46 32.8	86 48	123.9	46 58.5	86 48	123.5	47 24.1	85 48	123.1	47 49.7	85 49	122.8
9	46 04.0	85 48	122.8	46 29.6	85 49	122.4	46 55.1	85 49	122.0	47 20.6	85 49	121.6
40	45 34.9	85 49	121.6	46 00.4	85 49	121.2	46 25.8	84 50	120.9	46 51.1	84 50	120.5
1	45 05.4	85 50	120.5	45 30.8	84 50	120.1	45 56.0	84 50	119.7	46 21.2	84 50	119.3
2	44 35.6	84 50	119.4	45 00.8	84 50	119.0	45 26.0	84 51	118.6	45 51.1	83 51	118.2
3	44 05.5	84 51	118.3	44 30.6	84 51	117.9	44 55.6	83 51	117.5	45 20.6	83 51	117.1
4	43 35.0	84 51	117.2	44 00.0	83 51	116.9	44 25.0	83 52	116.5	44 49.8	83 52	116.1
45	43 04.3	83 52	116.2	43 29.2	83 52	115.8	43 54.0	83 52	115.4	44 18.8	82 52	115.0
6	42 33.2	83 52	115.1	42 58.1	83 52	114.7	43 22.8	82 52	114.4	43 47.5	82 53	114.0
7	42 02.0	83 53	114.1	42 26.7	82 53	113.7	42 51.3	82 53	113.3	43 15.9	82 53	112.9
8	41 30.4	82 53	113.1	41 55.0	82 53	112.7	42 19.6	82 53	112.3	42 44.1	81 53	111.9
9	40 58.6	82 53	112.0	41 23.2	82 53	111.7	41 47.6	81 54	111.3	42 12.0	81 54	110.9
50	40 26.6	82 54	111.0	40 51.1	81 54	110.7	41 15.5	81 54	110.3	41 39.8	81 54	109.9
1	39 54.4	81 54	110.1	40 18.8	81 54	109.7	40 43.1	81 54	109.3	41 07.3	81 54	108.9
2	39 22.0	81 54	109.1	39 46.3	81 54	108.7	40 10.5	81 55	108.3	40 34.7	80 55	107.9
3	38 49.4	81 55	108.1	39 13.6	81 55	107.7	39 37.7	80 55	107.3	40 01.8	80 55	107.0
4	38 16.6	81 55	107.2	38 40.7	80 55	106.8	39 04.8	80 55	106.4	39 28.8	80 55	106.0
55	37 43.6	80 55	106.2	38 07.7	80 55	105.8	38 31.7	80 56	105.4	38 55.7	80 56	105.1
6	37 10.5	80 56	105.3	37 34.5	80 56	104.9	37 58.5	80 56	104.5	38 22.4	80 56	104.1
7	36 37.2	80 56	104.3	37 01.2	80 56	104.0	37 25.1	80 56	103.6	37 48.9	79 56	103.2
8	36 03.8	80 56	103.4	36 27.7	80 56	103.0	36 51.6	79 56	102.7	37 15.4	79 56	102.3
9	35 30.3	80 56	102.5	35 54.1	79 56	102.1	36 17.9	79 56	101.8	36 41.7	79 56	101.4
60	34 56.6	80 56	101.6	35 20.4	79 56	101.2	35 44.2	79 56	100.9	36 07.9	79 56	100.5
1	34 22.8	79 56	100.7	34 46.6	79 56	100.3	35 10.3	79 56	100.0	35 34.0	79 57	99.6
2	33 49.0	79 57	99.8	34 12.7	79 57	99.5	34 36.4	79 57	99.1	35 00.0	79 57	98.7
3	33 15.0	79 57	98.9	33 38.7	79 57	98.6	34 02.4	79 57	98.2	34 26.0	78 57	97.8
4	32 41.0	79 57	98.1	33 04.7	79 57	97.7	33 28.3	79 57	97.3	33 51.8	78 57	97.0
65	32 06.9	79 57	97.2	32 30.5	79 57	96.8	32 54.1	79 57	96.5	33 17.6	78 57	96.1
6	31 32.7	79 57	96.3	31 56.3	79 57	96.0	32 19.9	78 57	95.6	32 43.4	78 57	95.2
7	30 58.5	79 57	95.5	31 22.1	79 57	95.1	31 45.6	78 57	94.8	32 09.1	78 57	94.4
8	30 24.2	79 57	94.6	30 47.8	79 57	94.3	31 11.3	78 57	93.9	31 34.8	78 57	93.5
9	29 49.9	79 57	93.8	30 13.4	78 57	93.4	30 37.0	78 57	93.1	31 00.4	78 57	92.7
70	29 15.5	79 57	93.0	29 39.1	78 57	92.6	30 02.6	78 57	92.2	30 26.0	78 57	91.9
1	28 41.1	79 57	92.1	29 04.7	78 57	91.8	29 28.2	78 57	91.4	29 51.6	78 57	91.0
2	28 06.7	79 57	91.3	28 30.3	78 57	90.9	28 53.8	78 57	90.6	29 17.2	78 57	90.2
3	27 32.3	79 57	90.5	27 55.9	78 57	90.1	28 19.4	78 57	89.8	28 42.8	78 57	89.4
4	26 57.9	79 57	89.6	27 21.4	78 57	89.3	27 44.9	78 57	88.9	28 08.4	78 57	88.6
75	26 23.5	79 57	88.8	26 47.0	78 57	88.5	27 10.5	78 57	88.1	27 34.0	78 57	87.8
6	25 49.1	79 57	88.0	26 12.6	78 57	87.7	26 36.2	78 57	87.3	26 59.6	78 57	87.0
7	25 14.7	79 57	87.2	25 38.3	78 57	86.9	26 01.8	78 57	86.5	26 25.3	78 57	86.2
8	24 40.3	79 57	86.4	25 03.9	79 57	86.1	25 27.4	78 57	85.7	25 50.9	78 57	85.4
9	24 06.0	79 57	85.6	24 29.6	79 57	85.3	24 53.2	78 57	84.9	25 16.6	78 57	84.6
80	23 31.7	79 57	84.8	23 55.3	79 57	84.5	24 18.9	78 57	84.1	24 42.4	78 57	83.8
1	22 57.5	79 57	84.0	23 21.1	79 57	83.7	23 44.7	79 57	83.3	24 08.2	78 57	83.0
2	22 23.3	79 57	83.2	22 46.9	79 57	82.9	23 10.5	79 57	82.6	23 34.1	78 57	82.2
3	21 49.1	79 57	82.4	22 12.8	79 57	82.1	22 36.4	79 57	81.8	23 00.0	79 57	81.4
4	21 15.0	79 57	81.6	21 38.7	79 57	81.3	22 02.4	79 56	81.0	22 26.0	79 57	80.6
85	20 41.0	79 56	80.9	21 04.8	79 57	80.5	21 28.5	79 56	80.2	21 52.1	79 56	79.9
6	20 07.1	79 56	80.1	20 30.9	79 56	79.7	20 54.6	79 56	79.4	21 18.3	79 56	79.1
7	19 33.2	79 56	79.3	19 57.0	79 56	79.0	20 20.8	79 56	78.6	20 44.5	79 56	78.3
8	18 59.5	80 56	78.5	19 23.3	79 56	78.2	19 47.1	79 56	77.9	20 10.9	79 56	77.5
9	18 25.8	80 56	77.7	18 49.7	80 56	77.4	19 13.5	79 56	77.1	19 37.3	79 56	76.8
90	17 52.2	80 56	77.0	18 16.1	80 56	76.6	18 40.0	80 56	76.3	19 03.9	79 56	76.0

Digitized by Google

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 55°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	15 00.0	1.0 00	180.0	14 30.0	1.0 00	180.0	14 00.0	1.0 00	180.0	13 30.0	1.0 00	180.0	13 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	00
1	14 59.7	1.0 01	179.0	14 29.7	1.0 01	179.0	13 59.7	1.0 02	179.0	13 29.7	1.0 01	179.0	12 59.7	1.0 01	179.0	12 29.7	1.0 01	179.1	11 59.7	1.0 01	179.1	11 29.7	1.0 01	179.1	1
2	14 58.8	1.0 02	178.1	14 28.8	1.0 02	178.1	13 58.8	1.0 02	178.1	13 28.9	1.0 02	178.1	12 58.9	1.0 02	178.1	12 28.9	1.0 02	178.1	11 58.9	1.0 02	178.1	11 28.9	1.0 02	178.1	2
3	14 57.4	1.0 03	177.1	14 27.4	1.0 03	177.1	13 57.4	1.0 03	177.1	13 27.4	1.0 03	177.1	12 57.4	1.0 03	177.1	12 27.4	1.0 03	177.2	11 57.5	1.0 03	177.2	11 27.5	1.0 03	177.2	3
4	14 55.3	1.0 04	176.1	14 25.4	1.0 04	176.1	13 55.4	1.0 04	176.2	13 25.4	1.0 04	176.2	12 55.4	1.0 04	176.2	12 25.5	1.0 04	176.2	11 55.5	1.0 04	176.2	11 25.5	1.0 04	176.3	4
05	14 52.7	1.0 05	175.1	14 22.7	1.0 05	175.2	13 52.8	1.0 05	175.2	13 22.8	1.0 05	175.2	12 52.9	1.0 05	175.2	12 22.9	1.0 05	175.3	11 52.9	1.0 05	175.3	11 23.0	1.0 05	175.3	05
6	14 49.5	1.0 06	174.2	14 19.6	1.0 06	174.2	13 49.6	1.0 06	174.2	13 19.7	1.0 06	174.3	12 49.7	1.0 06	174.3	12 19.8	1.0 06	174.3	11 49.8	1.0 06	174.4	11 19.9	1.0 06	174.4	6
7	14 45.7	1.0 07	173.2	14 15.8	1.0 07	173.2	13 45.9	1.0 07	173.3	13 15.9	1.0 07	173.3	12 46.0	1.0 07	173.3	12 16.1	1.0 07	173.4	11 46.2	1.0 07	173.4	11 16.3	1.0 07	173.5	7
8	14 41.3	1.0 08	172.2	14 11.4	1.0 08	172.3	13 41.6	1.0 08	172.3	13 11.6	1.0 08	172.4	12 41.8	1.0 08	172.4	12 11.9	1.0 08	172.4	11 42.0	1.0 08	172.5	11 12.1	1.0 08	172.5	8
9	14 36.4	1.0 09	171.3	14 06.5	1.0 09	171.3	13 36.7	1.0 09	171.4	13 06.8	1.0 09	171.4	12 36.9	1.0 09	171.5	12 07.0	1.0 09	171.5	11 37.2	1.0 09	171.5	11 07.3	1.0 09	171.6	9
10	14 30.9	99 10	170.3	14 01.0	99 10	170.3	13 31.2	99 10	170.4	13 01.4	99 10	170.5	12 31.5	99 10	170.5	12 01.7	99 10	170.6	11 31.8	99 10	170.6	11 02.0	99 10	170.7	10
1	14 24.8	99 11	169.3	13 55.0	99 11	169.4	13 25.2	99 11	169.4	12 55.4	99 11	169.5	12 25.6	99 11	169.6	11 55.8	99 11	169.6	11 25.9	99 11	169.7	10 56.1	99 11	169.7	1
2	14 18.1	99 12	168.4	13 48.4	99 12	168.4	13 18.6	99 12	168.5	12 48.8	99 12	168.6	12 19.1	99 12	168.6	11 49.3	99 12	168.7	11 19.5	99 12	168.7	10 49.7	99 12	168.8	2
3	14 10.9	99 13	167.4	13 41.2	99 13	167.5	13 11.5	99 13	167.5	12 41.7	99 13	167.6	12 12.0	99 13	167.7	11 42.2	99 13	167.7	11 12.5	99 12	167.8	10 42.8	99 12	167.9	3
4	14 03.1	99 14	166.4	13 33.5	99 14	166.5	13 03.8	99 14	166.6	12 34.1	99 14	166.7	12 04.4	99 14	166.7	11 34.7	99 14	166.8	11 05.0	99 14	166.9	10 35.3	99 13	167.0	4
15	13 54.8	99 15	165.5	13 25.2	99 15	165.6	12 55.5	99 15	165.6	12 25.9	99 15	165.7	11 56.2	99 14	165.8	11 26.5	99 14	165.9	10 56.9	99 14	166.0	10 27.2	99 14	166.0	15
6	13 45.9	99 16	164.5	13 16.3	99 16	164.6	12 46.7	99 16	164.7	12 17.1	99 16	164.8	11 47.5	99 15	164.9	11 17.9	99 15	164.9	10 48.3	99 15	165.0	10 18.7	99 15	165.1	6
7	13 36.4	99 17	163.6	13 06.9	99 17	163.7	12 37.3	99 16	163.8	12 07.8	99 16	163.8	11 38.2	99 16	163.9	11 08.7	99 16	164.0	10 39.1	99 16	164.1	10 09.6	99 16	164.2	7
8	13 26.4	98 18	162.6	12 56.9	98 18	162.7	12 27.4	98 17	162.8	11 57.9	98 17	162.9	11 28.4	98 17	163.0	10 58.9	98 17	163.1	10 29.4	98 17	163.2	9 59.9	98 17	163.3	8
9	13 15.9	98 18	161.7	12 46.5	98 18	161.8	12 17.0	98 18	161.9	11 47.6	98 18	162.0	11 18.1	98 18	162.1	10 48.7	98 18	162.2	10 19.2	98 18	162.3	9 49.7	98 18	162.4	9
20	13 04.8	98 19	160.7	12 35.4	98 19	160.8	12 06.0	98 19	160.9	11 36.6	98 19	161.0	11 07.3	98 19	161.1	10 37.9	98 19	161.2	10 08.5	98 19	161.3	9 39.1	98 19	161.4	20
1	12 53.2	98 20	159.8	12 23.9	98 20	159.9	11 54.5	98 20	160.0	11 25.2	98 20	160.1	10 55.9	98 20	160.2	10 26.5	98 20	160.3	9 57.2	98 20	160.4	9 27.9	98 20	160.5	1
2	12 41.0	98 21	158.8	12 11.8	98 21	159.0	11 42.5	98 21	159.1	11 13.2	98 21	159.2	10 44.0	98 21	159.3	10 14.7	98 21	159.4	9 45.4	98 20	159.5	9 16.1	98 20	159.6	2
3	12 28.4	97 22	157.9	11 59.2	97 22	158.0	11 30.0	97 22	158.1	11 00.7	97 22	158.3	10 31.5	97 22	158.4	10 02.3	97 21	158.5	9 33.1	97 21	158.6	9 03.9	97 21	158.7	3
4	12 15.2	97 23	157.0	11 46.0	97 23	157.1	11 16.9	97 23	157.2	10 47.7	97 23	157.3	10 18.6	97 22	157.5	9 49.5	97 22	157.6	9 20.3	97 22	157.7	8 51.2	97 22	157.8	4
25	12 01.4	97 24	156.0	11 32.4	97 24	156.2	11 03.3	97 24	156.3	10 34.2	97 23	156.4	10 05.2	97 23	156.5	9 36.1	97 23	156.7	9 07.0	97 23	156.8	8 37.9	97 23	156.9	25
6	11 47.2	97 25	155.1	11 18.2	97 24	155.2	10 49.2	97 24	155.4	10 20.2	97 24	155.5	9 51.2	97 24	155.6	9 22.2	97 24	155.8	8 53.2	97 24	155.9	8 24.2	97 24	156.0	6
7	11 32.5	96 25	154.2	11 03.6	96 25	154.3	10 34.6	96 25	154.5	10 05.7	96 25	154.6	9 36.8	96 25	154.7	9 07.8	96 25	154.9	8 38.9	96 25	155.0	8 09.9	96 25	155.1	7
8	11 17.2	96 26	153.3	10 48.4	96 26	153.4	10 19.5	96 26	153.5	9 50.7	96 26	153.7	9 21.8	96 26	153.8	8 53.0	96 26	154.0	8 24.1	96 26	154.1	7 55.2	96 25	154.2	8
9	11 01.5	96 27	152.3	10 32.7	96 27	152.5	10 04.0	96 27	152.6	9 35.2	96 27	152.8	9 06.4	96 26	152.9	8 37.6	96 26	153.1	8 08.8	96 26	153.2	7 40.0	96 26	153.3	9
30	10 45.3	96 28	151.4	10 16.6	96 28	151.6	9 47.9	96 28	151.7	9 19.2	96 27	151.9	8 50.5	96 27	152.0	8 21.8	96 27	152.2	7 53.1	96 27	152.3	7 24.4	96 27	152.5	30
1	10 28.6	95 29	150.5	10 00.0	95 28	150.7	9 31.4	95 28	150.8	9 02.7	95 28	151.0	8 34.1	95 28	151.1	8 05.5	95 28	151.3	7 36.8	95 28	151.4	7 08.2	95 28	151.6	1
2	10 11.4	95 29	149.6	9 42.9	95 29	149.8	9 14.3	95 29	149.9	8 45.8	95 29	150.1	8 17.3	95 29	150.2	7 48.7	95 29	150.4	7 20.1	95 29	150.5	6 51.6	95 28	150.7	2
3	9 53.8	95 30	148.7	9 25.3	95 30	148.9	8 56.9	95 30	149.0	8 28.4	95 30	149.2	7 59.9	95 30	149.3	7 31.5	95 30	149.5	7 03.0	95 29	149.7	6 34.5	95 29	149.8	3
4	9 35.7	95 31	147.8	9 07.3	95 31	148.0	8 38.9	95 31	148.1	8 10.5	95 31	148.3	7 42.2	95 30	148.5	7 13.8	95 30	148.6	6 45.4	95 30	148.8	6 17.0	95 30	148.9	4
35	9 17.1	94 32	146.9	8 48.8	94 32	147.1	8 20.5	94 31	147.2	7 52.2	94 31	147.4	7 23.9	94 31	147.6	6 55.6	94 31	147.7	6 27.3	94 31	147.9	5 59.0	94 31	148.1	35
6	8 58.1	94 32	146.0	8 29.9	94 32	146.2	8 01.7	94 32	146.3	7 33.5	94 32	146.5	7 05.2	94 32	146.7	6 37.0	94 32	146.9	6 08.8	94 32	147.0	5 40.6	94 31	147.2	6
7	8 38.6	94 33	145.1	8 10.5	94 33	145.3	7 42.4	94 33	145.5	7 14.3	94 33	145.6	6 46.1	94 33	145.8	6 18.0	94 32	146.0	5 49.9	94 32	146.2	5 21.7	94 32	146.3	7
8	8 18.7	93 34	144.2	7 50.7	93 34	144.4	7 22.6	93 34	144.6	6 54.6	93 33	144.8	6 26.6	93 33	144.9	5 58.5	93 33	145.1	5 30.5	93 33	145.3	5 02.4	94 33	145.5	8
9	7 58.4	93 35	143.3	7 30.4	93 34	143.5	7 02.5	93 34	143.7	6 34.5	93 34	143.9	6 06.6	93 34	144.1	5 38.6	93 34	144.3	5 10.7	93 34	144.4				9
40	7 37.6	93 35	142.5	7 09.8	93 35	142.6	6 41.9	93 35	142.8	6 14.0	93 35	143.0	5 46.2	93 35	143.2	5 18.3	93 34	143.4							40
1	7 16.4	93 36	141.6	6 48.7	93 36	141.8	6 20.9	93 36	142.0	5 53.1	93 36	142.1	5 25.4	93 35	142.3										1
2	6 54.8	92 37	140.7	6 27.2	92 37	140.9	5 59.5	92 36	141.1	5 31.8	92 36	141.3	5 04.1	92 36	141.5										2
3	6 32.8	92 37	139.8	6 05.3	92 37	140.0	5 37.7	92 37	140.2	5 10.1	92 37	140.4													3
4	6 10.4	92 38	139.0	5 42.9	92 38	139.2	5 15.5	92 38	139.4																4
45	5 47.6	91 39	138.1	5 20.2	91 38	138.3																			45
6	5 24.5	91 39	137.2																						6
7	5 00.9	91 40	136.4																						7

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	15 42.6	80 56	77.4	16 06.7	80 56	77.1	16 30.7	80 56	76.8	16 54.7	80 56	76.5	17 18.7	80 56	76.2	17 42.7	80 56	75.9	18 06.6	80 56	75.5	18 30 5	80 55	75.2	91
2	15 09.0	80 56	76.6	15 33.2	80 56	76.3	15 57.3	80 56	76.0	16 21.3	80 56	75.7	16 45.4	80 55	75.4	17 09.4	80 55	75.1	17 33.4	80 55	74.8	17 57 3	80 55	74.5	2
3	14 35.6	81 03	75.9	14 59.8	81 55	75.6	15 23.9	80 55	75.2	15 48.0	80 55	74.9	16 12.1	80 55	74.6	16 36.2	80 55	74.3	17 00.2	80 55	74.0	17 24 2	80 55	73.7	3
4	14 02.3	81 55	75.1	14 26.5	81 55	74.8	14 50.7	81 55	74.5	15 14.9	81 55	74.2	15 39.0	80 55	73.9	16 03.1	80 55	73.5	16 27.2	80 55	73.2	16 51 3	80 55	72.9	4
95	13 29.1	81 55	74.3	13 53.4	81 55	74.0	14 17.6	81 55	73.7	14 41.8	81 55	73.4	15 06.0	81 55	73.1	15 30.2	81 55	72.8	15 54.3	80 55	72.5	16 18 4	80 54	72.2	95
6	12 56.0	81 55	73.5	13 20.3	81 55	73.2	13 44.6	81 55	72.9	14 08.9	81 55	72.6	14 33.2	81 54	72.3	14 57.4	81 54	72.0	15 21.6	81 54	71.7	15 45 8	81 54	71.4	6
7	12 23.1	81 55	72.7	12 47.5	81 55	72.4	13 11.8	81 54	72.1	13 36.1	81 54	71.8	14 00.4	81 54	71.5	14 24.7	81 54	71.2	14 49.0	81 54	70.9	15 13 2	81 54	70.6	7
8	11 50.3	81 54	71.9	12 14.7	81 54	71.6	12 39.1	81 54	71.4	13 03.5	81 54	71.1	13 27.9	81 54	70.8	13 52.2	81 54	70.5	14 16.5	81 54	70.2	14 40 8	81 54	69.8	8
9	11 17.7	82 54	71.2	11 42.1	82 54	70.9	12 06.6	82 54	70.6	12 31.0	81 54	70.3	12 55.5	81 54	70.0	13 19.9	81 54	69.7	13 44.2	81 54	69.4	14 08 6	81 53	69.1	9
100	10 45.2	82 54	70.4	11 09.7	82 54	70.1	11 34.2	82 54	69.8	11 58.7	82 54	69.5	12 23.2	82 54	69.2	12 47.7	82 53	68.9	13 12.1	81 53	68.6	13 36 5	81 53	68.3	100
1	10 12.8	82 54	69.6	10 37.4	82 54	69.3	11 02.0	82 53	69.0	11 26.6	82 53	68.7	11 51.1	82 53	68.4	12 15.7	82 53	68.1	12 40.2	82 53	67.8	13 04.7	82 53	67.5	1
2	9 40.7	82 53	68.8	10 05.3	82 53	68.5	10 30.0	82 53	68.2	10 54.6	82 53	67.9	11 19.2	82 53	67.7	11 43.8	82 53	67.4	12 08.4	82 53	67.1	12 32.9	82 53	66.8	2
3	9 08.7	82 53	68.0	9 33.4	82 53	67.7	9 58.1	82 53	67.5	10 22.8	82 53	67.2	10 47.5	82 53	66.9	11 12.1	82 52	66.6	11 36.8	82 52	66.3	12 01.4	82 52	66.0	3
4	8 36.8	83 53	67.2	9 01.6	83 53	67.0	9 26.4	83 52	66.7	9 51.2	83 52	66.4	10 15.9	82 52	66.1	10 40.6	82 52	65.8	11 05.4	82 52	65.5	11 30.1	82 52	65.2	4
105	8 05.2	83 52	66.5	8 30.0	83 52	66.2	8 54.9	83 52	65.9	9 19.7	83 52	65.6	9 44.5	83 52	65.3	10 09.3	83 52	65.0	10 34.1	83 52	64.8	10 58.9	83 52	64.5	105
6	7 33.7	83 52	65.7	7 58.7	83 52	65.4	8 23.6	83 52	65.1	8 48.5	83 52	64.8	9 13.4	83 52	64.5	9 38.2	83 51	64.3	10 03.1	83 51	64.0	10 28.0	83 51	63.7	6
7	7 02.5	83 52	64.9	7 27.5	83 52	64.6	7 52.5	83 52	64.3	8 17.4	83 51	64.0	8 42.4	83 51	63.8	9 07.3	83 51	63.5	9 32.3	83 51	63.2	9 57.2	83 51	62.9	7
8	6 31.4	84 51	64.1	6 56.5	84 51	63.8	7 21.5	84 51	63.5	7 46.6	83 51	63.3	8 11.6	83 51	63.0	8 36.7	83 51	62.7	9 01.7	83 51	62.4	9 26.7	83 51	62.1	8
9	6 00.6	84 51	63.3	6 25.7	84 51	63.0	6 50.8	84 51	62.8	7 16.0	84 51	62.5	7 41.1	84 50	62.2	8 06.2	84 50	61.9	8 31.3	84 50	61.7	8 56.4	84 50	61.4	9
110	5 29.9	84 51	62.5	5 55.1	84 51	62.2	6 20.3	84 50	62.0	6 45.5	84 50	61.7	7 10.7	84 50	61.4	7 35.9	84 50	61.1	8 01.1	84 50	60.9	8 26 3	84 50	60.6	110
1				5 24.8	84 50	61.4	5 50.1	84 50	61.2	6 15.4	84 50	60.9	6 40.6	84 50	60.6	7 05.9	84 50	60.4	7 31.1	84 50	60.1	7 56.4	84 49	59.8	1
2							5 20.0	85 50	60.4	5 45.4	85 50	60.1	6 10.8	84 49	59.8	6 36.1	84 49	59.6	7 01.4	84 49	59.3	7 26.8	84 49	59.0	2
3										5 15.7	85 49	59.3	5 41.1	85 49	59.1	6 06.5	85 49	58.8	6 32.0	85 49	58.5	6 57.4	85 49	58.3	3
4													5 11.7	85 49	58.3	5 37.2	85 48	58.0	6 02.7	85 48	57.7	6 28.2	85 48	57.5	4
115																5 08.2	85 48	57.2	5 33.8	85 48	57.0	5 59.3	85 48	56.7	115
6																			5 05.0	86 48	56.2	5 30.7	86 47	55.9	6
7																						5 02.3	86 47	55.1	7

Digitized by Google

Lat. 55°

H.A.	24° 00′				24° 30′				25° 00′				25° 30′			
	Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.
°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°
00	59 00.0	1.0	01	180.0	59 30.0	1.0	01	180.0	60 00.0	1.0	01	180.0	60 30.0	1.0	01	180.0
1	58 59.5	1.0	03	178.2	59 29.5	1.0	03	178.2	59 59.5	1.0	03	178.2	60 29.4	1.0	03	178.2
2	58 57.9	1.0	04	176.5	59 27.8	1.0	04	176.4	59 57.8	1.0	04	176.4	60 27.8	1.0	05	176.3
3	58 55.2	1.0	06	174.7	59 25.2	1.0	06	174.6	59 55.1	1.0	06	174.6	60 25.1	1.0	06	174.5
4	58 51.5	1.0	08	172.9	59 21.4	1.0	08	172.8	59 51.3	1.0	08	172.8	60 21.2	1.0	08	172.7
05	58 46.7	1.0	10	171.2	59 16.6	1.0	10	171.1	59 46.4	1.0	10	171.0	60 16.3	99	10	170.9
6	58 40.9	99	11	169.4	59 10.7	99	12	169.3	59 40.5	99	12	169.2	60 10.3	99	12	169.1
7	58 34.1	99	13	167.7	59 03.8	99	13	167.5	59 33.5	99	13	167.4	60 03.2	99	14	167.3
8	58 26.2	99	15	165.9	58 55.9	99	15	165.8	59 25.5	99	15	165.6	59 55.1	99	15	165.5
9	58 17.4	99	16	164.2	58 46.9	98	17	164.1	59 16.5	98	17	163.9	59 46.0	98	17	163.7
10	58 07.5	98	18	162.5	58 37.0	98	18	162.3	59 06.4	98	18	162.2	59 35.8	98	19	162.0
1	57 56.7	98	20	160.8	58 26.1	98	20	160.6	58 55.4	98	20	160.4	59 24.7	98	20	160.2
2	57 44.9	97	21	159.1	58 14.2	97	21	158.9	58 43.4	97	22	158.7	59 12.6	97	22	158.5
3	57 32.2	97	23	157.5	58 01.3	97	23	157.3	58 30.4	97	23	157.0	58 59.5	97	23	156.8
4	57 18.6	97	24	155.8	57 47.6	97	24	155.6	58 16.5	96	25	155.4	58 45.4	96	25	155.1
15	57 04.1	96	26	154.2	57 32.9	96	26	154.0	58 01.7	96	26	153.7	58 30.5	96	26	153.4
6	56 48.7	96	27	152.6	57 17.4	96	27	152.3	57 46.0	96	28	152.1	58 14.7	95	28	151.8
7	56 32.4	95	28	151.0	57 01.0	95	29	150.7	57 29.5	95	29	150.5	57 58.0	95	29	150.2
8	56 15.3	95	30	149.5	56 43.7	95	30	149.2	57 12.1	94	30	148.9	57 40.4	94	31	148.6
9	55 57.4	94	31	147.9	56 25.7	94	31	147.6	56 53.9	94	32	147.3	57 22.1	94	32	147.0
20	55 38.8	94	32	146.4	56 06.9	94	33	146.1	56 34.9	93	33	145.7	57 02.9	93	33	145.4
1	55 19.3	93	34	144.9	55 47.3	93	34	144.6	56 15.2	93	34	144.2	56 43.0	93	34	143.9
2	54 59.2	93	35	143.4	55 27.0	93	35	143.1	55 54.7	92	35	142.7	56 22.4	92	36	142.4
3	54 38.3	92	36	141.9	55 05.9	92	36	141.6	55 33.5	92	36	141.2	56 01.0	92	37	140.9
4	54 16.7	92	37	140.5	54 44.2	91	37	140.1	55 11.6	91	38	139.8	55 39.0	91	38	139.4
25	53 54.5	91	38	139.0	54 21.8	91	38	138.7	54 49.0	91	39	138.3	55 16.2	90	39	138.0
6	53 31.6	91	39	137.6	53 58.8	90	39	137.3	54 25.9	90	40	136.9	54 52.9	90	40	136.5
7	53 08.1	90	40	136.3	53 35.1	90	40	135.9	54 02.0	90	41	135.5	54 28.9	89	41	135.1
8	52 44.0	90	41	134.9	53 10.9	89	41	134.5	53 37.6	89	42	134.2	54 04.3	89	42	133.8
9	52 19.4	89	42	133.6	52 46.1	89	42	133.2	53 12.7	89	42	132.8	53 39.2	88	43	132.4
30	51 54.2	89	43	132.2	52 20.7	88	43	131.9	52 47.2	88	43	131.5	53 13.5	88	44	131.1
1	51 28.4	88	44	130.9	51 54.8	88	44	130.6	52 21.1	88	44	130.2	52 47.3	87	44	129.8
2	51 02.2	88	44	129.7	51 28.4	87	45	129.3	51 54.6	87	45	128.9	52 20.6	87	45	128.5
3	50 35.5	87	45	128.4	51 01.5	87	46	128.0	51 27.5	87	46	127.6	51 53.4	86	46	127.2
4	50 08.2	87	46	127.2	50 34.2	86	46	126.8	51 00.0	86	46	126.4	51 25.8	86	47	125.9
35	49 40.6	86	47	125.9	50 06.4	86	47	125.5	50 32.1	86	47	125.1	50 57.7	85	48	124.7
6	49 12.5	86	48	124.7	49 38.2	85	48	124.3	50 03.8	85	48	123.9	50 29.2	85	48	123.5
7	48 44.0	85	48	123.5	49 09.6	85	48	123.1	49 35.0	85	49	122.7	50 00.3	84	49	122.3
8	48 15.2	85	49	122.4	48 40.5	84	49	122.0	49 05.8	84	49	121.6	49 31.1	84	49	121.1
9	47 45.9	84	49	121.2	48 11.2	84	50	120.8	48 36.3	84	50	120.4	49 01.4	83	50	120.0
40	47 16.3	84	50	120.1	47 41.4	84	50	119.7	48 06.5	83	50	119.3	48 31.5	83	50	118.8
1	46 46.3	84	50	118.9	47 11.4	83	51	118.5	47 36.3	83	51	118.1	48 01.1	83	51	117.7
2	46 16.1	83	51	117.8	46 41.0	83	51	117.4	47 05.8	83	51	117.0	47 30.5	82	52	116.6
3	45 45.5	83	52	116.7	46 10.3	83	52	116.3	46 35.0	82	52	115.9	46 59.6	82	52	115.5
4	45 14.6	82	52	115.7	45 39.3	82	52	115.3	46 03.9	82	52	114.9	46 28.4	82	52	114.4
45	44 43.5	82	52	114.6	45 08.0	82	53	114.2	45 32.5	82	53	113.8	45 57.0	81	53	113.4
6	44 12.0	82	53	113.6	44 36.5	81	53	113.2	45 00.9	81	53	112.7	45 25.2	81	53	112.3
7	43 40.4	81	53	112.5	44 04.8	81	53	112.1	44 29.1	81	54	111.7	44 53.3	81	54	111.3
8	43 08.5	81	54	111.5	43 32.8	81	54	111.1	43 57.0	81	54	110.7	44 21.1	80	54	110.3
9	42 36.3	81	54	110.5	43 00.5	81	54	110.1	43 24.7	80	54	109.7	43 48.7	80	54	109.3
50	42 04.0	81	54	109.5	42 28.1	80	54	109.1	42 52.2	80	54	108.7	43 16.1	80	55	108.3
1	41 31.4	80	54	108.5	41 55.5	80	55	108.1	42 19.5	80	55	107.7	42 43.4	79	55	107.3
2	40 58.7	80	55	107.5	41 22.7	80	55	107.1	41 46.6	80	55	106.7	42 10.4	79	55	106.3
3	40 25.8	80	55	106.6	40 49.7	80	55	106.2	41 13.6	79	55	105.8	41 37.3	79	55	105.4
4	39 52.8	80	55	105.6	40 16.6	79	55	105.2	40 40.4	79	56	104.8	41 04.1	79	56	104.4
55	39 19.5	79	56	104.7	39 43.3	79	56	104.3	40 07.0	79	56	103.9	40 30.7	79	56	103.5
6	38 46.2	79	56	103.7	39 09.9	79	56	103.3	39 33.6	79	56	102.9	39 57.1	78	56	102.5
7	38 12.7	79	56	102.8	38 36.4	79	56	102.4	39 00.0	79	56	102.0	39 23.5	78	56	101.6
8	37 39.1	79	56	101.9	38 02.7	79	56	101.5	38 26.2	78	56	101.1	38 49.7	78	56	100.7
9	37 05.3	79	56	101.0	37 28.9	78	56	100.6	37 52.4	78	56	100.2	38 15.9	78	57	99.8
60	36 31.5	79	56	100.1	36 55.0	78	57	99.7	37 18.5	78	57	99.3	37 41.9	78	57	98.9
1	35 57.6	78	57	99.2	36 21.1	78	57	98.8	36 44.5	78	57	98.4	37 07.9	78	57	98.0
2	35 23.6	78	57	98.3	35 47.0	78	57	97.9	36 10.4	78	57	97.6	36 33.8	78	57	97.2
3	34 49.5	78	57	97.4	35 12.9	78	57	97.1	35 36.3	78	57	96.7	35 59.6	78	57	96.3
4	34 15.3	78	57	96.6	34 38.7	78	57	96.2	35 02.1	78	57	95.8	35 25.3	77	57	95.4
65	33 41.1	78	57	95.7	34 04.5	78	57	95.3	34 27.8	78	57	95.0	34 51.1	77	57	94.6
6	33 06.8	78	57	94.9	33 30.2	78	57	94.5	33 53.5	78	57	94.1	34 16.7	77	57	93.7
7	32 32.5	78	57	94.0	32 55.9	78	57	93.6	33 19.2	78	57	93.3	33 42.4	77	57	92.9
8	31 58.2	78	57	93.2	32 21.5	78	57	92.8	32 44.8	77	57	92.4	33 08.0	77	57	92.1
9	31 23.8	78	57	92.3	31 47.1	78	57	92.0	32 10.4	77	57	91.6	32 33.6	77	57	91.2
70	30 49.4	78	57	91.5	31 12.7	78	57	91.1	31 36.0	77	57	90.8	31 59.2	77	57	90.4
1	30 15.0	78	57	90.7	30 38.3	78	57	90.3	31 01.6	77	57	90.0	31 24.8	77	57	89.6
2	29 40.6	78	57	89.9	30 03.9	78	57	89.5	30 27.2	77	57	89.1	30 50.4	77	57	88.8
3	29 06.2	78	57	89.0	29 29.5	78	57	88.7	29 52.8	77	57	88.3	30 16.0	77	57	88.0
4	28 31.8	78	57	88.2	28 55.1	78	57	87.9	29 18.4	77	57	87.5	29 41.6	77	57	87.2
75	27 57.4	78	57	87.4	28 20.7	78	57	87.1	28 44.0	78	57	86.7	29 07.2	77	57	86.4
6	27 23.0	78	57	86.6	27 46.4	78	57	86.3	28 09.7	78	57	85.9	28 32.9	77	57	85.6
7	26 48.7	78	57	85.8	27 12.0	78	57	85.5	27 35.3	78	57	85.1	27 58.6	77	57	84.8
8	26 14.4	78	57	85.0	26 37.7	78	57	84.7	27 01.1	78	57	84.3	27 24.4	77	57	84.0
9	25 40.1	78	57	84.2	26 03.5	78	57	83.9	26 26.9	78	57	83.5	26 50.2	78	57	83.2
80	25 05.9	78	57	83.4	25 29.3	78	57	83.1	25 52.7	78	57	82.8	26 16.0	78	57	82.4
1	24 31.7	78	57	82.7	24 55.2	78	57	82.3	25 18.6	78	57	82.0	25 41.9	78	57	81.6
2	23 57.6	78	57	81.9	24 21.1	78	57	81.5	24 44.5	78	57	81.2	25 07.9	78	57	80.8
3	23 23.6	78	57	81.1	23 47.1	78	57	80.8	24 10.6	78	56	80.4	24 34.0	78	56	80.1
4	22 49.6	79	56	80.3	23 13.2	78	56	80.0	23 36.7	78	56	79.6	24 00.1	78	56	79.3
85	22 15.7	79	56	79.5	22 39.3	79	56	79.2	23 02.9	78	56	78.9	23 26.3	78	56	78.5
6	21 41.9	79	56	78.8	22 05.6	79	56	78.4	22 29.1	79	56	78.1	22 52.7	78	56	77.8
7	21 08.2	79	56	78.0	21 31.9	79	56	77.7	21 55.5	79	56	77.3	22 19.1	79	56	77.0
8	20 34.6	79	56	77.2	20 58.3	79	56	76.9	21 22.0	79	56	76.6	21 45.6	79	56	76.2
9	20 01.1	79	56	76.4	20 24.9	79	56	76.1	20 48.6	79	56	75.8	21 12.2	79	55	75.5
90	19 27.7	79	56	75.7	19 51.5	79	55	75.4	20 15.3	79	55	75.0	20 39.0	79	55	74.7

26° 00′				26° 30′				27° 00′				27° 30′				H.A.
Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.	
° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	°
61 00.0	1.0	01	180.0	61 30.0	1.0	01	180.0	62 00.0	1.0	01	180.0	62 30.0	1.0	01	180.0	00
60 59.4	1.0	03	178.1	61 29.4	1.0	03	178.1	61 59.4	1.0	03	178.1	62 29.4	1.0	03	178.1	1
60 57.8	1.0	05	176.3	61 27.7	1.0	05	176.3	61 57.7	1.0	05	176.2	62 27.7	1.0	05	176.2	2
60 55.0	1.0	06	174.4	61 24.9	1.0	07	174.4	61 54.9	1.0	07	174.3	62 24.8	1.0	07	174.2	3
60 51.1	1.0	08	172.6	61 21.0	1.0	08	172.5	61 50.9	1.0	08	172.4	62 20.8	1.0	09	172.3	4
60 46.1	99	10	170.8	61 16.0	99	10	170.7	61 45.8	99	10	170.6	62 15.6	99	10	170.4	05
60 40.1	99	12	168.9	61 09.8	99	12	168.8	61 39.6	99	12	168.7	62 09.4	99	12	168.5	6
60 32.9	99	14	167.1	61 02.6	99	14	167.0	61 32.3	99	14	166.8	62 02.0	99	14	166.7	7
60 24.7	99	15	165.3	60 54.4	99	16	165.2	61 23.9	99	16	165.0	61 53.5	99	16	164.8	8
60 15.5	98	17	163.5	60 45.0	98	17	163.4	61 14.5	98	18	163.2	61 44.0	98	18	163.0	9
60 05.2	98	19	161.8	60 34.6	98	19	161.6	61 04.0	98	19	161.3	61 33.3	98	19	161.1	10
59 54.0	98	20	160.0	60 23.2	98	21	159.8	60 52.5	97	21	159.6	61 21.7	97	21	159.3	1
59 41.7	97	22	158.3	60 10.9	97	22	158.0	60 40.0	97	22	157.8	61 09.1	97	23	157.5	2
59 28.5	97	24	156.5	59 57.5	97	24	156.3	60 26.5	97	24	156.0	60 55.4	96	24	155.8	3
59 14.3	96	25	154.8	59 43.2	96	25	154.6	60 12.0	96	26	154.3	60 40.8	96	26	154.0	4
58 59.2	96	26	153.2	59 28.0	96	27	152.9	59 56.6	96	27	152.6	60 25.3	95	27	152.3	15
58 43.3	95	28	151.5	59 11.8	95	28	151.2	59 40.3	95	29	150.9	60 08.8	95	29	150.6	6
58 26.4	95	30	149.9	58 54.8	95	30	149.6	59 23.2	94	30	149.2	59 51.5	94	30	148.9	7
58 08.7	94	31	148.2	58 36.9	94	31	147.9	59 05.1	94	31	147.6	59 33.3	94	32	147.3	8
57 50.2	94	32	146.7	58 18.3	93	32	146.3	58 46.3	93	33	146.0	59 14.2	93	33	145.6	9
57 30.9	93	34	145.1	57 58.8	93	34	144.7	58 26.6	93	34	144.4	58 54.4	93	34	144.0	20
57 10.8	93	35	143.5	57 38.5	92	35	143.2	58 06.2	92	35	142.8	58 33.8	92	36	142.4	1
56 50.0	92	36	142.0	57 17.5	92	36	141.7	57 45.0	92	36	141.3	58 12.5	91	37	140.9	2
56 28.5	91	37	140.5	56 55.8	91	37	140.1	57 23.2	91	38	139.8	57 50.4	91	38	139.4	3
56 06.2	91	38	139.0	56 33.4	91	38	138.7	57 00.6	90	39	138.3	57 27.7	90	39	137.9	4
55 43.3	90	39	137.6	56 10.4	90	39	137.2	56 37.4	90	40	136.8	57 04.2	90	40	136.4	25
55 19.8	90	40	136.2	55 46.7	89	41	135.8	56 13.5	89	41	135.4	56 40.2	89	41	135.0	6
54 55.7	89	41	134.8	55 22.4	89	42	134.4	55 49.0	89	42	133.9	56 15.6	88	42	133.5	7
54 31.0	89	42	133.4	54 57.5	88	42	133.0	55 23.9	88	43	132.6	55 50.3	88	43	132.1	8
54 05.7	88	43	132.0	54 32.0	88	43	131.6	54 58.3	87	44	131.2	55 24.5	87	44	130.8	9
53 39.8	88	44	130.7	54 06.0	87	44	130.3	54 32.2	87	44	129.8	54 58.2	87	45	129.4	30
53 13.5	87	45	129.4	53 39.5	87	45	128.9	54 05.5	86	45	128.5	54 31.3	86	46	128.1	1
52 46.6	86	46	128.1	53 12.5	86	46	127.6	53 38.3	86	46	127.2	54 04.0	86	46	126.8	2
52 19.3	86	46	126.8	52 45.0	86	47	126.4	53 10.7	85	47	125.9	53 36.2	85	47	125.5	3
51 51.5	85	47	125.5	52 17.1	85	47	125.1	52 42.6	85	48	124.7	53 08.0	85	48	124.2	4
51 23.3	85	48	124.3	51 48.7	85	48	123.9	52 14.1	84	48	123.4	52 39.3	84	48	123.0	35
50 54.6	85	48	123.1	51 19.9	84	49	122.7	51 45.1	84	49	122.2	52 10.3	84	49	121.8	6
50 25.6	84	49	121.9	50 50.8	84	49	121.5	51 15.8	83	50	121.0	51 40.8	83	50	120.6	7
49 56.2	84	50	120.7	50 21.2	83	50	120.3	50 46.2	83	50	119.8	51 11.0	83	50	119.4	8
49 26.4	83	50	119.6	49 51.3	83	50	119.1	50 16.2	83	50	118.7	50 40.9	82	51	118.2	9
48 56.3	83	51	118.4	49 21.1	82	51	118.0	49 45.8	82	51	117.5	50 10.4	82	51	117.1	40
48 25.9	82	51	117.3	48 50.6	82	51	116.9	49 15.1	82	52	116.4	49 39.6	81	52	116.0	1
47 55.2	82	52	116.2	48 19.7	82	52	115.8	48 44.2	81	52	115.3	49 08.5	81	52	114.9	2
47 24.1	82	52	115.1	47 48.6	81	52	114.7	48 12.9	81	52	114.2	48 37.1	81	53	113.8	3
46 52.8	81	52	114.0	47 17.2	81	53	113.6	47 41.4	81	53	113.1	48 05.5	80	53	112.7	4
46 21.3	81	53	113.0	46 45.5	81	53	112.5	47 09.6	80	53	112.1	47 33.7	80	54	111.6	45
45 49.5	81	54	111.9	46 13.6	80	54	111.5	46 37.6	80	54	111.0	47 01.6	80	54	110.6	6
45 17.4	80	54	110.9	45 41.5	80	54	110.4	46 05.4	80	54	110.0	46 29.2	79	54	109.6	7
44 45.2	80	54	109.9	45 09.1	80	54	109.4	45 33.0	79	54	109.0	45 56.7	79	55	108.6	8
44 12.7	80	54	108.9	44 36.6	79	55	108.4	45 00.3	79	55	108.0	45 24.0	79	55	107.6	9
43 40.0	79	55	107.9	44 03.8	79	55	107.4	44 27.5	79	55	107.0	44 51.1	78	55	106.6	50
43 07.2	79	55	106.9	43 30.9	79	55	106.5	43 54.5	79	55	106.0	44 18.0	78	55	105.6	1
42 34.2	79	55	105.9	42 57.8	79	55	105.5	43 21.4	78	56	105.1	43 44.8	78	56	104.6	2
42 01.0	79	56	104.9	42 24.6	78	56	104.5	42 48.0	78	56	104.1	43 11.4	78	56	103.7	3
41 27.7	79	56	104.0	41 51.2	78	56	103.6	42 14.6	78	56	103.2	42 37.9	78	56	102.7	4
40 54.2	78	56	103.1	41 17.7	78	56	102.7	41 41.0	78	56	102.2	42 04.3	77	56	101.8	55
40 20.6	78	56	102.1	40 44.0	78	56	101.7	41 07.3	78	56	101.3	41 30.6	77	56	100.9	6
39 46.9	78	56	101.2	40 10.3	78	56	100.8	40 33.5	77	56	100.4	40 56.7	77	57	100.0	7
39 13.1	78	56	100.3	39 36.4	78	57	99.9	39 59.6	77	57	99.5	40 22.8	77	57	99.1	8
38 39.2	78	57	99.4	39 02.5	77	57	99.0	39 25.7	77	57	98.6	39 48.8	77	57	98.2	9
38 05.2	78	57	98.5	38 28.4	77	57	98.1	38 51.6	77	57	97.7	39 14.6	77	57	97.3	60
37 31.1	77	57	97.6	37 54.3	77	57	97.2	38 17.5	77	57	96.8	38 40.5	77	57	96.4	1
36 57.0	77	57	96.8	37 20.2	77	57	96.4	37 43.3	77	57	96.0	38 06.3	77	57	95.6	2
36 22.8	77	57	95.9	36 45.9	77	57	95.5	37 09.0	77	57	95.1	37 32.0	76	57	94.7	3
35 48.5	77	57	95.0	36 11.7	77	57	94.7	36 34.7	77	57	94.3	36 57.7	76	57	93.9	4
35 14.2	77	57	94.2	35 37.3	77	57	93.8	36 00.4	77	57	93.4	36 23.3	76	57	93.0	65
34 39.9	77	57	93.3	35 03.0	77	57	93.0	35 26.0	77	57	92.6	35 48.9	76	57	92.2	6
34 05.5	77	57	92.5	34 28.6	77	57	92.1	34 51.6	77	57	91.7	35 14.5	76	57	91.3	7
33 31.1	77	57	91.7	33 54.2	77	57	91.3	34 17.2	77	57	90.9	34 40.1	76	57	90.5	8
32 56.7	77	57	90.8	33 19.8	77	57	90.5	33 42.8	77	57	90.1	34 05.7	76	57	89.7	9
32 22.3	77	57	90.0	32 45.4	77	57	89.6	33 08.4	77	57	89.3	33 31.3	76	57	88.9	70
31 47.9	77	57	89.2	32 11.0	77	57	88.8	32 34.0	77	57	88.5	32 56.9	76	57	88.1	1
31 13.5	77	57	88.4	31 36.6	77	57	88.0	31 59.6	77	57	87.6	32 22.5	76	57	87.3	2
30 39.1	77	57	87.6	31 02.2	77	57	87.2	31 25.2	77	57	86.8	31 48.1	76	57	86.5	3
30 04.7	77	57	86.8	30 27.8	77	57	86.4	30 50.8	77	57	86.0	31 13.8	76	57	85.7	4
29 30.4	77	57	86.0	29 53.5	77	57	85.6	30 16.5	77	57	85.3	30 39.5	76	57	84.9	75
28 56.1	77	57	85.2	29 19.2	77	57	84.8	29 42.3	77	57	84.5	30 05.3	77	57	84.1	6
28 21.8	77	57	84.4	28 44.9	77	57	84.0	29 08.0	77	57	83.7	29 31.1	77	57	83.3	7
27 47.6	77	57	83.6	28 10.7	77	57	83.3	28 33.8	77	57	82.9	28 56.9	77	57	82.5	8
27 13.4	77	57	82.8	27 36.6	77	57	82.5	27 59.7	77	57	82.1	28 22.8	77	57	81.8	9
26 39.3	77	57	82.1	27 02.5	77	57	81.7	27 25.7	77	57	81.3	27 48.8	77	57	81.0	80
26 05.2	78	56	81.3	26 28.5	77	57	80.9	26 51.7	77	56	80.6	27 14.8	77	56	80.2	1
25 31.3	78	56	80.5	25 54.5	78	56	80.1	26 17.8	77	56	79.8	26 41.0	77	56	79.4	2
24 57.4	78	56	79.7	25 20.7	78	56	79.4	25 43.9	77	56	79.0	26 07.2	77	56	78.7	3
24 23.5	78	56	79.0	24 46.9	78	56	78.6	25 10.2	78	56	78.3	25 33.5	77	56	77.9	4
23 49.8	78	56	78.2	24 13.2	78	56	77.8	24 36.6	78	56	77.5	24 59.9	78	56	77.2	85
23 16.2	78	56	77.4	23 39.6	78	56	77.1	24 03.0	78	56	76.7	24 26.4	78	56	76.4	6
22 42.6	78	56	76.7	23 06.1	78	56	76.3	23 29.6	78	56	76.0	23 53.0	78	55	75.6	7
22 09.2	79	56	75.9	22 32.7	78	55	75.6	22 56.2	78	55	75.2	23 19.7	78	55	74.9	8
21 35.9	79	55	75.1	21 59.5	79	55	74.8	22 23.0	78	55	74.5	22 46.5	78	55	74.1	9
21 02.7	79	55	74.4	21 26.3	79	55	74.0	21 49.9	79	55	73.7	22 13.5	78	55	73.4	90

Digitized by Google

Lat. 55°

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	11 00.0	1.0	00	180.0	10 30.0	1.0	00	180.0	10 00.0	1.0	00	180.0	9 30.0	1.0	00	180.0	9 00.0	1.0	00	180.0	8 30.0	1.0	00	180.0	8 00.0	1.0	00	180.0	7 30.0	1.0	00	180.0	00
1	10 59.7	1.0	01	179.1	10 29.7	1.0	01	179.1	9 59.7	1.0	01	179.1	9 29.7	1.0	01	179.1	8 59.7	1.0	01	179.1	8 29.7	1.0	01	179.1	7 59.7	1.0	01	179.1	7 29.7	1.0	01	179.1	1
2	10 58.9	1.0	02	178.1	10 28.9	1.0	02	178.1	9 58.9	1.0	02	178.2	9 28.9	1.0	02	178.2	8 58.9	1.0	02	178.2	8 28.9	1.0	02	178.2	7 58.9	1.0	02	178.2	7 28.9	1.0	02	178.2	2
3	10 57.5	1.0	03	177.2	10 27.5	1.0	03	177.2	9 57.5	1.0	03	177.2	9 27.5	1.0	03	177.3	8 57.5	1.0	03	177.3	8 27.6	1.0	03	177.3	7 57.6	1.0	03	177.3	7 27.6	1.0	03	177.3	3
4	10 55.5	1.0	04	176.3	10 25.6	1.0	04	176.3	9 55.6	1.0	04	176.3	9 25.6	1.0	04	176.3	8 55.6	1.0	04	176.4	8 25.7	1.0	04	176.4	7 55.7	1.0	04	176.4	7 25.7	1.0	04	176.4	4
05	10 53.0	1.0	05	175.3	10 23.1	1.0	05	175.4	9 53.1	1.0	05	175.4	9 23.1	1.0	05	175.4	8 53.2	1.0	05	175.5	8 23.2	1.0	05	175.5	7 53.2	1.0	05	175.5	7 23.3	1.0	05	175.5	05
6	10 50.0	1.0	06	174.4	10 20.0	1.0	06	174.5	9 50.1	1.0	06	174.5	9 20.1	1.0	06	174.5	8 50.2	1.0	06	174.5	8 20.2	1.0	06	174.6	7 50.3	1.0	06	174.6	7 20.3	1.0	06	174.6	6
7	10 46.3	1.0	07	173.5	10 16.4	1.0	07	173.5	9 46.5	1.0	07	173.6	9 16.6	1.0	07	173.6	8 46.6	1.0	07	173.6	8 16.7	1.0	07	173.7	7 46.8	1.0	07	173.7	7 16.9	1.0	07	173.7	7
8	10 42.1	1.0	08	172.6	10 12.2	1.0	08	172.6	9 42.3	1.0	08	172.6	9 12.4	1.0	08	172.7	8 42.5	1.0	08	172.7	8 12.6	1.0	08	172.8	7 42.7	1.0	08	172.8	7 12.8	1.0	08	172.9	8
9	10 37.4	1.0	09	171.6	10 07.5	1.0	09	171.7	9 37.7	1.0	09	171.7	9 07.8	1.0	09	171.8	8 37.9	1.0	09	171.8	8 08.0	1.0	09	171.9	7 38.2	1.0	08	171.9	7 08.3	1.0	08	172.0	9
10	10 32.1	99	10	170.7	10 02.3	99	10	170.8	9 32.5	99	10	170.8	9 02.6	99	10	170.9	8 32.8	99	10	170.9	8 02.9	99	09	171.0	7 33.1	99	09	171.0	7 03.2	99	09	171.1	10
1	10 26.3	99	11	169.8	9 56.5	99	11	169.8	9 26.7	99	10	169.9	8 56.9	99	10	170.0	8 27.1	99	10	170.0	7 57.2	99	10	170.1	7 27.4	99	10	170.1	6 57.6	99	10	170.2	1
2	10 19.9	99	12	168.9	9 50.2	99	11	168.9	9 20.4	99	11	169.0	8 50.6	99	11	169.1	8 20.8	99	11	169.1	7 51.0	99	11	169.2	7 21.3	99	11	169.2	6 51.5	99	11	169.3	2
3	10 13.0	99	12	167.9	9 43.3	99	12	168.0	9 13.5	99	12	168.1	8 43.8	99	12	168.1	8 14.1	99	12	168.2	7 44.3	99	12	168.3	7 14.6	99	12	168.3	6 44.8	99	12	168.4	3
4	10 05.6	99	13	167.0	9 35.9	99	13	167.1	9 06.2	99	13	167.2	8 36.5	99	13	167.2	8 06.8	99	13	167.3	7 37.1	99	13	167.4	7 07.4	99	13	167.5	6 37.6	99	13	167.5	4
15	9 57.6	99	14	166.1	9 27.9	99	14	166.2	8 58.3	99	14	166.3	8 28.6	99	14	166.3	7 58.9	99	14	166.4	7 29.3	99	14	166.5	6 59.6	99	14	166.6	6 30.0	99	14	166.6	15
6	9 49.0	99	15	165.2	9 19.4	99	15	165.3	8 49.8	99	15	165.4	8 20.2	99	15	165.4	7 50.6	99	15	165.5	7 21.0	99	15	165.6	6 51.4	99	15	165.7	6 21.7	99	15	165.8	6
7	9 40.0	99	16	164.3	9 10.4	99	16	164.4	8 40.9	99	16	164.5	8 11.3	99	16	164.5	7 41.7	99	16	164.6	7 12.2	99	16	164.7	6 42.6	99	16	164.8	6 13.0	99	15	164.9	7
8	9 30.4	98	17	163.4	9 00.9	98	17	163.5	8 31.4	98	17	163.5	8 01.9	98	17	163.6	7 32.3	98	17	163.7	7 02.8	98	16	163.8	6 33.3	98	16	163.9	6 03.8	98	16	164.0	8
9	9 20.3	98	18	162.5	8 50.8	98	18	162.6	8 21.4	98	18	162.6	7 51.9	98	17	162.7	7 22.4	98	17	162.8	6 53.0	98	17	162.9	6 23.5	98	17	163.0	5 54.1	98	17	163.1	9
20	9 09.7	98	19	161.5	8 40.3	98	18	161.6	8 10.9	98	18	161.8	7 41.4	98	18	161.9	7 12.0	98	18	161.9	6 42.6	98	18	162.0	6 13.2	98	18	162.1	5 43.8	98	18	162.2	20
1	8 58.5	98	20	160.6	8 29.2	98	19	160.7	7 59.8	98	19	160.9	7 30.5	98	19	161.0	7 01.1	98	19	161.1	6 31.8	98	19	161.2	6 02.4	98	19	161.3	5 33.1	98	19	161.4	1
2	8 46.8	98	20	159.7	8 17.6	98	20	159.9	7 48.3	98	20	160.0	7 19.0	98	20	160.1	6 49.7	98	20	160.2	6 20.4	98	20	160.3	5 51.1	98	20	160.4	5 21.8	98	20	160.5	2
3	8 34.7	97	21	158.8	8 05.5	97	21	159.0	7 36.2	97	21	159.1	7 07.0	97	21	159.2	6 37.8	97	21	159.3	6 08.6	97	21	159.4	5 39.3	97	20	159.5	5 10.1	97	20	159.6	3
4	8 22.0	97	22	157.9	7 52.8	97	22	158.1	7 23.7	97	22	158.2	6 54.5	97	22	158.3	6 25.4	97	22	158.4	5 56.2	97	21	158.5	5 27.0	97	21	158.7					4
25	8 08.8	97	23	157.0	7 39.7	97	23	157.2	7 10.6	97	22	157.3	6 41.6	97	22	157.4	6 12.5	97	22	157.5	5 43.4	97	22	157.7	5 14.3	97	22	157.8					25
6	7 55.2	97	24	156.2	7 26.1	97	23	156.3	6 57.1	97	23	156.4	6 28.1	97	23	156.5	5 59.1	97	23	156.7	5 30.0	97	23	156.8	5 01.0	97	23	156.9					6
7	7 41.0	96	24	155.3	7 12.1	96	24	155.4	6 43.1	97	24	155.5	6 14.2	97	24	155.7	5 45.2	97	24	155.8	5 16.2	97	24	155.9									7
8	7 26.4	96	25	154.4	6 57.5	96	25	154.5	6 28.6	96	25	154.6	5 59.7	96	25	154.8	5 30.8	96	25	154.9	5 02.0	96	25	155.1									8
9	7 11.2	96	26	153.5	6 42.4	96	26	153.6	6 13.6	96	26	153.8	5 44.8	96	26	153.9	5 16.0	96	26	154.0													9
30	6 55.6	96	27	152.6	6 26.9	96	27	152.8	5 58.2	96	26	152.9	5 29.5	96	26	153.0	5 00.7	96	26	153.2													30
1	6 39.6	95	28	151.7	6 10.9	95	27	151.9	5 42.3	95	27	152.0	5 13.6	95	27	152.2																	1
2	6 23.0	95	28	150.8	5 54.5	95	28	151.0	5 25.9	95	28	151.2																					2
3	6 06.0	95	29	150.0	5 37.6	95	29	150.1	5 09.1	95	29	150.3																					3
4	5 48.6	95	30	149.1	5 20.2	95	30	149.3																									4
35	5 30.7	94	31	148.2	5 02.4	94	30	148.4																									35
6	5 12.4	94	32	147.4																													6

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	18 54.4	80	55	74.9	19 18.3	79	55	74.6	19 42.1	79	55	74.3	20 05.9	79	55	73.9	20 29.6	79	55	73.6	20 53.3	79	55	73.3	21 17.0	79	55	73.0	21 40.6	79	55	72.6	91
2	18 21.3	80	55	74.1	18 45.2	80	55	73.8	19 09.0	79	55	73.5	19 32.8	79	55	73.2	19 56.6	79	55	72.9	20 20.4	79	55	72.5	20 44.1	79	54	72.2	21 07.8	79	54	71.9	2
3	17 48.2	80	55	73.4	18 12.2	80	55	73.1	18 36.1	80	55	72.7	19 00.0	80	55	72.4	19 23.8	79	54	72.1	19 47.6	79	54	71.8	20 11.4	79	54	71.4	20 35.2	79	54	71.1	3
4	17 15.3	80	55	72.6	17 39.3	80	55	72.3	18 03.3	80	54	72.0	18 27.2	80	54	71.7	18 51.1	80	54	71.3	19 15.0	80	54	71.0	19 38.9	79	54	70.7	20 02.7	79	54	70.4	4
95	16 42.5	80	54	71.8	17 06.6	80	54	71.5	17 30.6	80	54	71.2	17 54.6	80	54	70.9	18 18.6	80	54	70.6	18 42.6	80	54	70.3	19 06.5	80	54	69.9	19 30.3	80	54	69.6	95
6	16 09.9	80	54	71.1	16 34.0	80	54	70.8	16 58.1	80	54	70.5	17 22.2	80	54	70.1	17 46.2	80	54	69.8	18 10.2	80	54	69.5	18 34.2	80	54	69.2	18 58.2	80	53	68.9	6
7	15 37.4	81	54	70.3	16 01.6	81	54	70.0	16 25.8	80	54	69.7	16 49.9	80	54	69.4	17 14.0	80	54	69.1	17 38.1	80	53	68.8	18 02.1	80	53	68.4	18 26.1	80	53	68.1	7
8	15 05.1	81	54	69.5	15 29.4	81	53	69.2	15 53.6	81	53	68.9	16 17.8	81	53	68.6	16 41.9	81	53	68.3	17 06.1	80	53	68.0	17 30.2	80	53	67.7	17 54.3	80	53	67.4	8
9	14 32.9	81	53	68.8	14 57.3	81	53	68.5	15 21.5	81	53	68.2	15 45.8	81	53	67.9	16 10.1	81	53	67.6	16 34.3	81	53	67.3	16 58.4	81	53	66.9	17 22.6	80	52	66.6	9
100	14 00.9	81	53	68.0	14 25.3	81	53	67.7	14 49.7	81	53	67.4	15 14.0	81	53	67.1	15 38.3	81	52	66.8	16 02.6	81	52	66.5	16 26.9	81	52	66.2	16 51.1	81	52	65.9	100
1	13 29.1	82	53	67.2	13 53.6	81	53	66.9	14 18.0	81	52	66.6	14 42.4	81	52	66.3	15 06.8	81	52	66.0	15 31.1	81	52	65.7	15 55.5	81	52	65.4	16 19.8	81	52	65.1	1
2	12 57.5	82	52	66.5	13 22.0	82	52	66.2	13 46.5	82	52	65.9	14 11.0	82	52	65.6	14 35.4	81	52	65.3	14 59.9	81	52	65.0	15 24.3	81	52	64.7	15 48.7	81	52	64.4	2
3	12 26.0	82	52	65.7	12 50.6	82	52	65.4	13 15.2	82	52	65.1	13 39.7	82	52	64.8	14 04.3	82	52	64.5	14 28.8	82	51	64.2	14 53.3	82	51	63.9	15 17.7	82	51	63.6	3
4	11 54.7	82	52	64.9	12 19.4	82	52	64.7	12 44.1	82	52	64.4	13 08.7	82	51	64.1	13 33.3	82	51	63.8	13 57.9	82	51	63.5	14 22.4	82	51	63.2	14 47.0	82	51	62.9	4
105	11 23.7	82	52	64.2	11 48.4	82	51	63.9	12 13.1	82	51	63.6	12 37.8	82	51	63.3	13 02.5	82	51	63.0	13 27.2	82	51	62.7	13 51.8	82	51	62.4	14 16.5	82	51	62.1	105
6	10 52.8	83	51	63.4	11 17.6	83	51	63.1	11 42.4	83	51	62.8	12 07.2	83	51	62.5	12 32.0	83	51	62.3	12 56.7	82	50	62.0	13 21.4	82	50	61.7	13 46.1	82	50	61.4	6
7	10 22.1	83	51	62.6	10 47.0	83	51	62.4	11 11.9	83	50	62.1	11 36.8	83	50	61.8	12 01.6	83	50	61.5	12 26.4	83	50	61.2	12 51.2	83	50	60.9	13 16.0	83	50	60.6	7
8	9 51.7	83	50	61.9	10 16.6	83	50	61.6	10 41.6	83	50	61.3	11 06.5	83	50	61.0	11 31.5	83	50	60.7	11 56.4	83	50	60.5	12 21.3	83	50	60.2	12 46.2	83	49	59.9	8
9	9 21.4	84	50	61.1	9 46.5	83	50	60.8	10 11.5	83	50	60.5	10 36.5	83	50	60.3	11 01.6	83	50	60.0	11 26.6	83	49	59.7	11 51.5	83	49	59.4	12 16.5	83	49	59.1	9
110	8 51.4	84	50	60.3	9 16.5	84	50	60.0	9 41.7	84	49	59.8	10 06.8	84	49	59.5	10 31.9	84	49	59.2	10 57.0	84	49	58.9	11 22.0	84	49	58.7	11 47.1	83	49	58.4	110
1	8 21.6	84	49	59.5	8 46.8	84	49	59.3	9 12.1	84	49	59.0	9 37.2	84	49	58.7	10 02.4	84	49	58.4	10 27.6	84	49	58.2	10 52.8	84	48	57.9	11 17.9	84	48	57.6	1
2	7 52.1	84	49	58.8	8 17.4	84	49	58.5	8 42.7	84	48	58.2	9 08.0	84	48	58.0	9 33.2	84	48	57.7	9 58.5	84	48	57.4	10 23.7	84	48	57.1	10 49.0	84	48	56.9	2
3	7 22.8	85	48	58.0	7 48.2	85	48	57.7	8 13.5	85	48	57.5	8 38.9	85	48	57.2	9 04.3	85	48	56.9	9 29.6	84	48	56.6	9 54.9	84	48	56.4	10 20.3	84	47	56.1	3
4	6 53.7	85	48	57.2	7 19.2	85	48	56.9	7 44.7	85	48	56.7	8 10.1	85	48	56.4	8 35.6	85	48	56.1	9 01.0	85	47	55.9	9 26.4	85	47	55.6	9 51.8	85	47	55.3	4
115	6 24.9	85	48	56.4	6 50.5	85	47	56.2	7 16.0	85	47	55.9	7 41.6	85	47	55.6	8 07.1	85	47	55.4	8 32.6	85	47	55.1	8 58.2	85	47	54.8	9 23.7	85	46	54.6	115
6	5 56.4	86	47	55.6	6 22.0	85	47	55.4	6 47.7	85	47	55.1	7 13.3	85	47	54.9	7 38.9	85	46	54.6	8 04.5	85	46	54.3	8 30.2	85	46	54.1	8 55.7	85	46	53.8	6
7	5 28.1	86	47	54.9	5 53.8	86	47	54.6	6 19.6	86	46	54.3	6 45.3	86	46	54.1	7 11.0	86	46	53.8	7 36.7	86	46	53.6	8 02.4	86	46	53.3	8 28.1	86	46	53.0	7
8	5 00.1	86	46	54.1	5 25.9	86	46	53.8	5 51.7	86	46	53.6	6 17.6	86	46	53.3	6 43.4	86	46	53.0	7 09.2	86	45	52.8	7 35.0	86	45	52.5	8 00.8	86	45	52.3	8
9									5 24.2	86	45	52.8	5 50.1	86	45	52.5	6 16.0	86	45	52.3	6 41.9	86	45	52.0	7 07.8	86	45	51.8	7 33.7	86	45	51.5	9
120													5 22.9	87	45	51.7	5 48.9	87	44	51.5	6 14.9	87	44	51.2	6 40.9	87	44	51.0	7 06.9	87	44	50.7	120
1																	5 22.2	87	44	50.7	5 48.2	87	44	50.4	6 14.3	87	44	50.2	6 40.4	87	44	50.0	1
2																					5 21.9	87	44	49.7	5 48.0	87	43	49.4	6 14.2	87	43	49.2	2
3																									5 22.1	88	43	48.6	5 48.3	88	43	48.4	3
4																													5 22.7	88	42	47.6	4

Digitized by Google

Lat. 55°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	63 00.0	1.0 01	180.0	63 30.0	1.0 01	180.0	64 00.0	1.0 01	180.0	65 00.0	1.0 01	180.0	67 00.0	1.0 01	180.0	69 00.0	1.0 01	180.0	69 30.0	1.0 01	180.0	70 30.0	1.0 01	180.0	00
1	62 59.4	1.0 03	178.1	63 29.4	1.0 03	178.0	63 59.4	1.0 03	178.0	64 59.4	1.0 03	178.0	66 59.3	1.0 03	177.8	68 59.3	1.0 03	177.7	69 29.3	1.0 04	177.6	70 29.3	1.0 04	177.6	1
2	62 57.7	1.0 05	176.1	63 27.6	1.0 05	176.1	63 57.6	1.0 05	176.0	64 57.5	1.0 05	175.9	66 57.4	1.0 05	175.7	68 57.2	1.0 06	175.4	69 27.2	1.0 06	175.3	70 27.1	1.0 06	175.1	2
3	62 54.8	1.0 07	174.2	63 24.7	1.0 07	174.1	63 54.6	1.0 07	174.0	64 54.5	1.0 07	173.9	66 54.1	1.0 08	173.5	68 53.8	1.0 08	173.1	69 23.7	1.0 08	173.0	70 23.4	1.0 08	172.7	3
4	62 50.7	1.0 09	172.2	63 20.6	1.0 09	172.1	63 50.4	1.0 09	172.0	64 50.2	1.0 09	171.8	66 49.6	99 10	171.4	68 48.9	99 10	170.8	69 18.7	99 10	170.6	70 18.3	99 11	170.3	4
05	62 45.5	99 10	170.3	63 15.3	99 11	170.2	63 45.1	99 11	170.1	64 44.7	99 11	169.8	66 43.8	99 12	169.2	68 42.8	99 12	168.5	69 12.5	99 13	168.3	70 11.8	99 13	167.9	05
6	62 39.1	99 12	168.4	63 08.9	99 13	168.3	63 38.6	99 13	168.1	64 38.0	99 13	167.8	66 36.7	99 14	167.1	68 35.2	99 15	166.3	69 04.8	99 15	166.0	70 03.9	98 15	165.5	6
7	62 31.6	99 14	166.5	63 01.3	99 14	166.3	63 30.9	99 15	166.2	64 30.2	99 15	165.8	66 28.4	98 16	165.0	68 26.4	98 17	164.0	68 55.9	98 17	163.8	69 54.7	98 18	163.2	7
8	62 23.1	99 16	164.6	62 52.6	98 16	164.4	63 22.1	98 16	164.2	64 21.1	98 17	163.8	66 18.9	98 18	162.9	68 16.3	98 19	161.8	68 45.6	98 19	161.5	69 44.1	97 20	160.9	8
9	62 13.4	98 18	162.8	62 42.8	98 18	162.5	63 12.2	98 18	162.3	64 11.0	98 19	161.9	66 08.2	98 20	160.9	68 05.0	97 21	159.7	68 34.1	97 21	159.3	69 32.2	97 22	158.6	9
10	62 02.7	98 20	160.9	62 32.0	98 20	160.7	63 01.3	98 20	160.4	63 59.7	97 21	159.9	65 56.4	97 22	158.8	67 52.4	96 23	157.5	68 21.3	96 23	157.2	69 19.0	96 24	156.4	10
1	61 50.9	97 21	159.1	62 20.1	97 22	158.8	62 49.2	97 22	158.6	63 47.4	97 22	158.0	65 43.4	96 24	156.8	67 38.7	96 25	155.4	68 07.4	96 25	155.0	69 04.6	95 26	154.2	1
2	61 38.1	97 23	157.3	62 07.1	97 23	157.0	62 36.1	97 24	156.7	63 34.0	96 24	156.1	65 29.3	96 25	154.9	67 23.8	95 27	153.4	67 52.3	95 27	152.9	68 49.1	94 28	152.1	2
3	61 24.3	96 25	155.5	61 53.2	96 25	155.2	62 22.0	96 25	154.9	63 19.6	96 26	154.3	65 14.1	95 27	152.9	67 07.8	94 28	151.3	67 36.1	94 29	150.9	68 32.4	94 30	150.0	3
4	61 09.6	96 26	153.7	61 38.3	96 26	153.4	62 06.9	95 27	153.1	63 04.1	95 27	152.4	64 58.0	94 29	151.0	66 50.8	94 30	149.3	67 18.8	93 30	148.9	68 14.6	93 31	147.9	4
15	60 53.8	95 28	152.0	61 22.4	95 28	151.7	61 50.9	95 28	151.3	62 47.7	95 29	150.6	64 40.8	94 30	149.1	66 32.7	93 32	147.4	67 00.5	92 32	146.9	67 55.8	92 33	145.9	15
6	60 37.2	95 29	150.3	61 05.6	95 30	149.9	61 33.9	94 30	149.6	62 30.4	94 30	148.9	64 22.6	93 32	147.3	66 13.7	92 33	145.5	66 41.3	92 34	145.0	67 36.1	91 35	143.9	6
7	60 19.7	94 31	148.6	60 47.9	94 31	148.2	61 16.1	94 31	147.9	62 12.2	93 32	147.1	64 03.6	92 33	145.5	65 53.7	91 35	143.6	66 21.0	91 35	143.1	67 15.3	90 36	142.0	7
8	60 01.3	93 32	146.9	60 29.4	93 32	146.5	60 57.3	93 33	146.2	61 53.0	93 32	145.4	63 43.6	92 35	143.7	65 32.9	90 36	141.8	65 59.9	90 37	141.2	66 53.7	89 37	140.1	8
9	59 42.1	93 33	145.3	60 10.0	93 34	144.9	60 37.7	92 34	144.5	61 33.1	92 35	143.7	63 22.8	91 36	142.0	65 11.1	90 38	140.0	65 38.0	89 38	139.4	66 31.2	88 39	138.3	9
20	59 22.1	92 35	143.7	59 49.8	92 35	143.3	60 17.4	92 35	142.9	61 12.3	91 36	142.1	63 01.2	90 37	140.3	64 48.6	89 39	138.2	65 15.2	88 39	137.7	66 07.9	87 40	136.5	20
1	59 01.3	92 36	142.1	59 28.8	91 36	141.7	59 56.2	91 36	141.3	60 50.8	91 37	140.4	62 38.9	89 39	138.6	64 25.3	88 40	136.5	64 51.6	88 40	136.0	65 43.9	87 41	134.8	1
2	58 39.8	91 37	140.5	59 07.1	91 37	140.1	59 34.3	91 38	139.7	60 28.5	90 38	138.8	62 15.7	89 40	137.0	64 01.3	87 41	134.8	64 27.3	87 42	134.3	65 19.1	86 42	133.1	2
3	58 17.6	90 38	139.0	58 44.7	90 39	138.6	59 11.7	90 39	138.1	60 05.5	89 39	137.3	61 51.9	88 41	135.4	63 36.5	86 42	133.2	64 02.4	86 43	132.6	64 53.6	85 44	131.4	3
4	57 54.7	90 39	137.5	58 21.6	90 40	137.0	58 48.4	89 40	136.6	59 41.8	89 41	135.7	61 27.4	87 42	133.8	63 11.1	86 43	131.6	63 36.7	85 44	131.0	64 27.5	84 45	129.8	4
25	57 31.1	89 40	136.0	57 57.8	89 41	135.6	58 24.4	89 41	135.1	59 17.4	88 42	134.2	61 02.2	87 43	132.3	62 45.1	85 44	130.1	63 10.5	84 45	129.5	64 00.8	83 46	128.3	25
6	57 06.8	89 41	134.5	57 33.4	88 42	134.1	57 59.8	88 42	133.7	58 52.5	87 43	132.7	60 36.4	86 44	130.8	62 18.5	84 45	128.6	62 43.6	84 46	128.0	63 33.5	83 46	126.7	6
7	56 42.0	88 42	133.1	57 08.4	88 43	132.7	57 34.6	87 43	132.2	58 26.9	87 44	131.3	60 10.1	85 45	129.3	61 51.3	83 46	127.1	62 16.2	83 47	126.5	63 05.6	82 47	125.2	7
8	56 16.6	87 43	131.7	56 42.8	87 44	131.3	57 08.9	87 44	130.8	58 00.8	86 44	129.9	59 43.2	85 46	127.9	61 23.5	83 47	125.6	61 48.3	82 47	125.0	62 37.3	81 48	123.8	8
9	55 50.6	87 44	130.3	56 16.6	87 44	129.9	56 42.6	86 45	129.4	57 34.1	86 45	128.5	59 15.7	84 47	126.4	60 55.3	82 48	124.2	61 19.9	81 48	123.6	62 08.4	80 49	122.4	9
30	55 24.1	86 45	129.0	55 50.0	86 45	128.5	56 15.7	86 46	128.1	57 06.9	85 46	127.1	58 47.8	83 47	125.1	60 26.6	81 49	122.8	60 51.0	81 49	122.2	61 39.1	80 50	121.0	30
1	54 57.1	86 46	127.6	55 22.8	85 46	127.2	55 48.4	85 46	126.7	56 39.2	84 47	125.8	58 19.4	83 48	123.7	59 57.5	81 49	121.5	60 21.6	80 50	120.9	61 09.4	79 50	119.6	1
2	54 29.6	85 47	126.3	54 55.1	85 47	125.9	55 20.5	85 47	125.4	56 11.0	84 48	124.4	57 50.6	82 49	122.4	59 27.9	80 50	120.1	59 51.9	80 50	119.6	60 39.3	78 51	118.3	2
3	54 01.7	85 47	125.0	54 27.0	84 48	124.6	54 52.3	84 48	124.1	55 42.4	83 48	123.2	57 21.3	82 49	121.1	58 58.0	80 51	118.9	59 21.8	79 51	118.3	60 08.8	78 51	117.0	3
4	53 33.3	84 48	123.8	53 58.5	84 48	123.3	54 23.6	83 48	122.9	55 13.4	83 49	121.9	56 51.6	81 50	119.8	58 27.7	79 51	117.6	58 51.3	78 51	117.0	59 38.0	77 52	115.8	4
35	53 04.5	84 49	122.5	53 29.5	83 49	122.1	53 54.5	83 49	121.6	54 44.0	82 50	120.6	56 21.6	80 51	118.6	57 57.0	78 52	116.4	58 20.4	78 52	115.8	59 06.9	77 52	114.5	35
6	52 35.3	83 49	121.3	53 00.2	83 50	120.9	53 25.0	82 50	120.4	54 14.2	82 50	119.4	55 51.2	80 51	117.4	57 26.0	78 52	115.1	57 49.3	77 52	114.6	58 35.4	76 53	113.3	6
7	52 05.7	83 50	120.1	52 30.4	82 50	119.7	52 55.1	82 50	119.2	53 44.1	81 51	118.2	55 20.5	79 52	116.2	56 54.7	77 53	114.0	57 17.9	77 53	113.4	58 03.7	76 53	112.2	7
8	51 35.7	82 50	118.9	52 00.4	82 51	118.5	52 24.9	82 51	118.0	53 13.6	81 51	117.0	54 49.5	79 52	115.0	56 23.1	77 53	112.8	56 46.1	76 53	112.2	57 31.7	75 54	111.0	8
9	51 05.5	82 51	117.8	51 30.0	81 51	117.3	51 54.3	81 52	116.9	52 42.8	80 52	115.9	54 18.1	79 53	113.8	55 51.2	77 54	111.6	56 14.1	76 54	111.1	56 59.4	75 54	109.9	9
40	50 34.9	81 52	116.6	50 59.2	81 52	116.2	51 23.5	81 52	115.7	52 11.7	80 52	114.8	53 46.5	78 53	112.7	55 19.1	76 54	110.5	55 41.9	76 54	109.9	56 26.9	74 54	108.8	40
1	50 03.9	81 52	115.5	50 28.2	81 52	115.1	50 52.3	80 52	114.6	51 40.3	79 53	113.6	53 14.6	78 54	111.6	54 46.8	76 54	109.4	55 09.4	75 54	108.9	55 54.3	74 55	107.7	1
2	49 32.8	81 52	114.4	49 56.9	80 53	114.0	50 20.9	80 53	113.5	51 08.6	79 53	112.5	52 42.5	77 54	110.5	54 14.2	75 55	108.3	54 36.8	75 55	107.8	55 21.4	74 55	106.6	2
3	49 01.3	80 53	113.3	49 25.3	80 53	112.9	49 49.2	80 53	112.4	50 36.7	79 54	111.4	52 10.2	77 54	109.4	53 41.5	75 55	107.3	54 03.9	75 55	106.7	54 48.3	73 55	105.6	3
4	48 29.6	80 53	112.3	48 53.5	80 53	111.8	49 17.3	79 54	111.3	50 04.6	78 54	110.4	51 37.6	77 55	108.4	53 08.5	75 55	106.2	53 30.9	74 55	105.7	54 15.1	73 56	104.5	4
45	47 57.6	80 54	111.2	48 21.4	79 54	110.7	48 45.1	79 54	110.3	49 32.2	78 54	109.3	51 04.9	76 55	107.3	52 35.4	74 55	105.2	52 57.6	74 56	104.7	53 41.7	73 56	103.5	45
6	47 25.4	79 54	110.2	47 49.1	79 54	109.7	48 12.7	79 54	109.2	48 59.6	78 55	108.3	50 31.9	76 55	106.3	52 02.1	74 56	104.2	52 24.3	74 56	103.7	53 08.2	73 56	102.5	6
7	46 53.0	79 54	109.1	47 16.6	79 54	108.7	47 40.1	78 55	108.2	48 26.8	77 55	107.3	49 58.8	76 55	105.3	51 28.7	74 56	103.2	51 50.8	73 56	102.7	52 34.5	72 56	101.6	7
8	46 20.4	79 55	108.1	46 43.9	78 55	107.7	47 07.3	78 55	107.2	47 53.9	77 55	106.3	49 25.5	76 56	104.3	50 55.1	74 56	102.2	51 17.1	73 56	101.7	52 00.7	72 56	100.6	8
9	45 47.6	78 55	107.1	46 11.0	78 55	106.7	46 34.4	78 55	106.2	47 20.8	77 55	105.3	48 52.1	75 56	103.3	50 21.4	73 56	101.3	50 43.4	73 56	100.7	51 26.8	72 57	99.6	9
50	45 14.6	78 55	106.1	45 38.0	78 55	105.7	46 01.3	77 56	105.2	46 47.5	77 56	104.3	48 18.6	75 56	102.4	49 47.6	73 57	100.3	50 09.5	73 57	99.8	50 52.9	72 57	98.7	50
1	44 41.4	78 56	105.2	45 04.8	78 56	104.7	45 28.0	77 56	104.3	46 14.1	76 56	103.3	47 44.9	75 56	101.4	49 13.7	73 57	99.4	49 35.5	73 57	98.9	50 18.8	72 57	97.8	1
2	44 08.2	78 56	104.2	44 31.4	77 56	103.8	44 54.6	77 56	103.3	45 40.5	76 56	102.4	47 11.1	75 56	100.5	48 39.7	73 57	98.5	49 01.5	72 57	98.0	49 44.7	71 57	96.9	2
3	43 34.7	77 56	103.2	43 57.9	77 56	102.8	44 21.0	77 56	102.4	45 06.9	76 56	101.5	46 37.2	75 57	99.6	48 05.6	73 57	97.6	48 27.4	72 57	97.0	49 10.5	71 57	96.0	3
4	43 01.2	77 56	102.3	43 24.3	77 56	101.9	43 47.3	77 56	101.4	44 33.1	76 56	100.5	46 03.2	74 57	98.7	47 31.5	73 57	96.7	47 53.2	72 57	96.2	48 36.2	71 57	95.1	4
55	42 27.5	77 56	101.4	42 50.6	77 56	100.9	43 13.5	76 56	100.5	43 59.2	76 57	99.6	45 29.2	74 57	97.7	46 57.3	73 57	95.8	47 19.0	72 57	95.3	48 01.9	71 57	94.2	55
6	41 53.7	77 56	100.5	42 16.7	77 57	100.0	42 39.7	76 57	99.6	43 25.2	76 57	98.7	44 55.0	74 57	96.9	46 23.0	72 57	94.9	46 44.7	72 57	94.4	47 27.6	71 57	93.4	6
7	41 19.8	77 57	99.6	41 42.8	76 57	99.1	42 05.7	76 57	98.7	42 51.2	75 57	97.8	44 20.8	74 57	96.0	45 48.7	72 57	94.0	46 10.3	72 57	93.5	46 53.2	71 57	92.5	7
8	40 45.8	77 57	98.7	41 08.8	76 57	98.2	41 31.6	76 57	97.8	42 17.0	75 57	96.9	43 46.6	74 57	95.1	45 14.3	72 57	93.2	45 36.0	72 57	92.7	46 18.8	71 57	91.7	8
9	40 11.8	77 57	97.8	40 34.7	76 57	97.3	40 57.5	76 57	96.9	41 42.8	75 57	96.0	43 12.3	74 57	94.2	44 40.0	72 57	92.3	45 01.6	72 57	91.9	45 44.4	71 57	90.9	9
60	39 37.6	76 57	96.9	40 00.5	76 57	96.5	40 23.3	76 57	96.0	41 08.6	75 57	95.2	42 38.0	74 57	93.4	44 05.6	72 57	91.5	44 27.2	72 57	91.0	45 10.0	71 57	90.0	60
1	39 03.4	76 57	96.0	39 26.3	76 57	95.6	39 49.0	76 57	95.2	40 34.3	75 57	94.3	42 03.6	74 57	92.5	43 31.2	72 57	90.7	43 52.8	72 57	90.2	44 35.6	71 57	89.2	1
2	38 29.2	76 57	95.2	38 52.0	76 57	94.7	39 14.7	76 57	94.3	40 00.0	75 57	93.5	41 29.2	74 57	91.7	42 56.7	72 57	89.9	43 18.3	72 57	89.4	44 01.2	71 57	88.4	2
3	37 54.9	76 57	94.3	38 17.7	76 57	93.9	38 40.4	76 57	93.5	39 25.6	75 57	92.6	40 54.8	74 57	90.9	42 22.3	72 57	89.0	42 43.9	72 57	88.6	43 26.8	71 57	87.6	3
4	37 20.5	76 57	93.4	37 43.3	76 57	93.0	38 06.0	76 57	92.6	38 51.2	75 57	91.8	40 20.4	74 57	90.0	41 47.9	72 57	88.2	42 09.5	72 57	87.8	42 52.4	71 57	86.8	4
65	36 46.2	76 57	92.6	37 09.0	76 57	92.2	37 31.7	76 57	91.8	38 16.8	75 57	91.0	39 46.0	74 57	89.2	41 13.5	72 57	87.4	41 35.2	72 57	87.0	42 18.1	71 57	86.0	65
6	36 11.8	76 57	91.8	36 34.6	76 57	91.4	36 57.3	76 57	91.0	37 42.4	75 57	90.1	39 11.6	74 57	88.4	40 39.2	72 57	86.6	41 00.8	72 57	86.2	41 43.8	71 57	85.2	6
7	35 37.4	76 57	90.9	36 00.2	76 57	90.5	36 22.8	75 57	90.1	37 08.0	75 57	89.3	38 37.2	74 57	87.6	40 04.8	72 57	85.8	40 26.5	72 57	85.4	41 09.5	71 57	84.5	7
8	35 03.0	76 57	90.1	35 25.7	76 57	89.7	35 48.4	75 57	89.3	36 33.6	75 57	88.5	38 02.8	74 57	86.8	39 30.5	72 57	85.1	39 52.2	72 57	84.6	40 35.3	71 57	83.7	8
9	34 28.6	76 57	89.3	34 51.3	76 57	88.9	35 14.0	76 57	88.5	35 59.2	75 57	87.7	37 28.4	74 57	86.0	38 56.3	73 57	84.3	39 18.0	72 57	83.8	40 01.1	71 57	82.9	9
70	33 54.1	76 57	88.5	34 16.9	76 57	88.1	34 39.6	76 57	87.7	35 24.8	75 57	86.9	36 54.1	74 57	85.2	38 22.0	73 57	83.5	38 43.8	72 57	83.1	39 26.9	72 57	82.2	70
1	33 19.8	76 57	87.7	33 42.5	76 57	87.3	34 05.2	76 57	86.9	34 50.4	75 57	86.1	36 19.9	74 57	84.5	37 47.9	73 57	82.8	38 09.6	72 57	82.3	38 52.9	72 57	81.4	1
2	32 45.4	76 57	86.9	33 08.2	76 57	86.5	33 30.9	76 57	86.1	34 16.1	75 57	85.3	35 45.6	74 57	83.7	37 13.8	73 57	82.0	37 35.6	73 57	81.6	38 18.9	72 57	80.7	2
3	32 11.0	76 57	86.1	32 33.8	76 57	85.7	32 56.6	76 57	85.3	33 41.8	75 57	84.5	35 11.4	74 57	82.9	36 39.7	73 57	81.2	37 01.6	73 57	80.8	37 45.0	72 56	79.9	3
4	31 36.7	76 57	85.3	31 59.5	76 57	84.9	32 22.3	76 57	84.5	33 07.6	75 57	83.7	34 37.3	74 57	82.1	36 05.7	73 56	80.5	36 27.6	73 56	80.1	37 11.1	72 56	79.2	4
75	31 02.4	76 57	84.5	31 25.3	76 57	84.1	31 48.1	76 57	83.7	32 33.4	75 57	83.0	34 03.3	74 57	81.4	35 31.8	73 56	79.7	35 53.8	73 56	79.3	36 37.4	72 56	78.5	75
6	30 28.2	76 57	83.7	30 51.1	76 57	83.3	31 13.9	76 57	83.0	31 59.3	75 57	82.2	33 29.3	74 57	80.6	34 58.0	73 56	79.0	35 20.0	73 56	78.6	36 03.7	73 56	77.7	6
7	29 54.0	76 57	82.9	30 16.9	76 57	82.6	30 39.8	76 57	82.2	31 25.2	76 57	81.4	32 55.4	75 56	79.9	34 24.3	74 56	78.3	34 46.3	73 56	77.8	35 30.1	73 56	77.0	7
8	29 19.9	77 57	82.2	29 42.8	76 57	81.8	30 05.7	76 57	81.4	30 51.2	76 57	80.7	32 21.5	75 56	79.1	33 50.6	74 56	77.5	34 12.7	73 56	77.1	34 56.6	73 56	76.3	8
9	28 45.8	77 57	81.4	29 08.8	76 57	81.0	29 31.7	76 56	80.7	30 17.3	76 56	79.9	31 47.8	75 56	78.4	33 17.1	74 56	76.8	33 39.2	74 56	76.4	34 23.2	73 55	75.6	9
80	28 11.8	77 56	80.6	28 34.8	77 56	80.3	28 57.8	76 56	79.9	29 43.5	76 56	79.1	31 14.1	75 56	77.6	32 43.6	74 56	76.0	33 05.8	74 55	75.6	33 50.0	73 55	74.8	80
1	27 37.9	77 56	79.8	28 01.0	77 56	79.5	28 23.9	77 56	79.1	29 09.7	76 56	78.4	30 40.5	75 56	76.9	32 10.3	74 55	75.3	32 32.5	74 55	74.9	33 16.8	74 55	74.1	1
2	27 04.1	77 56	79.1	27 27.2	77 56	78.7	27 50.2	77 56	78.4	28 36.1	76 56	77.6	30 07.1	75 56	76.1	31 37.0	75 55	74.6	31 59.4	74 55	74.2	32 43.8	74 55	73.4	2
3	26 30.3	77 56	78.3	26 53.5	77 56	78.0	27 16.5	77 56	77.6	28 02.5	76 56	76.9	29 33.7	76 55	75.4	31 03.9	75 55	73.9	31 26.3	74 55	73.5	32 10.8	74 55	72.7	3
4	25 56.7	77 56	77.6	26 19.9	77 56	77.2	26 43.0	77 56	76.9	27 29.0	77 56	76.1	29 00.5	76 55	74.7	30 30.9	75 55	73.1	30 53.4	75 55	72.8	31 38.1	74 54	72.0	4
85	25 23.1	77 56	76.8	25 46.3	77 56	76.5	26 09.5	77 56	76.1	26 55.7	77 55	75.4	28 27.3	76 55	73.9	29 58.0	75 55	72.4	30 20.6	75 54	72.0	31 05.4	74 54	71.3	86
6	24 49.7	78 56	76.0	25 12.9	77 56	75.7	25 36.2	77 55	75.3	26 22.4	77 55	74.6	27 54.3	76 55	73.2	29 25.3	75 54	71.7	29 47.9	75 54	71.3	30 32.9	75 54	70.6	6
7	24 16.3	78 55	75.3	24 39.7	78 55	74.9	25 02.9	77 55	74.6	25 49.3	77 55	73.9	27 21.5	76 55	72.5	28 52.7	76 54	71.0	29 15.4	75 54	70.6	30 00.5	75 54	69.9	7
8	23 43.1	78 55	74.5	24 06.5	78 55	74.2	24 29.8	78 55	73.9	25 16.3	77 55	73.2	26 48.7	77 54	71.7	28 20.2	76 54	70.3	28 43.0	76 54	69.9	29 28.3	75 53	69.2	8
9	23 10.0	78 55	73.8	23 33.4	78 55	73.4	23 56.8	78 55	73.1	24 43.4	78 55	72.4	26 16.1	77 54	71.0	27 47.9	76 54	69.6	28 10.7	76 53	69.2	28 56.2	76 53	68.5	9
90	22 37.0	78 55	73.0	23 00.5	78 55	72.7	23 23.9	78 54	72.4	24 10.7	78 54	71.7	25 43.6	77 54	70.3	27 15.7	76 53	68.8	27 38.6	76 53	68.5	28 24.2	76 53	67.7	90

Digitized by Google

16—18096

Lat. 55°

H.A.	28° 00′ Alt.	Az.	28° 30′ Alt.	Az.	29° 00′ Alt.	Az.	30° 00′ Alt.	Az.	32° 00′ Alt.	Az.	34° 00′ Alt.	Az.	34° 30′ Alt.	Az.	35° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	7 00.0 1.0 00	180.0	6 30.0 1.0 00	180.0	6 00.0 1.0 00	180.0	5 00.0 1.0 00	180.0									00
1	6 59.7 1.0 01	179.1	6 29.7 1.0 01	179.1	5 59.7 1.0 01	179.1											1
2	6 58.9 1.0 02	178.2	6 28.9 1.0 02	178.2	5 58.9 1.0 02	178.2											2
3	6 57.6 1.0 03	177.3	6 27.6 1.0 03	177.3	5 57.6 1.0 03	177.4											3
4	6 55.7 1.0 04	176.4	6 25.8 1.0 04	176.5	5 55.8 1.0 04	176.5											4
05	6 53.3 1.0 05	175.6	6 23.4 1.0 05	175.6	5 53.4 1.0 05	175.6											05
6	6 50.4 1.0 06	174.7	6 20.4 1.0 06	174.7	5 50.5 1.0 06	174.7											6
7	6 46.9 1.0 07	173.8	6 17.0 1.0 07	173.8	5 47.1 1.0 07	173.8											7
8	6 42.9 1.0 08	172.9	6 13.0 1.0 08	172.9	5 43.1 1.0 08	173.0											8
9	6 38.4 1.0 08	172.0	6 08.5 1.0 08	172.1	5 38.7 1.0 08	172.1											9
10	6 33.4 99 09	171.1	6 03.5 99 09	171.2	5 33.7 99 09	171.2											10
1	6 27.8 99 10	170.2	5 58.0 99 10	170.3	5 28.2 99 10	170.3											1
2	6 21.7 99 11	169.4	5 51.9 99 11	169.4	5 22.1 99 11	169.5											2
3	6 15.1 99 12	168.5	5 45.3 99 12	168.5	5 15.6 99 12	168.6											3
4	6 07.9 99 13	167.6	5 38.2 99 13	167.7	5 08.5 99 13	167.7											4
15	6 00.3 99 14	166.7	5 30.6 99 14	166.8	5 01.0 99 14	166.9											15
6	5 52.1 99 14	165.8	5 22.5 99 14	165.9													6
7	5 43.5 99 15	165.0	5 13.9 99 15	165.0													7
8	5 34.3 98 16	164.1	5 04.8 98 16	164.2													8
9	5 24.6 98 17	163.2															9
20	5 14.4 98 18	162.3															20
1	5 03.7 98 19	161.5															1

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′ Alt.	Az.	28° 30′ Alt.	Az.	29° 00′ Alt.	Az.	30° 00′ Alt.	Az.	32° 00′ Alt.	Az.	34° 00′ Alt.	Az.	34° 30′ Alt.	Az.	35° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	22 04.2 79 54	72.3	22 27.7 78 54	72.0	22 51.2 78 54	71.6	23 38.1 78 54	70.9	25 11.3 77 54	69.6	26 43.7 77 53	68.1	27 06.7 76 53	67.8	27 52.5 76 53	67.0	91
2	21 31.5 79 54	71.5	21 55.1 79 54	71.2	22 18.6 78 54	70.9	23 05.6 78 54	70.2	24 39.1 78 53	68.8	26 11.9 77 53	67.4	26 34.9 77 53	67.1	27 20.9 76 52	66.3	2
3	20 58.9 79 54	70.8	21 22.6 79 54	70.5	21 46.2 79 54	70.1	22 33.3 78 54	69.5	24 07.1 78 53	68.1	25 40.2 77 53	66.7	26 03.3 77 52	66.4	26 49.4 77 52	65.6	3
4	20 26.5 79 54	70.0	20 50.2 79 54	69.7	21 13.9 79 54	69.4	22 01.2 79 53	68.7	23 35.3 78 53	67.4	25 08.6 77 52	66.0	25 31.9 77 52	65.7	26 18.2 77 52	64.9	4
95	19 54.2 79 54	69.3	20 18.0 79 53	69.0	20 41.8 79 53	68.7	21 29.2 79 53	68.0	23 03.6 78 53	66.7	24 37.3 78 52	65.3	25 00.6 78 52	64.9	25 47.1 77 52	64.2	95
6	19 22.1 80 53	68.6	19 45.9 80 53	68.2	20 09.8 79 53	67.9	20 57.4 79 53	67.3	22 32.1 79 52	65.9	24 06.1 78 52	64.6	24 29.5 78 52	64.2	25 16.2 78 51	63.6	6
7	18 50.1 80 53	67.8	19 14.1 80 53	67.5	19 38.0 80 53	67.2	20 25.7 79 52	66.5	22 00.7 79 52	65.2	23 35.1 78 51	63.9	23 58.6 78 51	63.5	24 45.4 78 51	62.9	7
8	18 18.3 80 53	67.1	18 42.4 80 53	66.8	19 06.4 80 52	66.4	19 54.2 80 52	65.8	21 29.6 79 52	64.5	23 04.3 79 51	63.2	23 27.9 79 51	62.8	24 14.9 78 51	62.2	8
9	17 46.7 80 52	66.3	18 10.8 80 52	66.0	18 34.9 80 52	65.7	19 22.9 80 52	65.1	20 58.6 79 51	63.8	22 33.7 79 51	62.5	22 57.4 79 51	62.1	23 44.6 79 50	61.5	9
100	17 15.3 81 52	65.6	17 39.5 81 52	65.3	18 03.6 80 52	65.0	18 51.8 80 52	64.3	20 27.8 80 51	63.1	22 03.3 79 50	61.8	22 27.0 79 50	61.4	23 14.5 79 50	60.8	100
1	16 44.1 81 52	64.8	17 08.3 81 52	64.5	17 32.5 81 52	64.2	18 20.9 81 51	63.6	19 57.3 80 51	62.3	21 33.1 80 50	61.0	21 56.9 79 50	60.7	22 44.5 79 50	60.1	1
2	16 13.0 81 51	64.1	16 37.3 81 51	63.8	17 01.7 81 51	63.5	17 50.2 81 51	62.9	19 26.9 80 50	61.6	21 03.1 80 50	60.3	21 27.0 80 50	60.0	22 14.8 80 49	59.4	2
3	15 42.2 81 51	63.3	16 06.6 81 51	63.0	16 31.0 81 51	62.7	17 19.7 81 51	62.1	18 56.7 81 50	60.9	20 33.3 80 49	59.6	20 57.3 80 49	59.3	21 45.3 80 49	58.7	3
4	15 11.5 82 51	62.6	15 36.0 82 51	62.3	16 00.5 82 50	62.0	16 49.3 81 50	61.4	18 26.8 81 50	60.2	20 03.7 81 49	58.9	20 27.8 80 49	58.6	21 16.0 80 48	58.0	4
105	14 41.1 82 50	61.8	15 05.6 82 50	61.5	15 30.2 82 50	61.2	16 19.2 82 50	60.6	17 57.0 81 49	59.4	19 34.3 81 49	58.2	19 58.6 81 48	57.9	20 47.0 81 48	57.3	105
6	14 10.8 82 50	61.1	14 35.5 82 50	60.8	15 00.1 82 50	60.5	15 49.3 82 49	59.9	17 27.5 82 49	58.7	19 05.2 81 48	57.5	19 29.5 81 48	57.2	20 18.1 81 48	56.6	6
7	13 40.8 83 50	60.3	14 05.6 82 50	60.1	14 30.3 82 49	59.8	15 19.7 82 49	59.2	16 58.2 82 48	58.0	18 36.3 82 48	56.8	19 00.7 81 48	56.5	19 49.5 81 47	55.9	7
8	13 11.0 83 49	59.6	13 35.8 83 49	59.3	14 00.7 83 49	59.0	14 50.2 83 49	58.4	16 29.1 82 48	57.3	18 07.6 82 47	56.1	18 32.2 82 47	55.8	19 21.2 82 47	55.1	8
9	12 41.4 83 49	58.8	13 06.4 83 49	58.6	13 31.3 83 49	58.3	14 21.0 83 48	57.7	16 00.3 83 48	56.5	17 39.2 82 47	55.3	18 03.8 82 47	55.0	18 53.1 82 46	54.4	9
110	12 12.1 83 48	58.1	12 37.1 83 48	57.8	13 02.1 83 48	57.5	13 52.1 83 48	57.0	15 31.7 83 47	55.8	17 11.0 83 47	54.6	17 35.7 82 46	54.3	18 25.2 82 46	53.7	110
1	11 43.0 84 48	57.3	12 08.1 84 48	57.1	12 33.2 84 48	56.8	13 23.3 83 47	56.2	15 03.4 83 47	55.1	16 43.1 83 46	53.9	17 07.9 83 46	53.6	17 57.6 83 46	53.0	1
2	11 14.2 84 48	56.6	11 39.4 84 48	56.3	12 04.6 84 47	56.0	12 54.9 84 47	55.5	14 35.3 84 46	54.3	16 15.4 83 46	53.2	16 40.3 83 46	52.9	17 30.2 83 45	52.3	2
3	10 45.6 84 47	55.8	11 10.9 84 47	55.5	11 36.1 84 47	55.3	12 26.6 84 47	54.7	14 07.5 84 46	53.6	15 47.9 84 45	52.5	16 13.0 84 45	52.2	17 03.1 83 45	51.6	3
4	10 17.2 85 47	55.1	10 42.6 85 47	54.8	11 08.0 85 46	54.5	11 58.7 84 46	54.0	13 39.9 84 46	52.9	15 20.8 84 45	51.8	15 46.0 84 45	51.5	16 36.2 84 44	50.9	4
115	9 49.1 85 46	54.3	10 14.6 85 46	54.0	10 40.1 85 46	53.8	11 31.0 85 46	53.2	13 12.6 85 45	52.1	14 53.9 84 44	51.0	15 19.2 84 44	50.8	16 09.7 84 44	50.2	115
6	9 21.3 85 46	53.5	9 46.9 85 46	53.3	10 12.5 85 46	53.0	11 03.6 85 45	52.5	12 45.5 85 45	51.4	14 27.3 85 44	50.3	14 52.7 85 44	50.0	15 43.4 84 43	49.5	6
7	8 53.8 86 46	52.8	9 19.5 86 45	52.5	9 45.1 86 45	52.3	10 36.4 85 45	51.7	12 18.8 85 44	50.7	14 00.9 85 43	49.6	14 26.4 85 43	49.3	15 17.3 85 43	48.8	7
8	8 26.5 86 45	52.0	8 52.3 86 45	51.8	9 18.0 86 45	51.5	10 09.5 86 44	51.0	11 52.3 86 44	49.9	13 34.9 85 43	48.9	14 00.5 85 43	48.6	14 51.6 85 42	48.0	8
9	7 59.5 86 44	51.2	8 25.4 86 44	51.0	8 51.3 86 44	50.7	9 42.9 86 44	50.2	11 26.1 86 43	49.2	13 09.1 86 42	48.1	13 34.8 86 42	47.9	14 26.2 86 42	47.3	9
120	7 32.9 87 44	50.5	7 58.8 87 44	50.2	8 24.8 86 44	50.0	9 16.6 86 43	49.5	11 00.2 86 43	48.4	12 43.6 86 42	47.4	13 09.4 86 42	47.1	14 01.0 86 41	46.6	120
1	7 06.5 87 44	49.7	7 32.5 87 43	49.5	7 58.6 87 43	49.2	8 50.6 87 43	48.7	10 34.6 87 42	47.7	12 18.4 86 41	46.7	12 44.4 86 41	46.4	13 36.1 86 41	45.9	1
2	6 40.4 87 43	48.9	7 06.5 87 43	48.7	7 32.7 87 43	48.4	8 24.9 87 42	47.9	10 09.3 87 42	46.9	11 53.6 87 41	45.9	12 19.6 87 41	45.7	13 11.6 87 40	45.2	2
3	6 14.6 88 42	48.2	6 40.8 87 42	47.9	7 07.1 87 42	47.7	7 59.5 87 42	47.2	9 44.3 87 41	46.2	11 29.0 87 40	45.2	11 55.1 87 40	44.9	12 47.3 87 40	44.4	3
4	5 49.1 88 42	47.4	6 15.4 88 42	47.1	6 41.8 88 42	46.9	7 34.4 88 41	46.4	9 19.7 88 41	45.4	11 04.7 87 40	44.5	11 31.0 87 40	44.2	12 23.4 87 39	43.7	4
125	5 23.9 88 42	46.6	5 50.4 88 41	46.4	6 16.8 88 41	46.1	7 09.7 88 41	45.6	8 55.3 88 40	44.7	10 40.8 88 39	43.7	11 07.1 88 39	43.5	11 59.8 88 39	43.0	125
6			5 25.6 88 41	45.6	5 52.2 88 40	45.3	6 45.2 88 40	44.9	8 31.3 88 40	43.9	10 17.2 88 39	43.0	10 43.6 88 39	42.7	11 36.5 88 38	42.3	6
7			5 01.2 89 40	44.8	5 27.9 89 40	44.6	6 21.1 89 40	44.1	8 07.6 89 39	43.2	9 53.9 89 38	42.2	10 20.4 88 38	42.0	11 13.5 88 38	41.5	7
8					5 03.9 89 40	43.8	5 57.3 89 39	43.3	7 44.2 89 38	42.4	9 30.9 89 38	41.5	9 57.6 89 38	41.3	10 50.9 89 37	40.8	8
9							5 33.9 89 38	42.5	7 21.1 89 38	41.6	9 08.3 89 37	40.7	9 35.0 89 37	40.5	10 28.5 89 37	40.0	9
130							5 10.8 90 38	41.8	6 58.4 90 37	40.9	8 46.0 90 37	40.0	9 12.9 90 36	39.8	10 06.6 89 36	39.3	130
1									6 36.1 90 37	40.1	8 24.0 90 36	39.2	8 51.0 90 36	39.0	9 44.9 90 35	38.6	1
2									6 14.1 90 36	39.3	8 02.5 90 35	38.5	8 29.5 90 35	38.3	9 23.7 90 35	37.8	2
3									5 52.5 91 35	38.6	7 41.2 91 35	37.7	8 08.4 91 35	37.5	9 02.7 91 34	37.1	3
4									5 31.2 91 35	37.8	7 20.3 91 34	37.0	7 47.6 91 34	36.8	8 42.2 91 34	36.3	4
135									5 10.3 91 34	37.0	6 59.8 91 34	36.2	7 27.2 91 33	36.0	8 22.0 91 33	35.6	135
6											6 39.7 92 33	35.4	7 07.2 92 33	35.2	8 02.1 92 32	34.8	6
7											6 19.9 92 32	34.7	6 47.5 92 32	34.5	7 42.6 92 32	34.1	7
8											6 00.5 92 32	33.9	6 28.2 92 32	33.7	7 23.6 92 31	33.3	8
9											5 41.5 93 31	33.1	6 09.3 93 31	32.9	7 04.8 93 31	32.6	9
140											5 22.9 93 30	32.4	5 50.8 93 30	32.2	6 46.5 93 30	31.8	140
1											5 04.7 93 30	31.6	5 32.7 93 30	31.4	6 28.6 93 29	31.0	1
2													5 14.9 94 29	30.6	6 11.0 93 29	30.3	2
3															5 53.9 94 28	29.5	3
4															5 37.1 94 27	28.7	4
145															5 20.8 94 27	28.0	145
6															5 04.8 95 26	27.2	6

Digitized by Google

Lat. 55°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	71 00.0	1.0 01	180.0	72 00.0	1.0 01	180.0	73 30.0	1.0 01	180.0	75 00.0	1.0 01	180.0	77 00.0	1.0 02	180.0	77 30.0	1.0 02	180.0	78 00.0	1.0 02	180.0	80 00.0	1.0 02	180.0	00
1	70 59.3	1.0 04	177.5	71 59.2	1.0 04	177.4	73 29.2	1.0 04	177.2	74 59.1	1.0 04	177.0	76 59.0	1.0 05	176.7	77 29.0	1.0 05	176.6	77 58.9	1.0 05	176.5	79 58.8	1.0 06	175.9	1
2	70 57.0	1.0 06	175.0	71 56.9	1.0 06	174.8	73 26.7	1.0 07	174.5	74 56.4	1.0 07	174.1	76 56.0	1.0 08	173.4	77 25.9	1.0 08	173.2	77 55.8	1.0 09	173.0	79 55.1	99 10	171.9	2
3	70 53.3	1.0 09	172.6	71 53.0	1.0 09	172.3	73 22.6	99 10	171.8	74 52.0	99 10	171.2	76 51.1	99 11	170.2	77 20.8	99 12	169.9	77 50.6	99 12	169.5	79 49.1	99 14	167.9	3
4	70 48.1	99 11	170.1	71 47.7	99 11	169.7	73 16.8	99 12	169.1	74 45.9	99 13	168.3	76 44.3	98 14	166.9	77 13.8	98 15	166.5	77 43.3	98 15	166.1	79 40.8	97 18	164.0	4
05	70 41.5	99 13	167.7	71 40.8	99 14	167.2	73 09.5	99 15	166.4	74 38.1	98 16	165.4	76 35.6	98 18	163.8	77 04.9	97 18	163.3	77 34.1	97 19	162.8	79 30.2	96 21	160.2	05
6	70 33.5	98 16	165.3	71 32.4	98 16	164.7	73 00.7	98 17	163.7	74 28.6	97 18	162.6	76 25.1	97 20	160.7	76 54.0	96 21	160.1	77 22.9	96 22	159.5	79 17.5	95 24	156.6	6
7	70 24.0	98 18	162.9	71 22.6	98 19	162.3	72 50.3	97 20	161.1	74 17.5	97 21	159.8	76 12.8	96 23	157.7	76 41.5	95 24	157.0	77 10.0	95 24	156.3	79 02.8	93 28	153.0	7
8	70 13.2	97 20	160.6	71 11.5	97 21	159.8	72 38.4	96 22	158.6	74 04.9	96 24	157.1	75 59.0	94 26	154.7	76 27.2	94 26	154.0	76 55.4	94 27	153.3	78 46.3	91 30	149.6	8
9	70 01.1	96 22	158.3	70 58.9	96 23	157.5	72 25.2	95 24	156.1	73 50.7	95 26	154.5	75 43.5	93 28	151.9	76 11.4	93 29	151.1	76 39.1	92 30	150.3	78 28.1	89 33	146.4	9
10	69 47.8	96 24	156.0	70 45.1	95 25	155.1	72 10.5	95 27	153.6	73 35.2	94 28	151.9	75 26.5	92 31	149.1	75 54.0	91 31	148.3	76 21.3	91 32	147.4	78 08.3	87 35	143.3	10
1	69 33.2	95 26	153.8	70 30.0	94 27	152.8	71 54.6	94 29	151.3	73 18.4	92 30	149.4	75 08.2	90 33	146.4	75 35.2	90 34	145.6	76 02.1	89 34	144.7	77 47.0	86 38	140.4	1
2	69 17.4	94 28	151.6	70 13.7	94 29	150.6	71 37.5	93 31	148.9	73 00.2	91 32	147.0	74 48.5	89 35	143.9	75 15.1	88 36	143.0	75 41.5	88 36	142.0	77 24.4	84 40	137.6	2
3	69 00.4	93 30	149.5	69 56.2	93 31	148.4	71 19.1	92 32	146.7	72 40.9	90 34	144.6	74 27.6	88 37	141.4	74 53.8	87 37	140.5	75 19.7	86 38	139.5	77 00.7	82 41	135.0	3
4	68 42.4	92 32	147.4	69 37.7	92 33	146.3	70 59.7	90 34	144.5	72 20.4	89 36	142.3	74 05.6	86 38	139.0	74 31.3	85 39	138.1	74 56.8	85 40	137.1	76 35.8	80 43	132.4	4
15	68 23.4	92 33	145.4	69 18.0	91 34	144.2	70 39.1	89 36	142.3	71 58.9	88 38	140.1	73 42.5	85 40	136.7	74 07.8	84 41	135.7	74 32.9	83 42	134.7	76 09.9	78 45	130.1	15
6	68 03.3	91 35	143.4	68 57.4	90 36	142.2	70 17.6	88 37	140.2	71 36.3	87 39	138.0	73 18.4	83 42	134.5	73 43.3	83 42	133.5	74 08.0	82 43	132.5	75 43.1	77 46	127.8	6
7	67 42.3	90 36	141.4	68 35.9	89 37	140.2	69 55.1	87 39	138.2	71 12.8	85 41	135.9	72 53.4	82 43	132.4	73 17.9	81 44	131.4	73 42.2	80 44	130.4	75 15.5	75 47	125.7	7
8	67 20.4	89 38	139.5	68 13.4	88 39	138.3	69 31.7	86 40	136.3	70 48.5	84 42	133.9	72 27.6	81 44	130.4	72 51.7	80 45	129.4	73 15.5	79 46	128.3	74 47.2	74 48	123.6	8
9	66 57.6	88 39	137.7	67 50.1	87 40	136.4	69 07.5	85 42	134.4	70 23.3	83 43	132.0	72 01.0	80 46	128.4	72 24.8	79 46	127.4	72 48.2	78 47	126.4	74 18.2	72 49	121.7	9
20	66 34.1	87 41	135.9	67 26.0	86 41	134.6	68 42.5	84 43	132.5	69 57.3	82 44	130.1	71 33.7	78 47	126.5	71 57.1	77 47	125.5	72 20.1	76 48	124.5	73 48.7	71 50	119.8	20
1	66 09.8	86 42	134.2	67 01.1	85 43	132.9	68 16.8	83 44	130.7	69 30.7	81 46	128.3	71 05.7	77 48	124.7	71 28.8	76 48	123.7	71 51.5	75 49	122.7	73 18.6	70 51	118.1	1
2	65 44.7	85 43	132.5	66 35.5	84 44	131.1	67 50.4	82 45	129.0	69 03.4	80 47	126.6	70 37.1	76 49	123.0	70 59.8	75 49	122.0	71 22.2	74 50	120.9	72 48.0	69 52	116.4	2
3	65 19.0	84 44	130.8	66 09.3	83 45	129.5	67 23.3	81 46	127.3	68 35.4	79 48	124.9	70 08.0	75 49	121.3	70 30.4	74 50	120.3	70 52.4	73 50	119.3	72 16.9	68 52	114.8	3
4	64 52.6	84 45	129.2	65 42.4	82 46	127.9	66 55.7	80 47	125.7	68 06.9	78 48	123.3	69 38.3	74 50	119.7	70 00.4	73 51	118.7	70 22.2	72 51	117.7	71 45.5	67 53	113.3	4
25	64 25.7	83 46	127.6	65 15.0	82 47	126.3	66 27.4	79 48	124.1	67 37.9	77 49	121.7	69 08.2	73 51	118.1	69 30.0	72 51	117.2	69 51.5	71 52	116.2	71 13.7	66 54	111.8	25
6	63 58.1	82 47	126.1	64 46.9	81 48	124.7	65 58.7	79 49	122.6	67 08.4	76 50	120.2	68 37.7	72 52	116.6	68 59.2	71 52	115.7	69 20.4	70 52	114.7	70 41.6	65 54	110.4	6
7	63 30.1	81 48	124.6	64 18.4	80 48	123.3	65 29.4	78 50	121.1	66 38.4	75 51	118.7	68 06.7	72 52	115.2	68 28.0	70 53	114.2	68 49.0	69 53	113.2	70 09.2	64 54	109.0	7
8	63 01.5	80 48	123.1	63 49.4	79 49	121.8	64 59.7	77 50	119.6	66 08.0	75 51	117.3	67 35.4	71 53	113.8	67 56.4	70 53	112.8	68 17.2	69 54	111.9	69 36.5	63 55	107.7	8
9	62 32.4	80 49	121.7	63 19.9	78 50	120.4	64 29.6	76 51	118.2	65 37.3	74 52	115.9	67 03.7	70 53	112.4	67 24.6	69 54	111.5	67 45.1	68 54	110.5	69 03.6	63 55	106.4	9
30	62 02.9	79 50	120.3	62 50.0	78 50	119.0	63 59.1	76 51	116.9	65 06.1	73 52	114.5	66 31.8	69 54	111.1	66 52.4	68 54	110.2	67 12.7	67 54	109.2	68 30.5	62 56	105.2	30
1	61 33.0	78 50	119.0	62 19.7	77 51	117.7	63 28.2	75 52	115.5	64 34.7	73 53	113.2	65 59.5	69 54	109.8	66 20.0	68 54	108.9	66 40.1	67 55	108.0	67 57.2	62 56	104.0	1
2	61 02.8	78 51	117.7	61 49.1	77 52	116.3	62 57.0	74 53	114.2	64 02.9	72 53	111.9	65 27.0	68 55	108.6	65 47.3	67 55	107.7	66 07.3	66 55	106.8	67 23.7	61 56	102.9	2
3	60 32.1	77 52	116.4	61 18.1	76 52	115.1	62 25.5	74 53	113.0	63 30.8	71 54	110.7	64 54.3	68 55	107.4	65 14.4	67 55	106.5	65 34.2	66 55	105.6	66 50.1	61 56	101.8	3
4	60 01.1	77 52	115.1	60 46.7	75 53	113.8	61 53.6	73 54	111.7	62 58.5	71 54	109.5	64 21.3	67 55	106.2	64 41.3	66 55	105.4	65 01.0	65 56	104.5	66 16.3	60 56	100.7	4
35	59 29.8	76 53	113.9	60 15.1	75 53	112.6	61 21.5	73 54	110.5	62 25.9	70 55	108.3	63 48.2	67 56	105.1	64 08.0	66 56	104.2	64 27.6	65 56	103.4	65 42.5	60 57	99.6	35
6	58 58.2	76 53	112.7	59 43.2	74 54	111.4	60 49.2	72 54	109.4	61 53.2	70 55	107.2	63 14.9	66 56	104.0	63 34.6	65 56	103.1	63 54.0	64 56	102.3	65 08.5	60 57	98.6	6
7	58 26.3	75 54	111.5	59 11.0	74 54	110.2	60 16.6	72 55	108.2	61 20.2	69 55	106.0	62 41.4	66 56	102.9	63 01.0	65 56	102.1	63 20.3	64 56	101.2	64 34.4	59 57	97.6	7
8	57 54.2	75 54	110.4	58 38.6	73 54	109.1	59 43.8	71 55	107.1	60 47.0	69 56	104.9	62 07.8	66 56	101.8	62 27.3	65 56	101.0	62 46.5	64 57	100.2	64 00.3	59 57	96.7	8
9	57 21.8	74 54	109.3	58 06.0	73 55	108.0	59 10.8	71 55	106.0	60 13.7	69 56	103.9	61 34.0	65 56	100.8	61 53.5	64 57	100.0	62 12.6	63 57	99.2	63 26.1	59 57	95.7	9
40	56 49.2	74 55	108.2	57 33.2	73 55	106.9	58 37.6	71 56	104.9	59 40.2	68 56	102.8	61 00.2	65 57	99.8	61 19.5	64 57	99.0	61 38.6	63 57	98.2	62 51.8	59 57	94.8	40
1	56 16.4	74 55	107.1	57 00.1	72 55	105.8	58 04.3	70 56	103.9	59 06.6	68 56	101.8	60 26.2	65 57	98.8	60 45.5	64 57	98.0	61 04.5	63 57	97.2	62 17.5	59 57	93.9	1
2	55 43.4	73 55	106.0	56 27.0	72 56	104.8	57 30.8	70 56	102.8	58 32.8	68 56	100.8	59 52.2	64 57	97.9	60 11.4	64 57	97.1	60 30.3	63 57	96.3	61 43.1	59 57	93.0	2
3	55 10.2	73 56	105.0	55 53.6	72 56	103.7	56 57.2	70 56	101.8	57 59.0	67 57	99.8	59 18.0	64 57	96.9	59 37.2	63 57	96.2	59 56.1	62 57	95.4	61 08.7	59 57	92.1	3
4	54 36.9	73 56	103.9	55 20.1	71 56	102.7	56 23.5	69 56	100.8	57 25.0	67 57	98.8	58 43.8	64 57	96.0	59 03.0	63 57	95.2	59 21.8	62 57	94.5	60 34.3	59 57	91.3	4
45	54 03.4	72 56	102.9	54 46.5	71 56	101.7	55 49.6	69 57	99.9	56 50.9	67 57	97.9	58 09.6	64 57	95.1	58 28.7	63 57	94.3	58 47.5	62 57	93.6	59 59.9	58 57	90.5	45
6	53 29.8	72 56	102.0	54 12.7	71 56	100.8	55 15.7	69 57	98.9	56 16.8	67 57	97.0	57 35.3	64 57	94.2	57 54.3	63 57	93.5	58 13.1	62 57	92.7	59 25.5	58 57	89.6	6
7	52 56.1	72 56	101.0	53 38.9	71 57	99.8	54 41.6	69 57	98.0	55 42.6	67 57	96.0	57 01.0	64 57	93.3	57 20.0	63 57	92.6	57 38.7	62 57	91.9	58 51.1	59 57	88.8	7
8	52 22.3	72 57	100.0	53 04.9	70 57	98.9	54 07.5	69 57	97.0	55 08.4	67 57	95.1	56 26.6	64 57	92.4	56 45.6	63 57	91.7	57 04.3	62 57	91.0	58 16.7	59 57	88.0	8
9	51 48.3	71 57	99.1	52 30.9	70 57	97.9	53 33.3	68 57	96.1	54 34.1	67 57	94.3	55 52.2	64 57	91.6	56 11.2	63 57	90.9	56 29.9	62 57	90.2	57 42.3	59 57	87.3	9
50	51 14.3	71 57	98.2	51 56.7	70 57	97.0	52 59.1	68 57	95.2	53 59.7	66 57	93.4	55 17.8	64 57	90.8	55 36.7	63 57	90.1	55 55.5	62 57	89.4	57 08.0	59 57	86.5	50
1	50 40.2	71 57	97.2	51 22.5	70 57	96.1	52 24.8	68 57	94.4	53 25.4	66 57	92.5	54 43.4	64 57	89.9	55 02.3	63 57	89.3	55 21.1	62 57	88.6	56 33.6	59 57	85.7	1
2	50 06.0	71 57	96.3	50 48.3	70 57	95.2	51 50.4	68 57	93.5	52 51.0	66 57	91.7	54 09.0	64 57	89.1	54 27.9	63 57	88.5	54 46.7	62 57	87.8	55 59.3	59 57	85.0	2
3	49 31.8	71 57	95.5	50 14.0	70 57	94.4	51 16.1	68 57	92.6	52 16.6	66 57	90.8	53 34.6	64 57	88.3	53 53.5	63 57	87.7	54 12.3	62 57	87.0	55 25.1	59 57	84.2	3
4	48 57.5	71 57	94.6	49 39.7	70 57	93.5	50 41.7	68 57	91.8	51 42.2	66 57	90.0	53 00.2	64 57	87.5	53 19.2	63 57	86.9	53 37.9	62 57	86.2	54 50.8	59 57	83.5	4
55	48 23.2	71 57	93.7	49 05.3	70 57	92.6	50 07.3	68 57	91.0	51 07.7	66 57	89.2	52 25.8	64 57	86.7	52 44.8	63 57	86.1	53 03.6	62 57	85.5	54 16.7	59 57	82.8	55
6	47 48.8	71 57	92.9	48 30.9	70 57	91.8	49 32.9	68 57	90.1	50 33.3	66 57	88.4	51 51.4	64 57	86.0	52 10.5	63 57	85.3	52 29.3	62 57	84.7	53 42.6	60 57	82.1	6
7	47 14.5	71 57	92.0	47 56.5	70 57	91.0	48 58.5	68 57	89.3	49 58.9	66 57	87.6	51 17.1	64 57	85.2	51 36.2	63 57	84.6	51 55.1	63 57	84.0	53 08.5	60 57	81.4	7
8	46 40.1	71 57	91.2	47 22.1	70 57	90.1	48 24.0	68 57	88.5	49 24.6	66 57	86.8	50 42.9	64 57	84.5	51 02.0	63 57	83.8	51 20.9	63 57	83.2	52 34.5	60 57	80.7	8
9	46 05.6	71 57	90.3	46 47.7	70 57	89.3	47 49.7	68 57	87.7	48 50.2	66 57	86.0	50 08.6	64 57	83.7	50 27.8	64 57	83.1	50 46.7	63 57	82.5	52 00.6	60 56	80.0	9
60	45 31.2	71 57	89.5	46 13.3	70 57	88.5	47 15.3	68 57	86.9	48 15.9	67 57	85.3	49 34.4	64 57	83.0	49 53.6	64 57	82.4	50 12.6	63 57	81.8	51 26.7	60 56	79.3	60
1	44 56.8	71 57	88.7	45 38.9	70 57	87.7	46 40.9	68 57	86.1	47 41.6	67 57	84.5	49 00.3	64 57	82.2	49 19.6	64 57	81.6	49 38.6	63 57	81.0	50 53.0	61 56	78.6	1
2	44 22.4	71 57	87.9	45 04.5	70 57	86.9	46 06.6	68 57	85.4	47 07.4	67 57	83.7	48 26.2	65 57	81.5	48 45.5	64 57	80.9	49 04.7	63 56	80.3	50 19.3	61 56	77.9	2
3	43 48.0	71 57	87.1	44 30.2	70 57	86.1	45 32.3	68 57	84.6	46 33.2	67 57	83.0	47 52.2	65 57	80.8	48 11.6	64 56	80.2	48 30.8	64 56	79.6	49 45.7	61 56	77.2	3
4	43 13.7	71 57	86.3	43 55.8	70 57	85.3	44 58.1	68 57	83.8	45 59.1	67 57	82.3	47 18.3	65 56	80.1	47 37.7	64 56	79.5	47 57.0	64 56	78.9	49 12.1	61 56	76.6	4
65	42 39.4	71 57	85.5	43 21.6	70 57	84.6	44 23.9	69 57	83.1	45 25.0	67 57	81.5	46 44.4	65 56	79.4	47 03.9	65 56	78.8	47 23.2	64 56	78.2	48 38.7	62 56	75.9	65
6	42 05.1	71 57	84.8	42 47.3	70 57	83.8	43 49.8	69 57	82.3	44 51.0	67 57	80.8	46 10.7	65 56	78.7	46 30.2	65 56	78.1	46 49.6	64 56	77.5	48 05.4	62 55	75.3	6
7	41 30.8	71 57	84.0	42 13.1	70 57	83.1	43 15.7	69 57	81.6	44 17.1	68 56	80.1	45 37.0	66 56	78.0	45 56.6	65 56	77.4	46 16.0	65 56	76.9	47 32.2	62 55	74.6	7
8	40 56.6	71 57	83.2	41 39.0	70 57	82.3	42 41.7	69 57	80.8	43 43.2	68 56	79.3	45 03.4	66 56	77.3	45 23.0	65 56	76.7	45 42.5	65 56	76.2	46 59.0	63 55	74.0	8
9	40 22.5	71 57	82.5	41 04.9	70 57	81.6	42 07.7	69 56	80.1	43 09.4	68 56	78.6	44 29.8	66 56	76.6	44 49.6	66 56	76.0	45 09.2	65 55	75.5	46 26.0	63 55	73.3	9
70	39 48.4	71 57	81.7	40 30.9	71 57	80.8	41 33.9	69 56	79.4	42 35.7	68 56	77.9	43 56.4	66 56	75.9	44 16.2	66 55	75.4	44 35.9	65 55	74.8	45 53.1	63 55	72.7	70
1	39 14.4	71 57	81.0	39 57.0	71 56	80.1	41 00.1	70 56	78.7	42 02.1	68 56	77.2	43 23.1	67 55	75.2	43 43.0	66 55	74.7	44 02.7	66 55	74.2	45 20.3	64 54	72.0	1
2	38 40.4	72 56	80.2	39 23.1	71 56	79.3	40 26.4	70 56	77.9	41 28.6	69 56	76.5	42 49.9	67 55	74.5	43 09.8	66 55	74.0	43 29.7	66 55	73.5	44 47.6	64 54	71.4	2
3	38 06.5	72 56	79.5	38 49.3	71 56	78.6	39 52.8	70 56	77.2	40 55.2	69 56	75.8	42 16.7	67 55	73.8	42 36.8	67 55	73.3	42 56.8	66 55	72.8	44 15.1	64 54	70.7	3
4	37 32.7	72 56	78.8	38 15.6	71 56	77.9	39 19.3	70 56	76.5	40 21.9	69 55	75.1	41 43.7	67 55	73.2	42 03.9	67 55	72.7	42 23.9	67 54	72.2	43 42.7	65 54	70.1	4
75	36 59.0	72 56	78.0	37 42.0	71 56	77.2	38 45.8	70 56	75.8	39 48.7	69 55	74.4	41 10.9	68 55	72.5	41 31.1	67 54	72.0	41 51.2	67 54	71.5	43 10.4	65 54	69.5	75
6	36 25.4	72 56	77.3	37 08.5	72 56	76.4	38 12.5	71 55	75.1	39 15.6	70 55	73.7	40 38.1	68 54	71.8	40 58.4	68 54	71.4	41 18.6	67 54	70.9	42 38.2	65 53	68.8	6
7	35 51.9	72 56	76.6	36 35.1	72 56	75.7	37 39.3	71 55	74.4	38 42.6	70 55	73.0	40 05.5	68 54	71.2	40 25.9	68 54	70.7	40 46.2	67 54	70.2	42 06.2	66 53	68.2	7
8	35 18.4	73 56	75.9	36 01.8	72 55	75.0	37 06.2	71 55	73.7	38 09.8	70 55	72.4	39 33.0	69 54	70.5	39 53.5	68 54	70.0	40 13.9	68 54	69.6	41 34.3	66 53	67.6	8
9	34 45.1	73 55	75.1	35 28.7	72 55	74.3	36 33.3	71 55	73.0	37 37.0	70 54	71.7	39 00.6	69 54	69.9	39 21.2	69 54	69.4	39 41.7	68 53	68.9	41 02.5	67 53	67.0	9
80	34 11.9	73 55	74.4	34 55.6	72 55	73.6	36 00.4	72 55	72.3	37 04.4	71 54	71.0	38 28.3	69 54	69.2	38 49.1	69 53	68.7	39 09.7	69 53	68.3	40 30.9	67 52	66.3	80
1	33 38.8	73 55	73.7	34 22.6	73 55	72.9	35 27.7	72 54	71.6	36 31.9	71 54	70.3	37 56.2	70 53	68.5	38 17.1	69 53	68.1	38 37.8	69 53	67.6	39 59.5	67 52	65.7	1
2	33 05.9	74 55	73.0	33 49.8	73 54	72.2	34 55.1	72 54	70.9	35 59.6	71 54	69.7	37 24.3	70 53	67.9	37 45.2	70 53	67.4	38 06.0	69 53	67.0	39 28.2	68 52	65.1	2
3	32 33.0	74 55	72.3	33 17.1	73 54	71.5	34 22.6	72 54	70.2	35 27.4	72 53	69.0	36 52.5	70 53	67.2	37 13.5	70 53	66.8	37 34.4	70 52	66.3	38 57.1	68 52	64.5	3
4	32 00.3	74 54	71.6	32 44.5	73 54	70.8	33 50.3	73 54	69.6	34 55.4	72 53	68.3	36 20.8	71 52	66.6	36 42.0	70 52	66.1	37 03.0	70 52	65.7	38 26.1	69 51	63.9	4
85	31 27.7	74 54	70.9	32 12.1	74 54	70.1	33 18.1	73 53	68.9	34 23.5	72 53	67.6	35 49.3	71 52	65.9	36 10.6	71 52	65.5	36 31.7	70 52	65.0	37 55.3	69 51	63.2	85
6	30 55.3	75 54	70.2	31 39.8	74 54	69.4	32 46.1	73 53	68.2	33 51.7	72 53	67.0	35 18.0	71 52	65.3	35 39.3	71 52	64.8	36 00.6	71 52	64.4	37 24.6	69 51	62.6	6
7	30 23.0	75 54	69.5	31 07.7	74 53	68.7	32 14.2	74 53	67.5	33 20.1	73 52	66.3	34 46.8	72 52	64.6	35 08.3	71 52	64.2	35 29.6	71 51	63.8	36 54.1	70 50	62.0	7
8	29 50.8	75 53	68.8	30 35.7	75 53	68.0	31 42.5	74 53	66.8	32 48.7	73 52	65.6	34 15.8	72 51	64.0	34 37.4	72 51	63.6	34 58.8	71 51	63.1	36 23.8	70 50	61.4	8
9	29 18.8	75 53	68.1	30 03.9	75 53	67.3	31 11.0	74 52	66.2	32 17.4	73 52	65.0	33 45.0	72 51	63.3	34 06.6	72 51	62.9	34 28.2	72 51	62.5	35 53.7	71 50	60.8	9
90	28 46.9	76 53	67.4	29 32.2	75 52	66.6	30 39.6	75 52	65.5	31 46.3	74 52	64.3	33 14.3	73 51	62.7	33 36.1	73 51	62.3	33 57.8	72 50	61.9	35 23.8	71 50	60.2	90

Digitized by Google

Lat. 55°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	28 15.3	76 53	66.7	29 00.7	75 52	65.9	30 08.3	75 52	64.8	31 15.4	74 51	63.6	32 43.8	73 51	62.0	33 05.7	73 50	61.6	33 27.5	73 50	61.2	34 54.9	71 49	59.5	91
2	27 43.7	76 52	66.0	28 29.3	76 52	65.2	29 37.3	75 51	64.1	30 44.7	75 51	63.0	32 13.5	74 50	61.4	32 35.5	73 50	61.0	32 57.5	73 50	60.6	34 24.4	72 49	58.9	2
3	27 12.4	76 52	65.3	27 58.2	76 52	64.6	29 06.4	76 51	63.4	30 14.1	75 51	62.3	31 43.4	74 50	60.7	32 05.5	74 50	60.3	32 27.6	73 50	59.9	33 55.1	72 49	58.3	3
4	26 41.2	77 52	64.6	27 27.2	76 51	63.9	28 35.7	76 51	62.8	29 43.7	75 50	61.6	31 13.4	74 50	60.1	31 35.7	74 49	59.7	31 57.9	74 49	59.3	33 25.9	73 48	57.7	4
95	26 10.2	77 51	63.9	26 56.4	77 51	63.2	28 05.2	76 51	62.1	29 13.5	76 50	61.0	30 43.7	75 49	59.5	31 06.1	74 49	59.1	31 28.4	74 49	58.7	32 56.9	73 48	57.1	95
6	25 39.4	77 51	63.2	26 25.8	77 51	62.5	27 34.9	77 50	61.4	28 43.5	76 50	60.3	30 14.2	75 49	58.8	30 36.7	75 49	58.4	30 59.1	75 48	58.0	32 28.1	74 48	56.5	6
7	25 08.8	78 51	62.5	25 55.3	77 50	61.8	27 04.8	77 50	60.7	28 13.7	76 49	59.7	29 44.8	76 49	58.2	30 07.4	75 48	57.8	30 30.0	75 48	57.4	31 59.5	74 47	55.8	7
8	24 38.4	78 50	61.8	25 25.1	78 50	61.1	26 34.9	77 50	60.1	27 44.1	77 49	59.0	29 15.7	76 48	57.5	29 38.4	76 48	57.1	30 01.1	75 48	56.8	31 31.1	75 47	55.2	8
9	24 08.1	78 50	61.1	24 55.1	78 50	60.4	26 05.1	78 49	59.4	27 14.7	77 49	58.3	28 46.8	76 48	56.9	29 09.6	76 48	56.5	29 32.4	76 47	56.1	31 03.0	75 47	54.6	9
100	23 38.1	79 50	60.4	24 25.2	78 49	59.7	25 35.6	78 49	58.7	26 45.6	77 48	57.7	28 18.1	77 48	56.2	28 41.0	77 47	55.9	29 04.0	76 47	55.5	30 35.0	75 46	54.0	100
1	23 08.3	79 49	59.7	23 55.6	79 49	59.1	25 06.3	78 48	58.0	26 16.6	78 48	57.0	27 49.6	77 47	55.6	28 12.7	77 47	55.2	28 35.7	77 47	54.8	30 07.3	76 46	53.4	1
2	22 38.7	79 49	59.0	23 26.2	79 49	58.4	24 37.2	79 48	57.4	25 47.8	78 48	56.3	27 21.3	78 47	54.9	27 44.5	77 47	54.6	28 07.7	77 46	54.2	29 39.8	76 45	52.7	2
3	22 09.3	80 49	58.3	22 57.0	79 48	57.7	24 08.4	79 48	56.7	25 19.3	79 47	55.7	26 53.2	78 46	54.3	27 16.6	78 46	53.9	27 39.9	78 46	53.6	29 12.5	77 45	52.1	3
4	21 40.1	80 48	57.6	22 28.0	80 48	57.0	23 39.7	79 47	56.0	24 51.0	79 47	55.0	26 25.4	78 46	53.6	26 48.9	78 46	53.3	27 12.3	78 46	52.9	28 45.5	77 45	51.5	4
105	21 11.1	80 48	56.9	21 59.3	80 48	56.3	23 11.3	80 47	55.3	24 22.9	79 46	54.3	25 57.8	79 46	53.0	26 21.4	79 45	52.6	26 45.0	78 45	52.3	28 18.7	78 44	50.9	105
6	20 42.4	81 47	56.2	21 30.8	81 47	55.6	22 43.1	80 47	54.6	23 55.1	80 46	53.7	25 30.4	79 45	52.3	25 54.2	79 45	52.0	26 17.9	79 45	51.6	27 52.1	78 44	50.3	6
7	20 13.9	81 47	55.5	21 02.5	81 47	54.9	22 15.2	81 46	54.0	23 27.5	80 46	53.0	25 03.3	80 45	51.7	25 27.2	79 45	51.3	25 51.0	79 44	51.0	27 25.7	78 44	49.6	7
8	19 45.6	81 47	54.8	20 34.5	81 46	54.2	21 47.5	81 46	53.3	23 00.1	81 45	52.3	24 36.5	80 44	51.0	25 00.4	80 44	50.7	25 24.4	80 44	50.4	26 59.6	79 43	49.0	8
9	19 17.6	82 46	54.1	20 06.7	82 46	53.5	21 20.0	81 45	52.6	22 33.0	81 45	51.7	24 09.8	80 44	50.4	24 33.9	80 44	50.0	24 58.0	80 44	49.7	26 33.8	80 43	48.4	9
110	18 49.9	82 46	53.4	19 39.1	82 46	52.8	20 52.8	82 45	51.9	22 06.1	81 44	51.0	23 43.4	81 44	49.7	24 07.7	81 43	49.4	24 31.9	81 43	49.1	26 08.2	80 42	47.7	110
1	18 22.3	83 45	52.7	19 11.8	82 45	52.1	20 25.8	82 44	51.2	21 39.5	82 44	50.3	23 17.3	81 43	49.1	23 41.7	81 43	48.7	24 06.0	81 43	48.4	25 42.8	80 42	47.1	1
2	17 55.1	83 45	52.0	18 44.8	83 45	51.4	19 59.1	82 44	50.5	21 13.2	82 44	49.6	22 51.5	82 43	48.4	23 15.9	82 42	48.1	23 40.4	81 42	47.8	25 17.8	81 41	46.5	2
3	17 28.1	83 45	51.3	18 18.0	83 44	50.7	19 32.7	83 44	49.9	20 47.1	83 43	49.0	22 25.9	82 42	47.7	22 50.5	82 42	47.4	23 15.0	82 42	47.1	24 52.9	81 41	45.8	3
4	17 01.3	84 44	50.6	17 51.5	83 44	50.0	19 06.5	83 43	49.2	20 21.3	83 43	48.3	22 00.5	82 42	47.1	22 25.3	82 42	46.8	22 50.0	82 41	46.5	24 28.4	82 40	45.2	4
115	16 34.9	84 44	49.9	17 25.2	84 43	49.3	18 40.6	84 43	48.5	19 55.7	83 42	47.6	21 35.5	83 41	46.4	22 00.3	83 41	46.1	22 25.1	83 41	45.8	24 04.1	82 40	44.6	115
6	16 08.7	84 43	49.2	16 59.3	84 43	48.6	18 15.0	84 42	47.8	19 30.4	84 42	46.9	21 10.7	83 41	45.8	21 35.7	83 41	45.5	22 00.6	83 40	45.2	23 40.1	83 40	43.9	6
7	15 42.8	85 43	48.5	16 33.6	85 42	47.9	17 49.6	84 42	47.1	19 05.4	84 41	46.2	20 46.2	84 40	45.1	21 11.3	84 40	44.8	21 36.3	84 40	44.5	23 16.3	83 39	43.3	7
8	15 17.2	85 42	47.8	16 08.2	85 42	47.2	17 24.6	85 41	46.4	18 40.7	85 41	45.6	20 21.9	84 40	44.4	20 47.2	84 40	44.1	21 12.4	84 40	43.8	22 52.9	84 39	42.7	8
9	14 51.8	85 42	47.1	15 43.1	85 41	46.5	16 59.8	85 41	45.7	18 16.3	85 40	44.9	19 58.0	85 39	43.8	20 23.3	84 39	43.5	20 48.7	84 39	43.2	22 29.7	84 38	42.0	9
120	14 26.8	86 41	46.3	15 18.2	86 41	45.8	16 35.3	86 40	45.0	17 52.2	85 40	44.2	19 34.3	85 39	43.1	19 59.8	85 39	42.8	20 25.3	85 39	42.5	22 06.8	84 38	41.4	120
1	14 02.0	86 41	45.6	14 53.7	86 40	45.1	16 11.1	86 40	44.3	17 28.3	86 39	43.5	19 11.0	85 38	42.4	19 36.6	85 38	42.1	20 02.2	85 38	41.9	21 44.2	85 37	40.7	1
2	13 37.6	87 40	44.9	14 29.5	86 40	44.4	15 47.2	86 39	43.6	17 04.8	86 39	42.8	18 47.9	86 38	41.7	19 13.6	86 38	41.5	19 39.3	86 38	41.2	21 21.9	85 37	40.1	2
3	13 13.4	87 40	44.2	14 05.6	87 39	43.7	15 23.6	87 39	42.9	16 41.5	86 38	42.1	18 25.2	86 37	41.1	18 51.0	86 37	40.8	19 16.8	86 37	40.5	20 59.9	86 36	39.4	3
4	12 49.6	87 39	43.5	13 41.9	87 39	43.0	15 00.4	87 38	42.2	16 18.6	87 38	41.4	18 02.7	87 37	40.4	18 28.7	87 37	40.1	18 54.6	86 36	39.9	20 38.2	86 36	38.8	4
125	12 26.1	88 39	42.7	13 18.7	88 38	42.2	14 37.4	87 38	41.5	15 56.0	87 37	40.7	17 40.6	87 36	39.7	18 06.6	87 36	39.5	18 32.7	87 36	39.2	20 16.8	87 35	38.1	125
6	12 02.9	88 38	42.0	12 55.7	88 38	41.5	14 14.8	88 37	40.8	15 33.7	88 37	40.0	17 18.7	87 36	39.0	17 44.9	87 36	38.8	18 11.1	87 35	38.5	19 55.7	87 35	37.5	6
7	11 40.0	89 38	41.3	12 33.0	88 37	40.8	13 52.4	88 37	40.1	15 11.7	88 36	39.3	16 57.2	88 35	38.4	17 23.5	88 35	38.1	17 49.8	88 35	37.8	19 34.9	87 34	36.8	7
8	11 17.5	89 37	40.5	12 10.7	89 37	40.1	13 30.5	89 36	39.4	14 50.1	88 36	38.6	16 36.0	88 35	37.7	17 02.5	88 35	37.4	17 28.9	88 34	37.2	19 14.4	88 34	36.2	8
9	10 55.3	89 36	39.8	11 48.7	89 36	39.4	13 08.8	89 36	38.7	14 28.7	89 35	37.9	16 15.2	89 34	37.0	16 41.7	89 34	36.7	17 08.3	88 34	36.5	18 54.3	88 33	35.5	9
130	10 33.4	89 36	39.1	11 27.1	89 36	38.6	12 47.5	89 35	37.9	14 07.8	89 34	37.2	15 54.6	89 34	36.3	16 21.3	89 34	36.1	16 48.0	89 33	35.8	18 34.4	89 32	34.9	130
1	10 11.9	90 35	38.3	11 05.8	90 35	37.9	12 26.5	90 34	37.2	13 47.1	90 34	36.5	15 34.4	89 33	35.6	16 01.2	89 33	35.4	16 28.0	89 33	35.1	18 14.9	89 32	34.2	1
2	9 50.7	90 35	37.6	10 44.8	90 34	37.2	12 05.8	90 34	36.5	13 26.8	90 33	35.8	15 14.5	90 33	34.9	15 41.4	90 32	34.7	16 08.3	90 32	34.5	17 55.8	89 31	33.5	2
3	9 29.9	91 34	36.9	10 24.2	90 34	36.4	11 45.5	90 33	35.8	13 06.8	90 33	35.1	14 55.0	90 32	34.2	15 22.0	90 32	34.0	15 49.0	90 32	33.8	17 36.9	90 31	32.9	3
4	9 09.4	91 34	36.1	10 03.9	91 33	35.7	11 25.6	91 33	35.1	12 47.2	91 32	34.4	14 35.8	90 31	33.5	15 03.0	90 31	33.3	15 30.1	90 31	33.1	17 18.4	90 30	32.2	4
135	8 49.3	91 33	35.4	9 44.0	91 33	35.0	11 06.0	91 32	34.3	12 27.9	91 32	33.7	14 17.0	91 31	32.8	14 44.2	91 31	32.6	15 11.5	91 30	32.4	17 00.2	91 30	31.5	135
6	8 29.6	92 32	34.6	9 24.5	91 32	34.2	10 46.8	91 31	33.6	12 09.0	91 31	33.0	13 58.5	91 30	32.1	14 25.9	91 30	31.9	14 53.2	91 30	31.7	16 42.4	91 29	30.9	6
7	8 10.2	92 32	33.9	9 05.3	92 31	33.5	10 27.9	92 31	32.9	11 50.5	92 30	32.3	13 40.4	92 30	31.4	14 07.8	92 29	31.2	14 35.3	91 29	31.0	16 24.9	91 29	30.2	7
8	7 51.2	92 31	33.1	8 46.5	92 31	32.7	10 09.4	92 30	32.1	11 32.3	92 30	31.5	13 22.6	92 29	30.7	13 50.2	92 29	30.5	14 17.7	92 29	30.3	16 07.8	92 28	29.5	8
9	7 32.6	93 30	32.4	8 28.1	92 30	32.0	9 51.3	92 30	31.4	11 14.4	92 29	30.8	13 05.2	92 28	30.0	13 32.9	92 28	29.8	14 00.5	92 28	29.6	15 51.0	92 27	28.8	9
140	7 14.4	93 30	31.6	8 10.1	93 29	31.2	9 33.6	93 29	30.7	10 57.0	93 28	30.1	12 48.2	93 28	29.3	13 15.9	93 28	29.1	13 43.7	93 27	28.9	15 34.6	92 27	28.2	140
1	6 56.5	93 29	30.9	7 52.4	93 29	30.5	9 16.2	93 28	29.9	10 39.9	93 28	29.4	12 31.5	93 27	28.6	12 59.4	93 27	28.4	13 27.2	93 27	28.2	15 18.6	93 26	27.5	1
2	6 39.1	93 28	30.1	7 35.1	93 28	29.7	8 59.2	93 28	29.2	10 23.2	93 27	28.7	12 15.2	93 27	27.9	12 43.2	93 26	27.7	13 11.1	93 26	27.5	15 02.9	93 26	26.8	2
3	6 22.0	94 28	29.3	7 18.3	94 27	29.0	8 42.6	94 27	28.5	10 06.9	94 27	27.9	11 59.3	94 26	27.2	12 27.3	94 26	27.0	12 55.4	94 26	26.8	14 47.5	93 25	26.1	3
4	6 05.3	94 27	28.6	7 01.8	94 27	28.2	8 26.4	94 26	27.7	9 51.0	94 26	27.2	11 43.7	94 25	26.5	12 11.9	94 25	26.3	12 40.0	94 25	26.1	14 32.6	94 24	25.4	4
145	5 49.1	94 26	27.8	6 45.7	94 26	27.5	8 10.6	94 26	27.0	9 35.5	94 25	26.5	11 28.6	94 25	25.8	11 56.8	94 24	25.6	12 25.1	94 24	25.4	14 18.0	94 24	24.7	145
6	5 33.2	95 26	27.0	6 30.0	95 25	26.7	7 55.2	95 25	26.2	9 20.3	95 25	25.7	11 13.8	95 24	25.1	11 42.1	94 24	24.9	12 10.5	94 24	24.7	14 03.8	94 23	24.1	6
7	5 17.8	95 25	26.3	6 14.8	95 25	25.9	7 40.2	95 24	25.5	9 05.6	95 24	25.0	10 59.4	95 23	24.3	11 27.8	95 23	24.2	11 56.3	95 23	24.0	13 49.9	95 22	23.4	7
8	5 02.8	95 24	25.5	5 59.9	95 24	25.2	7 25.6	95 24	24.7	8 51.3	95 23	24.3	10 45.4	95 23	23.6	11 13.9	95 23	23.5	11 42.4	95 22	23.3	13 36.5	95 22	22.7	8
9				5 45.5	95 23	24.4	7 11.4	95 23	24.0	8 37.3	95 23	23.5	10 31.8	95 22	22.9	11 00.4	95 22	22.8	11 29.0	95 22	22.6	13 23.4	95 21	22.0	9
150				5 31.5	96 23	23.7	6 57.6	96 22	23.2	8 23.8	96 22	22.8	10 18.6	96 21	22.2	10 47.3	96 21	22.0	11 16.0	96 21	21.9	13 10.7	96 21	21.3	150
1				5 17.9	96 22	22.9	6 44.3	96 22	22.5	8 10.7	96 21	22.0	10 05.8	96 21	21.5	10 34.6	96 20	21.3	11 03.4	96 20	21.2	12 58.4	96 20	20.6	1
2				5 04.7	96 21	22.1	6 31.3	96 21	21.7	7 58.0	96 20	21.3	9 53.4	96 20	20.7	10 22.3	96 20	20.6	10 51.1	96 20	20.5	12 46.5	96 19	19.9	2
3							6 18.8	97 20	20.9	7 45.7	96 20	20.5	9 41.4	96 19	20.0	10 10.4	96 19	19.9	10 39.3	96 19	19.7	12 35.0	96 19	19.2	3
4							6 06.7	97 19	20.2	7 33.8	97 19	19.8	9 29.9	97 19	19.3	9 58.9	97 18	19.2	10 27.9	97 18	19.0	12 23.9	97 18	18.5	4
155							5 55.1	97 19	19.4	7 22.4	97 18	19.1	9 18.7	97 18	18.6	9 47.8	97 18	18.4	10 16.9	97 18	18.3	12 13.1	97 17	17.8	155
6							5 43.9	97 18	18.7	7 11.3	97 18	18.3	9 08.0	97 17	17.8	9 37.1	97 17	17.7	10 06.3	97 17	17.6	12 02.8	97 17	17.1	6
7							5 33.1	97 17	17.9	7 00.7	97 17	17.6	8 57.6	97 16	17.1	9 26.8	97 16	17.0	9 56.1	97 16	16.9	11 52.9	97 16	16.4	7
8							5 22.7	98 17	17.1	6 50.6	98 16	16.8	8 47.7	98 16	16.4	9 17.0	98 16	16.3	9 46.3	98 16	16.1	11 43.4	98 15	15.7	8
9							5 12.8	98 16	16.4	6 40.9	98 15	16.0	8 38.2	98 15	15.6	9 07.6	98 15	15.5	9 36.9	98 15	15.4	11 34.3	98 14	15.0	9
160							5 03.3	98 15	15.6	6 31.6	98 15	15.3	8 29.2	98 14	14.9	8 58.6	98 14	14.8	9 28.0	98 14	14.7	11 25.6	98 14	14.3	160
1										6 22.7	98 14	14.5	8 20.6	98 14	14.2	8 50.0	98 14	14.1	9 19.5	98 14	14.0	11 17.3	98 13	13.6	1
2										6 14.3	98 13	13.8	8 12.4	98 13	13.4	8 41.9	98 13	13.3	9 11.4	98 13	13.2	11 09.4	98 12	12.9	2
3										6 06.3	99 13	13.0	8 04.6	99 12	12.7	8 34.2	99 12	12.6	9 03.7	99 12	12.5	11 02.0	99 12	12.2	3
4										5 58.8	99 12	12.3	7 57.3	99 12	11.9	8 26.9	99 11	11.9	8 56.5	99 11	11.8	10 54.9	99 11	11.4	4
165										5 51.7	99 11	11.5	7 50.4	99 11	11.2	8 20.0	99 11	11.1	8 49.7	99 11	11.0	10 48.3	99 10	10.7	165
6										5 45.1	99 10	10.7	7 43.9	99 10	10.5	8 13.6	99 10	10.4	8 43.3	99 10	10.3	10 42.1	99 10	10.0	6
7										5 38.9	99 10	10.0	7 37.9	99 09	09.7	8 07.6	99 09	09.6	8 37.4	99 09	09.6	10 36.3	99 09	09.3	7
8										5 33.1	99 09	09.2	7 32.3	99 09	09.0	8 02.1	99 09	08.9	8 31.8	99 08	08.8	10 31.0	99 08	08.6	8
9										5 27.9	99 08	08.4	7 27.1	99 08	08.2	7 57.0	99 08	08.2	8 26.8	99 08	08.1	10 26.0	99 08	07.9	9
170										5 23.0	99 07	07.7	7 22.4	99 07	07.5	7 52.3	99 07	07.4	8 22.1	99 07	07.4	10 21.5	99 07	07.2	170
1										5 18.7	1.0 06	06.9	7 18.2	1.0 06	06.7	7 48.1	1.0 06	06.7	8 17.9	1.0 06	06.6	10 17.4	1.0 06	06.5	1
2										5 14.8	1.0 06	06.1	7 14.4	1.0 06	06.0	7 44.3	1.0 06	05.9	8 14.2	1.0 06	05.9	10 13.8	1.0 05	05.7	2
3										5 11.3	1.0 05	05.4	7 11.0	1.0 05	05.2	7 40.9	1.0 05	05.2	8 10.9	1.0 05	05.2	10 10.6	1.0 05	05.0	3
4										5 08.3	1.0 04	04.6	7 08.1	1.0 04	04.5	7 38.0	1.0 04	04.5	8 08.0	1.0 04	04.4	10 07.8	1.0 04	04.3	4
175										5 05.8	1.0 03	03.8	7 05.6	1.0 03	03.7	7 35.6	1.0 03	03.7	8 05.5	1.0 03	03.7	10 05.4	1.0 03	03.6	175
6										5 03.7	1.0 03	03.1	7 03.6	1.0 03	03.0	7 33.6	1.0 03	03.0	8 03.5	1.0 03	03.0	10 03.4	1.0 03	02.9	6
7										5 02.1	1.0 02	02.3	7 02.0	1.0 02	02.2	7 32.0	1.0 02	02.2	8 02.0	1.0 02	02.2	10 01.9	1.0 02	02.2	7
8										5 00.9	1.0 01	01.5	7 00.9	1.0 01	01.5	7 30.9	1.0 01	01.5	8 00.9	1.0 01	01.5	10 00.9	1.0 01	01.4	8
9										5 00.2	1.0 00	00.8	7 00.2	1.0 00	00.7	7 30.2	1.0 00	00.7	8 00.2	1.0 00	00.7	10 00.2	1.0 00	00.7	9
										5 00.0	1.0 00	00.0	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	8 00.0	1.0 00	00.0	10 00.0	1.0 00	00.0	

Lat. 56°

Lat. 57°

Lat. 58°

Lat. 55°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	81 00.0	1.0 02	180.0	82 00.0	1.0 02	180.0	83 30.0	1.0 03	180.0	84 30.0	1.0 03	180.0	85 30.0	1.0 04	180.0	86 30.0	1.0 05	180.0	87 30.0	1.0 07	180.0	89 00.0	1.0 16	180.0	00
1	80 58.7	1.0 07	175.6	81 58.5	1.0 07	175.1	83 28.2	1.0 09	174.2	84 28.0	99 10	173.2	85 27.6	99 12	171.9	86 27.0	99 15	169.9	87 25.9	97 20	166.3	88 50.6	87 38	149.4	1
2	80 54.7	99 11	171.2	81 54.1	99 12	170.3	83 23.0	98 14	168.4	84 22.0	98 16	166.7	85 20.4	97 19	164.1	86 18.1	96 23	160.3	87 14.1	91 30	153.9	88 28.0	66 48	129.9	2
3	80 48.1	98 15	166.9	81 46.9	98 17	165.5	83 14.5	97 19	162.9	84 12.2	95 22	160.3	85 08.9	93 26	156.8	86 04.0	90 31	151.6	86 56.1	83 38	143.4	87 59.5	52 52	118.6	3
4	80 39.1	97 19	162.6	81 37.0	96 21	161.0	83 02.8	94 24	157.6	83 58.9	92 27	154.4	84 53.5	89 31	150.1	85 45.7	84 36	144.0	86 33.6	75 43	135.0	87 28.3	42 54	111.7	4
05	80 27.6	95 23	158.6	81 24.5	94 25	156.6	82 48.3	92 29	152.5	83 42.6	89 32	148.9	84 34.8	85 36	144.1	85 23.9	78 41	137.5	86 07.8	67 47	128.2	86 55.8	36 55	107.0	05
6	80 14.0	94 26	154.7	81 09.7	92 28	152.4	82 31.2	89 32	147.9	83 23.5	85 36	143.9	84 13.3	80 40	138.7	84 59.4	73 44	131.8	85 39.7	61 49	122.7	86 22.6	32 56	103.6	6
7	79 58.2	92 29	150.9	80 52.7	90 32	148.4	82 11.8	86 36	143.5	83 02.1	82 39	139.3	83 49.5	76 43	133.9	84 32.8	68 47	127.0	85 10.1	56 51	118.3	85 49.0	29 56	101.0	7
8	79 40.6	90 32	147.4	80 33.7	87 35	144.6	81 50.3	83 39	139.5	82 38.7	78 42	135.1	83 23.8	72 45	129.7	84 04.6	63 49	122.9	84 39.2	52 53	114.6	85 15.0	27 57	98.9	8
9	79 21.2	87 35	144.0	80 12.9	85 37	141.1	81 27.1	80 41	135.8	82 13.6	75 44	131.3	82 56.6	68 47	125.9	83 35.1	60 51	119.4	84 07.6	48 54	111.5	84 41.0	25 57	97.1	9
10	79 00.1	85 37	140.8	79 50.5	83 40	137.8	81 02.4	77 43	132.4	81 47.1	72 46	127.9	82 28.2	65 49	122.6	83 04.7	56 52	116.2	83 35.2	45 55	108.8	84 06.8	24 57	95.7	10
1	78 37.7	83 40	137.8	79 26.7	80 42	134.7	80 36.4	74 45	129.2	81 19.3	69 48	124.8	81 58.7	62 51	119.6	82 33.4	53 53	113.5	83 02.5	43 55	106.5	83 32.5	23 57	94.4	1
2	78 13.9	81 42	134.9	79 01.7	78 44	131.8	80 09.2	72 47	126.3	80 50.6	66 49	122.0	81 28.3	59 52	116.9	82 01.6	51 54	111.1	82 29.3	41 56	104.5	82 58.2	23 57	93.2	2
3	77 49.0	79 48	132.2	78 35.5	76 45	129.1	79 41.0	69 48	123.7	80 21.0	64 51	119.4	80 57.3	57 53	114.5	81 29.2	49 55	108.9	81 55.8	39 56	102.7	82 23.8	22 57	92.2	3
4	77 23.0	77 45	129.7	78 08.3	74 47	126.6	79 11.9	67 50	121.2	79 50.6	62 52	117.0	80 25.7	55 53	112.3	80 56.5	47 55	107.0	81 22.2	38 56	101.1	81 49.4	22 57	91.3	4
15	76 56.1	75 46	127.3	77 40.3	72 48	124.2	78 42.1	65 51	118.9	79 19.7	60 52	114.8	79 53.7	53 54	110.2	80 23.4	46 56	105.2	80 48.3	37 57	99.6	81 15.0	22 57	90.4	15
6	76 28.3	74 48	125.1	77 11.5	70 49	122.0	78 11.7	63 52	116.8	78 48.2	58 53	112.8	79 21.2	52 55	108.4	79 50.1	44 56	103.5	80 14.3	36 57	98.2	80 40.6	22 57	89.6	6
7	75 59.8	72 49	122.9	76 42.0	68 50	119.9	77 40.7	62 52	114.8	78 16.2	57 54	110.9	78 48.4	50 55	106.7	79 16.5	43 56	102.0	79 40.2	35 57	97.0	80 06.1	22 57	88.8	7
8	75 30.5	71 50	120.9	76 11.8	67 51	118.0	77 09.2	60 53	112.9	77 43.9	55 54	109.2	78 15.3	49 56	105.1	78 42.8	42 56	100.6	79 06.0	35 57	95.8	79 31.7	22 57	88.1	8
9	75 00.7	69 51	119.0	75 41.2	66 52	116.1	76 37.3	59 54	111.2	77 11.3	54 55	107.5	77 41.9	48 56	103.6	78 08.9	42 57	99.3	78 31.7	34 57	94.7	78 57.4	22 57	87.4	9
20	74 30.4	68 51	117.2	75 10.0	64 53	114.3	76 05.1	58 54	109.5	76 38.3	53 55	106.0	77 08.4	47 56	102.2	77 34.9	41 57	98.1	77 57.4	34 57	93.7	78 23.0	23 57	86.7	20
1	73 59.5	67 52	115.5	74 38.5	63 53	112.7	75 32.5	57 55	108.0	76 05.1	52 56	104.6	76 34.7	46 56	100.9	77 00.8	40 57	96.9	77 23.1	34 57	92.8	77 48.6	23 57	86.1	1
2	73 28.3	66 53	113.8	74 06.5	62 54	111.1	74 59.6	56 55	106.5	75 31.7	51 56	103.2	76 00.8	46 57	99.7	76 26.6	40 57	95.9	76 48.7	34 57	91.8	77 14.3	23 57	85.4	2
3	72 56.6	65 53	112.3	73 34.3	61 54	109.6	74 26.5	55 56	105.1	74 58.1	50 56	101.9	75 26.8	45 57	98.5	75 52.3	40 57	94.8	76 14.3	34 57	91.0	76 40.0	24 57	84.8	3
4	72 24.6	64 54	110.8	73 01.7	60 55	108.1	73 53.2	54 56	103.8	74 24.4	50 56	100.7	74 52.7	45 57	97.4	75 18.0	39 57	93.8	75 39.8	34 57	90.1	76 05.8	24 57	84.2	4
25	71 52.3	63 54	109.4	72 28.9	59 55	106.8	73 19.7	53 56	102.6	73 50.5	49 57	99.5	74 18.5	44 57	96.3	74 43.6	39 57	92.9	75 05.4	34 57	89.3	75 31.6	24 57	83.6	25
6	71 19.6	62 55	108.0	71 55.8	59 55	105.5	72 46.0	53 56	101.3	73 16.5	49 57	98.4	73 44.3	44 57	95.3	74 09.2	39 57	92.0	74 31.0	34 57	88.5	74 57.4	25 57	83.1	6
7	70 46.8	61 55	106.7	71 22.5	58 56	104.2	72 12.2	52 57	100.2	72 42.4	48 57	97.3	73 10.0	44 57	94.3	73 34.8	39 57	91.1	73 56.6	34 57	87.8	74 23.2	25 57	82.5	7
8	70 13.7	61 55	105.4	70 49.1	57 56	103.0	71 38.3	52 57	99.1	72 08.2	48 57	96.3	72 35.7	44 57	93.3	73 00.4	39 57	90.3	73 22.2	34 57	87.0	73 49.1	26 57	82.0	8
9	69 40.4	60 56	104.2	70 15.5	57 56	101.8	71 04.2	51 57	98.0	71 34.0	48 57	95.3	72 01.3	43 57	92.4	72 26.0	39 57	89.5	72 47.9	34 57	86.3	73 15.1	26 57	81.4	9
30	69 07.0	59 56	103.0	69 41.7	56 56	100.7	70 30.1	51 57	97.0	70 59.7	47 57	94.3	71 26.9	43 57	91.6	71 51.6	39 57	88.7	72 13.6	34 57	85.6	72 41.1	27 57	80.9	30
1	68 33.4	59 56	101.9	69 07.8	56 57	99.6	69 55.9	51 57	96.0	70 25.4	47 57	93.4	70 52.5	43 57	90.7	71 17.2	39 57	87.9	71 39.3	35 57	85.0	72 07.1	27 56	80.4	1
2	67 59.6	58 56	100.8	68 33.9	56 57	98.5	69 21.7	51 57	95.0	69 51.0	47 57	92.5	70 18.1	43 57	89.9	70 42.8	39 57	87.1	71 05.0	35 57	84.3	71 33.2	28 56	79.9	2
3	67 25.8	58 57	99.7	67 59.8	55 57	97.5	68 47.4	50 57	94.1	69 16.6	47 57	91.6	69 43.7	43 57	89.1	70 08.4	39 57	86.4	70 30.8	35 57	83.7	70 59.4	28 56	79.3	3
4	66 51.8	58 57	98.7	67 25.6	55 57	96.5	68 13.0	50 57	93.2	68 42.2	47 57	90.8	69 09.3	43 57	88.3	69 34.1	39 57	85.7	69 56.6	35 57	83.0	70 25.6	29 56	78.8	4
35	66 17.7	57 57	97.7	66 51.4	55 57	95.6	67 38.6	50 57	92.3	68 07.8	47 57	89.9	68 34.9	43 57	87.5	68 59.8	40 57	85.0	69 22.5	36 57	82.4	69 51.8	29 56	78.3	35
6	65 43.6	57 57	96.7	66 17.1	55 57	94.6	67 04.2	50 57	91.4	67 33.4	47 57	89.1	68 00.5	44 57	86.8	68 25.6	40 57	84.3	68 48.4	36 57	81.8	69 18.2	30 56	77.8	6
7	65 09.4	57 57	95.7	65 42.8	54 57	93.7	66 29.8	50 57	90.6	66 59.0	47 57	88.3	67 26.2	44 57	86.0	67 51.3	40 57	83.7	68 14.3	36 57	81.2	68 44.5	31 56	77.3	7
8	64 35.1	57 57	94.8	65 08.4	54 57	92 8	65 55.4	50 57	89.7	66 24.6	47 57	87.6	66 51.8	44 57	85.3	67 17.1	40 57	83.0	67 40.4	37 57	80.6	68 11.0	31 56	76.8	8
9	64 00.8	57 57	93.9	64 34.1	54 57	92.0	65 21.0	50 57	88.9	65 50.2	47 57	86.8	66 17.6	44 57	84.6	66 43.0	41 57	82.4	67 06.4	37 56	80.0	67 37.5	32 56	76.3	9
40	63 26.4	57 57	93.0	63 59.7	54 57	91.1	64 46.6	50 57	88.1	65 15.8	47 57	86.1	65 43.3	44 57	83.9	66 08.9	41 57	81.7	66 32.6	38 56	79.4	67 04.1	32 56	75.9	40
1	62 52.1	56 57	92.1	63 25.2	54 57	90.3	64 12.2	50 57	87.4	64 41.5	47 57	85.4	65 09.1	45 57	83.3	65 34.9	41 57	81.1	65 58.8	38 56	78.9	66 30.8	33 55	75.4	1
2	62 17.7	56 57	91.3	62 50.8	54 57	89.5	63 37.8	50 57	86.6	64 07.2	48 57	84.6	64 35.0	45 57	82.6	65 00.9	42 57	80.5	65 25.0	39 56	78.3	65 57.5	34 55	74.9	2
3	61 43.2	56 57	90.4	62 16.4	54 57	88.7	63 03.5	50 57	85.9	63 33.0	48 57	83.9	64 00.9	45 57	81.9	64 27.0	42 56	79.9	64 51.4	39 56	77.7	65 24.3	34 55	74.4	3
4	61 08.8	56 57	89.6	61 42.0	54 57	87.9	62 29.2	51 57	85.1	62 58.8	48 57	83.2	63 26.8	45 57	81.3	63 53.2	42 56	79.3	64 17.8	40 56	77.2	64 51.2	35 55	73.9	4
45	60 34.4	56 57	88.8	61 07.6	54 57	87.1	61 54.9	51 57	84.4	62 24.6	48 57	82.6	62 52.8	46 57	80.6	63 19.4	42 56	78.7	63 44.3	40 56	76.6	64 18.2	35 55	73.4	45
6	60 00.0	56 57	88.0	60 33.3	54 57	86.3	61 20.7	51 57	83.7	61 50.6	49 57	81.9	62 18.9	46 56	80.0	62 45.7	43 56	78.1	63 10.8	40 56	76.1	63 45.2	36 55	73.0	6
7	59 25.6	57 57	87.2	59 59.0	54 57	85.6	60 46.5	51 57	83.0	61 16.5	49 57	81.2	61 45.0	46 56	79.4	62 12.1	44 56	77.5	62 37.5	41 55	75.5	63 12.4	37 55	72.5	7
8	58 51.3	57 57	86.5	59 24.7	55 57	84.9	60 12.4	51 57	82.3	60 42.5	49 57	80.6	61 11.3	47 56	78.8	61 38.5	44 56	76.9	62 04.2	41 55	75.0	62 39.6	37 54	72.0	8
9	58 16.9	57 57	85.7	58 50.4	55 57	84.1	59 38.3	52 57	81.6	60 08.6	49 56	79.9	60 37.5	47 56	78.1	61 05.0	45 56	76.3	61 31.0	42 55	74.4	62 06.9	38 54	71.5	9
50	57 42.6	57 57	85.0	58 16.2	55 57	83.4	59 04.3	52 57	81.0	59 34.8	50 56	79.3	60 03.9	47 56	77.5	60 31.6	45 56	75.8	60 57.9	42 55	73.9	61 34.3	38 54	71.1	50
1	57 08.4	57 57	84.2	57 42.0	55 57	82.7	58 30.3	52 56	80.3	59 01.0	50 56	78.6	59 30.3	48 56	76.9	59 58.3	45 55	75.2	60 24.9	43 55	73.4	61 01.8	39 54	70.6	1
2	56 34.2	57 57	83.5	57 07.9	55 57	82.0	57 56.4	52 56	79.6	58 27.3	50 56	78.0	58 56.9	48 56	76.3	59 25.1	46 55	74.6	59 51.9	44 55	72.9	60 29.4	40 54	70.1	2
3	56 00.0	57 57	82.8	56 33.9	56 57	81.3	57 22.6	53 56	79.0	57 53.7	51 56	77.4	58 23.5	49 56	75.8	58 52.0	46 55	74.1	59 19.1	44 55	72.3	59 57.1	40 54	69.6	3
4	55 25.9	58 57	82.1	55 59.9	56 57	80.6	56 48.9	53 56	78.3	57 20.1	51 56	76.8	57 50.1	49 55	75.2	58 18.9	47 55	73.5	58 46.3	45 54	71.8	59 24.9	41 54	69.2	4
55	54 51.8	58 57	81.4	55 26.0	56 56	79.9	56 15.2	53 56	77.7	56 46.7	51 56	76.2	57 16.9	49 55	74.6	57 46.0	47 55	72.9	58 13.7	45 54	71.3	58 52.8	42 53	68.7	55
6	54 17.8	58 57	80.7	54 52.1	56 56	79.3	55 41.6	54 56	77.1	56 13.3	52 55	75.6	56 43.8	50 55	74.0	57 13.1	48 55	72.4	57 41.2	46 54	70.8	58 20.8	42 53	68.2	6
7	53 43.9	58 56	80.0	54 18.3	57 56	78.6	55 08.1	54 56	76.4	55 40.0	52 55	75.0	56 10.8	50 55	73.4	56 40.4	48 54	71.8	57 08.7	46 54	70.2	57 48.9	43 53	67.7	7
8	53 10.0	58 56	79.3	53 44.6	57 56	78.0	54 34.7	54 56	75.8	55 06.8	53 55	74.4	55 37.8	51 55	72.8	56 07.7	49 54	71.3	56 36.4	47 54	69.7	57 17.1	44 53	67.3	8
9	52 36.3	59 56	78.6	53 11.0	57 56	77.3	54 01.4	55 55	75.2	54 33.7	53 53	73.8	55 05.0	51 55	72.3	55 35.2	49 54	70.8	56 04.2	47 54	69.2	56 45.4	44 53	66.8	9
60	52 02.6	59 56	78.0	52 37.5	57 56	76.7	53 28.2	55 55	74.6	54 00.7	53 55	73.2	54 32.3	52 54	71.7	55 02.7	50 54	70.2	55 32.0	48 53	68.7	56 13.8	45 52	66.3	60
1	51 28.9	59 56	77.3	52 04.1	58 56	76.0	52 55.0	55 55	74.0	53 27.8	54 55	72.6	53 59.6	52 54	71.1	54 30.4	50 54	69.7	55 00.0	48 53	68.2	55 42.4	46 52	65.8	1
2	50 55.4	60 56	76.7	51 30.7	58 55	75.4	52 22.0	56 55	73.4	52 55.1	54 54	72.0	53 27.1	53 54	70.6	53 58.2	51 54	69.1	54 28.2	49 53	67.7	55 11.0	46 52	65.4	2
3	50 22.0	60 56	76.0	50 57.5	58 55	74.7	51 49.1	56 55	72.8	52 22.4	55 54	71.4	52 54.7	53 54	70.0	53 26.1	51 53	68.6	53 56.4	50 53	67.1	54 39.8	47 52	64.9	3
4	49 48.6	60 55	75.4	50 24.3	59 55	74.1	51 16.3	57 55	72.2	51 49.8	55 54	70.8	52 22.4	54 54	69.5	52 54.1	52 53	68.1	53 24.7	50 53	66.6	54 08.7	47 52	64.4	4
65	49 15.4	60 55	74.7	49 51.3	59 55	73.5	50 43.6	57 54	71.6	51 17.4	56 54	70.3	51 50.3	54 53	68.9	52 22.2	52 53	67.5	52 53.2	51 52	66.1	53 37.7	48 51	63.9	65
6	48 42.2	61 55	74.1	49 18.3	60 55	72.9	50 11.0	57 54	71.0	50 45.0	56 54	69.7	51 18.2	55 53	68.4	51 50.5	53 53	67.0	52 21.8	51 52	65.6	53 06.9	49 51	63.5	6
7	48 09.2	61 55	73.4	48 45.5	60 55	72.2	49 38.5	58 54	70.4	50 12.8	57 53	69.1	50 46.3	55 53	67.8	51 18.9	54 52	66.5	51 50.5	52 52	65.1	52 36.1	49 51	63.0	7
8	47 36.3	61 55	72.8	48 12.8	60 54	71.6	49 06.2	58 54	69.8	49 40.7	57 53	68.5	50 14.5	56 53	67.2	50 47.4	54 52	65.9	51 19.4	53 52	64.6	52 05.5	50 51	62.5	8
9	47 03.4	62 54	72.2	47 40.2	61 54	71.0	48 33.9	59 54	69.2	49 08.8	57 53	68.0	49 42.8	56 53	66.7	50 16.0	55 52	65.4	50 48.4	53 51	64.1	51 35.1	51 51	62.0	9
70	46 30.7	62 54	71.5	47 07.7	61 54	70.4	48 01.8	59 53	68.6	48 36.9	58 53	67.4	49 11.3	57 52	66.1	49 44.8	55 52	64.9	50 17.5	54 51	63.6	51 04.8	51 50	61.5	70
1	45 58.2	63 54	70.9	46 35.4	61 54	69.8	47 29.8	60 53	68.0	48 05.2	58 53	66.8	48 39.9	57 52	65.6	49 13.7	56 52	64.3	49 46.7	54 51	63.0	50 34.6	52 50	61.1	1
2	45 25.7	63 54	70.3	46 03.1	62 53	69.2	46 58.0	60 53	67.4	47 33.7	59 52	66.3	48 08.6	58 52	65.0	48 42.8	56 51	63.8	49 16.1	55 51	62.5	50 04.5	53 50	60.6	2
3	44 53.4	63 54	69.7	45 31.0	62 53	68.6	46 26.3	61 53	66.9	47 02.2	59 52	65.7	47 37.5	58 52	64.5	48 12.0	57 51	63.3	48 45.7	55 51	62.0	49 34.6	53 50	60.1	3
4	44 21.2	64 53	69.0	44 59.1	63 53	68.0	45 54.7	61 52	66.3	46 31.0	60 52	65.1	47 06.5	59 51	63.9	47 41.3	57 51	62.7	48 15.3	56 50	61.5	49 04.9	54 49	59.6	4
75	43 49.1	64 53	68.4	44 27.2	63 53	67.3	45 23.3	61 52	65.7	45 59.8	60 52	64.6	46 35.7	59 51	63.4	47 10.8	58 51	62.2	47 45.2	57 50	61.0	48 35.2	55 49	59.1	75
6	43 17.2	64 53	67.8	43 55.5	63 53	66.7	44 52.0	62 52	65.1	45 28.8	61 51	64.0	46 05.0	60 51	62.8	46 40.4	58 50	61.7	47 15.1	57 50	60.5	48 05.8	55 49	58.6	6
7	42 45.4	65 53	67.2	43 24.0	64 52	66.1	44 20.8	62 52	64.5	44 57.9	61 51	63.4	45 34.4	60 51	62.3	46 10.2	59 50	61.1	46 45.3	58 50	60.0	47 36.5	56 49	58.2	7
8	42 13.7	65 53	66.6	42 52.6	64 52	65.5	43 49.8	63 51	64.0	44 27.2	62 51	62.9	45 04.0	61 50	61.8	45 40.1	60 50	60.6	46 15.5	58 49	59.5	47 07.3	57 48	57.7	8
9	41 42.2	66 52	66.0	42 21.3	65 52	65.0	43 19.0	63 51	63.4	43 56.7	62 51	62.3	44 33.8	61 50	61.2	45 10.2	60 50	60.1	45 46.0	59 49	58.9	46 38.3	57 48	57.2	9
80	41 10.8	66 52	65.4	41 50.2	65 52	64.4	42 48.3	64 51	62.8	43 26.3	63 50	61.7	44 03.7	62 50	60.7	44 40.5	61 49	59.6	45 16.6	60 49	58.4	46 09.5	58 48	56.7	80
1	40 39.6	67 52	64.8	41 19.3	66 51	63.8	42 17.8	64 51	62.2	42 56.1	63 50	61.2	43 33.8	62 50	60.1	44 10.9	61 49	59.0	44 47.3	60 48	57.9	45 40.8	59 48	56.2	1
2	40 08.6	67 52	64.1	40 48.5	66 51	63.2	41 47.4	65 50	61.7	42 26.0	64 50	60.6	43 04.0	63 49	59.6	43 41.5	62 49	58.5	44 18.3	61 48	57.4	45 12.3	59 47	55.7	2
3	39 37.7	67 51	63.5	40 17.9	67 51	62.6	41 17.2	65 50	61.1	41 56.1	64 50	60.1	42 34.4	63 49	59.0	43 12.2	62 48	58.0	43 49.4	61 48	56.9	44 43.9	60 47	55.2	3
4	39 07.0	68 51	62.9	39 47.4	67 50	62.0	40 47.2	66 50	60.5	41 26.4	65 49	59.5	42 05.0	64 49	58.5	42 43.1	63 48	57.4	43 20.6	62 48	56.4	44 15.8	60 47	54.7	4
85	38 36.4	68 51	62.3	39 17.1	67 50	61.4	40 17.3	66 50	59.9	40 56.8	65 49	58.9	41 35.8	65 48	57.9	42 14.2	64 48	56.9	42 52.1	63 47	55.8	43 47.8	61 46	54.2	85
6	38 06.0	69 50	61.7	38 47.0	68 50	60.8	39 47.6	67 49	59.3	40 27.4	66 49	58.4	41 06.7	65 48	57.4	41 45.5	64 48	56.4	42 23.7	63 47	55.3	43 19.9	62 46	53.7	6
7	37 35.8	69 50	61.1	38 17.1	68 50	60.2	39 18.1	67 49	58.8	39 58.2	66 48	57.8	40 37.8	66 48	56.8	41 16.9	65 47	55.8	41 55.5	64 47	54.8	42 52.3	62 46	53.2	7
8	37 05.8	70 50	60.5	37 47.3	69 49	59.6	38 48.7	68 49	58.2	39 29.2	67 48	57.2	40 09.1	66 48	56.3	40 48.5	65 47	55.3	41 27.4	64 46	54.3	42 24.8	63 46	52.7	8
9	36 35.9	70 49	59.9	37 17.7	69 49	59.0	38 19.6	68 48	57.6	39 00.3	67 48	56.7	39 40.6	67 47	55.7	40 20.3	66 47	54.7	40 59.6	65 46	53.7	41 57.5	64 45	52.2	9
90	36 06.2	70 49	59.3	36 48.3	70 49	58.4	37 50.6	69 48	57.0	38 31.6	68 47	56.1	39 12.2	67 47	55.2	39 52.3	66 46	54.2	40 31.9	66 46	53.2	41 30.4	64 45	51.7	90

Digitized by Google

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	35 36.7	71 49	58.7	36 19.1	70 48	57.8	37 21.8	69 48	56.5	38 03.2	69 47	55.6	38 44.1	68 47	54.6	39 24.5	67 46	53.7	40 04.5	66 45	52.7	41 03.5	65 45	51.2	91
2	35 07.4	71 49	58.1	35 50.0	71 48	57.2	36 53.2	70 47	55.9	37 34.9	69 47	55.0	38 16.1	68 46	54.1	38 56.9	68 46	53.1	39 37.2	67 45	52.2	40 36.8	66 44	50.7	2
3	34 38.3	72 48	57.5	35 21.2	71 48	56.6	36 24.8	70 47	55.3	37 06.8	70 46	54.4	37 48.3	69 46	53.5	38 29.4	68 45	52.6	39 10.1	67 45	51.6	40 10.2	66 44	50.2	3
4	34 09.4	72 48	56.9	34 52.6	72 47	56.0	35 56.7	71 47	54.7	36 38.9	70 46	53.9	37 20.8	69 46	53.0	38 02.2	69 45	52.0	38 43.2	68 44	51.1	39 43.9	67 44	49.7	4
95	33 40.7	73 48	56.3	34 24.1	72 47	55.4	35 28.7	71 46	54.2	36 11.2	71 46	53.3	36 53.4	70 45	52.4	37 35.2	69 45	51.5	38 16.5	69 44	50.6	39 17.7	67 43	49.2	95
6	33 12.2	73 47	55.7	33 55.9	73 47	54.8	35 00.9	72 46	53.6	35 43.7	71 45	52.7	36 26.2	71 45	51.8	37 08.3	70 44	51.0	37 50.1	69 44	50.0	38 51.8	68 43	48.7	6
7	32 43.8	74 47	55.0	33 27.9	73 46	54.2	34 33.3	72 46	53.0	35 16.5	72 45	52.1	35 59.3	71 45	51.3	36 41.7	70 44	50.4	37 23.8	70 43	49.5	38 26.1	69 43	48.1	7
8	32 15.7	74 46	54.4	33 00.0	74 46	53.6	34 05.9	73 45	52.4	34 49.4	72 45	51.6	35 32.5	72 44	50.7	36 15.3	71 44	49.9	36 57.7	70 43	49.0	38 00.5	69 42	47.6	8
9	31 47.9	75 46	53.8	32 32.4	74 46	53.0	33 38.7	73 45	51.8	34 22.5	73 44	51.0	35 06.0	72 44	50.2	35 49.1	72 43	49.3	36 31.8	71 43	48.4	37 35.2	70 42	47.1	9
100	31 20.2	75 46	53.2	32 05.0	75 45	52.4	33 11.8	74 45	51.2	33 55.9	73 44	50.4	34 39.7	73 44	49.6	35 23.1	72 43	48.8	36 06.2	71 42	47.9	37 10.1	71 41	46.6	100
1	30 52.7	75 45	52.6	31 37.9	75 45	51.8	32 45.1	74 44	50.7	33 29.5	74 44	49.9	34 13.6	73 43	49.0	34 57.3	73 43	48.2	35 40.8	72 42	47.4	36 45.2	71 41	46.1	1
2	30 25.5	76 45	52.0	31 10.9	75 45	51.2	32 18.6	75 44	50.1	33 03.3	74 43	49.3	33 47.7	74 43	48.5	34 31.8	73 42	47.7	35 15.6	73 42	46.8	36 20.6	72 41	45.5	2
3	29 58.5	76 45	51.4	30 44.2	76 44	50.6	31 52.3	75 43	49.5	32 37.3	75 43	48.7	33 22.0	74 42	47.9	34 06.5	74 42	47.1	34 50.6	73 41	46.3	35 56.1	72 40	45.0	3
4	29 31.7	77 44	50.8	30 17.7	76 44	50.0	31 26.2	76 43	48.9	32 11.6	75 42	48.1	32 56.6	75 42	47.3	33 41.4	74 41	46.5	34 25.8	74 41	45.7	35 31.9	73 40	44.5	4
105	29 05.2	77 44	50.2	29 51.5	77 43	49.4	31 00.4	76 43	48.3	31 46.1	76 42	47.5	32 31.4	75 42	46.8	33 16.5	75 41	46.0	34 01.3	74 40	45.2	35 07.9	74 40	44.0	105
6	28 38.9	78 43	49.5	29 25.4	77 43	48.8	30 34.8	77 42	47.7	31 20.8	76 42	47.0	32 06.5	76 41	46.2	32 51.9	75 41	45.4	33 37.0	75 40	44.6	34 44.1	74 39	43.4	6
7	28 12.8	78 43	48.9	28 59.6	78 43	48.2	30 09.5	77 42	47.1	30 55.7	77 41	46.4	31 41.7	76 41	45.6	32 27.5	76 40	44.9	33 12.9	76 40	44.1	34 20.5	75 39	42.9	7
8	27 47.0	79 43	48.3	28 34.1	78 42	47.6	29 44.4	78 41	46.5	30 31.0	77 41	45.8	31 17.3	77 40	45.1	32 03.3	77 40	44.3	32 49.1	76 39	43.5	33 57.2	75 38	42.4	8
9	27 21.4	79 42	47.7	28 08.8	79 42	47.0	29 19.5	78 41	45.9	30 06.4	78 40	45.2	30 53.0	78 40	44.5	31 39.4	77 39	43.7	32 25.5	77 39	43.0	33 34.2	76 38	41.8	9
110	26 56.1	80 42	47.1	27 43.8	79 41	46.4	28 54.9	79 41	45.3	29 42.1	78 40	44.6	30 29.0	78 40	43.9	31 15.7	78 39	43.2	32 02.2	77 38	42.4	33 11.3	76 38	41.3	110
1	26 31.0	80 41	46.4	27 19.0	80 41	45.8	28 30.6	79 40	44.7	29 18.0	79 40	44.0	30 05.3	79 39	43.3	30 52.3	78 39	42.6	31 39.1	78 38	41.9	32 48.7	77 37	40.8	1
2	26 06.2	81 41	45.8	26 54.5	80 40	45.2	28 06.5	80 40	44.1	28 54.2	79 39	43.5	29 41.8	79 39	42.8	30 29.1	79 38	42.0	31 16.2	78 38	41.3	32 26.4	78 37	40.2	2
3	25 41.6	81 40	45.2	26 30.2	81 40	44.5	27 42.6	80 39	43.5	28 30.7	80 39	42.9	29 18.6	80 38	42.2	30 06.2	79 38	41.5	30 53.6	79 37	40.8	32 04.3	78 36	39.7	3
4	25 17.4	81 40	44.6	26 06.2	81 40	43.9	27 19.1	81 39	42.9	28 07.4	80 38	42.3	28 55.6	80 38	41.6	29 43.5	80 37	40.9	30 31.3	79 37	40.2	31 42.4	79 36	39.1	4
115	24 53.3	82 40	44.0	25 42.4	82 39	43.3	26 55.7	81 38	42.3	27 44.4	81 38	41.7	28 32.9	81 37	41.0	29 21.1	80 37	40.3	30 09.2	80 36	39.6	31 20.8	79 36	38.6	115
6	24 29.6	82 39	43.3	25 19.0	82 39	42.7	26 32.7	82 38	41.7	27 21.6	81 37	41.1	28 10.4	81 37	40.4	28 59.0	81 36	39.8	29 47.4	80 36	39.1	30 59.5	80 35	38.0	6
7	24 06.1	83 39	42.7	24 55.8	83 38	42.1	26 09.9	82 38	41.1	26 59.2	82 37	40.5	27 48.2	82 36	39.8	28 37.1	81 36	39.2	29 25.8	81 36	38.5	30 38.4	80 35	37.5	7
8	23 42.9	83 38	42.1	24 32.8	83 38	41.5	25 47.4	83 37	40.5	26 37.0	82 37	39.9	27 26.3	82 36	39.3	28 15.5	82 36	38.6	29 04.5	82 35	38.0	30 17.6	81 34	36.9	8
9	23 20.0	84 38	41.4	24 10.2	84 37	40.8	25 25.2	83 37	39.9	26 15.0	83 36	39.3	27 04.7	83 36	38.7	27 54.2	82 35	38.0	28 43.5	82 35	37.4	29 57.1	82 34	36.4	9
120	22 57.4	84 37	40.8	23 47.8	84 37	40.2	25 03.3	84 36	39.3	25 53.4	83 36	38.7	26 43.3	83 35	38.1	27 33.1	83 35	37.5	28 22.7	83 34	36.8	29 36.8	82 33	35.8	120
1	22 35.0	85 37	40.2	23 25.8	84 36	39.6	24 41.6	84 36	38.7	25 32.0	84 35	38.1	26 22.2	84 35	37.5	27 12.3	83 34	36.9	28 02.2	83 34	36.2	29 16.8	83 33	35.3	1
2	22 13.0	85 36	39.5	23 04.0	85 36	38.9	24 20.2	85 35	38.1	25 10.9	84 35	37.5	26 01.4	84 34	36.9	26 51.8	84 34	36.3	27 42.0	84 33	35.7	28 57.0	83 32	34.7	2
3	21 51.2	86 36	38.9	22 42.5	85 35	38.3	23 59.2	85 35	37.5	24 50.1	85 34	36.9	25 40.9	85 34	36.3	26 31.6	84 33	35.7	27 22.1	84 33	35.1	28 37.6	84 32	34.2	3
4	21 29.8	86 35	38.2	22 21.3	86 35	37.7	23 38.4	85 34	36.8	24 29.6	85 34	36.3	25 20.7	85 33	35.7	26 11.6	85 33	35.1	27 02.4	85 32	34.5	28 18.4	84 32	33.6	4
125	21 08.6	86 35	37.6	22 00.4	86 34	37.1	23 17.9	86 34	36.2	24 09.4	86 33	35.7	25 00.7	86 33	35.1	25 52.0	85 32	34.5	26 43.1	85 32	33.9	27 59.5	85 31	33.0	125
6	20 47.8	87 34	37.0	21 39.8	87 34	36.4	22 57.7	86 33	35.6	23 49.5	86 33	35.1	24 41.1	86 32	34.5	25 32.6	86 32	33.9	26 24.0	86 31	33.4	27 40.8	85 31	32.5	6
7	20 27.3	87 34	36.3	21 19.6	87 33	35.8	22 37.8	87 33	35.0	23 29.8	87 32	34.4	24 21.8	86 32	33.9	25 13.6	86 31	33.3	26 05.2	86 31	32.8	27 22.5	86 30	31.9	7
8	20 07.0	88 33	35.7	20 59.6	88 33	35.1	22 18.2	87 32	34.4	23 10.5	87 32	33.8	24 02.7	87 31	33.3	24 54.8	87 31	32.7	25 46.8	86 30	32.2	27 04.5	86 30	31.3	8
9	19 47.1	88 33	35.0	20 39.9	88 32	34.5	21 59.0	88 32	33.7	22 51.5	88 31	33.2	23 44.0	87 31	32.7	24 36.3	87 30	32.1	25 28.6	87 30	31.6	26 46.7	87 29	30.8	9
130	19 27.6	88 32	34.4	20 20.6	88 32	33.9	21 40.0	88 31	33.1	22 32.8	88 31	32.6	23 25.6	88 30	32.1	24 18.2	88 30	31.6	25 10.7	87 29	31.0	26 29.2	87 29	30.2	130
1	19 08.3	89 32	33.7	20 01.6	89 31	33.2	21 21.4	89 31	32.5	22 14.5	88 30	32.0	23 07.4	88 30	31.5	24 00.3	88 29	31.0	24 53.1	88 29	30.4	26 12.1	88 28	29.6	1
2	18 49.4	89 31	33.1	19 42.9	89 31	32.6	21 03.1	89 30	31.8	21 56.4	89 30	31.4	22 49.6	89 29	30.9	23 42.8	89 29	30.3	24 35.8	88 28	29.8	25 55.2	88 28	29.1	2
3	18 30.8	90 30	32.4	19 24.5	90 30	31.9	20 45.1	89 29	31.2	21 38.6	89 29	30.7	22 32.1	89 29	30.2	23 25.5	89 28	29.7	24 18.9	89 28	29.2	25 38.6	89 27	28.5	3
4	18 12.5	90 30	31.7	19 06.5	90 30	31.3	20 27.4	90 29	30.6	21 21.2	90 28	30.1	22 15.0	90 28	29.6	23 08.6	89 28	29.1	24 02.2	89 27	28.7	25 22.4	89 27	27.9	4
135	17 54.6	90 29	31.1	18 48.8	90 29	30.6	20 10.0	90 28	29.9	21 04.1	90 28	29.5	21 58.1	90 28	29.0	22 52.0	90 27	28.5	23 45.9	90 27	28.1	25 06.4	89 26	27.3	135
6	17 37.0	91 29	30.4	18 31.4	91 28	30.0	19 53.0	91 28	29.3	20 47.3	90 27	28.9	21 41.6	90 27	28.4	22 35.7	90 27	27.9	23 29.8	90 26	27.5	24 50.8	90 26	26.7	6
7	17 19.7	91 28	29.8	18 14.4	91 28	29.3	19 36.4	91 27	28.7	20 30.9	91 27	28.2	21 25.4	91 26	27.8	22 19.8	91 26	27.3	23 14.1	90 26	26.9	24 35.5	90 25	26.2	7
8	17 02.8	92 28	29.1	17 57.7	91 27	28.7	19 20.0	91 27	28.0	20 14.8	91 26	27.6	21 09.5	91 26	27.2	22 04.2	91 26	26.7	22 58.7	91 25	26.3	24 20.5	91 24	25.6	8
9	16 46.2	92 27	28.4	17 41.4	92 27	28.0	19 04.0	92 26	27.4	19 59.0	92 26	27.0	20 54.0	92 25	26.5	21 48.9	91 25	26.1	22 43.7	91 25	25.7	24 05.8	91 24	25.0	9
140	16 30.0	92 26	27.8	17 25.4	92 26	27.4	18 48.4	92 26	26.7	19 43.6	92 25	26.3	20 38.8	92 25	25.9	21 33.9	92 24	25.5	22 28.9	92 24	25.1	23 51.4	92 23	24.4	140
1	16 14.2	93 26	27.1	17 09.8	93 25	26.7	18 33.0	92 25	26.1	19 28.5	92 25	25.7	20 23.9	92 24	25.3	21 19.2	92 24	24.9	22 14.5	92 23	24.5	23 37.3	92 23	23.8	1
2	15 58.7	93 25	26.4	16 54.5	93 25	26.0	18 18.1	93 24	25.4	19 13.8	93 24	25.1	20 09.4	93 24	24.7	21 04.9	93 23	24.3	22 00.4	92 23	23.8	23 23.6	92 22	23.2	2
3	15 43.6	93 25	25.7	16 39.6	93 24	25.4	18 03.5	93 24	24.8	18 59.4	93 23	24.4	19 55.2	93 23	24.0	20 51.0	93 23	23.6	21 46.7	93 22	23.2	23 10.2	93 22	22.6	3
4	15 28.8	94 24	25.1	16 25.0	94 24	24.7	17 49.2	94 23	24.1	18 45.3	93 23	23.8	19 41.3	93 22	23.4	20 37.3	93 22	23.0	21 33.3	93 22	22.6	22 57.1	93 21	22.0	4
145	15 14.4	94 23	24.4	16 10.8	94 23	24.0	17 35.3	94 23	23.5	18 31.6	94 22	23.1	19 27.9	94 22	22.8	20 24.1	94 22	22.4	21 20.2	94 21	22.0	22 44.4	93 21	21.4	145
6	15 00.4	94 23	23.7	15 57.0	94 22	23.4	17 21.8	94 22	22.8	18 18.3	94 22	22.5	19 14.7	94 21	22.1	20 11.1	94 21	21.8	21 07.5	94 21	21.4	22 31.9	94 20	20.8	6
7	14 46.7	95 22	23.0	15 43.5	95 22	22.7	17 08.6	95 21	22.2	18 05.3	94 21	21.8	19 01.9	94 21	21.5	19 58.5	94 20	21.1	20 55.1	94 20	20.8	22 19.9	94 20	20.2	7
8	14 33.5	95 22	22.4	15 30.4	95 21	22.0	16 55.8	95 21	21.5	17 52.7	95 20	21.2	18 49.5	95 20	20.9	19 46.3	95 20	20.5	20 43.1	95 20	20.2	22 08.1	94 19	19.6	8
9	14 20.6	95 21	21.7	15 17.7	95 21	21.4	16 43.3	95 20	20.9	17 40.4	95 20	20.6	18 37.4	95 20	20.2	19 34.4	95 19	19.9	20 31.4	95 19	19.6	21 56.7	95 18	19.0	9
150	14 08.0	96 20	21.0	15 05.3	95 20	20.7	16 31.3	95 20	20.2	17 28.5	95 19	19.9	18 25.7	95 19	19.6	19 22.9	95 19	19.3	20 20.0	95 18	18.9	21 45.7	95 18	18.4	150
1	13 55.9	96 20	20.3	14 53.4	96 19	20.0	16 19.5	96 19	19.6	17 17.0	96 19	19.3	18 14.3	96 18	18.9	19 11.7	96 18	18.6	20 09.0	96 18	18.3	21 34.9	95 17	17.8	1
2	13 44.2	96 19	19.6	14 41.8	96 19	19.3	16 08.2	96 18	18.9	17 05.8	96 18	18.6	18 03.4	96 18	18.3	19 00.9	96 17	18.0	19 58.4	96 17	17.7	21 24.6	96 17	17.2	2
3	13 32.8	96 18	18.9	14 30.6	96 18	18.7	15 57.3	96 18	18.2	16 55.0	96 17	17.9	17 52.7	96 17	17.7	18 50.4	96 17	17.4	19 48.1	96 17	17.1	21 14.5	96 16	16.6	3
4	13 21.8	97 18	18.2	14 19.8	97 17	18.0	15 46.7	97 17	17.6	16 44.6	96 17	17.3	17 42.5	96 16	17.0	18 40.3	96 16	16.7	19 38.2	96 16	16.5	21 04.9	96 16	16.0	4
155	13 11.3	97 17	17.5	14 09.4	97 17	17.3	15 36.5	97 16	16.9	16 34.5	97 16	16.6	17 32.6	97 16	16.4	18 30.6	97 16	16.1	19 28.6	97 15	15.8	20 55.5	97 15	15.4	155
6	13 01.1	97 16	16.9	13 59.3	97 16	16.6	15 26.7	97 16	16.2	16 24.9	97 15	16.0	17 23.1	97 15	15.7	18 21.2	97 15	15.5	19 19.4	97 15	15.2	20 46.6	97 14	14.8	6
7	12 51.3	97 16	16.2	13 49.7	97 15	15.9	15 17.2	97 15	15.6	16 15.6	97 15	15.3	17 13.9	97 15	15.1	18 12.2	97 14	14.8	19 10.5	97 14	14.6	20 37.9	97 14	14.2	7
8	12 41.9	98 15	15.5	13 40.4	98 15	15.2	15 08.2	97 14	14.9	16 06.7	97 14	14.7	17 05.2	97 14	14.4	18 03.6	97 14	14.2	19 02.0	97 14	14.0	20 29.7	97 13	13.6	8
9	12 32.9	98 14	14.8	13 31.6	98 14	14.6	14 59.5	98 14	14.2	15 58.2	98 14	14.0	16 56.8	98 13	13.8	17 55.4	98 13	13.6	18 53.9	98 13	13.3	20 21.8	98 13	13.0	9
160	12 24.4	98 14	14.1	13 23.1	98 13	13.9	14 51.3	98 13	13.6	15 50.0	98 13	13.3	16 48.8	98 13	13.1	17 47.5	98 12	12.9	18 46.2	98 12	12.7	20 14.2	98 12	12.4	160
1	12 16.2	98 13	13.4	13 15.1	98 13	13.2	14 43.4	98 12	12.9	15 42.3	98 12	12.7	16 41.1	98 12	12.5	17 40.0	98 12	12.3	18 38.8	98 12	12.1	20 07.0	98 11	11.8	1
2	12 08.4	98 12	12.7	13 07.4	98 12	12.5	14 35.9	98 12	12.2	15 34.9	98 12	12.0	16 33.9	98 11	11.8	17 32.8	98 11	11.6	18 31.8	98 11	11.4	20 00.2	98 11	11.1	2
3	12 01.1	99 12	12.0	13 00.2	99 11	11.8	14 28.8	98 11	11.5	15 27.9	98 11	11.4	16 27.0	98 11	11.2	17 26.1	98 11	11.0	18 25.1	98 10	10.8	19 53.7	98 10	10.5	3
4	11 54.1	99 11	11.3	12 53.3	99 11	11.1	14 22.1	99 10	10.9	15 21.3	99 10	10.7	16 20.5	99 10	10.5	17 19.7	99 10	10.4	18 18.9	99 10	10.2	19 47.6	99 10	09.9	4
165	11 47.6	99 10	10.6	12 46.9	99 10	10.4	14 15.9	99 10	10.2	15 15.1	99 10	10.0	16 14.4	99 10	09.9	17 13.7	99 09	09.7	18 13.0	99 09	09.5	19 41.9	99 09	09.3	165
6	11 41.5	99 10	09.9	12 40.9	99 09	09.7	14 10.0	99 09	09.5	15 09.3	99 09	09.4	16 08.7	99 09	09.2	17 08.1	99 09	09.1	18 07.5	99 09	08.9	19 36.5	99 08	08.7	6
7	11 35.8	99 09	09.2	12 35.3	99 09	09.0	14 04.5	99 08	08.8	15 03.9	99 08	08.7	16 03.4	99 08	08.6	17 02.9	99 08	08.4	18 02.3	99 08	08.3	19 31.5	99 08	08.1	7
8	11 30.5	99 08	08.5	12 30.1	99 08	08.4	13 59.4	99 08	08.2	14 58.9	99 08	08.0	15 58.5	99 08	07.9	16 58.0	99 07	07.8	17 57.5	99 07	07.6	19 26.8	99 07	07.4	8
9	11 25.7	99 07	07.8	12 25.3	99 07	07.7	13 54.7	99 07	07.5	14 54.3	99 07	07.4	15 53.9	99 07	07.2	16 53.5	99 07	07.1	17 53.1	99 07	07.0	19 22.5	99 07	06.8	9
170	11 21.2	99 07	07.1	12 20.9	99 07	07.0	13 50.4	99 06	06.8	14 50.1	99 06	06.7	15 49.8	99 06	06.6	16 49.5	99 06	06.5	17 49.1	99 06	06.4	19 18.6	99 06	06.2	170
1	11 17.2	1.0 06	06.4	12 16.9	1.0 06	06.3	13 46.6	1.0 06	06.1	14 46.3	1.0 06	06.0	15 46.0	1.0 06	05.9	16 45.8	1.0 06	05.8	17 45.5	1.0 05	05.7	19 15.1	1.0 05	05.6	1
2	11 13.6	1.0 05	05.7	12 13.4	1.0 05	05.6	13 43.1	1.0 05	05.4	14 42.9	1.0 05	05.4	15 42.7	1.0 05	05.3	16 42.5	1.0 05	05.2	17 42.3	1.0 05	05.1	19 11.9	1.0 05	05.0	2
3	11 10.4	1.0 05	05.0	12 10.3	1.0 05	04.9	13 40.0	1.0 04	04.8	14 39.9	1.0 04	04.7	15 39.7	1.0 04	04.6	16 39.5	1.0 04	04.5	17 39.4	1.0 04	04.5	19 09.1	1.0 04	04.3	3
4	11 07.6	1.0 04	04.2	12 07.5	1.0 04	04.2	13 37.4	1.0 04	04.1	14 37.2	1.0 04	04.0	15 37.1	1.0 04	04.0	16 37.0	1.0 04	03.9	17 36.9	1.0 04	03.8	19 06.7	1.0 03	03.7	4
175	11 05.3	1.0 03	03.5	12 05.2	1.0 03	03.5	13 35.1	1.0 03	03.4	14 35.0	1.0 03	03.4	15 35.0	1.0 03	03.3	16 34.9	1.0 03	03.2	17 34.8	1.0 03	03.2	19 04.7	1.0 03	03.1	175
6	11 03.4	1.0 02	02.8	12 03.3	1.0 02	02.8	13 33.3	1.0 02	02.7	14 33.2	1.0 02	02.7	15 33.2	1.0 02	02.6	16 33.1	1.0 02	02.6	17 33.1	1.0 02	02.6	19 03.0	1.0 02	02.5	6
7	11 01.9	1.0 02	02.1	12 01.9	1.0 02	02.1	13 31.8	1.0 02	02.0	14 31.8	1.0 02	02.0	15 31.8	1.0 02	02.0	16 31.8	1.0 02	01.9	17 31.7	1.0 02	01.9	19 01.7	1.0 02	01.9	7
8	11 00.8	1.0 01	01.4	12 00.8	1.0 01	01.4	13 30.8	1.0 01	01.4	14 30.8	1.0 01	01.3	15 30.8	1.0 01	01.3	16 30.8	1.0 01	01.3	17 30.8	1.0 01	01.3	19 00.7	1.0 01	01.2	8
9	11 00.2	1.0 00	00.7	12 00.2	1.0 00	00.7	13 30.2	1.0 00	00.7	14 30.2	1.0 00	00.7	15 30.2	1.0 00	00.7	16 30.2	1.0 00	00.6	17 30.2	1.0 00	00.6	19 00.2	1.0 00	00.6	9
180	11 00.0	1.0 00	00.0	12 00.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 30.0	1.0 00	00.0	16 30.0	1.0 00	00.0	17 30.0	1.0 00	00.0	19 00.0	1.0 00	00.0	180

Lat. 55°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	81 00.0	1.0 02	180.0	82 00.0	1.0 02	180.0	83 30.0	1.0 03	180.0	84 30.0	1.0 03	180.0
1	80 58.7	1.0 07	175.6	81 58.5	1.0 07	175.1	83 28.2	1.0 09	174.2	84 28.0	99 10	173.2
2	80 54.7	99 11	171.2	81 54.1	99 12	170.3	83 23.0	98 14	168.4	84 22.0	98 16	166.7
3	80 48.1	98 15	166.9	81 46.9	98 17	165.5	83 14.5	97 19	162.9	84 12.2	95 22	160.3
4	80 39.1	97 19	162.6	81 37.0	96 21	161.0	83 02.8	94 24	157.6	83 58.9	92 27	154.4
05	80 27.6	95 23	158.6	81 24.5	94 25	156.6	82 48.3	92 29	152.5	83 42.6	89 32	148.9
6	80 14.0	94 26	154.7	81 09.7	92 28	152.4	82 31.2	89 32	147.9	83 23.5	85 36	143.9
7	79 58.2	92 29	150.9	80 52.7	90 32	148.4	82 11.8	86 36	143.5	83 02.1	82 39	139.3
8	79 40.6	90 32	147.4	80 33.7	87 35	144.6	81 50.3	83 39	139.5	82 38.7	78 42	135.1
9	79 21.2	87 35	144.0	80 12.9	85 37	141.1	81 27.1	80 41	135.8	82 13.6	75 44	131.3
10	79 00.1	85 37	140.8	79 50.5	83 40	137.8	81 02.4	77 43	132.4	81 47.1	72 46	127.9
1	78 37.7	83 40	137.8	79 26.7	80 42	134.7	80 36.4	74 45	129.2	81 19.3	69 48	124.8
2	78 13.9	81 42	134.9	79 01.7	78 44	131.8	80 09.2	72 47	126.3	80 50.6	66 49	122.0
3	77 49.0	79 43	132.2	78 35.5	76 45	129.1	79 41.0	69 48	123.7	80 21.0	64 51	119.4
4	77 23.0	77 45	129.7	78 08.3	74 47	126.6	79 11.9	67 50	121.2	79 50.6	62 52	117.0
15	76 56.1	75 46	127.3	77 40.3	72 48	124.2	78 42.1	65 51	118.9	79 19.7	60 52	114.8
6	76 28.3	74 48	125.1	77 11.5	70 49	122.0	78 11.7	63 52	116.8	78 48.2	58 53	112.8
7	75 59.8	72 49	122.9	76 42.0	68 50	119.9	77 40.7	62 52	114.8	78 16.2	57 54	110.9
8	75 30.5	71 50	120.9	76 11.8	67 51	118.0	77 09.2	60 53	112.9	77 43.9	55 54	109.2
9	75 00.7	69 51	119.0	75 41.2	66 52	116.1	76 37.3	59 54	111.2	77 11.3	54 55	107.5
20	74 30.4	68 51	117.2	75 10.0	64 53	114.3	76 05.1	58 54	109.5	76 38.3	53 55	106.0
1	73 59.5	67 52	115.5	74 38.5	63 53	112.7	75 32.5	57 55	108.0	76 05.1	52 56	104.6
2	73 28.3	66 53	113.8	74 06.5	62 54	111.1	74 59.6	56 55	106.5	75 31.7	51 56	103.2
3	72 56.6	65 53	112.3	73 34.3	61 54	109.6	74 26.5	55 56	105.1	74 58.1	50 56	101.9
4	72 24.6	64 54	110.8	73 01.7	60 55	108.1	73 53.2	54 56	103.8	74 24.4	50 56	100.7
25	71 52.3	63 54	109.4	72 28.9	59 55	106.8	73 19.7	53 56	102.6	73 50.5	49 57	99.5
6	71 19.6	62 55	108.0	71 55.8	59 55	105.5	72 46.0	53 56	101.3	73 16.5	49 57	98.4
7	70 46.8	61 55	106.7	71 22.5	58 56	104.2	72 12.2	52 57	100.2	72 42.4	48 57	97.3
8	70 13.7	61 55	105.4	70 49.1	57 56	103.0	71 38.3	52 57	99.1	72 08.2	48 57	96.3
9	69 40.4	60 56	104.2	70 15.5	57 56	101.8	71 04.2	51 57	98.0	71 34.0	48 57	95.3
30	69 07.0	59 56	103.0	69 41.7	56 56	100.7	70 30.1	51 57	97.0	70 59.7	47 57	94.3
1	68 33.4	59 56	101.9	69 07.8	56 57	99.6	69 55.9	51 57	96.0	70 25.4	47 57	93.4
2	67 59.6	58 56	100.8	68 33.9	56 57	98.5	69 21.7	51 57	95.0	69 51.0	47 57	92.5
3	67 25.8	58 57	99.7	67 59.8	55 57	97.5	68 47.4	50 57	94.1	69 16.6	47 57	91.6
4	66 51.8	58 57	98.7	67 25.6	55 57	96.5	68 13.0	50 57	93.2	68 42.2	47 57	90.8
35	66 17.7	57 57	97.7	66 51.4	55 57	95.6	67 38.6	50 57	92.3	68 07.8	47 57	89.9
6	65 43.6	57 57	96.7	66 17.1	55 57	94.6	67 04.2	50 57	91.4	67 33.4	47 57	89.1
7	65 09.4	57 57	95.7	65 42.8	54 57	93.7	66 29.8	50 57	90.6	66 59.0	47 57	88.3
8	64 35.1	57 57	94.8	65 08.4	54 57	92.8	65 55.4	50 57	89.7	66 24.6	47 57	87.6
9	64 00.8	57 57	93.9	64 34.1	54 57	92.0	65 21.0	50 57	88.9	65 50.2	47 57	86.8
40	63 26.4	57 57	93.0	63 59.7	54 57	91.1	64 46.6	50 57	88.1	65 15.8	47 57	86.1
1	62 52.1	56 57	92.1	63 25.2	54 57	90.3	64 12.2	50 57	87.4	64 41.5	47 57	85.4
2	62 17.7	56 57	91.3	62 50.8	54 57	89.5	63 37.8	50 57	86.6	64 07.2	48 57	84.6
3	61 43.2	56 57	90.4	62 16.4	54 57	88.7	63 03.5	50 57	85.9	63 33.0	48 57	83.9
4	61 08.8	56 57	89.6	61 42.0	54 57	87.9	62 29.2	51 57	85.1	62 58.8	48 57	83.2
45	60 34.4	56 57	88.8	61 07.6	54 57	87.1	61 54.9	51 57	84.4	62 24.6	48 57	82.6
6	60 00.0	56 57	88.0	60 33.3	54 57	86.3	61 20.7	51 57	83.7	61 50.6	49 57	81.9
7	59 25.6	57 57	87.2	59 59.0	54 57	85.6	60 46.5	51 57	83.0	61 16.5	49 57	81.2
8	58 51.3	57 57	86.5	59 24.7	55 57	84.9	60 12.4	51 57	82.3	60 42.5	49 57	80.6
9	58 16.9	57 57	85.7	58 50.4	55 57	84.1	59 38.3	52 57	81.6	60 08.6	49 56	79.9
50	57 42.6	57 57	85.0	58 16.2	55 57	83.4	59 04.3	52 57	81.0	59 34.8	50 56	79.3
1	57 08.4	57 57	84.2	57 42.0	55 57	82.7	58 30.3	52 56	80.3	59 01.0	50 56	78.6
2	56 34.2	57 57	83.5	57 07.9	55 57	82.0	57 56.4	52 56	79.6	58 27.3	50 56	78.0
3	56 00.0	57 57	82.8	56 33.9	56 57	81.3	57 22.6	53 56	79.0	57 53.7	51 56	77.4
4	55 25.9	58 57	82.1	55 59.9	56 57	80.6	56 48.9	53 56	78.3	57 20.1	51 56	76.8
55	54 51.8	58 57	81.4	55 26.0	56 56	79.9	56 15.2	53 56	77.7	56 46.7	51 56	76.2
6	54 17.8	58 57	80.7	54 52.1	56 56	79.3	55 41.6	54 56	77.1	56 13.3	52 55	75.6
7	53 43.9	58 56	80.0	54 18.3	57 56	78.6	55 08.1	54 56	76.4	55 40.0	52 55	75.0
8	53 10.0	58 56	79.3	53 44.6	57 56	78.0	54 34.7	54 56	75.8	55 06.8	53 55	74.4
9	52 36.3	59 56	78.6	53 11.0	57 56	77.3	54 01.4	55 55	75.2	54 33.7	53 55	73.8
60	52 02.6	59 56	78.0	52 37.5	57 56	76.7	53 28.2	55 55	74.6	54 00.7	53 55	73.2
1	51 28.9	59 56	77.3	52 04.1	58 56	76.0	52 55.0	55 55	74.0	53 27.8	54 55	72.6
2	50 55.4	60 56	76.7	51 30.7	58 55	75.4	52 22.0	56 55	73.4	52 55.1	54 54	72.0
3	50 22.0	60 56	76.0	50 57.5	58 55	74.7	51 49.1	56 55	72.8	52 22.4	55 54	71.4
4	49 48.6	60 55	75.4	50 24.3	59 55	74.1	51 16.3	57 55	72.2	51 49.8	55 54	70.8
65	49 15.4	60 55	74.7	49 51.3	59 55	73.5	50 43.6	57 54	71.6	51 17.4	56 54	70.3
6	48 42.2	61 55	74.1	49 18.3	60 55	72.9	50 11.0	57 54	71.0	50 45.0	56 54	69.7
7	48 09.2	61 55	73.4	48 45.5	60 55	72.2	49 38.5	58 54	70.4	50 12.8	57 53	69.1
8	47 36.3	61 55	72.8	48 12.8	60 54	71.6	49 06.2	58 54	69.8	49 40.7	57 53	68.5
9	47 03.4	62 54	72.2	47 40.2	61 54	71.0	48 33.9	59 54	69.2	49 08.8	57 53	68.0
70	46 30.7	62 54	71.5	47 07.7	61 54	70.4	48 01.8	59 53	68.6	48 36.9	58 53	67.4
1	45 58.2	63 54	70.9	46 35.4	61 54	69.8	47 29.8	60 53	68.0	48 05.2	58 53	66.8
2	45 25.7	63 54	70.3	46 03.1	62 53	69.2	46 58.0	60 53	67.4	47 33.7	59 52	66.3
3	44 53.4	63 54	69.7	45 31.0	62 53	68.6	46 26.3	61 53	66.9	47 02.2	59 52	65.7
4	44 21.2	64 53	69.0	44 59.1	63 53	68.0	45 54.7	61 52	66.3	46 31.0	60 52	65.1
75	43 49.1	64 53	68.4	44 27.2	63 53	67.3	45 23.3	61 52	65.7	45 59.8	60 52	64.6
6	43 17.2	64 53	67.8	43 55.5	63 53	66.7	44 52.0	62 52	65.1	45 28.8	61 51	64.0
7	42 45.4	65 53	67.2	43 24.0	64 52	66.1	44 20.8	62 52	64.5	44 57.9	61 51	63.4
8	42 13.7	65 53	66.6	42 52.6	64 52	65.5	43 49.8	63 51	64.0	44 27.2	62 51	62.9
9	41 42.2	66 52	66.0	42 21.3	65 52	65.0	43 19.0	63 51	63.4	43 56.7	62 51	62.3
80	41 10.8	66 52	65.4	41 50.2	65 52	64.4	42 48.3	64 51	62.8	43 26.3	63 50	61.7
1	40 39.6	67 52	64.8	41 19.3	66 51	63.8	42 17.8	64 51	62.2	42 56.1	63 50	61.2
2	40 08.6	67 52	64.1	40 48.5	66 51	63.2	41 47.4	65 50	61.7	42 26.0	64 50	60.6
3	39 37.7	67 51	63.5	40 17.9	67 51	62.6	41 17.2	65 50	61.1	41 56.1	64 50	60.1
4	39 07.0	68 51	62.9	39 47.4	67 50	62.0	40 47.2	66 50	60.5	41 26.4	65 49	59.5
85	38 36.4	68 51	62.3	39 17.1	67 50	61.4	40 17.3	66 50	59.9	40 56.8	65 49	58.9
6	38 06.0	69 50	61.7	38 47.0	68 50	60.8	39 47.6	67 49	59.3	40 27.4	66 49	58.4
7	37 35.8	69 50	61.1	38 17.1	68 50	60.2	39 18.1	67 49	58.8	39 58.2	66 48	57.8
8	37 05.8	70 50	60.5	37 47.3	69 49	59.6	38 48.7	68 49	58.2	39 29.2	67 48	57.2
9	36 35.9	70 49	59.9	37 17.7	69 49	59.0	38 19.6	68 48	57.6	39 00.3	67 48	56.7
90	36 06.2	70 49	59.3	36 48.3	70 49	58.4	37 50.6	69 48	57.0	38 31.6	68 47	56.1

H.A.	50° 30′			51° 30′			52° 30′			54° 00′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	85 30.0	1.0 04	180.0	86 30.0	1.0 05	180.0	87 30.0	1.0 07	180.0	89 00.0	1.0 16	180.0
1	85 27.6	99 12	171.9	86 27.0	99 15	169.9	87 25.9	97 20	166.3	88 50.6	87 38	149.4
2	85 20.4	97 19	164.1	86 18.1	95 23	160.3	87 14.1	91 30	153.9	88 28.0	66 48	129.9
3	85 08.9	93 26	156.8	86 04.0	90 31	151.6	86 56.1	83 38	143.4	87 59.5	52 52	118.6
4	84 53.5	89 31	150.1	85 45.7	84 36	144.0	86 33.6	75 43	135.0	87 28.3	42 54	111.7
05	84 34.8	85 36	144.1	85 23.9	78 41	137.5	86 07.8	67 47	128.2	86 55.8	36 55	107.0
6	84 13.3	80 40	138.7	84 59.4	73 44	131.8	85 39.7	61 49	122.7	86 22.6	32 56	103.6
7	83 49.5	76 43	133.9	84 32.8	68 47	127.0	85 10.1	56 51	118.3	85 49.0	29 56	101.0
8	83 23.8	72 45	129.7	84 04.6	63 49	122.9	84 39.2	52 53	114.6	85 15.0	27 57	98.9
9	82 56.6	68 47	125.9	83 35.1	60 51	119.4	84 07.6	48 54	111.5	84 41.0	25 57	97.1
10	82 28.2	65 49	122.6	83 04.7	56 52	116.2	83 35.2	45 55	108.8	84 06.8	24 57	95.7
1	81 58.7	62 51	119.6	82 33.4	53 53	113.5	83 02.5	43 55	106.5	83 32.5	23 57	94.4
2	81 28.3	59 52	116.9	82 01.6	51 54	111.1	82 29.3	41 56	104.5	82 58.2	23 57	93.2
3	80 57.3	57 53	114.5	81 29.2	49 55	108.9	81 55.8	39 56	102.7	82 23.8	22 57	92.2
4	80 25.7	55 53	112.3	80 56.5	47 55	107.0	81 22.2	38 56	101.1	81 49.4	22 57	91.3
15	79 53.7	53 54	110.2	80 23.4	46 56	105.2	80 48.3	37 57	99.6	81 15.0	22 57	90.4
6	79 21.2	52 55	108.4	79 50.1	44 56	103.5	80 14.3	36 57	98.2	80 40.6	22 57	89.6
7	78 48.4	50 55	106.7	79 16.5	43 56	102.0	79 40.2	35 57	97.0	80 06.1	22 57	88.8
8	78 15.3	49 56	105.1	78 42.8	42 56	100.6	79 06.0	35 57	95.8	79 31.7	22 57	88.1
9	77 41.9	48 56	103.6	78 08.9	42 57	99.3	78 31.7	34 57	94.7	78 57.4	22 57	87.4
20	77 08.4	47 56	102.2	77 34.9	41 57	98.1	77 57.4	34 57	93.7	78 23.0	23 57	86.7
1	76 34.7	46 56	100.9	77 00.8	40 57	96.9	77 23.1	34 57	92.8	77 48.6	23 57	86.1
2	76 00.8	46 57	99.7	76 26.6	40 57	95.9	76 48.7	34 57	91.8	77 14.3	23 57	85.4
3	75 26.8	45 57	98.5	75 52.3	40 57	94.8	76 14.3	34 57	91.0	76 40.0	24 57	84.8
4	74 52.7	45 57	97.4	75 18.0	39 57	93.8	75 39.8	34 57	90.1	76 05.8	24 57	84.2
25	74 18.5	44 57	96.3	74 43.6	39 57	92.9	75 05.4	34 57	89.3	75 31.6	24 57	83.6
6	73 44.3	44 57	95.3	74 09.2	39 57	92.0	74 31.0	34 57	88.5	74 57.4	25 57	83.1
7	73 10.0	44 57	94.3	73 34.8	39 57	91.1	73 56.6	34 57	87.8	74 23.2	25 57	82.5
8	72 35.7	44 57	93.3	73 00.4	39 57	90.3	73 22.2	34 57	87.0	73 49.1	26 57	82.0
9	72 01.3	43 57	92.4	72 26.0	39 57	89.5	72 47.9	34 57	86.3	73 15.1	26 57	81.4
30	71 26.9	43 57	91.6	71 51.6	39 57	88.7	72 13.6	34 57	85.6	72 41.1	27 57	80.9
1	70 52.5	43 57	90.7	71 17.2	39 57	87.9	71 39.3	35 57	85.0	72 07.1	27 56	80.4
2	70 18.1	43 57	89.9	70 42.8	39 57	87.1	71 05.0	35 57	84.3	71 33.2	28 56	79.9
3	69 43.7	43 57	89.1	70 08.4	39 57	86.4	70 30.8	35 57	83.7	70 59.4	28 56	79.3
4	69 09.3	43 57	88.3	69 34.1	39 57	85.7	69 56.6	35 57	83.0	70 25.6	29 56	78.8
35	68 34.9	43 57	87.5	68 59.8	40 57	85.0	69 22.5	36 57	82.4	69 51.8	29 56	78.3
6	68 00.5	44 57	86.8	68 25.6	40 57	84.3	68 48.4	36 57	81.8	69 18.2	30 56	77.8
7	67 26.2	44 57	86.0	67 51.3	40 57	83.7	68 14.3	36 57	81.2	68 44.5	31 56	77.3
8	66 51.8	44 57	85.3	67 17.1	40 57	83.0	67 40.4	37 57	80.6	68 11.0	31 56	76.8
9	66 17.6	44 57	84.6	66 43.0	41 57	82.4	67 06.4	37 56	80.0	67 37.5	32 56	76.3
40	65 43.3	44 57	83.9	66 08.9	41 57	81.7	66 32.6	38 56	79.4	67 04.1	32 56	75.9
1	65 09.1	45 57	83.3	65 34.9	41 57	81.1	65 58.8	38 56	78.9	66 30.8	33 55	75.4
2	64 35.0	45 57	82.6	65 00.9	42 57	80.5	65 25.0	39 56	78.3	65 57.5	34 55	74.9
3	64 00.9	45 57	81.9	64 27.0	42 56	79.9	64 51.4	39 56	77.7	65 24.3	34 55	74.4
4	63 26.8	45 57	81.3	63 53.2	42 56	79.3	64 17.8	40 56	77.2	64 51.2	35 55	73.9
45	62 52.8	46 57	80.6	63 19.4	42 56	78.7	63 44.3	40 56	76.6	64 18.2	35 55	73.4
6	62 18.9	46 56	80.0	62 45.7	43 56	78.1	63 10.8	40 56	76.1	63 45.2	36 55	73.0
7	61 45.0	46 56	79.4	62 12.1	44 56	77.5	62 37.5	41 55	75.5	63 12.4	37 55	72.5
8	61 11.3	47 56	78.8	61 38.5	44 56	76.9	62 04.2	41 55	75.0	62 39.6	37 54	72.0
9	60 37.5	47 56	78.1	61 05.0	45 56	76.3	61 31.0	42 55	74.4	62 06.9	38 54	71.5
50	60 03.9	47 56	77.5	60 31.6	45 56	75.8	60 57.9	42 55	73.9	61 34.3	38 54	71.1
1	59 30.3	48 56	76.9	59 58.3	45 55	75.2	60 24.9	43 55	73.4	61 01.8	39 54	70.6
2	58 56.9	48 56	76.3	59 25.1	46 55	74.6	59 51.9	44 55	72.9	60 29.4	40 54	70.1
3	58 23.5	49 56	75.8	58 52.0	46 55	74.1	59 19.1	44 55	72.3	59 57.1	40 54	69.6
4	57 50.1	49 55	75.2	58 18.9	47 55	73.5	58 46.3	45 54	71.8	59 24.9	41 54	69.2
55	57 16.9	49 55	74.6	57 46.0	47 55	72.9	58 13.7	45 54	71.3	58 52.8	42 53	68.7
6	56 43.8	50 55	74.0	57 13.1	48 55	72.4	57 41.2	46 54	70.8	58 20.8	42 53	68.2
7	56 10.8	50 55	73.4	56 40.4	48 54	71.8	57 08.7	46 54	70.2	57 48.9	43 53	67.7
8	55 37.8	51 55	72.8	56 07.7	49 54	71.3	56 36.4	47 54	69.7	57 17.1	44 53	67.3
9	55 05.0	51 55	72.3	55 35.2	49 54	70.8	56 04.2	47 54	69.2	56 45.4	44 53	66.8
60	54 32.3	52 54	71.7	55 02.7	50 54	70.2	55 32.0	48 53	68.7	56 13.8	45 52	66.3
1	53 59.6	52 54	71.1	54 30.4	50 54	69.7	55 00.0	48 53	68.2	55 42.4	46 52	65.8
2	53 27.1	53 54	70.6	53 58.2	51 54	69.1	54 28.2	49 53	67.7	55 11.0	46 52	65.4
3	52 54.7	53 54	70.0	53 26.1	51 53	68.6	53 56.4	50 53	67.1	54 39.8	47 52	64.9
4	52 22.4	54 54	69.5	52 54.1	52 53	68.1	53 24.7	50 53	66.6	54 08.7	47 52	64.4
65	51 50.3	54 53	68.9	52 22.2	52 53	67.5	52 53.2	51 52	66.1	53 37.7	48 51	63.9
6	51 18.2	55 53	68.4	51 50.5	53 53	67.0	52 21.8	51 52	65.6	53 06.9	49 51	63.5
7	50 46.3	55 53	67.8	51 18.9	54 52	66.5	51 50.5	52 52	65.1	52 36.1	49 51	63.0
8	50 14.5	56 53	67.2	50 47.4	54 52	65.9	51 19.4	53 52	64.6	52 05.5	50 51	62.5
9	49 42.8	56 53	66.7	50 16.0	55 52	65.4	50 48.4	53 51	64.1	51 35.1	51 51	62.0
70	49 11.3	57 52	66.1	49 44.8	55 52	64.9	50 17.5	54 51	63.6	51 04.8	51 50	61.5
1	48 39.9	57 52	65.6	49 13.7	56 52	64.3	49 46.7	54 51	63.0	50 34.6	52 50	61.1
2	48 08.6	58 52	65.0	48 42.8	56 51	63.8	49 16.1	55 51	62.5	50 04.5	53 50	60.6
3	47 37.5	58 52	64.5	48 12.0	57 51	63.3	48 45.7	55 51	62.0	49 34.6	53 50	60.1
4	47 06.5	59 51	63.9	47 41.3	57 51	62.7	48 15.3	56 50	61.5	49 04.9	54 49	59.6
75	46 35.7	59 51	63.4	47 10.8	58 51	62.2	47 45.2	57 50	61.0	48 35.2	55 49	59.1
6	46 05.0	60 51	62.8	46 40.4	58 50	61.7	47 15.1	57 50	60.5	48 05.8	55 49	58.6
7	45 34.4	60 51	62.3	46 10.2	59 50	61.1	46 45.3	58 50	60.0	47 36.5	56 49	58.2
8	45 04.0	61 50	61.8	45 40.1	60 50	60.6	46 15.5	58 49	59.5	47 07.3	57 48	57.7
9	44 33.8	61 50	61.2	45 10.2	60 50	60.1	45 46.0	59 49	58.9	46 38.3	57 48	57.2
80	44 03.7	62 50	60.7	44 40.5	61 49	59.6	45 16.6	60 49	58.4	46 09.5	58 48	56.7
1	43 33.8	62 50	60.1	44 10.9	61 49	59.0	44 47.3	60 48	57.9	45 40.8	59 48	56.2
2	43 04.0	63 49	59.6	43 41.5	62 49	58.5	44 18.3	61 48	57.4	45 12.3	59 47	55.7
3	42 34.4	63 49	59.0	43 12.2	62 48	58.0	43 49.4	61 48	56.9	44 43.9	60 47	55.2
4	42 05.0	64 49	58.5	42 43.1	63 48	57.4	43 20.6	62 48	56.4	44 15.8	60 47	54.7
85	41 35.8	65 48	57.9	42 14.2	64 48	56.9	42 52.1	63 47	55.8	43 47.8	61 46	54.2
6	41 06.7	65 48	57.4	41 45.5	64 48	56.4	42 23.7	63 47	55.3	43 19.9	62 46	53.7
7	40 37.8	66 48	56.8	41 16.9	65 47	55.8	41 55.5	64 47	54.8	42 52.3	62 46	53.2
8	40 09.1	66 48	56.3	40 48.5	65 47	55.3	41 27.4	64 46	54.3	42 24.8	63 46	52.7
9	39 40.6	67 47	55.7	40 20.3	66 47	54.7	40 59.6	65 46	53.7	41 57.5	64 45	52.2
90	39 12.2	67 47	55.2	39 52.3	66 46	54.2	40 31.9	66 46	53.2	41 30.4	64 45	51.7

Digitized by Google

Lat. 55°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	35 36.7	71 49	58.7	36 19.1	70 48	57.8	37 21.8	69 48	56.5	38 03.2	69 47	55.6	38 44.1	68 47	54.6	39 24.5	67 46	53.7	40 04.5	66 45	52.7	41 03.5	65 45	51.2	91
2	35 07.4	71 49	58.1	35 50.0	71 48	57.2	36 53.2	70 47	55.9	37 34.9	69 47	55.0	38 16.1	68 46	54.1	38 56.9	68 46	53.1	39 37.2	67 45	52.2	40 36.8	66 44	50.7	2
3	34 38.3	72 48	57.5	35 21.2	71 48	56.6	36 24.8	70 47	55.3	37 06.8	70 46	54.4	37 48.3	69 46	53.5	38 29.4	68 45	52.6	39 10.1	67 45	51.6	40 10.2	66 44	50.2	3
4	34 09.4	72 48	56.9	34 52.6	72 47	56.0	35 56.7	71 47	54.7	36 38.9	70 46	53.9	37 20.8	69 46	53.0	38 02.2	69 45	52.0	38 43.2	68 44	51.1	39 43.9	67 44	49.7	4
95	33 40.7	73 48	56.3	34 24.1	72 47	55.4	35 28.7	71 46	54.2	36 11.2	71 46	53.3	36 53.4	70 45	52.4	37 35.2	69 45	51.5	38 16.5	69 44	50.6	39 17.7	67 43	49.2	95
6	33 12.2	73 47	55.7	33 55.9	73 47	54.8	35 00.9	72 46	53.6	35 43.7	71 45	52.7	36 26.2	71 45	51.8	37 08.3	70 44	51.0	37 50.1	69 44	50.0	38 51.8	68 43	48.7	6
7	32 43.8	74 47	55.0	33 27.9	73 46	54.2	34 33.3	72 46	53.0	35 16.5	72 45	52.1	35 59.3	71 45	51.3	36 41.7	70 44	50.4	37 23.8	70 43	49.5	38 26.1	69 43	48.1	7
8	32 15.7	74 46	54.4	33 00.0	74 46	53.6	34 05.9	73 45	52.4	34 49.4	72 45	51.6	35 32.5	72 44	50.7	36 15.3	71 44	49.9	36 57.7	70 43	49.0	38 00.5	69 42	47.6	8
9	31 47.9	75 46	53.8	32 32.4	74 46	53.0	33 38.7	73 45	51.8	34 22.5	73 44	51.0	35 06.0	72 44	50.2	35 49.1	72 43	49.3	36 31.8	71 43	48.4	37 35.2	70 42	47.1	9
100	31 20.2	75 46	53.2	32 05.0	75 45	52.4	33 11.8	74 45	51.2	33 55.9	73 44	50.4	34 39.7	73 44	49.6	35 23.1	72 43	48.8	36 06.2	71 42	47.9	37 10.1	71 41	46.6	100
1	30 52.7	75 45	52.6	31 37.9	75 45	51.8	32 45.1	74 44	50.7	33 29.5	74 44	49.9	34 13.6	73 43	49.0	34 57.3	73 43	48.2	35 40.8	72 42	47.4	36 45.2	71 41	46.1	1
2	30 25.5	76 45	52.0	31 10.9	75 45	51.2	32 18.6	75 44	50.1	33 03.3	74 43	49.3	33 47.7	74 43	48.5	34 31.8	73 42	47.7	35 15.6	73 42	46.8	36 20.6	72 41	45.5	2
3	29 58.5	76 45	51.4	30 44.2	76 44	50.6	31 52.3	75 43	49.5	32 37.3	75 43	48.7	33 22.0	74 42	47.9	34 06.5	74 42	47.1	34 50.6	73 41	46.3	35 56.1	72 40	45.0	3
4	29 31.7	77 44	50.8	30 17.7	76 44	50.0	31 26.2	76 43	48.9	32 11.6	75 42	48.1	32 56.6	75 42	47.3	33 41.4	74 41	46.5	34 25.8	74 41	45.7	35 31.9	73 40	44.5	4
105	29 05.2	77 44	50.2	29 51.5	77 43	49.4	31 00.4	76 43	48.3	31 46.1	76 42	47.5	32 31.4	75 42	46.8	33 16.5	75 41	46.0	34 01.3	74 40	45.2	35 07.9	74 40	44.0	105
6	28 38.9	78 43	49.5	29 25.4	77 43	48.8	30 34.8	77 42	47.7	31 20.8	76 42	47.0	32 06.5	76 41	46.2	32 51.9	75 41	45.4	33 37.0	75 40	44.6	34 44.1	74 39	43.4	6
7	28 12.8	78 43	48.9	28 59.6	78 43	48.2	30 09.5	77 42	47.1	30 55.7	77 41	46.4	31 41.7	76 41	45.6	32 27.5	76 40	44.9	33 12.9	76 40	44.1	34 20.5	75 39	42.9	7
8	27 47.0	79 43	48.3	28 34.1	78 42	47.6	29 44.4	78 41	46.5	30 31.0	77 41	45.8	31 17.3	77 40	45.1	32 03.3	77 40	44.3	32 49.1	76 39	43.5	33 57.2	75 38	42.4	8
9	27 21.4	79 42	47.7	28 08.8	79 42	47.0	29 19.5	78 41	45.9	30 06.4	78 40	45.2	30 53.0	78 40	44.5	31 39.4	77 39	43.7	32 25.5	77 39	43.0	33 34.2	76 38	41.8	9
110	26 56.1	80 42	47.1	27 43.8	79 41	46.4	28 54.9	79 41	45.3	29 42.1	78 40	44.6	30 29.0	78 40	43.9	31 15.7	78 39	43.2	32 02.2	77 38	42.4	33 11.3	76 38	41.3	110
1	26 31.0	80 41	46.4	27 19.0	80 41	45.8	28 30.6	79 40	44.7	29 18.0	79 40	44.0	30 05.3	79 39	43.3	30 52.3	78 39	42.6	31 39.1	78 38	41.9	32 48.7	77 37	40.8	1
2	26 06.2	81 41	45.8	26 54.5	80 40	45.2	28 06.5	80 40	44.1	28 54.2	79 39	43.5	29 41.8	79 39	42.8	30 29.1	79 38	42.0	31 16.2	78 38	41.3	32 26.4	78 37	40.2	2
3	25 41.6	81 40	45.2	26 30.2	81 40	44.5	27 42.6	80 39	43.5	28 30.7	80 39	42.9	29 18.6	80 38	42.2	30 06.2	79 38	41.5	30 53.6	79 37	40.8	32 04.3	78 36	39.7	3
4	25 17.4	81 40	44.6	26 06.2	81 40	43.9	27 19.1	81 39	42.9	28 07.4	80 38	42.3	28 55.6	80 38	41.6	29 43.5	80 37	40.9	30 31.3	79 37	40.2	31 42.4	79 36	39.1	4
115	24 53.3	82 40	44.0	25 42.4	82 39	43.3	26 55.7	81 38	42.3	27 44.4	81 38	41.7	28 32.9	81 37	41.0	29 21.1	80 37	40.3	30 09.2	80 36	39.6	31 20.8	79 36	38.6	115
6	24 29.6	82 39	43.3	25 19.0	82 39	42.7	26 32.7	82 38	41.7	27 21.6	81 37	41.1	28 10.4	81 37	40.4	28 59.0	81 36	39.8	29 47.4	80 36	39.1	30 59.5	80 35	38.0	6
7	24 06.1	83 39	42.7	24 55.8	83 38	42.1	26 09.9	82 38	41.1	26 59.2	82 37	40.5	27 48.2	82 36	39.8	28 37.1	81 36	39.2	29 25.8	81 36	38.5	30 38.4	80 35	37.5	7
8	23 42.9	83 38	42.1	24 32.8	83 38	41.5	25 47.4	83 37	40.5	26 37.0	82 37	39.9	27 26.3	82 36	39.3	28 15.5	82 36	38.6	29 04.5	82 35	38.0	30 17.6	81 34	36.9	8
9	23 20.0	84 38	41.4	24 10.2	84 37	40.8	25 25.2	83 37	39.9	26 15.0	83 36	39.3	27 04.7	83 36	38.7	27 54.2	82 35	38.0	28 43.5	82 35	37.4	29 57.1	82 34	36.4	9
120	22 57.4	84 37	40.8	23 47.8	84 37	40.2	25 03.3	84 36	39.3	25 53.4	83 36	38.7	26 43.3	83 35	38.1	27 33.1	83 35	37.5	28 22.7	83 34	36.8	29 36.8	82 33	35.8	120
1	22 35.0	85 37	40.2	23 25.8	84 36	39.6	24 41.6	84 36	38.7	25 32.0	84 35	38.1	26 22.2	84 35	37.5	27 12.3	83 34	36.9	28 02.2	83 34	36.2	29 16.8	83 33	35.3	1
2	22 13.0	85 36	39.5	23 04.0	85 36	38.9	24 20.2	85 35	38.1	25 10.9	84 35	37.5	26 01.4	84 34	36.9	26 51.8	84 34	36.3	27 42.0	84 33	35.7	28 57.0	83 32	34.7	2
3	21 51.2	86 36	38.9	22 42.5	85 35	38.3	23 59.2	85 35	37.5	24 50.1	85 34	36.9	25 40.9	85 34	36.3	26 31.6	84 33	35.7	27 22.1	84 33	35.1	28 37.6	84 32	34.2	3
4	21 29.8	86 35	38.2	22 21.3	86 35	37.7	23 38.4	85 34	36.8	24 29.6	85 34	36.3	25 20.7	85 33	35.7	26 11.6	85 33	35.1	27 02.4	85 32	34.5	28 18.4	84 32	33.6	4
125	21 08.6	86 35	37.6	22 00.4	86 34	37.1	23 17.9	86 34	36.2	24 09.4	86 33	35.7	25 00.7	86 33	35.1	25 52.0	85 32	34.5	26 43.1	85 32	33.9	27 59.5	85 31	33.0	125
6	20 47.8	87 34	37.0	21 39.8	87 34	36.4	22 57.7	86 33	35.6	23 49.5	86 33	35.1	24 41.1	86 32	34.5	25 32.6	86 32	33.9	26 24.0	86 31	33.4	27 40.8	85 31	32.5	6
7	20 27.3	87 34	36.3	21 19.6	87 33	35.8	22 37.8	87 33	35.0	23 29.8	87 32	34.4	24 21.8	86 32	33.9	25 13.6	86 31	33.3	26 05.2	86 31	32.8	27 22.5	86 30	31.9	7
8	20 07.0	88 33	35.7	20 59.6	88 33	35.1	22 18.2	87 32	34.4	23 10.5	87 32	33.8	24 02.7	87 31	33.3	24 54.8	87 31	32.7	25 46.8	86 30	32.2	27 04.5	86 30	31.3	8
9	19 47.1	88 33	35.0	20 39.9	88 32	34.5	21 59.0	88 32	33.7	22 51.5	88 31	33.2	23 44.0	87 31	32.7	24 36.3	87 30	32.1	25 28.6	87 30	31.6	26 46.7	87 29	30.8	9
130	19 27.6	88 32	34.4	20 20.6	88 32	33.9	21 40.0	88 31	33.1	22 32.8	88 31	32.6	23 25.6	88 30	32.1	24 18.2	88 30	31.6	25 10.7	87 29	31.0	26 29.2	87 29	30.2	130
1	19 08.3	89 32	33.7	20 01.6	89 31	33.2	21 21.4	89 31	32.5	22 14.5	88 30	32.0	23 07.4	88 30	31.5	24 00.3	88 29	31.0	24 53.1	88 29	30.4	26 12.1	88 28	29.6	1
2	18 49.4	89 31	33.1	19 42.9	89 31	32.6	21 03.1	89 30	31.8	21 56.4	89 30	31.4	22 49.6	89 29	30.9	23 42.8	89 29	30.3	24 35.8	88 28	29.8	25 55.2	88 28	29.1	2
3	18 30.8	90 30	32.4	19 24.5	90 30	31.9	20 45.1	89 29	31.2	21 38.6	89 29	30.7	22 32.1	89 29	30.2	23 25.5	89 28	29.7	24 18.9	89 28	29.2	25 38.6	89 27	28.5	3
4	18 12.5	90 30	31.7	19 06.5	90 30	31.3	20 27.4	90 29	30.6	21 21.2	90 28	30.1	22 15.0	90 28	29.6	23 08.6	89 28	29.1	24 02.2	89 27	28.7	25 22.4	89 27	27.9	4
135	17 54.6	90 29	31.1	18 48.8	90 29	30.6	20 10.0	90 28	29.9	21 04.1	90 28	29.5	21 58.1	90 28	29.0	22 52.0	90 27	28.5	23 45.9	90 27	28.1	25 06.4	89 26	27.3	135
6	17 37.0	91 29	30.4	18 31.4	91 28	30.0	19 53.0	91 28	29.3	20 47.3	90 27	28.9	21 41.6	90 27	28.4	22 35.7	90 27	27.9	23 29.8	90 26	27.5	24 50.8	90 26	26.7	6
7	17 19.7	91 28	29.8	18 14.4	91 28	29.3	19 36.4	91 27	28.7	20 30.9	91 27	28.2	21 25.4	91 26	27.8	22 19.8	91 26	27.3	23 14.1	90 26	26.9	24 35.5	90 25	26.2	7
8	17 02.8	92 28	29.1	17 57.7	91 27	28.7	19 20.0	91 27	28.0	20 14.8	91 26	27.6	21 09.5	91 26	27.2	22 04.2	91 26	26.7	22 58.7	91 25	26.3	24 20.5	91 24	25.6	8
9	16 46.2	92 27	28.4	17 41.4	92 27	28.0	19 04.0	92 26	27.4	19 59.0	92 26	27.0	20 54.0	92 25	26.5	21 48.9	91 25	26.1	22 43.7	91 25	25.7	24 05.8	91 24	25.0	9
140	16 30.0	92 26	27.8	17 25.4	92 26	27.4	18 48.4	92 26	26.7	19 43.6	92 25	26.3	20 38.8	92 25	25.9	21 33.9	92 24	25.5	22 28.9	92 24	25.1	23 51.4	92 23	24.4	140
1	16 14.2	93 26	27.1	17 09.8	93 25	26.7	18 33.0	92 25	26.1	19 28.5	92 25	25.7	20 23.9	92 24	25.3	21 19.2	92 24	24.9	22 14.5	92 23	24.5	23 37.3	92 23	23.8	1
2	15 58.7	93 25	26.4	16 54.5	93 25	26.0	18 18.1	93 24	25.4	19 13.8	93 24	25.1	20 09.4	93 24	24.7	21 04.9	93 23	24.3	22 00.4	92 23	23.8	23 23.6	92 22	23.2	2
3	15 43.6	93 25	25.7	16 39.6	93 24	25.4	18 03.5	93 24	24.8	18 59.4	93 23	24.4	19 55.2	93 23	24.0	20 51.0	93 23	23.6	21 46.7	93 22	23.2	23 10.2	93 22	22.6	3
4	15 28.8	94 24	25.1	16 25.0	94 24	24.7	17 49.2	94 23	24.1	18 45.3	93 23	23.8	19 41.3	93 22	23.4	20 37.3	93 22	23.0	21 33.3	93 22	22.6	22 57.1	93 21	22.0	4
145	15 14.4	94 23	24.4	16 10.8	94 23	24.0	17 35.3	94 23	23.5	18 31.6	94 22	23.1	19 27.9	94 22	22.8	20 24.1	94 22	22.4	21 20.2	94 21	22.0	22 44.4	93 21	21.4	145
6	15 00.4	94 23	23.7	15 57.0	94 22	23.4	17 21.8	94 22	22.8	18 18.3	94 22	22.5	19 14.7	94 21	22.1	20 11.1	94 21	21.8	21 07.5	94 21	21.4	22 31.9	94 20	20.8	6
7	14 46.7	95 22	23.0	15 43.5	95 22	22.7	17 08.6	95 21	22.2	18 05.3	94 21	21.8	19 01.9	94 21	21.5	19 58.5	94 20	21.1	20 55.1	94 20	20.8	22 19.9	94 20	20.2	7
8	14 33.5	95 22	22.4	15 30.4	95 21	22.0	16 55.8	95 21	21.5	17 52.7	95 20	21.2	18 49.5	95 20	20.9	19 46.3	95 20	20.5	20 43.1	95 20	20.2	22 08.1	94 19	19.6	8
9	14 20.6	95 21	21.7	15 17.7	95 21	21.4	16 43.3	95 20	20.9	17 40.4	95 20	20.6	18 37.4	95 20	20.2	19 34.4	95 19	19.9	20 31.4	95 19	19.6	21 56.7	95 18	19.0	9
150	14 08.0	96 20	21.0	15 05.3	95 20	20.7	16 31.3	95 20	20.2	17 28.5	95 19	19.9	18 25.7	95 19	19.6	19 22.9	95 19	19.3	20 20.0	95 18	18.9	21 45.7	95 18	18.4	150
1	13 55.9	96 20	20.3	14 53.4	96 19	20.0	16 19.5	96 19	19.6	17 17.0	96 19	19.3	18 14.3	96 18	18.9	19 11.7	96 18	18.6	20 09.0	96 18	18.3	21 34.9	95 17	17.8	1
2	13 44.2	96 19	19.6	14 41.8	96 19	19.3	16 08.2	96 18	18.9	17 05.8	96 18	18.6	18 03.4	96 18	18.3	19 00.9	96 17	18.0	19 58.4	96 17	17.7	21 24.6	96 17	17.2	2
3	13 32.8	96 18	18.9	14 30.6	96 18	18.7	15 57.3	96 18	18.2	16 55.0	96 17	17.9	17 52.7	96 17	17.7	18 50.4	96 17	17.4	19 48.1	96 17	17.1	21 14.5	96 16	16.6	3
4	13 21.8	97 18	18.2	14 19.8	97 17	18.0	15 46.7	97 17	17.6	16 44.6	96 17	17.3	17 42.5	96 16	17.0	18 40.3	96 16	16.7	19 38.2	96 16	16.5	21 04.9	96 16	16.0	4
155	13 11.3	97 17	17.5	14 09.4	97 17	17.3	15 36.5	97 16	16.9	16 34.5	97 16	16.6	17 32.6	97 16	16.4	18 30.6	97 16	16.1	19 28.6	97 15	15.8	20 55.5	97 15	15.4	155
6	13 01.1	97 16	16.9	13 59.3	97 16	16.6	15 26.7	97 16	16.2	16 24.9	97 15	16.0	17 23.1	97 15	15.7	18 21.2	97 15	15.5	19 19.4	97 15	15.2	20 46.6	97 14	14.8	6
7	12 51.3	97 16	16.2	13 49.7	97 15	15.9	15 17.2	97 15	15.6	16 15.6	97 15	15.3	17 13.9	97 15	15.1	18 12.2	97 14	14.8	19 10.5	97 14	14.6	20 37.9	97 14	14.2	7
8	12 41.9	98 15	15.5	13 40.4	98 15	15.2	15 08.2	97 14	14.9	16 06.7	97 14	14.7	17 05.2	97 14	14.4	18 03.6	97 14	14.2	19 02.0	97 14	14.0	20 29.7	97 13	13.6	8
9	12 32.9	98 14	14.8	13 31.6	98 14	14.6	14 59.5	98 14	14.2	15 58.2	98 14	14.0	16 56.8	98 13	13.8	17 55.4	98 13	13.6	18 53.9	98 13	13.3	20 21.8	98 13	13.0	9
160	12 24.4	98 14	14.1	13 23.1	98 13	13.9	14 51.3	98 13	13.6	15 50.0	98 13	13.3	16 48.8	98 13	13.1	17 47.5	98 12	12.9	18 46.2	98 12	12.7	20 14.2	98 12	12.4	160
1	12 16.2	98 13	13.4	13 15.1	98 13	13.2	14 43.4	98 12	12.9	15 42.3	98 12	12.7	16 41.1	98 12	12.5	17 40.0	98 12	12.3	18 38.8	98 12	12.1	20 07.0	98 11	11.8	1
2	12 08.4	98 12	12.7	13 07.4	98 12	12.5	14 35.9	98 12	12.2	15 34.9	98 12	12.0	16 33.9	98 11	11.8	17 32.8	98 11	11.6	18 31.8	98 11	11.4	20 00.2	98 11	11.1	2
3	12 01.1	99 12	12.0	13 00.2	99 11	11.8	14 28.8	98 11	11.5	15 27.9	98 11	11.4	16 27.0	98 11	11.2	17 26.1	98 11	11.0	18 25.1	98 10	10.8	19 53.7	98 10	10.5	3
4	11 54.1	99 11	11.3	12 53.3	99 11	11.1	14 22.1	99 10	10.9	15 21.3	99 10	10.7	16 20.5	99 10	10.5	17 19.7	99 10	10.4	18 18.9	99 10	10.2	19 47.6	99 10	09.9	4
165	11 47.6	99 10	10.6	12 46.9	99 10	10.4	14 15.9	99 10	10.2	15 15.1	99 10	10.0	16 14.4	99 10	09.9	17 13.7	99 09	09.7	18 13.0	99 09	09.5	19 41.9	99 09	09.3	165
6	11 41.5	99 10	09.9	12 40.9	99 09	09.7	14 10.0	99 09	09.5	15 09.3	99 09	09.4	16 08.7	99 09	09.2	17 08.1	99 09	09.1	18 07.5	99 09	08.9	19 36.5	99 08	08.7	6
7	11 35.8	99 09	09.2	12 35.3	99 09	09.0	14 04.5	99 08	08.8	15 03.9	99 08	08.7	16 03.4	99 08	08.6	17 02.9	99 08	08.4	18 02.3	99 08	08.3	19 31.5	99 08	08.1	7
8	11 30.5	99 08	08.5	12 30.1	99 08	08.4	13 59.4	99 08	08.2	14 58.9	99 08	08.0	15 58.5	99 08	07.9	16 58.0	99 07	07.8	17 57.5	99 07	07.6	19 26.8	99 07	07.4	8
9	11 25.7	99 07	07.8	12 25.3	99 07	07.7	13 54.7	99 07	07.5	14 54.3	99 07	07.4	15 53.9	99 07	07.2	16 53.5	99 07	07.1	17 53.1	99 07	07.0	19 22.5	99 07	06.8	9
170	11 21.2	99 07	07.1	12 20.9	99 07	07.0	13 50.4	99 06	06.8	14 50.1	99 06	06.7	15 49.8	99 06	06.6	16 49.5	99 06	06.5	17 49.1	99 06	06.4	19 18.6	99 06	06.2	170
1	11 17.2	1.0 06	06.4	12 16.9	1.0 06	06.3	13 46.6	1.0 06	06.1	14 46.3	1.0 06	06.0	15 46.0	1.0 06	05.9	16 45.8	1.0 06	05.8	17 45.5	1.0 05	05.7	19 15.1	1.0 05	05.6	1
2	11 13.6	1.0 05	05.7	12 13.4	1.0 05	05.6	13 43.1	1.0 05	05.4	14 42.9	1.0 05	05.4	15 42.7	1.0 05	05.3	16 42.5	1.0 05	05.2	17 42.3	1.0 05	05.1	19 11.9	1.0 05	05.0	2
3	11 10.4	1.0 05	05.0	12 10.3	1.0 05	04.9	13 40.0	1.0 04	04.8	14 39.9	1.0 04	04.7	15 39.7	1.0 04	04.6	16 39.5	1.0 04	04.5	17 39.4	1.0 04	04.5	19 09.1	1.0 04	04.3	3
4	11 07.6	1.0 04	04.2	12 07.5	1.0 04	04.2	13 37.4	1.0 04	04.1	14 37.2	1.0 04	04.0	15 37.1	1.0 04	04.0	16 37.0	1.0 04	03.9	17 36.9	1.0 04	03.8	19 06.7	1.0 03	03.7	4
175	11 05.3	1.0 03	03.5	12 05.2	1.0 03	03.5	13 35.1	1.0 03	03.4	14 35.0	1.0 03	03.4	15 35.0	1.0 03	03.3	16 34.9	1.0 03	03.2	17 34.8	1.0 03	03.2	19 04.7	1.0 03	03.1	175
6	11 03.4	1.0 02	02.8	12 03.3	1.0 02	02.8	13 33.3	1.0 02	02.7	14 33.2	1.0 02	02.7	15 33.2	1.0 02	02.6	16 33.1	1.0 02	02.6	17 33.1	1.0 02	02.6	19 03.0	1.0 02	02.5	6
7	11 01.9	1.0 02	02.1	12 01.9	1.0 02	02.1	13 31.8	1.0 02	02.0	14 31.8	1.0 02	02.0	15 31.8	1.0 02	02.0	16 31.8	1.0 02	01.9	17 31.7	1.0 02	01.9	19 01.7	1.0 02	01.9	7
8	11 00.8	1.0 01	01.4	12 00.8	1.0 01	01.4	13 30.8	1.0 01	01.4	14 30.8	1.0 01	01.3	15 30.8	1.0 01	01.3	16 30.8	1.0 01	01.3	17 30.8	1.0 01	01.3	19 00.7	1.0 01	01.2	8
9	11 00.2	1.0 00	00.7	12 00.2	1.0 00	00.7	13 30.2	1.0 00	00.7	14 30.2	1.0 00	00.7	15 30.2	1.0 00	00.7	16 30.2	1.0 00	00.6	17 30.2	1.0 00	00.6	19 00.2	1.0 00	00.6	9
180	11 00.0	1.0 00	00.0	12 00.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 30.0	1.0 00	00.0	16 30.0	1.0 00	00.0	17 30.0	1.0 00	00.0	19 00.0	1.0 00	00.0	180

Lat. 55°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		°
00	89 30.0	1.0 26	180.0	90 00.0	. . 57	. . . .	89 00.0	1.0 15	00.0	88 30.0	1.0 10	00.0	88 00.0	1.0 08	00.0	87 30.0	1.0 06	00.0	86 00.0	1.0 04	00.0	85 30.0	1.0 03	00.0	00
1	89 14.2	66 49	130.5	89 25.6	01 57	89.6	88 51.0	87 36	29.1	88 23.9	93 27	20.2	87 55.4	96 21	15.2	87 26.3	97 17	12.1	85 57.8	99 11	07.3	85 28.1	99 10	06.4	1
2	88 44.6	41 54	112.6	88 51.2	01 57	89.2	88 29.4	65 46	47.7	88 07.5	79 38	36.1	87 42.5	87 32	28.4	87 15.9	91 27	23.1	85 51.3	96 17	14.4	85 22.3	97 15	12.7	2
3	88 11.9	30 56	104.9	88 16.8	02 57	88.8	88 01.7	49 50	58.3	87 44.5	65 45	47.1	87 23.4	76 39	38.8	86 59.8	82 34	32.5	85 40.8	92 22	21.0	85 13.0	93 21	18.6	3
4	87 38.3	24 57	100.6	87 42.4	03 57	88.4	87 31.4	38 53	64.5	87 17.7	53 48	54.7	87 00.0	64 44	46.6	86 39.4	73 39	40.0	85 26.8	86 28	26.9	85 00.5	89 26	24.0	4
05	87 04.3	21 57	97.8	87 08.0	04 57	88.0	86 59.8	30 54	68.5	86 48.7	44 51	59.9	86 33.8	55 47	52.4	86 15.9	64 43	46.0	85 09.8	81 32	32.2	84 45.2	84 30	28.9	05
6	86 30.1	18 57	95.8	86 33.6	04 57	87.5	86 27.5	24 55	71.1	86 18.4	37 52	63.6	86 05.8	47 49	56.7	85 50.1	56 46	50.7	84 50.3	75 36	36.8	84 27.4	78 33	35.3	6
7	85 55.9	17 57	94.2	85 59.2	05 57	87.1	85 54.8	20 55	73.0	85 47.2	31 53	66.3	85 36.4	41 50	60.1	85 22.8	50 48	54.4	84 28.8	69 39	40.7	84 07.5	73 36	37.2	7
8	85 21.5	16 57	92.9	85 24.8	06 57	86.7	85 21.8	16 55	74.3	85 15.4	26 54	68.3	85 06.2	35 51	62.6	84 54.3	44 49	57.4	84 05.5	63 41	44.1	83 45.9	68 38	40.6	8
9	84 47.1	16 57	91.8	84 50.5	06 57	86.3	84 48.6	13 56	75.2	84 43.3	22 54	69.8	84 35.4	31 52	64.6	84 24.9	39 50	59.7	83 40.9	58 43	47.1	83 22.8	63 40	43.5	9
10	84 12.7	16 57	90.9	84 16.2	07 57	85.9	84 15.2	10 56	75.9	84 10.9	19 54	71.0	84 04.1	27 53	66.2	83 54.9	34 51	61.7	83 15.2	53 44	49.6	82 58.6	58 42	46.1	10
1	83 38.3	16 57	90.0	83 41.8	08 57	85.5	83 41.8	08 56	76.4	83 38.2	16 55	71.9	83 32.4	23 53	67.5	83 24.4	30 52	63.2	82 48.6	49 46	51.7	82 33.3	54 44	48.4	1
2	83 03.9	16 57	89.2	83 07.5	09 57	85.1	83 08.3	06 56	76.7	83 05.5	13 55	72.6	83 00.5	20 54	68.5	82 53.5	27 52	64.5	82 21.2	44 47	53.6	82 07.2	49 45	50.3	2
3	82 29.5	16 57	88.5	82 33.3	09 57	84.7	82 34.8	04 56	76.9	82 32.6	11 55	73.1	82 28.4	17 54	69.3	82 22.3	24 52	65.6	81 53.2	41 47	55.2	81 40.3	45 46	52.0	3
4	81 55.1	16 57	87.8	81 59.0	10 57	84.3	82 01.3	02 56	77.1	81 59.6	09 55	73.5	81 56.2	15 54	69.9	81 50.8	21 53	66.4	81 24.8	37 48	56.6	81 12.9	42 46	53.5	4
15	81 20.7	16 57	87.2	81 24.8	11 57	83.8	81 27.8	01 56	77.1	81 26.6	07 55	73.8	81 23.8	12 54	70.4	81 19.2	18 53	67.1	80 55.8	34 49	57.7	80 45.0	38 47	54.8	15
6	80 46.3	17 57	86.5	80 50.6	11 57	83.4	80 54.2	01 56	77.1	80 53.6	05 55	74.0	80 51.3	10 54	70.8	80 47.4	16 53	67.7	80 26.6	31 49	58.8	80 16.7	35 48	55.9	6
7	80 12.0	17 57	85.9	80 16.4	12 57	83.0	80 20.6	02 56	77.1	80 20.5	03 55	74.1	80 18.8	08 54	71.1	80 15.5	13 53	68.2	79 57.0	28 50	59.6	79 48.0	32 48	56.9	7
8	79 37.7	18 57	85.4	79 42.2	13 57	82.6	79 47.1	03 56	77.0	79 47.4	02 55	74.2	79 46.2	06 54	71.4	79 43.5	11 53	68.6	79 27.2	25 50	60.4	79 19.0	29 49	57.8	8
9	79 03.4	18 57	84.8	79 08.1	14 57	82.2	79 13.6	05 56	76.9	79 14.2	00 55	74.2	79 13.5	05 54	71.5	79 11.5	09 54	68.9	78 57.2	22 50	61.1	78 49.8	27 49	58.5	9
20	78 29.1	18 57	84.3	78 34.1	14 57	81.8	78 40.1	06 56	76.7	78 41.1	01 55	74.2	78 40.9	03 54	71.6	78 39.3	07 54	69.1	78 27.0	20 51	61.6	78 20.3	24 49	59.2	20
1	77 54.9	19 57	83.7	78 00.0	15 57	81.4	78 06.6	07 56	76.6	78 08.0	03 55	74.1	78 08.2	01 54	71.7	78 07.2	06 54	69.3	77 56.6	18 51	62.1	77 50.7	22 50	59.8	1
2	77 20.7	20 57	83.2	77 26.0	16 57	81.0	77 33.1	08 56	76.4	77 34.9	04 55	74.0	77 35.5	00 54	71.7	77 35.0	04 54	69.4	77 26.2	16 51	62.5	77 20.9	19 50	60.2	2
3	76 46.6	20 57	82.7	76 52.0	16 57	80.5	76 59.7	09 56	76.2	77 01.8	05 55	73.9	77 02.9	01 54	71.7	77 02.7	02 54	69.5	76 55.6	14 51	62.8	76 51.0	17 50	60.7	3
4	76 12.5	21 57	82.2	76 18.1	17 56	80.1	76 26.3	10 56	75.9	76 28.8	06 55	73.8	76 30.2	03 54	71.7	76 30.5	01 54	69.5	76 24.9	12 51	63.1	76 20.9	15 50	61.0	4
25	75 38.4	21 57	81.7	75 44.2	18 56	79.7	75 52.9	11 56	75.7	75 55.8	08 55	73.6	75 57.5	04 54	71.6	75 58.3	01 54	69.5	75 54.2	10 51	63.3	75 50.8	13 50	61.3	25
6	75 04.3	22 57	81.2	75 10.4	19 56	79.3	75 19.6	12 55	75.4	75 22.8	09 55	73.4	75 24.9	05 54	71.5	75 26.0	02 54	69.5	75 23.4	08 51	63.5	75 20.5	11 50	61.6	6
7	74 30.4	22 57	80.7	74 36.6	19 56	78.9	74 46.3	13 55	75.1	74 49.8	10 55	73.2	74 52.3	07 54	71.3	74 53.8	03 54	69.4	74 52.6	06 51	63.7	74 50.2	09 51	61.8	7
8	73 56.4	23 56	80.2	74 02.9	20 56	78.5	74 13.1	14 55	74.9	74 16.8	11 55	73.0	74 19.7	08 54	71.2	74 21.6	05 54	69.3	74 21.7	05 51	63.8	74 19.9	08 51	61.9	8
9	73 22.5	24 56	79.7	73 29.2	21 56	78.0	73 39.9	15 55	74.6	73 44.0	12 55	72.8	73 47.1	09 54	71.0	73 49.4	06 54	69.2	73 50.9	03 51	63.8	73 49.5	06 51	62.0	9
30	72 48.7	24 56	79.3	72 55.5	21 56	77.6	73 06.7	16 55	74.3	73 11.1	13 55	72.5	73 14.6	10 54	70.8	73 17.2	07 54	69.1	73 20.0	01 52	63.9	73 19.1	04 51	62.1	30
1	72 14.9	25 56	78.8	72 21.9	22 56	77.2	72 33.6	17 55	73.9	72 38.3	14 55	72.3	72 42.1	11 54	70.6	72 45.1	09 54	69.0	72 49.1	00 52	63.9	72 48.7	03 51	62.2	1
2	71 41.2	25 56	78.3	71 48.4	23 56	76.8	72 00.6	18 55	73.6	72 05.5	15 55	72.0	72 09.7	12 54	70.4	72 13.0	10 53	68.8	72 18.2	02 51	63.9	72 18.2	01 51	62.2	2
3	71 07.5	26 56	77.9	71 14.9	24 56	76.4	71 27.6	19 55	73.3	71 32.8	16 54	71.8	71 37.3	14 54	70.2	71 40.9	11 53	68.6	71 47.3	03 51	63.8	71 47.8	00 51	62.2	3
4	70 33.9	27 56	77.4	70 41.5	24 56	75.9	70 54.7	20 55	73.0	71 00.2	17 54	71.5	71 04.9	15 54	69.9	71 08.9	12 53	68.4	71 16.4	04 51	63.8	71 17.3	02 51	62.2	4
35	70 00.3	27 56	76.9	70 08.2	25 56	75.5	70 21.8	20 55	72.6	70 27.6	18 54	71.2	70 32.6	16 54	69.7	70 36.9	13 53	68.2	70 45.5	06 51	63.7	70 46.9	03 51	62.2	35
6	69 26.8	28 56	76.5	69 34.9	26 55	75.1	69 49.0	21 55	72.3	69 55.0	19 54	70.9	70 00.4	17 54	69.4	70 05.0	14 53	68.0	70 14.7	07 51	63.6	70 16.5	05 51	62.1	6
7	68 53.4	29 56	76.0	69 01.7	26 55	74.7	69 16.2	22 54	71.9	69 22.5	20 54	70.6	69 28.2	18 54	69.2	69 33.1	15 53	67.8	69 43.9	08 51	63.5	69 46.1	06 51	62.0	7
8	68 20.1	29 55	75.6	68 28.5	27 55	74.2	68 43.5	23 54	71.6	68 50.1	21 54	70.2	68 56.0	19 53	68.9	69 01.3	16 53	67.5	69 13.1	10 51	63.3	69 15.7	07 51	61.9	8
9	67 46.8	30 55	75.1	67 55.4	28 55	73.8	68 10.9	24 54	71.2	68 17.8	22 54	69.9	68 24.0	20 53	68.6	68 29.5	18 53	67.3	68 42.4	11 51	63.2	68 45.3	09 51	61.8	9
40	67 13.5	30 55	74.6	67 22.4	29 55	73.4	67 38.4	25 54	70.9	67 45.5	23 54	69.6	67 52.0	21 53	68.3	67 57.8	19 53	67.0	68 11.7	12 51	63.0	68 15.0	10 50	61.7	40
1	66 40.4	31 55	74.2	66 49.5	29 55	73.0	67 05.9	26 54	70.5	67 13.2	24 54	69.3	67 20.0	22 53	68.0	67 26.2	20 53	66.7	67 41.0	13 51	62.9	67 44.7	11 50	61.5	1
2	66 07.3	32 55	73.7	66 16.6	30 55	72.5	66 33.5	26 54	70.1	66 41.1	24 53	68.9	66 48.1	23 53	67.7	66 54.6	21 53	66.5	67 10.4	15 51	62.7	67 14.5	13 50	61.4	2
3	65 34.3	32 55	73.3	65 43.8	31 55	72.1	66 01.2	27 54	69.8	66 09.0	25 53	68.6	66 16.3	23 53	67.4	66 23.1	22 52	66.2	66 39.9	16 51	62.5	66 44.3	14 50	61.2	3
4	65 01.4	33 55	72.8	65 11.1	31 54	71.7	65 28.9	28 54	69.4	65 37.0	26 53	68.2	65 44.6	24 53	67.1	65 51.6	23 52	65.9	66 09.4	17 51	62.3	66 14.2	15 50	61.0	4
45	64 28.6	34 55	72.4	64 38.5	32 54	71.3	64 56.7	29 54	69.0	65 05.1	27 53	67.9	65 13.0	25 53	66.7	65 20.3	24 52	65.6	65 39.0	18 51	62.0	65 44.1	16 50	60.8	45
6	63 55.8	34 54	71.9	64 05.9	33 54	70.8	64 24.6	30 53	68.6	64 33.3	28 53	67.5	64 41.4	26 52	66.4	64 49.0	24 52	65.3	65 08.6	19 50	61.8	65 14.1	17 50	60.6	6
7	63 23.1	35 54	71.4	63 33.4	34 54	70.4	63 52.6	30 53	68.3	64 01.5	29 53	67.2	64 09.9	27 52	66.1	64 17.8	25 52	65.0	64 38.3	20 50	61.6	64 44.1	18 50	60.4	7
8	62 50.6	36 54	71.0	63 01.1	34 54	70.0	63 20.7	31 53	67.9	63 29.8	30 53	66.8	63 38.5	28 52	65.7	63 46.6	26 52	64.6	64 08.1	21 50	61.3	64 14.2	20 50	60.2	8
9	62 18.1	36 54	70.5	62 28.8	35 54	69.5	62 48.9	32 53	67.5	62 58.2	30 52	66.4	63 07.1	29 52	65.4	63 15.6	27 52	64.3	63 37.9	22 50	61.1	63 44.4	21 50	60.0	9
50	61 45.7	37 54	70.1	61 56.6	36 54	69.1	62 17.1	33 53	67.1	62 26.7	31 52	66.1	62 35.9	30 52	65.0	62 44.6	28 51	64.0	63 07.8	23 50	60.8	63 14.6	22 49	59.7	50
1	61 13.4	38 54	69.6	61 24.5	36 53	68.7	61 45.5	34 53	66.7	61 55.3	32 52	65.7	62 04.7	31 52	64.7	62 13.7	29 51	63.7	62 37.8	24 50	60.5	62 44.9	23 49	59.5	1
2	60 41.1	38 54	69.2	60 52.5	37 53	68.2	61 13.9	34 52	66.3	61 24.0	33 52	65.3	61 33.7	31 52	64.3	61 42.9	30 51	63.3	62 07.9	26 50	60.3	62 15.3	24 49	59.2	2
3	60 09.0	39 53	68.7	60 20.6	38 53	67.8	60 42.5	35 52	65.9	60 52.8	34 52	64.9	61 02.7	32 51	64.0	61 12.2	31 51	63.0	61 38.1	27 50	60.0	61 45.8	25 49	59.0	3
4	59 37.0	40 53	68.3	59 48.8	39 53	67.3	60 11.1	36 52	65.5	60 21.7	35 52	64.5	60 31.8	33 51	63.6	60 41.6	32 51	62.6	61 08.3	28 49	59.7	61 16.4	26 49	58.7	4
55	59 05.1	40 53	67.8	59 17.9	39 53	66.9	59 39.8	37 52	65.1	59 50.6	35 52	64.2	60 01.1	34 51	63.2	60 11.1	33 51	62.3	60 38.7	29 49	59.4	60 47.0	27 49	58.4	55
6	58 33.3	41 53	67.3	58 45.4	40 52	66.5	59 08.7	37 52	64.7	59 19.7	36 51	63.8	59 30.4	35 51	62.8	59 40.7	34 51	61.9	60 09.1	30 49	59.1	60 17.7	28 49	58.1	6
7	58 01.6	42 53	66.9	58 13.9	41 52	66.0	58 37.6	38 52	64.3	58 48.9	37 51	63.4	58 59.8	35 51	62.5	59 10.3	34 50	61.6	59 39.6	31 49	58.8	59 48.6	29 48	57.8	7
8	57 30.0	42 52	66.4	57 42.6	41 52	65.6	58 06.7	39 51	63.9	58 18.2	38 51	63.0	58 29.3	37 51	62.1	58 40.1	35 50	61.2	59 10.2	31 49	58.5	59 19.5	30 48	57.5	8
9	56 58.5	43 52	66.0	57 11.3	42 52	65.1	57 35.8	40 51	63.4	57 47.6	39 51	62.6	57 59.0	37 50	61.7	58 10.0	36 50	60.8	58 40.9	32 49	58.1	58 50.5	31 48	57.2	9
60	56 27.1	44 52	65.5	56 40.1	43 52	64.7	57 05.1	41 51	63.0	57 17.1	39 51	62.2	57 28.7	38 50	61.3	57 40.0	37 50	60.5	58 11.8	33 48	57.8	58 21.6	32 48	56.9	60
1	55 55.9	45 52	65.0	56 09.1	43 52	64.2	56 34.5	41 51	62.6	56 46.7	40 50	61.8	56 58.6	39 50	60.9	57 10.2	38 50	60.1	57 42.7	34 48	57.5	57 52.8	33 48	56.6	1
2	55 24.7	45 52	64.6	55 38.1	44 51	63.8	56 04.0	42 51	62.2	56 16.4	41 50	61.4	56 28.6	40 50	60.5	56 40.4	39 49	59.7	57 13.7	35 48	57.2	57 24.1	34 48	56.3	2
3	54 53.7	46 52	64.1	55 07.3	45 51	63.3	55 33.6	43 50	61.8	55 46.3	42 50	61.0	55 58.7	41 50	60.1	56 10.7	40 49	59.3	56 44.9	36 48	56.8	56 55.6	35 47	56.0	3
4	54 22.8	47 51	63.7	54 36.6	45 51	62.9	55 03.4	44 50	61.3	55 16.3	43 50	60.5	55 28.9	42 49	59.8	55 41.2	40 49	58.9	56 16.1	37 48	56.5	56 27.1	36 47	55.6	4
65	53 52.0	47 51	63.2	54 06.0	46 51	62.4	54 33.2	44 50	60.9	54 46.4	43 50	60.1	54 59.2	42 49	59.4	55 11.8	41 49	58.6	55 47.5	38 48	56.1	55 58.8	37 47	55.3	65
6	53 21.4	48 51	62.7	53 35.6	47 51	62.0	54 03.2	45 50	60.5	54 16.6	44 49	59.7	54 29.7	43 49	58.9	54 42.5	42 49	58.2	55 19.0	39 47	55.8	55 30.5	38 47	55.0	6
7	52 50.8	49 51	62.3	53 05.3	48 50	61.5	53 33.3	46 50	60.1	53 46.9	45 49	59.3	54 00.3	44 49	58.5	54 13.3	43 48	57.8	54 50.6	40 47	55.4	55 02.4	39 47	54.6	7
8	52 20.4	49 50	61.8	52 35.1	48 50	61.1	53 03.6	47 49	59.6	53 17.4	46 49	58.9	53 31.0	45 49	58.1	53 44.2	44 48	57.4	54 22.3	41 47	55.1	54 34.4	40 46	54.3	8
9	51 58.2	50 50	61.3	52 05.0	49 50	60.6	52 33.9	47 49	59.2	52 48.0	46 49	58.5	53 01.8	46 48	57.7	53 15.3	45 48	57.0	53 54.2	42 47	54.7	54 06.5	41 46	53.9	9
70	51 29.1	51 50	60.9	51 35.1	50 50	60.2	52 04.5	48 49	58.8	52 18.7	47 49	58.0	52 32.8	46 48	57.3	52 46.5	45 48	56.6	53 26.1	43 46	54.3	53 38.8	42 46	53.6	70
1	50 50.1	51 50	60.4	51 05.3	50 49	59.7	51 35.1	49 49	58.3	51 49.6	48 48	57.6	52 03.9	47 48	56.9	52 17.9	46 48	56.2	52 58.2	43 46	54.0	53 11.1	43 46	53.2	1
2	50 20.2	52 50	59.9	50 35.7	51 49	59.2	51 05.9	50 48	57.9	51 20.6	49 48	57.2	51 35.1	48 48	56.5	51 49.3	47 47	55.8	52 30.5	44 46	53.6	52 43.6	43 46	52.8	2
3	49 50.5	53 49	59.4	50 06.2	52 49	58.8	50 36.8	50 48	57.4	50 51.8	49 48	56.7	51 06.5	49 47	56.1	51 21.0	48 47	55.4	52 02.9	45 46	53.2	52 16.3	44 45	52.5	3
4	49 20.9	53 49	59.0	49 36.8	53 49	58.3	50 07.9	51 48	57.0	50 23.1	50 48	56.3	50 38.0	49 47	55.6	50 52.7	49 47	54.9	51 35.4	46 46	52.8	51 49.1	45 45	52.1	4
75	48 51.5	54 49	58.5	49 07.6	53 48	57.8	49 39.1	52 48	56.5	49 54.5	51 47	55.9	50 09.7	50 47	55.2	50 24.6	49 47	54.5	51 08.0	47 45	52.4	51 22.0	46 45	51.7	75
6	48 22.3	55 49	58.0	48 38.5	54 48	57.4	49 10.5	52 47	56.1	49 26.1	52 47	55.4	49 41.5	51 47	54.8	49 56.7	50 46	54.1	50 40.8	48 45	52.1	50 55.0	47 45	51.4	6
7	47 53.2	55 48	57.5	48 09.6	55 48	56.9	48 42.0	53 47	55.6	48 57.8	52 47	55.0	49 13.5	52 46	54.3	49 28.9	51 46	53.7	50 13.7	49 45	51.7	50 28.2	48 44	51.0	7
8	47 24.2	56 48	57.1	47 40.9	55 48	56.4	48 13.6	54 47	55.2	48 29.7	53 47	54.6	48 45.6	53 46	53.9	49 01.2	52 46	53.3	49 46.8	50 45	51.3	50 01.5	49 44	50.6	8
9	46 55.4	57 48	56.6	47 12.3	56 47	56.0	47 45.5	55 47	54.7	48 01.8	54 46	54.1	48 17.8	53 46	53.5	48 33.7	53 46	52.8	49 20.0	50 44	50.9	49 35.0	50 44	50.2	9
80	46 26.7	57 47	56.1	46 43.8	57 47	55.5	47 17.4	55 46	54.3	47 33.9	55 46	53.7	47 50.3	54 46	53.0	48 06.4	53 45	52.4	48 53.4	51 44	50.5	49 08.6	50 44	49.8	80
1	45 58.3	58 47	55.6	46 15.6	57 47	55.0	46 49.6	56 46	53.8	47 06.3	55 46	53.2	47 22.8	55 45	52.6	47 39.2	54 45	52.0	48 26.9	52 44	50.1	48 42.4	51 43	49.4	1
2	45 29.9	59 47	55.1	45 47.4	58 47	54.5	46 21.9	57 46	53.4	46 38.8	56 46	52.8	46 55.6	56 45	52.2	47 12.1	55 45	51.5	48 00.6	53 44	49.7	48 16.4	52 43	49.0	2
3	45 01.8	59 47	54.6	45 19.5	59 46	54.1	45 54.3	58 46	52.9	46 11.5	57 45	52.3	46 28.5	56 45	51.7	46 45.3	56 44	51.1	47 34.5	54 43	49.3	47 50.4	53 43	48.6	3
4	44 33.8	60 46	54.2	44 51.7	59 46	53.6	45 27.0	58 45	52.4	45 44.4	58 45	51.9	46 01.5	57 45	51.3	46 18.6	56 44	50.7	47 08.5	54 43	48.9	47 24.7	54 43	48.2	4
85	44 06.0	61 46	53.7	44 24.1	60 46	53.1	44 59.8	59 45	52.0	45 17.4	58 45	51.4	45 34.8	58 44	50.8	45 52.0	57 44	50.2	46 42.6	55 43	48.4	46 59.1	55 42	47.8	85
6	43 38.4	61 46	53.2	43 56.7	61 45	52.6	44 32.8	60 45	51.5	44 50.6	59 44	50.9	45 08.2	58 44	50.4	45 25.7	58 44	49.8	46 17.0	56 42	48.0	46 33.7	55 42	47.4	6
7	43 10.9	62 45	52.7	43 29.4	61 45	52.1	44 05.9	60 44	51.0	44 23.9	60 44	50.5	44 41.8	59 44	49.9	44 59.5	59 43	49.3	45 51.5	57 42	47.6	46 08.4	56 42	47.0	7
8	42 43.6	63 45	52.2	43 02.3	62 45	51.7	43 39.2	61 44	50.6	43 57.5	60 44	50.0	44 15.5	60 43	49.5	44 33.4	59 42	48.9	45 26.1	58 42	47.2	45 43.3	57 42	46.6	8
9	42 16.5	63 45	51.7	42 35.4	63 45	51.2	43 12.7	62 44	50.1	43 31.2	61 44	49.6	43 49.5	61 43	49.0	44 07.6	60 43	48.5	45 01.0	58 42	46.8	45 18.4	58 41	46.2	9
90	41 49.6	64 45	51.2	42 08.7	63 44	50.7	42 46.4	62 44	49.6	43 05.1	62 43	49.1	43 23.6	61 43	48.5	43 41.9	61 42	48.0	44 36.0	59 41	46.3	44 53.7	59 41	45.8	90

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	41 22.9	64 44	50.7	41 42.2	64 44	50.2	42 20.3	63 43	49.1	42 39.2	63 43	48.6	42 57.9	62 43	48.1	43 16.4	62 42	47.5	44 11.2	60 41	45.9	44 29.1	59 41	45.3	91
2	40 56.4	65 44	50.2	41 15.8	65 44	49.7	41 54.4	64 43	48.7	42 13.4	63 43	48.1	42 32.4	63 42	47.6	42 51.1	62 42	47.1	43 46.6	61 41	45.5	44 04.7	60 40	44.9	2
3	40 30.0	66 44	49.7	40 49.7	65 43	49.2	41 28.6	64 43	48.2	41 47.9	64 42	47.7	42 07.0	64 42	47.2	42 26.0	63 42	46.6	43 22.1	62 40	45.0	43 40.5	61 40	44.5	3
4	40 03.9	66 43	49.2	40 23.7	66 43	48.7	41 03.1	65 42	47.7	41 22.6	65 42	47.2	41 41.9	64 42	46.7	42 01.1	64 41	46.2	42 57.9	62 40	44.6	43 16.5	62 40	44.1	4
95	39 37.9	67 43	48.7	39 58.0	67 43	48.2	40 37.7	66 42	47.2	40 57.4	65 42	46.7	41 16.9	65 41	46.2	41 36.4	65 41	45.7	42 33.8	63 40	44.2	42 52.6	63 39	43.6	95
6	39 12.2	68 43	48.2	39 32.4	67 42	47.7	40 12.6	66 42	46.7	40 32.4	66 41	46.2	40 52.2	66 41	45.7	41 11.8	65 41	45.2	42 09.9	64 39	43.7	42 29.0	63 39	43.2	6
7	38 46.6	68 42	47.7	39 07.1	68 42	47.2	39 47.6	67 41	46.2	40 07.7	67 41	45.8	40 27.6	66 41	45.3	40 47.5	66 40	44.8	41 46.2	65 39	43.3	42 05.5	64 39	42.8	7
8	38 21.3	69 42	47.2	38 41.9	69 42	46.7	39 22.8	68 41	45.8	39 43.1	67 41	45.3	40 03.3	67 40	44.8	40 23.3	67 40	44.3	41 22.7	65 39	42.8	41 42.3	65 38	42.3	8
9	37 56.2	70 42	46.7	38 17.0	69 41	46.2	38 58.3	68 41	45.3	39 18.8	68 40	44.8	39 39.2	68 40	44.3	39 59.4	67 40	43.8	40 59.4	66 38	42.4	41 19.2	66 38	41.9	9
100	37 31.2	70 41	46.1	37 52.2	70 41	45.7	38 33.9	69 40	44.8	38 54.6	69 40	44.3	39 15.2	68 40	43.8	39 35.7	68 39	43.4	40 36.4	67 38	41.9	40 56.3	66 38	41.4	100
1	37 06.5	71 41	45.6	37 27.7	70 40	45.2	38 09.8	70 40	44.3	38 30.7	69 40	43.8	38 51.5	69 39	43.4	39 12.1	69 39	42.9	40 13.5	68 38	41.5	40 33.7	67 37	41.0	1
2	36 42.0	71 40	45.1	37 03.4	71 40	44.7	37 45.9	70 40	43.8	38 07.0	70 39	43.3	38 28.0	70 39	42.9	38 48.8	69 39	42.4	39 50.8	68 37	41.0	40 11.2	68 37	40.5	2
3	36 17.8	72 40	44.6	36 39.3	72 40	44.2	37 22.2	71 39	43.3	37 43.5	71 39	42.8	38 04.6	70 38	42.4	38 25.7	70 38	41.9	39 28.3	69 37	40.6	39 48.9	69 37	40.1	3
4	35 53.7	73 40	44.1	36 15.5	72 39	43.6	36 58.7	72 39	42.8	37 20.2	71 38	42.3	37 41.6	71 38	41.9	38 02.8	71 38	41.5	39 06.0	70 37	40.1	39 26.9	69 36	39.6	4
105	35 29.9	73 39	43.5	35 51.8	73 39	43.1	36 35.4	72 38	42.3	36 57.1	72 38	41.8	37 18.7	72 38	41.4	37 40.2	71 37	41.0	38 44.0	70 36	39.6	39 05.0	70 36	39.2	105
6	35 06.3	74 39	43.0	35 28.4	74 39	42.6	36 12.4	73 38	41.8	36 34.3	73 38	41.3	36 56.0	72 37	40.9	37 17.7	72 37	40.5	38 22.1	71 36	39.2	38 43.4	71 36	38.7	6
7	34 42.9	74 39	42.5	35 05.2	74 38	42.1	35 49.6	74 38	41.3	36 11.6	73 37	40.8	36 33.6	73 37	40.4	36 55.5	73 37	40.0	38 00.5	72 36	38.7	38 22.0	71 35	38.2	7
8	34 19.8	75 38	42.0	34 42.3	75 38	41.6	35 27.0	74 37	40.8	35 49.2	74 37	40.3	36 11.4	74 37	39.9	36 33.5	73 36	39.5	37 39.1	72 35	38.2	38 00.8	72 35	37.8	8
9	33 56.9	76 38	41.4	34 19.6	75 37	41.0	35 04.7	75 37	40.2	35 27.1	75 37	39.8	35 49.4	74 36	39.4	36 11.7	74 36	39.0	37 17.9	73 35	37.7	37 39.8	73 35	37.3	9
110	33 34.2	76 37	40.9	33 57.1	76 37	40.5	34 42.5	76 36	39.7	35 05.2	75 36	39.3	35 27.7	75 36	38.9	35 50.1	75 36	38.5	36 57.0	74 35	37.3	37 19.1	74 34	36.8	110
1	33 11.8	77 37	40.4	33 34.8	77 37	40.0	34 20.7	76 36	39.2	34 43.5	76 36	38.8	35 06.2	76 35	38.4	35 28.8	75 35	38.0	36 36.3	75 34	36.8	36 58.6	74 34	36.4	1
2	32 49.6	77 37	39.8	33 12.8	77 36	39.5	33 59.0	77 36	38.7	34 22.0	76 35	38.3	34 44.9	76 35	37.9	35 07.7	76 35	37.5	36 15.8	75 34	36.3	36 38.3	75 33	35.9	2
3	32 27.7	78 36	39.3	32 51.1	78 36	38.9	33 37.6	77 35	38.2	34 00.8	77 35	37.8	34 23.9	77 35	37.4	34 46.9	77 34	37.0	35 55.5	76 33	35.8	36 18.2	76 33	35.4	3
4	32 06.0	79 36	38.8	32 29.6	78 35	38.4	33 16.5	78 35	37.7	33 39.8	78 35	37.3	34 03.1	77 34	36.9	34 26.3	77 34	36.5	35 35.5	76 33	35.4	35 58.4	76 33	35.0	4
115	31 44.6	79 35	38.2	32 08.3	79 35	37.9	32 55.6	79 34	37.1	33 19.1	78 34	36.8	33 42.5	78 34	36.4	34 05.9	78 34	36.0	35 15.7	77 33	34.9	35 38.8	77 32	34.5	115
6	31 23.4	80 35	37.7	31 47.3	80 35	37.3	32 34.9	79 34	36.6	32 58.6	79 34	36.3	33 22.2	79 33	35.9	33 45.8	78 33	35.5	34 56.1	78 32	34.4	35 19.4	78 32	34.0	6
7	31 02.5	80 34	37.1	31 26.6	80 34	36.8	32 14.5	80 34	36.1	32 38.4	79 33	35.7	33 02.2	79 33	35.4	33 25.9	79 33	35.0	34 36.8	78 32	33.9	35 00.3	78 31	33.5	7
8	30 41.9	81 34	36.6	31 06.1	81 34	36.3	31 54.4	80 33	35.6	32 18.4	80 33	35.2	32 42.4	80 33	34.9	33 06.3	80 32	34.5	34 17.7	79 31	33.4	34 41.4	79 31	33.0	8
9	30 21.5	81 34	36.1	30 45.9	81 33	35.7	31 34.5	81 33	35.0	31 58.7	81 32	34.7	32 22.9	80 32	34.3	32 47.0	80 32	34.0	33 58.9	80 31	32.9	34 22.8	79 31	32.5	9
120	30 01.4	82 33	35.5	30 25.9	82 33	35.2	31 14.9	81 32	34.5	31 39.2	81 32	34.2	32 03.6	81 32	33.8	32 27.9	81 31	33.5	33 40.3	80 31	32.4	34 04.4	80 30	32.0	120
1	29 41.5	82 33	35.0	30 06.2	82 32	34.6	30 55.5	82 32	34.0	31 20.1	82 32	33.6	31 44.6	82 31	33.3	32 09.0	81 31	33.0	33 22.0	81 30	31.9	33 46.2	81 30	31.6	1
2	29 21.9	83 32	34.4	29 46.8	83 32	34.1	30 36.4	82 31	33.4	31 01.1	82 31	33.1	31 25.8	82 31	32.8	31 50.4	82 31	32.4	33 04.0	81 30	31.4	33 28.4	81 29	31.1	2
3	29 02.6	84 32	33.9	29 27.7	83 31	33.5	30 17.6	83 31	32.9	30 42.5	83 31	32.6	31 07.3	83 30	32.2	31 32.1	83 30	31.9	32 46.2	82 29	30.9	33 10.7	82 29	30.6	3
4	28 43.6	84 31	33.3	29 08.8	84 31	33.0	29 59.0	84 30	32.4	30 24.1	83 30	32.0	30 49.1	83 30	31.7	31 14.0	83 30	31.4	32 28.6	83 29	30.4	32 53.4	82 28	30.1	4
125	28 24.8	85 31	32.7	28 50.2	84 31	32.4	29 40.7	84 30	31.8	30 05.9	84 30	31.5	30 31.1	84 29	31.2	30 56.2	84 29	30.9	32 11.3	83 28	29.9	32 36.2	83 28	29.6	125
6	28 06.4	85 30	32.2	28 31.9	85 30	31.9	29 22.7	85 30	31.3	29 48.1	85 29	31.0	30 13.4	84 29	30.7	30 38.7	84 29	30.3	31 54.3	84 28	29.4	32 19.4	84 28	29.1	6
7	27 48.2	86 30	31.6	28 13.8	85 30	31.3	29 05.0	85 29	30.7	29 30.5	85 29	30.4	29 56.0	85 29	30.1	30 21.5	85 28	29.8	31 37.5	84 27	28.9	32 02.8	84 27	28.6	7
8	27 30.3	86 29	31.1	27 56.1	86 29	30.8	28 47.6	86 29	30.2	29 13.2	86 28	29.9	29 38.9	85 28	29.6	30 04.5	85 28	29.3	31 21.0	85 27	28.4	31 46.5	85 27	28.1	8
9	27 12.7	87 29	30.5	27 38.6	86 29	30.2	28 30.4	86 28	29.6	28 56.2	86 28	29.3	29 22.0	86 28	29.1	29 47.8	86 27	28.8	31 04.8	85 27	27.9	31 30.4	85 26	27.6	9
130	26 55.4	87 28	29.9	27 21.4	87 28	29.7	28 13.5	87 28	29.1	28 39.5	87 27	28.8	29 05.5	86 27	28.5	29 31.4	86 27	28.2	30 48.9	86 26	27.3	31 14.6	86 26	27.0	130
1	26 38.3	87 28	29.4	27 04.6	87 28	29.1	27 56.9	87 27	28.5	28 23.1	87 27	28.3	28 49.2	87 27	28.0	29 15.2	87 26	27.7	30 33.2	86 26	26.8	30 59.1	86 25	26.5	1
2	26 21.6	88 27	28.8	26 48.0	88 27	28.5	27 40.6	88 27	28.0	28 06.9	88 26	27.7	28 33.2	87 26	27.4	28 59.4	87 26	27.2	30 17.8	87 25	26.3	30 43.9	87 25	26.0	2
3	26 05.2	88 27	28.2	26 31.7	88 27	28.0	27 24.6	88 26	27.4	27 51.1	88 26	27.2	28 17.5	88 26	26.9	28 43.8	88 25	26.6	30 02.7	87 25	25.8	30 28.9	87 24	25.5	3
4	25 49.1	89 26	27.6	26 15.7	89 26	27.4	27 08.9	89 26	26.9	27 35.5	89 25	26.6	28 02.0	88 25	26.4	28 28.5	88 25	26.1	29 47.9	88 24	25.3	30 14.2	88 24	25.0	4
135	25 33.2	89 26	27.1	26 00.0	89 26	26.8	26 53.5	89 25	26.3	27 20.2	89 25	26.1	27 46.9	89 25	25.8	28 13.5	89 24	25.5	29 33.3	88 24	24.8	29 59.8	88 24	24.5	135
6	25 17.7	90 25	26.5	25 44.7	90 25	26.3	26 38.4	90 25	25.8	27 05.3	89 24	25.5	27 32.1	89 24	25.3	27 58.9	89 24	25.0	29 19.0	89 23	24.2	29 45.7	89 23	24.0	6
7	25 02.5	90 25	25.9	25 29.6	90 25	25.7	26 23.6	90 24	25.2	26 50.6	90 24	25.0	27 17.5	90 24	24.7	27 44.5	90 24	24.5	29 05.1	89 23	23.7	29 31.9	89 23	23.4	7
8	24 47.6	91 24	25.3	25 14.8	91 24	25.1	26 09.1	90 24	24.6	26 36.2	90 23	24.4	27 03.3	90 23	24.2	27 30.4	90 23	23.9	28 51.4	90 22	23.2	29 18.3	90 22	22.9	8
9	24 33.1	91 24	24.8	25 00.4	91 24	24.5	25 54.9	91 23	24.1	26 22.2	91 23	23.8	26 49.4	91 23	23.6	27 16.6	91 22	23.4	28 38.0	90 22	22.6	29 05.1	90 22	22.4	9
140	24 18.8	91 23	24.2	24 46.2	91 23	24.0	25 41.0	91 23	23.5	26 08.4	91 22	23.3	26 35.7	91 22	23.0	27 03.1	91 22	22.8	28 24.9	91 21	22.1	28 52.1	91 21	21.9	140
1	24 04.9	92 23	23.6	24 32.4	92 22	23.4	25 27.5	92 22	22.9	25 55.0	92 22	22.7	26 22.4	92 22	22.5	26 49.9	91 21	22.3	28 12.1	91 21	21.6	28 39.4	91 21	21.3	1
2	23 51.3	92 22	23.0	24 18.9	92 22	22.8	25 14.2	92 22	22.4	25 41.8	92 21	22.2	26 09.4	92 21	21.9	26 37.0	92 21	21.7	27 59.6	92 20	21.0	28 27.1	92 20	20.8	2
3	23 38.0	93 22	22.4	24 05.8	93 21	22.2	25 01.3	92 21	21.8	25 29.0	92 21	21.6	25 56.7	92 21	21.4	26 24.4	92 20	21.2	27 47.4	92 20	20.5	28 15.0	92 20	20.3	3
4	23 25.0	93 21	21.8	23 52.9	93 21	21.6	24 48.7	93 20	21.2	25 16.5	93 20	21.0	25 44.3	93 20	20.8	26 12.1	93 20	20.6	27 35.5	92 19	20.0	28 03.2	92 19	19.8	4
145	23 12.4	93 21	21.2	23 40.4	93 20	21.1	24 36.3	93 20	20.7	25 04.3	93 20	20.5	25 32.3	93 20	20.3	26 00.2	93 19	20.1	27 23.9	93 19	19.4	27 51.7	93 19	19.2	145
6	23 00.1	94 20	20.7	23 28.2	94 20	20.5	24 24.4	94 19	20.1	24 52.4	94 19	19.9	25 20.5	93 19	19.7	25 48.5	93 19	19.5	27 12.6	93 18	18.9	27 40.5	93 18	18.7	6
7	22 48.1	94 19	20.1	23 16.3	94 19	19.9	24 12.7	94 19	19.5	24 40.9	94 19	19.3	25 09.1	94 19	19.1	25 37.2	94 18	18.9	27 01.6	94 18	18.4	27 29.6	94 18	18.2	7
8	22 36.5	94 19	19.5	23 04.8	94 19	19.3	24 01.4	94 18	18.9	24 29.7	94 18	18.7	24 57.9	94 18	18.6	25 26.2	94 18	18.4	26 50.9	94 17	17.8	27 19.1	94 17	17.6	8
9	22 25.2	95 18	18.9	22 53.6	95 18	18.7	23 50.4	95 18	18.4	24 18.8	95 18	18.2	24 47.1	95 17	18.0	25 15.5	95 17	17.8	26 40.5	94 17	17.3	27 08.8	94 17	17.1	9
150	22 14.2	95 18	18.3	22 42.7	95 18	18.1	23 39.7	95 17	17.8	24 08.2	95 17	17.6	24 36.7	95 17	17.4	25 05.1	95 17	17.3	26 30.4	95 16	16.7	26 58.9	95 16	16.5	150
1	22 03.6	95 17	17.7	22 32.2	95 17	17.5	23 29.4	95 17	17.2	23 58.0	95 16	17.0	24 26.5	95 16	16.9	24 55.1	95 16	16.7	26 20.7	95 16	16.2	26 49.2	95 16	16.0	1
2	21 53.3	96 17	17.1	22 22.0	96 16	16.9	23 19.4	96 16	16.6	23 48.0	96 16	16.5	24 16.7	96 16	16.3	24 45.4	96 16	16.1	26 11.3	95 15	15.6	26 39.9	95 15	15.5	2
3	21 43.3	96 16	16.5	22 12.1	96 16	16.3	23 09.7	96 16	16.0	23 38.5	96 15	15.9	24 07.2	96 15	15.7	24 36.0	96 15	15.6	26 02.2	96 15	15.1	26 30.9	96 14	14.9	3
4	21 33.8	96 15	15.9	22 02.6	96 15	15.7	23 00.4	96 15	15.4	23 29.2	96 15	15.3	23 58.1	96 15	15.1	24 26.9	96 15	15.0	25 53.4	96 14	14.5	26 22.2	96 14	14.4	4
155	21 24.5	97 15	15.3	21 53.5	97 15	15.1	22 51.4	96 14	14.9	23 20.3	96 14	14.7	23 49.2	96 14	14.6	24 18.2	96 14	14.4	25 44.9	96 14	14.0	26 13.8	96 13	13.8	155
6	21 15.6	97 14	14.7	21 44.6	97 14	14.5	22 42.7	97 14	14.3	23 11.7	97 14	14.1	23 40.7	97 14	14.0	24 09.8	97 13	13.9	25 36.7	97 13	13.4	26 05.7	97 13	13.3	6
7	21 07.1	97 14	14.1	21 36.2	97 14	13.9	22 34.4	97 13	13.7	23 03.5	97 13	13.6	23 32.6	97 13	13.4	24 01.7	97 13	13.3	25 28.9	97 13	12.9	25 58.0	97 12	12.7	7
8	20 58.9	97 13	13.5	21 28.1	97 13	13.3	22 26.4	97 13	13.1	22 55.6	97 13	13.0	23 24.8	97 12	12.8	23 53.9	97 12	12.7	25 21.4	97 12	12.3	25 50.5	97 12	12.2	8
9	20 51.0	98 12	12.9	21 20.3	98 12	12.7	22 18.8	98 12	12.5	22 48.0	97 12	12.4	23 17.3	97 12	12.3	23 46.5	97 12	12.1	25 14.2	97 11	11.8	25 43.4	97 11	11.6	9
160	20 43.5	98 12	12.3	21 12.9	98 12	12.1	22 11.5	98 12	11.9	22 40.8	98 11	11.8	23 10.1	98 11	11.7	23 39.5	98 11	11.6	25 07.3	98 11	11.2	25 36.6	98 11	11.1	160
1	20 36.4	98 11	11.7	21 05.8	98 11	11.5	22 04.6	98 11	11.3	22 34.0	98 11	11.2	23 03.3	98 11	11.1	23 32.7	98 11	11.0	25 00.8	98 10	10.7	25 30.2	98 10	10.5	1
2	20 29.6	98 11	11.0	20 59.1	98 11	10.9	21 58.0	98 10	10.7	22 27.4	98 10	10.6	22 56.9	98 10	10.5	23 26.3	98 10	10.4	24 54.6	98 10	10.1	25 24.0	98 10	10.0	2
3	20 23.2	98 10	10.4	20 52.7	98 10	10.3	21 51.8	98 10	10.1	22 21.3	98 10	10.0	22 50.8	98 10	10.0	23 20.3	98 10	09.9	24 48.7	98 09	09.5	25 18.2	98 09	09.4	3
4	20 17.2	99 09	09.8	20 46.7	99 09	09.7	21 45.9	99 09	09.6	22 15.4	99 09	09.5	22 45.0	99 09	09.4	23 14.5	99 09	09.3	24 43.2	98 09	09.0	25 12.7	98 09	08.9	4
165	20 11.5	99 09	09.2	20 41.1	99 09	09.1	21 40.3	99 09	09.0	22 09.9	99 09	08.9	22 39.6	99 08	08.8	23 09.2	99 08	08.7	24 38.0	99 08	08.4	25 07.6	99 08	08.3	165
6	20 06.1	99 08	08.6	20 35.8	99 08	08.5	21 35.2	99 08	08.4	22 04.8	99 08	08.3	22 34.5	99 08	08.2	23 04.1	99 08	08.1	24 33.1	99 08	07.9	25 02.7	99 08	07.8	6
7	20 01.2	99 08	08.0	20 30.9	99 08	07.9	21 30.3	99 07	07.8	22 00.0	99 07	07.7	22 29.7	99 07	07.6	22 59.4	99 07	07.5	24 28.5	99 07	07.3	24 58.2	99 07	07.2	7
8	19 56.6	99 07	07.4	20 26.3	99 07	07.3	21 25.8	99 07	07.2	21 55.6	99 07	07.1	22 25.3	99 07	07.0	22 55.1	99 07	07.0	24 24.3	99 06	06.8	24 54.1	99 06	06.7	8
9	19 52.3	99 06	06.8	20 22.1	99 06	06.7	21 21.7	99 06	06.6	21 51.5	99 06	06.5	22 21.3	99 06	06.5	22 51.1	99 06	06.4	24 20.5	99 06	06.2	24 50.2	99 06	06.1	9
170	19 48.5	99 06	06.2	20 18.3	99 06	06.1	21 18.0	99 06	06.0	21 47.8	99 06	05.9	22 17.6	99 06	05.9	22 47.4	99 06	05.8	24 16.9	99 05	05.6	24 46.7	99 05	05.6	170
1	19 45.0	1.0 05	05.5	20 14.8	1.0 05	05.5	21 14.6	1.0 05	05.4	21 44.4	1.0 05	05.3	22 14.3	1.0 05	05.3	22 44.1	1.0 05	05.2	24 13.7	1.0 05	05.1	24 43.6	1.0 05	05.0	1
2	19 41.8	1.0 05	04.9	20 11.7	1.0 05	04.9	21 11.5	1.0 04	04.8	21 41.4	1.0 04	04.7	22 11.3	1.0 04	04.7	22 41.2	1.0 04	04.6	24 10.8	1.0 04	04.5	24 40.7	1.0 04	04.5	2
3	19 39.1	1.0 04	04.3	20 09.0	1.0 04	04.3	21 08.8	1.0 04	04.2	21 38.7	1.0 04	04.2	22 08.6	1.0 04	04.1	22 38.6	1.0 04	04.1	24 08.3	1.0 04	03.9	24 38.2	1.0 04	03.9	3
4	19 36.7	1.0 03	03.7	20 06.6	1.0 03	03.7	21 06.5	1.0 03	03.6	21 36.4	1.0 03	03.6	22 06.3	1.0 03	03.5	22 36.3	1.0 03	03.5	24 06.1	1.0 03	03.4	24 36.0	1.0 03	03.3	4
175	19 34.6	1.0 03	03.1	20 04.6	1.0 03	03.1	21 04.5	1.0 03	03.0	21 34.5	1.0 03	03.0	22 04.4	1.0 03	02.9	22 34.4	1.0 03	02.9	24 04.2	1.0 03	02.8	24 34.2	1.0 02	02.8	175
6	19 33.0	1.0 02	02.5	20 02.9	1.0 02	02.4	21 02.9	1.0 02	02.4	21 32.9	1.0 02	02.4	22 02.8	1.0 02	02.3	22 32.8	1.0 02	02.3	24 02.7	1.0 02	02.3	24 32.7	1.0 02	02.2	6
7	19 31.7	1.0 02	01.8	20 01.6	1.0 02	01.8	21 01.6	1.0 02	01.8	21 31.6	1.0 01	01.8	22 01.6	1.0 01	01.8	22 31.6	1.0 01	01.7	24 01.5	1.0 01	01.7	24 31.5	1.0 01	01.7	7
8	19 30.7	1.0 01	01.2	20 00.7	1.0 01	01.2	21 00.7	1.0 01	01.2	21 30.7	1.0 01	01.2	22 00.7	1.0 01	01.2	22 30.7	1.0 01	01.2	24 00.7	1.0 01	01.1	24 30.7	1.0 01	01.1	8
9	19 30.2	1.0 00	00.6	20 00.2	1.0 00	00.6	21 00.2	1.0 00	00.6	21 30.2	1.0 00	00.6	22 00.2	1.0 00	00.6	22 30.2	1.0 00	00.6	24 00.2	1.0 00	00.6	24 30.2	1.0 00	00.6	9
180	19 30.0	1.0 00	00.0	20 00.0	1.0 00	00.0	21 00.0	1.0 00	00.0	21 30.0	1.0 00	00.0	22 00.0	1.0 00	00.0	22 30.0	1.0 00	00.0	24 00.0	1.0 00	00.0	24 30.0	1.0 00	00.0	180

Lat. 55°

Lat. 56°

Lat 57°

Lat 58°

La 59

Lat. 55°

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	62° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	85 00.0	1.0	03	00.0	84 30.0	1.0	03	00.0	83 00.0	1.0	02	00.0	82 30.0	1.0	02	00.0
1	84 58.3	99	08	05.7	84 28.5	99	08	05.1	82 58.8	1.0	06	03.8	82 28.9	1.0	05	03.5
2	84 53.2	97	14	11.3	84 23.9	98	12	10.1	82 55.4	99	09	07.6	82 25.8	99	09	07.0
3	84 44.9	94	19	16.6	84 16.4	95	17	15.0	82 49.7	97	13	11.4	82 20.5	97	12	10.4
4	84 33.6	91	23	21.6	84 06.2	92	21	19.5	82 41.9	95	16	14.9	82 13.3	96	15	13.8
05	84 19.7	86	27	26.2	83 53.5	88	25	23.8	82 32.0	92	20	18.4	82 04.2	93	18	17.0
6	84 03.4	82	31	30.3	83 38.5	84	28	27.7	82 20.3	89	23	21.6	81 53.3	91	21	20.0
7	83 45.0	77	33	34.0	83 21.6	80	31	31.3	82 06.7	86	25	24.6	81 40.7	88	24	22.9
8	83 24.9	72	36	37.4	83 02.9	75	34	34.5	81 51.6	83	28	27.5	81 26.6	84	26	25.6
9	83 03.3	67	38	40.3	82 42.7	71	36	37.4	81 35.0	79	30	30.1	81 11.0	81	28	28.1
10	82 40.5	62	40	42.9	82 21.1	66	38	40.0	81 17.1	75	32	32.6	80 54.2	78	30	30.5
1	82 16.5	58	41	45.2	81 58.5	62	39	42.3	80 58.0	72	34	34.8	80 36.1	74	32	32.7
2	81 51.7	54	43	47.2	81 34.9	58	41	44.4	80 37.9	68	35	36.8	80 17.1	71	33	34.7
3	81 26.0	50	44	49.0	81 10.4	54	42	46.2	80 16.8	64	37	38.7	79 57.0	67	35	36.5
4	80 59.7	46	45	50.6	80 45.2	50	43	47.9	79 54.9	61	38	40.4	79 36.1	64	36	38.2
15	80 32.9	43	46	52.0	80 19.4	47	44	49.3	79 32.2	58	39	42.0	79 14.4	61	37	39.8
6	80 05.5	39	46	53.2	79 53.1	44	45	50.6	79 08.8	54	40	43.4	78 52.1	57	38	41.2
7	79 37.8	36	47	54.3	79 26.2	40	45	51.8	78 44.9	51	41	44.7	78 29.1	54	39	42.6
8	79 09.6	33	47	55.2	78 59.0	37	46	52.8	78 20.4	48	42	45.9	78 05.6	51	40	43.8
9	78 41.2	31	48	56.1	78 31.4	35	46	53.7	77 55.5	45	42	46.9	77 41.5	48	41	44.8
20	78 12.5	28	48	56.8	78 03.6	32	47	54.5	77 30.2	42	43	47.9	77 17.0	45	41	45.8
1	77 43.6	25	48	57.5	77 35.4	29	47	55.2	77 04.5	39	43	48.8	76 52.2	43	42	46.8
2	77 14.5	23	49	58.0	77 07.1	27	48	55.8	76 38.4	37	44	49.6	76 26.9	40	43	47.6
3	76 45.3	21	49	58.5	76 38.5	24	48	56.4	76 12.1	34	44	50.3	76 01.4	37	43	48.3
4	76 15.8	19	49	58.9	76 09.7	22	48	56.9	75 45.5	32	45	50.9	75 35.5	35	44	49.0
25	75 46.3	17	49	59.3	75 40.9	20	48	57.3	75 18.7	29	45	51.5	75 09.4	32	44	49.6
6	75 16.7	15	50	59.6	75 11.8	18	49	57.7	74 51.6	27	45	52.0	74 43.1	30	44	50.2
7	74 47.0	13	50	59.9	74 42.7	16	49	58.0	74 24.4	25	46	52.5	74 16.6	28	45	50.7
8	74 17.2	11	50	60.1	74 13.5	14	49	58.2	73 57.1	23	46	52.9	73 49.8	25	45	51.1
9	73 47.3	09	50	60.3	73 44.2	12	40	58.5	73 29.6	21	46	53.2	73 23.0	23	45	51.5
30	73 17.4	07	50	60.4	73 14.8	10	49	58.7	73 01.9	19	46	53.5	72 56.0	21	45	51.9
1	72 47.5	05	50	60.5	72 45.4	08	49	58.8	72 34.2	17	46	53.8	72 28.8	19	45	52.2
2	72 17.5	04	50	60.6	72 15.9	07	49	58.9	72 06.4	15	46	54.1	72 01.6	17	46	52.5
3	71 47.5	02	50	60.6	71 46.4	05	49	59.0	71 38.5	13	47	54.3	71 34.3	15	46	52.7
4	71 17.5	01	50	60.7	71 16.9	03	49	59.1	71 10.5	11	47	54.4	71 06.9	13	46	52.9
35	70 47.5	01	50	60.7	70 47.4	02	49	59.1	70 42.5	09	47	54.6	70 39.4	12	46	53.1
6	70 17.5	02	50	60.6	70 17.8	00	49	59.2	70 14.4	07	47	54.7	70 11.8	10	46	53.2
7	69 47.5	04	50	60.6	69 48.3	01	49	59.1	69 46.3	06	47	54.8	69 44.2	08	46	53.4
8	69 17.6	05	50	60.5	69 18.8	03	49	59.1	69 18.2	04	47	54.9	69 16.6	06	46	53.5
9	68 47.6	07	50	60.4	68 49.2	04	49	59.1	68 50.0	02	47	54.9	68 48.9	05	46	53.5
40	68 17.7	08	50	60.3	68 19.7	06	49	59.0	68 21.9	01	47	54.9	68 21.3	03	46	53.6
1	67 47.8	09	50	60.2	67 50.2	07	49	58.9	67 53.7	01	47	54.9	67 53.6	02	46	53.6
2	67 17.9	10	50	60.1	67 20.8	08	49	58.8	67 25.5	02	47	54.9	67 25.9	00	46	53.6
3	66 48.1	12	50	60.0	66 51.4	10	49	58.7	66 57.4	04	47	54.9	66 58.2	02	46	53.6
4	66 18.4	13	50	59.8	66 22.0	11	49	58.6	66 29.2	05	47	54.8	66 30.5	03	46	53.6
45	65 48.6	14	49	59.6	65 52.6	12	49	58.4	66 01.1	07	47	54.8	66 02.8	05	46	53.5
6	65 19.0	15	49	59.5	65 23.3	14	49	58.3	65 33.0	08	47	54.7	65 35.1	06	46	53.5
7	64 49.4	17	49	59.3	64 54.1	15	49	58.1	65 04.9	09	47	54.6	65 07.5	07	46	53.4
8	64 19.8	18	49	59.1	64 24.9	16	49	57.9	64 36.9	11	47	54.5	64 39.8	09	46	53.3
9	63 50.3	19	49	58.9	63 55.8	17	48	57.7	64 08.9	12	47	54.3	64 12.3	10	46	53.2
50	63 20.9	20	49	58.6	63 26.7	18	48	57.5	63 41.0	13	46	54.2	63 44.7	12	46	53.1
1	62 51.6	21	49	58.4	62 57.7	20	48	57.3	63 13.1	15	46	54.1	63 17.2	13	46	53.0
2	62 22.3	22	49	58.2	62 28.7	21	48	57.1	62 45.3	16	46	53.9	62 49.8	14	46	52.8
3	61 53.1	23	49	57.9	61 59.9	22	48	56.9	62 17.5	17	46	53.7	62 22.4	16	46	52.7
4	61 24.0	25	48	57.7	61 31.1	23	48	56.7	61 49.8	18	46	53.6	61 55.0	17	45	52.5
55	60 54.9	26	48	57.4	61 02.4	24	48	56.4	61 22.1	20	46	53.4	61 27.8	18	45	52.3
6	60 26.0	27	48	57.1	60 33.8	25	48	56.2	60 54.5	21	46	53.2	61 00.6	19	45	52.2
7	59 57.1	28	48	56.9	60 05.2	26	47	55.9	60 27.0	22	46	53.0	60 33.4	21	45	52.0
8	59 28.3	29	48	56.6	59 36.8	27	47	55.6	59 59.6	23	46	52.8	60 06.3	22	45	51.8
9	58 59.6	30	48	56.3	59 08.4	29	47	55.4	59 32.2	24	45	52.5	59 39.3	23	45	51.6
60	58 31.1	31	47	56.0	58 40.1	30	47	55.1	59 04.9	26	45	52.3	59 12.4	24	45	51.4
1	58 02.6	32	47	55.7	58 11.9	31	47	54.8	58 37.8	27	45	52.1	58 45.6	25	45	51.1
2	57 34.2	33	47	55.4	57 43.9	32	47	54.5	58 10.7	28	45	51.8	58 18.8	27	44	50.9
3	57 05.9	34	47	55.1	57 15.9	33	46	54.2	57 43.6	29	45	51.6	57 52.1	28	44	50.7
4	56 37.7	35	47	54.8	56 48.0	34	46	53.9	57 16.7	30	45	51.3	57 25.6	29	44	50.4
65	56 09.7	36	47	54.5	56 20.3	35	46	53.6	56 49.9	31	45	51.1	56 59.1	30	44	50.2
6	55 41.7	37	46	54.1	55 52.6	36	46	53.3	56 23.2	32	44	50.8	56 32.7	31	44	49.9
7	55 13.9	38	46	53.8	55 25.1	37	46	53.0	55 56.6	33	44	50.5	56 06.4	32	44	49.7
8	54 46.2	39	46	53.5	54 57.6	38	46	52.7	55 30.1	34	44	50.2	55 40.2	33	43	49.4
9	54 18.6	40	46	53.1	54 30.3	39	45	52.4	55 03.7	35	44	49.9	55 14.2	34	43	49.1
70	53 51.1	41	46	52.8	54 03.1	40	45	52.0	54 37.4	37	44	49.6	54 48.2	35	43	48.8
1	53 23.8	42	45	52.5	53 36.1	41	45	51.7	54 11.3	38	43	49.3	54 22.4	36	43	48.5
2	52 56.5	42	45	52.1	53 09.1	42	45	51.3	53 45.2	39	43	49.0	53 56.6	38	43	48.3
3	52 29.4	43	45	51.7	52 42.3	42	44	51.0	53 19.3	40	43	48.7	53 31.0	39	42	48.0
4	52 02.5	44	45	51.4	52 15.6	43	44	50.7	52 53.5	41	43	48.4	53 05.5	40	42	47.7
75	51 35.7	45	44	51.0	51 49.1	44	44	50.3	52 27.8	42	43	48.1	52 40.1	41	42	47.3
6	51 09.0	46	44	50.7	51 22.7	45	44	50.0	52 02.2	43	42	47.8	52 14.9	42	42	47.0
7	50 42.4	47	44	50.3	50 56.4	46	44	49.6	51 36.8	44	42	47.4	51 49.8	43	42	46.7
8	50 16.0	48	44	49.9	50 30.3	47	43	49.2	51 11.5	45	42	47.1	51 24.8	44	41	46.4
9	49 49.8	49	44	49.5	50 04.3	48	43	48.9	50 46.4	46	42	46.8	50 59.9	45	41	46.1
80	49 23.7	50	43	49.2	49 38.4	49	43	48.5	50 21.4	46	41	46.4	50 35.2	46	41	45.7
1	48 57.7	51	43	48.8	49 12.7	50	43	48.1	49 56.5	47	41	46.1	50 10.6	47	41	45.4
2	48 31.9	51	43	48.4	48 47.2	51	42	47.7	49 31.8	48	41	45.7	49 46.2	48	40	45.1
3	48 06.2	52	42	48.0	48 21.8	52	42	47.4	49 07.2	49	41	45.4	49 21.9	49	40	44.7
4	47 40.7	53	42	47.6	47 56.6	52	42	47.0	48 42.8	50	40	45.0	48 57.8	50	40	44.4
85	47 15.4	54	42	47.2	47 31.5	53	42	46.6	48 18.5	51	40	44.7	48 33.8	50	40	44.0
6	46 50.2	55	42	46.8	47 06.6	54	41	46.2	47 54.4	52	40	44.3	48 09.9	51	39	43.7
7	46 25.2	56	41	46.4	46 41.8	55	41	45.8	47 30.4	53	40	44.0	47 46.2	52	39	43.3
8	46 00.4	56	41	46.0	46 17.2	56	41	45.4	47 06.6	54	39	43.6	47 22.7	53	39	43.0
9	45 35.7	57	41	45.6	45 52.8	57	40	45.0	46 43.0	55	39	43.2	46 59.3	54	39	42.6
90	45 11.2	58	41	45.2	45 28.5	58	40	44.6	46 19.5	56	39	42.8	46 36.1	55	38	42.2

H.A.	63° 00′ Alt.	Δd	Δt	Az.	69° 00′ Alt.	Δd	Δt	Az.	69° 30′ Alt.	Δd	Δt	Az.	74° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	82 00.0	1.0	02	00.0	76 00.0	1.0	01	00.0	75 30.0	1.0	01	00.0	70 30.0	1.0	00	00.0
1	81 59.0	1.0	05	03.8	75 59.6	1.0	02	01.5	75 29.6	1.0	02	01.4	70 29.8	1.0	01	00.8
2	81 56.1	99	08	06.5	75 58.2	1.0	04	03.0	75 28.3	1.0	03	02.8	70 29.0	1.0	02	01.6
3	81 51.3	98	11	09.7	75 56.0	99	05	04.4	75 26.2	99	05	04.2	70 27.8	1.0	03	02.4
4	81 44.6	96	14	12.7	75 52.9	99	07	05.9	75 23.3	99	06	05.6	70 26.2	99	04	03.2
05	81 36.1	94	17	15.7	75 49.0	98	08	07.3	75 19.6	98	08	06.9	70 24.0	99	04	04.0
6	81 26.0	92	20	18.6	75 44.1	97	09	08.7	75 15.0	97	09	08.3	70 21.4	98	05	04.8
7	81 14.2	89	22	21.3	75 38.5	96	11	10.1	75 09.7	96	10	09.6	70 18.3	98	06	05.5
8	81 01.0	86	24	23.9	75 32.0	95	12	11.5	75 03.6	95	11	10.9	70 14.7	97	07	06.3
9	80 46.4	83	26	26.3	75 24.8	93	13	12.9	74 56.7	94	13	12.2	70 10.7	96	07	07.1
10	80 30.6	80	28	28.6	75 16.7	92	15	14.2	74 49.0	92	14	13.4	70 06.2	96	08	07.8
1	80 13.5	76	30	30.7	75 07.9	90	16	15.5	74 40.7	91	15	14.6	70 01.3	95	09	08.6
2	79 55.5	73	32	32.7	74 58.4	89	17	16.7	74 31.6	89	16	15.8	69 56.0	94	10	09.3
3	79 36.4	70	33	34.5	74 48.1	87	18	17.9	74 21.9	88	17	17.0	69 50.2	93	10	10.0
4	79 16.5	67	34	36.2	74 37.2	85	19	19.1	74 11.5	86	18	18.1	69 44.0	92	11	10.8
15	78 55.8	63	36	37.7	74 25.7	83	20	20.2	74 00.5	84	19	19.2	69 37.3	90	12	11.5
6	78 34.4	60	37	39.2	74 13.4	81	21	21.3	73 48.9	82	20	20.3	69 30.3	89	12	12.1
7	78 12.4	57	38	40.5	74 00.7	79	22	22.4	73 36.7	80	21	21.3	69 22.9	88	13	12.8
8	77 49.8	54	39	41.7	73 47.3	77	23	23.4	73 23.9	78	22	22.3	69 15.0	87	14	13.5
9	77 26.6	51	39	42.8	73 33.4	75	24	24.3	73 10.6	76	23	23.2	69 06.8	85	14	14.1
20	77 03.0	48	40	43.9	73 18.9	73	25	25.3	72 56.8	74	24	24.1	68 58.2	84	15	14.8
1	76 38.9	46	41	44.8	73 04.0	71	26	26.2	72 42.5	72	25	25.0	68 49.3	82	16	15.4
2	76 14.5	43	41	45.6	72 48.6	69	26	27.0	72 27.8	70	25	25.8	68 40.0	81	16	16.0
3	75 49.7	40	42	46.4	72 32.7	66	27	27.8	72 12.6	68	26	26.6	68 30.4	79	17	16.6
4	75 24.6	38	42	47.1	72 16.5	64	28	28.6	71 56.9	66	27	27.4	68 20.4	77	17	17.1
25	74 59.3	35	43	47.8	71 59.8	62	28	29.3	71 40.9	64	27	28.1	68 10.1	76	18	17.7
6	74 33.7	33	43	48.4	71 42.7	60	29	30.0	71 24.5	61	28	28.8	67 59.5	74	18	18.2
7	74 07.8	31	43	48.9	71 25.3	58	30	30.7	71 07.8	59	28	29.4	67 48.6	72	19	18.7
8	73 41.8	28	44	49.4	71 07.6	55	30	31.3	70 50.7	57	29	30.1	67 37.4	71	19	19.2
9	73 15.6	26	44	49.8	70 49.5	53	31	31.9	70 33.3	55	30	30.7	67 25.9	69	20	19.7
30	72 49.2	24	44	50.2	70 31.2	51	31	32.5	70 15.6	53	30	31.2	67 14.2	67	20	20.2
1	72 22.7	22	44	50.6	70 12.6	49	31	33.0	69 57.6	51	30	31.8	67 02.1	65	20	20.7
2	71 56.0	20	45	50.9	69 53.7	47	32	33.5	69 39.4	49	31	32.3	66 49.9	63	21	21.1
3	71 29.3	18	45	51.1	69 34.5	45	32	34.0	69 20.9	46	31	32.7	66 37.4	62	21	21.5
4	71 02.4	16	45	51.4	69 15.2	42	33	34.5	69 02.2	44	32	33.2	66 24.6	60	22	21.9
35	70 35.5	14	45	51.6	68 55.6	40	33	34.9	68 43.2	42	32	33.6	66 11.7	58	22	22.3
6	70 08.5	12	45	51.8	68 35.8	38	33	35.3	68 24.1	40	32	34.0	65 58.5	56	22	22.7
7	69 41.4	10	45	51.9	68 15.9	36	34	35.6	68 04.7	38	32	34.4	65 45.1	54	23	23.1
8	69 14.3	09	45	52.0	67 55.8	34	34	36.0	67 45.2	36	33	34.7	65 31.5	52	23	23.4
9	68 47.2	07	45	52.1	67 35.5	32	34	36.3	67 25.5	34	33	35.0	65 17.8	50	23	23.7
40	68 20.0	05	45	52.2	67 15.0	30	34	36.6	67 05.7	32	33	35.3	65 03.8	49	24	24.0
1	67 52.8	04	45	52.3	66 54.5	28	34	36.8	66 45.7	30	34	35.6	64 49.7	47	24	24.3
2	67 25.6	02	45	52.3	66 33.8	26	35	37.1	66 25.6	28	34	35.9	64 35.5	45	24	24.6
3	66 58.3	00	45	52.3	66 13.0	24	35	37.3	66 05.4	26	34	36.1	64 21.1	43	24	24.9
4	66 31.1	01	45	52.3	65 52.1	22	35	37.5	65 45.1	24	34	36.3	64 06.5	41	24	25.2
45	66 03.8	03	45	52.3	65 31.1	21	35	37.7	65 24.6	22	34	36.5	63 51.8	39	25	25.4
6	65 36.6	04	45	52.3	65 10.0	19	35	37.9	65 04.1	20	34	36.7	63 37.0	37	25	25.6
7	65 09.4	06	45	52.2	64 48.8	17	35	38.0	64 43.5	19	34	36.9	63 22.0	35	25	25.8
8	64 42.2	07	45	52.1	64 27.6	15	35	38.1	64 22.8	17	35	37.0	63 07.0	33	25	26.1
9	64 15.1	08	45	52.1	64 06.3	13	36	38.3	64 02.1	15	35	37.1	62 51.8	32	25	26.2
50	63 47.9	10	45	52.0	63 45.0	11	36	38.4	63 41.3	13	35	37.2	62 36.5	30	26	26.4
1	63 20.9	11	45	51.9	63 23.6	10	36	38.5	63 20.4	11	35	37.3	62 21.2	28	26	26.6
2	62 53.8	13	45	51.7	63 02.2	08	36	38.5	62 59.5	10	35	37.4	62 05.7	26	26	26.7
3	62 26.8	14	45	51.6	62 40.7	06	36	38.6	62 38.6	08	35	37.5	61 50.2	24	26	26.9
4	61 59.9	15	45	51.5	62 19.3	05	36	38.6	62 17.6	06	35	37.5	61 34.6	22	26	27.0
55	61 33.0	17	45	51.3	61 57.8	03	36	38.6	61 56.7	05	35	37.6	61 18.9	20	26	27.1
6	61 06.1	18	45	51.2	61 36.3	01	36	38.7	61 35.7	03	35	37.6	61 03.2	19	26	27.2
7	60 39.4	19	45	51.0	61 14.8	00	36	38.7	61 14.7	01	35	37.6	60 47.4	17	26	27.3
8	60 12.7	20	44	50.8	60 53.3	02	36	38.7	60 53.6	00	35	37.6	60 31.6	15	26	27.4
9	59 46.0	22	44	50.6	60 31.8	04	36	38.6	60 32.6	02	35	37.6	60 15.7	13	26	27.5
60	59 19.5	23	44	50.4	60 10.3	05	36	38.6	60 11.6	04	35	37.6	59 59.8	11	27	27.6
1	58 53.0	24	44	50.2	59 48.8	07	36	38.6	59 50.6	05	35	37.6	59 43.9	10	27	27.6
2	58 26.6	25	44	50.0	59 27.4	08	36	38.5	59 29.7	07	35	37.5	59 27.9	08	27	27.7
3	58 00.3	26	44	49.8	59 06.0	10	36	38.4	59 08.7	08	35	37.5	59 11.9	06	27	27.7
4	57 34.0	28	44	49.5	58 44.6	11	36	38.4	58 47.8	10	35	37.4	58 55.9	05	27	27.7
65	57 07.9	29	43	49.3	58 23.3	13	36	38.3	58 26.9	11	35	37.3	58 39.9	03	27	27.8
6	56 41.8	30	43	49.1	58 02.0	14	35	38.2	58 06.0	13	35	37.3	58 23.9	01	27	27.8
7	56 15.9	31	43	48.8	57 40.7	16	35	38.1	57 45.2	14	35	37.2	58 07.8	01	27	27.8
8	55 50.1	32	43	48.6	57 19.5	17	35	38.0	57 24.5	16	35	37.1	57 51.8	02	27	27.8
9	55 24.3	33	43	48.3	56 58.3	19	35	37.9	57 03.7	17	34	37.0	57 35.8	04	27	27.7
70	54 58.7	34	43	48.0	56 37.2	20	35	37.7	56 43.1	19	34	36.8	57 19.7	06	27	27.7
1	54 33.2	35	42	47.7	56 16.2	21	35	37.6	56 22.5	20	34	36.7	57 03.7	07	27	27.7
2	54 07.7	37	42	47.5	55 55.2	23	35	37.5	56 01.9	22	34	36.6	56 47.8	09	27	27.7
3	53 42.4	38	42	47.2	55 34.3	24	35	37.3	55 41.4	23	34	36.5	56 31.8	10	27	27.6
4	53 17.3	39	42	46.9	55 13.5	26	35	37.2	55 21.0	24	34	36.3	56 15.9	12	26	27.6
75	52 52.2	40	42	46.6	54 52.8	27	34	37.0	55 00.7	26	34	36.2	56 00.0	14	26	27.5
6	52 27.2	41	41	46.3	54 32.1	28	34	36.8	54 40.4	27	34	36.0	55 44.1	15	26	27.4
7	52 02.4	42	41	46.0	54 11.5	30	34	36.6	54 20.2	28	34	35.8	55 28.3	17	26	27.3
8	51 37.8	43	41	45.7	53 51.0	31	34	36.5	54 00.1	30	33	35.6	55 12.5	18	26	27.3
9	51 13.2	44	41	45.4	53 30.6	32	34	36.3	53 40.1	31	33	35.5	54 56.7	20	26	27.2
80	50 48.8	45	40	45.0	53 10.3	33	34	36.1	53 20.2	32	33	35.3	54 41.0	21	26	27.1
1	50 24.5	46	40	44.7	52 50.1	35	34	35.9	53 00.4	34	33	35.1	54 25.4	23	26	27.0
2	50 00.4	47	40	44.4	52 30.0	36	33	35.7	52 40.6	35	33	34.9	54 09.8	24	26	26.9
3	49 36.4	48	40	44.1	52 10.0	37	33	35.4	52 21.0	36	33	34.7	53 54.3	26	26	26.8
4	49 12.5	49	40	43.7	51 50.1	38	33	35.2	52 01.5	37	32	34.5	53 38.8	27	26	26.6
85	48 48.8	50	39	43.4	51 30.3	40	33	35.0	51 42.0	39	32	34.3	53 23.4	29	26	26.5
6	48 25.2	51	39	43.0	51 10.6	41	33	34.8	51 22.7	40	32	34.0	53 08.1	30	25	26.4
7	48 01.8	52	39	42.7	50 51.0	42	32	34.5	51 03.5	41	32	33.8	52 52.8	31	25	26.2
8	47 38.6	53	38	42.3	50 31.6	43	32	34.3	50 44.4	42	32	33.6	52 37.7	33	25	26.1
9	47 15.5	53	38	42.0	50 12.3	44	32	34.0	50 25.5	44	31	33.3	52 22.6	34	25	26.0
90	46 52.5	54	38	41.6	49 53.1	46	32	33.8	50 06.6	45	31	33.1	52 07.5	36	25	25.8

Digitized by Google

Lat. 55°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	44 46.9	59 40	44.8	45 04.5	58 40	44.2	45 56.2	57 39	42.5	46 13.1	56 38	41.9	46 29.8	55 38	41.3	49 34.0	47 32	33.5	49 47.9	46 31	32.9	51 52.6	37 25	25.6	91
2	44 22.7	60 40	44.4	44 40.6	59 40	43.8	45 33.9	57 38	42.1	45 50.2	57 38	41.5	46 07.1	56 37	40.9	49 15.0	48 31	33.3	49 29.3	47 31	32.6	51 37.8	38 25	25.5	2
3	43 58.8	61 40	43.9	44 16.8	60 39	43.4	45 10.1	58 38	41.7	45 27.5	58 38	41.1	45 44.7	57 37	40.5	48 56.2	49 31	33.0	49 10.8	48 31	32.3	51 23.0	40 24	25.3	3
4	43 35.0	61 39	43.5	43 53.3	61 39	43.0	44 47.3	59 38	41.3	45 04.9	59 37	40.7	45 22.4	58 37	40.1	48 37.5	50 31	32.7	48 52.4	49 30	32.1	51 08.3	41 24	25.1	4
95	43 11.4	62 39	43.1	43 29.9	62 39	42.6	44 24.7	60 37	40.9	44 42.6	59 37	40.3	45 00.3	59 37	39.8	48 19.0	51 31	32.5	48 34.2	50 30	31.8	50 53.7	42 24	25.0	95
6	42 47.9	63 39	42.7	43 06.7	62 38	42.1	44 02.2	61 37	40.5	44 20.4	60 37	39.9	44 38.4	60 36	39.4	48 00.6	52 30	32.2	48 16.2	52 30	31.6	50 39.3	44 24	24.8	6
7	42 24.7	64 38	42.2	42 43.7	63 38	41.7	43 40.0	62 37	40.1	43 58.4	61 36	39.6	44 16.7	61 36	39.0	47 42.3	53 30	31.9	47 58.2	53 30	31.3	50 24.9	45 24	24.6	7
8	42 01.7	64 38	41.8	42 20.9	64 38	41.3	43 17.9	63 36	39.7	43 36.6	62 36	39.2	43 55.1	62 36	38.6	47 24.2	54 30	31.6	47 40.4	54 29	31.0	50 10.6	46 24	24.4	8
9	41 38.8	65 38	41.4	41 58.3	65 37	40.9	42 56.0	63 36	39.3	43 14.9	63 36	38.8	43 33.7	62 35	38.2	47 06.2	55 30	31.3	47 22.8	55 29	30.7	49 56.5	47 23	24.2	9
100	41 16.2	66 37	40.9	41 35.9	66 37	40.4	42 34.3	64 36	38.9	42 53.5	64 35	38.4	43 12.5	63 35	37.8	46 48.4	56 29	31.0	47 05.3	56 29	30.4	49 42.4	49 23	24.0	100
1	40 53.7	67 37	40.5	41 13.7	66 37	40.0	42 12.8	65 36	38.5	42 32.2	65 35	38.0	42 51.5	64 35	37.4	46 30.7	58 29	30.7	46 47.9	57 29	30.1	49 28.4	50 23	23.8	1
2	40 31.5	67 37	40.0	40 51.7	67 36	39.6	41 51.5	66 35	38.1	42 11.1	65 35	37.6	42 30.7	65 34	37.0	46 13.2	59 29	30.4	46 30.7	58 28	29.9	49 14.6	51 23	23.6	2
3	40 09.5	68 36	39.6	40 29.9	68 36	39.1	41 30.3	67 35	37.6	41 50.2	66 34	37.1	42 10.0	66 34	36.6	45 55.9	60 29	30.1	46 13.6	59 28	29.6	49 00.9	52 23	23.4	3
4	39 47.6	69 36	39.2	40 08.3	69 36	38.7	41 09.4	67 35	37.2	41 29.6	67 34	36.7	41 49.6	66 34	36.2	45 38.7	61 28	29.8	45 56.7	60 28	29.3	48 47.3	54 22	23.2	4
105	39 26.0	70 36	38.7	39 46.8	69 35	38.2	40 48.7	68 34	36.8	41 09.1	68 34	36.3	41 29.3	67 33	35.8	45 21.6	62 28	29.5	45 40.0	61 28	29.0	48 33.8	55 22	23.0	105
6	39 04.6	70 35	38.3	39 25.7	70 35	37.8	40 28.2	69 34	36.4	40 48.8	69 33	35.9	41 09.3	68 33	35.4	45 04.8	62 28	29.2	45 23.4	62 27	28.6	48 20.4	56 22	22.7	6
7	38 43.4	71 35	37.8	39 04.7	71 35	37.3	40 07.9	70 34	36.0	40 28.7	69 33	35.5	40 49.4	69 33	35.0	44 48.1	63 28	28.9	45 07.0	63 27	28.3	48 07.2	57 22	22.5	7
8	38 22.4	72 35	37.3	38 43.9	71 34	36.9	39 47.8	70 33	35.5	40 08.8	70 33	35.1	40 29.8	70 32	34.6	44 31.5	64 27	28.6	44 50.8	64 27	28.0	47 54.1	58 22	22.3	8
9	38 01.6	73 34	36.9	38 23.3	72 34	36.4	39 27.9	71 33	35.1	39 49.2	71 32	34.6	40 10.4	70 32	34.2	44 15.2	65 27	28.2	44 34.7	65 27	27.7	47 41.1	59 21	22.0	9
110	37 41.1	73 34	36.4	38 03.0	73 34	36.0	39 08.2	72 32	34.7	39 29.7	72 32	34.2	39 51.1	71 32	33.8	43 59.0	66 27	27.9	44 18.8	66 26	27.4	47 28.3	60 21	21.8	110
1	37 20.8	74 34	36.0	37 42.9	74 33	35.5	38 48.7	73 32	34.2	39 10.5	72 32	33.8	39 32.1	72 31	33.3	43 42.9	67 26	27.6	44 03.0	67 26	27.1	47 15.5	61 21	21.6	1
2	37 00.7	75 33	35.5	37 23.0	74 33	35.1	38 29.5	73 32	33.8	38 51.4	73 31	33.4	39 13.3	73 31	32.9	43 27.1	68 26	27.2	43 47.5	68 26	26.7	47 03.0	63 21	21.3	2
3	36 40.8	75 33	35.0	37 03.4	75 32	34.6	38 10.4	74 31	33.3	38 32.6	74 31	32.9	38 54.7	73 31	32.5	43 11.4	69 26	26.9	43 32.1	69 25	26.4	46 50.5	64 20	21.1	3
4	36 21.2	76 32	34.6	36 43.9	76 32	34.1	37 51.6	75 31	32.9	38 14.0	74 31	32.5	38 36.3	74 30	32.1	42 56.0	70 26	26.6	43 16.9	69 25	26.1	46 38.2	65 20	20.8	4
115	36 01.8	77 32	34.1	36 24.7	76 32	33.7	37 33.1	76 31	32.5	37 55.7	75 30	32.0	38 18.2	75 30	31.6	42 40.7	71 25	26.2	43 01.8	70 25	25.7	46 26.0	66 20	20.6	115
6	35 42.6	77 32	33.6	36 05.8	77 31	33.2	37 14.7	76 30	32.0	37 37.5	76 30	31.6	38 00.2	76 30	31.2	42 25.6	72 25	25.9	42 47.0	71 24	25.4	46 14.0	67 20	20.3	6
7	35 23.7	78 31	33.1	35 47.0	78 31	32.7	36 56.6	77 30	31.6	37 19.6	77 30	31.2	37 42.5	76 29	30.8	42 10.6	72 25	25.5	42 32.3	72 24	25.1	46 02.1	68 20	20.1	7
8	35 05.0	79 31	32.6	35 28.5	78 30	32.3	36 38.7	78 29	31.1	37 01.9	77 29	30.7	37 25.1	77 29	30.3	41 55.9	73 24	25.2	42 17.8	73 24	24.7	45 50.4	69 19	19.8	8
9	34 46.6	79 30	32.2	35 10.3	79 30	31.8	36 21.0	78 29	30.7	36 44.4	78 29	30.3	37 07.8	78 28	29.9	41 41.4	74 24	24.8	42 03.5	74 24	24.4	45 38.8	70 19	19.5	9
120	34 28.4	80 30	31.7	34 52.3	80 30	31.3	36 03.6	79 29	30.2	36 27.2	79 28	29.8	36 50.8	78 28	29.4	41 27.0	75 24	24.5	41 49.4	75 23	24.0	45 27.4	71 19	19.3	120
1	34 10.4	80 30	31.2	34 34.5	80 29	30.8	35 46.4	80 28	29.7	36 10.2	79 28	29.4	36 34.0	79 28	29.0	41 12.9	76 23	24.1	41 35.5	76 23	23.7	45 16.1	72 19	19.0	1
2	33 52.7	81 29	30.7	34 17.0	81 29	30.4	35 29.4	80 28	29.3	35 53.5	80 28	28.9	36 17.4	80 27	28.5	40 58.9	76 23	23.7	41 21.8	76 23	23.3	45 05.0	72 18	18.7	2
3	33 35.3	82 29	30.2	33 59.7	81 28	29.9	35 12.7	81 27	28.8	35 37.0	81 27	28.4	36 01.1	80 27	28.1	40 45.2	77 23	23.4	41 08.3	77 22	23.0	44 54.0	73 18	18.4	3
4	33 18.1	82 28	29.7	33 42.7	82 28	29.4	34 56.3	81 27	28.3	35 20.7	81 27	28.0	35 45.0	81 26	27.6	40 31.6	78 22	23.0	40 55.0	78 22	22.6	44 43.2	74 18	18.2	4
125	33 01.1	83 28	29.2	33 25.9	83 28	28.9	34 40.1	82 27	27.9	35 04.7	82 26	27.5	35 29.2	82 26	27.2	40 18.2	79 22	22.6	40 41.8	78 22	22.2	44 32.6	75 17	17.9	125
6	32 44.4	83 27	28.7	33 09.4	83 27	28.4	34 24.1	83 26	27.4	34 48.9	82 26	27.1	35 13.6	82 26	26.7	40 05.1	80 22	22.3	40 28.9	79 21	21.9	44 22.1	76 17	17.6	6
7	32 28.0	84 27	28.2	32 53.2	84 27	27.9	34 08.4	83 26	26.9	34 33.3	83 25	26.6	34 58.2	83 25	26.3	39 52.2	80 21	21.9	40 16.2	80 21	21.5	44 11.7	77 17	17.3	7
8	32 11.9	85 26	27.7	32 37.2	84 26	27.4	33 52.9	84 25	26.5	34 18.1	84 25	26.1	34 43.1	84 25	25.8	39 39.4	81 21	21.5	40 03.7	81 20	21.1	44 01.6	78 17	17.0	8
9	31 56.0	85 26	27.2	32 21.5	85 26	26.9	33 37.7	84 25	26.0	34 03.0	84 25	25.7	34 28.3	84 24	25.3	39 26.9	82 20	21.1	39 51.4	81 20	20.8	43 51.6	79 16	16.7	9
130	31 40.3	86 26	26.7	32 06.0	85 25	26.4	33 22.8	85 24	25.5	33 48.2	85 24	25.2	34 13.7	85 24	24.9	39 14.6	82 20	20.8	39 39.3	82 20	20.4	43 41.8	79 16	16.4	130
1	31 25.0	86 25	26.2	31 50.8	86 25	25.9	33 08.1	86 24	25.0	33 33.7	85 24	24.7	33 59.3	85 23	24.4	39 02.5	83 20	20.4	39 27.4	83 19	20.0	43 32.1	80 16	16.2	1
2	31 09.9	87 25	25.7	31 35.9	87 24	25.4	32 53.6	86 24	24.6	33 19.5	86 23	24.2	33 45.2	86 23	23.9	38 50.6	84 19	20.0	39 15.7	83 19	19.6	43 22.6	81 16	15.9	2
3	30 55.1	87 24	25.2	31 21.3	87 24	24.9	32 39.5	87 23	24.1	33 05.5	87 23	23.8	33 31.4	86 23	23.5	38 39.0	84 19	19.6	39 04.3	84 19	19.3	43 13.3	82 15	15.6	3
4	30 40.6	88 24	24.7	31 06.9	88 24	24.4	32 25.6	87 23	23.6	32 51.7	87 22	23.3	33 17.8	87 22	23.0	38 27.5	85 19	19.2	38 53.0	85 18	18.9	43 04.2	83 15	15.3	4
135	30 26.3	88 23	24.2	30 52.8	88 23	23.9	32 11.9	88 22	23.1	32 38.2	88 22	22.8	33 04.5	88 22	22.5	38 16.3	86 18	18.8	38 42.0	85 18	18.5	42 55.2	83 15	15.0	135
6	30 12.4	89 23	23.7	30 39.0	89 23	23.4	31 58.6	88 22	22.6	32 25.0	88 22	22.3	32 51.5	88 21	22.1	38 05.3	86 18	18.4	38 31.2	86 18	18.1	42 46.4	84 14	14.6	6
7	29 58.7	89 22	23.2	30 25.4	89 22	22.9	31 45.5	89 21	22.1	32 12.1	89 21	21.8	32 38.7	89 21	21.6	37 54.6	87 18	18.0	38 20.6	87 17	17.7	42 37.8	85 14	14.3	7
8	29 45.3	90 22	22.7	30 12.2	90 22	22.4	31 32.7	89 21	21.6	31 59.4	89 21	21.4	32 26.2	89 20	21.1	37 44.0	87 17	17.7	38 10.2	87 17	17.3	42 29.3	85 14	14.0	8
9	29 32.1	90 21	22.1	29 59.2	90 21	21.9	31 20.1	90 20	21.1	31 47.0	90 20	20.9	32 13.9	90 20	20.6	37 33.7	88 17	17.3	38 00.1	88 17	17.0	42 21.1	86 13	13.7	9
140	29 19.3	91 21	21.6	29 46.5	91 21	21.4	31 07.8	90 20	20.6	31 34.9	90 20	20.4	32 01.9	90 20	20.1	37 23.6	89 16	16.9	37 50.1	88 16	16.6	42 13.0	87 13	13.4	140
1	29 06.8	91 20	21.1	29 34.1	91 20	20.9	30 55.8	91 20	20.1	31 23.0	91 19	19.9	31 50.2	91 19	19.7	37 13.7	89 16	16.5	37 40.5	89 16	16.2	42 05.1	87 13	13.1	1
2	28 54.5	92 20	20.6	29 22.0	91 20	20.4	30 44.1	91 19	19.6	31 11.5	91 19	19.4	31 38.8	91 19	19.2	37 04.1	90 16	16.1	37 31.0	90 15	15.8	41 57.4	88 13	12.8	2
3	28 42.6	92 19	20.1	29 10.1	92 19	19.8	30 32.7	92 19	19.2	31 00.2	92 18	18.9	31 27.6	91 18	18.7	36 54.7	90 15	15.6	37 21.7	90 15	15.4	41 49.9	89 12	12.5	3
4	28 30.9	92 19	19.5	28 58.6	92 19	19.3	30 21.5	92 18	18.7	30 49.2	92 18	18.4	31 16.7	92 18	18.2	36 45.5	91 15	15.2	37 12.7	91 15	15.0	41 42.6	89 12	12.1	4
145	28 19.5	93 18	19.0	28 47.4	93 18	18.8	30 10.7	92 18	18.1	30 38.4	92 17	17.9	31 06.1	92 17	17.7	36 36.6	91 14	14.8	37 04.0	91 14	14.6	41 35.4	90 12	11.8	145
6	28 08.5	93 18	18.5	28 36.4	93 18	18.3	30 00.1	93 17	17.6	30 28.0	93 17	17.4	30 55.8	93 17	17.2	36 27.9	92 14	14.4	36 55.4	92 14	14.2	41 28.5	90 11	11.5	6
7	27 57.7	94 17	18.0	28 25.8	93 17	17.8	29 49.8	93 17	17.1	30 17.8	93 16	16.9	30 45.8	93 16	16.7	36 19.5	92 14	14.0	36 47.1	92 13	13.8	41 21.7	91 11	11.2	7
8	27 47.3	94 17	17.4	28 15.4	94 17	17.2	29 39.8	94 16	16.6	30 07.9	94 16	16.4	30 36.0	94 16	16.2	36 11.2	93 13	13.6	36 39.0	93 13	13.4	41 15.1	91 11	10.9	8
9	27 37.1	94 16	16.9	28 05.4	94 16	16.7	29 30.1	94 16	16.1	29 58.3	94 16	15.9	30 26.5	94 15	15.7	36 03.3	93 13	13.2	36 31.2	93 13	13.0	41 08.7	92 10	10.5	9
150	27 27.3	95 16	16.4	27 55.6	95 16	16.2	29 20.7	94 15	15.6	29 49.0	94 15	15.4	30 17.3	94 15	15.2	35 55.5	94 12	12.8	36 23.6	93 12	12.6	41 02.5	92 10	10.2	150
1	27 17.7	95 15	15.8	27 46.2	95 15	15.7	29 11.6	95 15	15.1	29 40.0	95 15	14.9	30 08.4	95 14	14.7	35 48.0	94 12	12.4	36 16.2	94 12	12.2	40 56.5	93 10	09.9	1
2	27 08.5	95 15	15.3	27 37.1	95 15	15.1	29 02.8	95 14	14.6	29 31.3	95 14	14.4	29 59.8	95 14	14.2	35 40.8	94 12	12.0	36 09.1	94 11	11.7	40 50.7	93 09	09.5	2
3	26 59.6	96 14	14.8	27 28.2	96 14	14.6	28 54.2	95 14	14.1	29 22.9	95 14	13.9	29 51.5	95 13	13.7	35 33.8	95 11	11.5	36 02.2	95 11	11.3	40 45.1	94 09	09.2	3
4	26 50.9	96 14	14.2	27 19.7	96 14	14.1	28 46.0	96 13	13.6	29 14.7	96 13	13.4	29 43.5	96 13	13.2	35 27.0	95 11	11.1	35 55.5	95 11	10.9	40 39.7	94 09	08.9	4
155	26 42.7	96 13	13.7	27 11.5	96 13	13.5	28 38.1	96 13	13.1	29 06.9	96 13	12.9	29 35.7	96 12	12.7	35 20.5	95 10	10.7	35 49.1	95 10	10.5	40 34.5	95 08	08.6	155
6	26 34.7	97 13	13.1	27 03.6	97 13	13.0	28 30.4	96 12	12.6	28 59.4	96 12	12.4	29 28.3	96 12	12.2	35 14.2	96 10	10.3	35 43.0	96 10	10.1	40 29.5	95 08	08.2	6
7	26 27.0	97 12	12.6	26 56.0	97 12	12.5	28 23.1	97 12	12.0	28 52.1	97 12	11.9	29 21.1	97 11	11.7	35 08.2	96 10	09.9	35 37.1	96 09	09.7	40 24.6	96 08	07.9	7
8	26 19.6	97 12	12.1	26 48.8	97 12	11.9	28 16.1	97 11	11.5	28 45.2	97 11	11.4	29 14.3	97 11	11.2	35 02.5	96 09	09.4	35 31.4	96 09	09.3	40 20.0	96 07	07.5	8
9	26 12.6	97 11	11.5	26 41.8	97 11	11.4	28 09.4	97 11	11.0	28 38.5	97 11	10.9	29 07.7	97 10	10.7	34 56.9	97 09	09.0	35 26.0	97 09	08.9	40 15.6	96 07	07.2	9
160	26 05.9	98 11	11.0	26 35.2	98 11	10.9	28 03.0	97 10	10.5	28 32.2	97 10	10.4	29 01.4	97 10	10.2	34 51.7	97 08	08.6	35 20.8	97 08	08.4	40 11.4	97 07	06.9	160
1	25 59.5	98 10	10.4	26 28.9	98 10	10.3	27 56.8	98 10	10.0	28 26.2	98 10	09.8	28 55.5	98 09	09.7	34 46.7	97 08	08.2	35 15.9	97 08	08.0	40 07.4	97 06	06.5	1
2	25 53.4	98 10	09.9	26 22.8	98 09	09.8	27 51.0	98 09	09.4	28 20.4	98 09	09.3	28 49.8	98 09	09.2	34 41.9	98 06	07.7	35 11.2	98 07	07.6	40 03.6	97 06	06.2	2
3	25 47.7	98 09	09.3	26 17.2	98 09	09.2	27 45.6	98 09	08.9	28 15.0	98 09	08.8	28 44.5	98 08	08.7	34 37.4	98 07	07.3	35 06.7	98 07	07.2	39 59.9	98 06	05.9	3
4	25 42.3	98 08	08.8	26 11.8	98 08	08.7	27 40.4	98 08	08.4	28 09.9	98 08	08.3	28 39.4	98 08	08.2	34 33.1	98 07	06.9	35 02.6	98 07	06.8	39 56.5	98 05	05.5	4
165	25 37.2	99 08	08.3	26 06.8	99 08	08.2	27 35.5	99 08	07.9	28 05.1	99 08	07.8	28 34.6	99 07	07.7	34 29.1	98 06	06.5	34 58.6	98 06	06.4	39 53.3	98 05	05.2	165
6	25 32.4	99 07	07.7	26 02.0	99 07	07.6	27 30.9	99 07	07.4	28 00.6	99 07	07.3	28 30.2	99 07	07.2	34 25.4	99 06	06.0	34 55.0	99 06	05.9	39 50.3	98 05	04.8	6
7	25 27.9	99 07	07.2	25 57.6	99 07	07.1	27 26.7	99 07	06.8	27 56.4	99 06	06.8	28 26.0	99 06	06.7	34 21.9	99 05	05.6	34 51.5	99 05	05.5	39 47.5	99 04	04.5	7
8	25 23.8	99 06	06.6	25 53.5	99 06	06.5	27 22.7	99 06	06.3	27 52.5	99 06	06.2	28 22.2	99 06	06.2	34 18.7	99 05	05.2	34 48.3	99 05	05.1	39 44.9	99 04	04.1	8
9	25 20.0	99 06	06.1	25 49.8	99 06	06.0	27 19.1	99 06	05.8	27 48.9	99 05	05.7	28 18.7	99 05	05.6	34 15.7	99 05	04.7	34 45.4	99 04	04.7	39 42.6	99 04	03.8	9
170	25 16.5	99 05	05.5	25 46.4	99 05	05.4	27 15.8	99 05	05.3	27 45.6	99 05	05.2	28 15.4	99 05	05.1	34 13.0	99 04	04.3	34 42.7	99 04	04.2	39 40.4	99 03	03.5	170
1	25 13.4	1.0 05	05.0	25 43.3	1.0 05	04.9	27 12.8	99 04	04.7	27 42.6	99 04	04.7	28 12.5	99 04	04.6	34 10.5	99 04	03.9	34 40.3	99 04	03.8	39 38.4	99 03	03.1	1
2	25 10.6	1.0 04	04.4	25 40.5	1.0 04	04.4	27 10.1	1.0 04	04.2	27 40.0	1.0 04	04.2	28 09.9	1.0 04	04.1	34 08.3	1.0 03	03.5	34 38.2	1.0 03	03.4	39 36.7	99 03	02.8	2
3	25 08.1	1.0 04	03.9	25 38.0	1.0 04	03.8	27 07.7	1.0 03	03.7	27 37.7	1.0 03	03.6	28 07.6	1.0 03	03.6	34 06.4	1.0 03	03.0	34 36.2	1.0 03	03.0	39 35.1	1.0 02	02.4	3
4	25 06.0	1.0 03	03.3	25 35.9	1.0 03	03.3	27 05.7	1.0 03	03.2	27 35.6	1.0 03	03.1	28 05.6	1.0 03	03.1	34 04.7	1.0 02	02.6	34 34.6	1.0 02	02.5	39 33.7	1.0 02	02.1	4
175	25 04.1	1.0 02	02.8	25 34.1	1.0 02	02.7	27 04.0	1.0 02	02.6	27 33.9	1.0 02	02.6	28 03.9	1.0 02	02.6	34 03.2	1.0 02	02.2	34 33.2	1.0 02	02.1	39 32.6	1.0 02	01.7	175
6	25 02.7	1.0 02	02.2	25 32.6	1.0 02	02.2	27 02.5	1.0 02	02.1	27 32.5	1.0 02	02.1	28 02.5	1.0 02	02.1	34 02.1	1.0 02	01.7	34 32.0	1.0 02	01.7	39 31.7	1.0 01	01.4	6
7	25 01.5	1.0 01	01.7	25 31.5	1.0 01	01.6	27 01.4	1.0 01	01.6	27 31.4	1.0 01	01.6	28 01.4	1.0 01	01.5	34 01.2	1.0 01	01.3	34 31.1	1.0 01	01.3	39 30.9	1.0 01	01.0	7
8	25 00.7	1.0 01	01.1	25 30.7	1.0 01	01.1	27 00.6	1.0 01	01.1	27 30.6	1.0 01	01.0	28 00.6	1.0 01	01.0	34 00.5	1.0 01	00.9	34 30.5	1.0 01	00.8	39 30.4	1.0 01	00.7	8
9	25 00.2	1.0 00	00.6	25 30.2	1.0 00	00.5	27 00.2	1.0 00	00.5	27 30.2	1.0 00	00.5	28 00.2	1.0 00	00.5	34 00.1	1.0 00	00.4	34 30.1	1.0 00	00.4	39 30.1	1.0 00	00.3	9
180	25 00.0	1.0 00	00.0	25 30.0	1.0 00	00.0	27 00.0	1.0 00	00.0	27 30.0	1.0 00	00.0	28 00.0	1.0 00	00.0	34 00.0	1.0 00	00.0	34 30.0	1.0 00	00.0	39 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 55°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	39	180	43	180	47	180	51	180	55	180	59	180	63	180	67	180	71	180	75	180	79	180	00
4	39	175	43	175	47	174	51	174	55	173	59	173	63	172	67	171	71	170	75	168	79	165	4
8	39	170	43	169	47	169	51	168	54	167	58	166	62	165	66	163	70	161	74	157	78	152	8
12	38	165	42	164	46	163	50	162	54	161	58	159	62	157	65	155	69	152	73	147	77	140	12
16	37	160	41	159	45	158	49	156	53	155	57	153	61	150	64	147	68	143	72	138	75	130	16
20	36	155	40	154	44	152	48	151	52	149	56	146	59	144	63	140	67	136	70	130	73	122	20
24	35	150	39	149	43	147	47	145	51	143	54	140	58	137	61	134	65	129	68	123	71	116	24
28	34	146	38	144	42	142	45	140	49	138	53	135	56	132	60	128	63	123	66	117	69	110	28
32	33	141	37	139	40	137	44	135	47	133	51	130	54	126	58	122	61	118	64	112	67	105	32
36	31	137	35	135	39	133	42	130	46	128	49	125	53	121	56	117	59	113	62	107	65	100	36
40	30	132	33	130	37	128	40	126	44	123	47	120	51	117	54	113	57	108	60	103	62	97	40
44	28	128	32	126	35	124	38	121	42	119	45	116	48	112	52	108	55	104	57	99	60	93	44
48	26	124	30	122	33	120	36	117	40	115	43	112	46	108	49	104	52	100	55	95	58	90	48
52	24	121	28	118	31	116	34	113	38	111	41	108	44	104	47	100	50	96	53	92	55	86	52
56	22	117	26	114	29	112	32	110	36	107	39	104	42	100	45	97	48	93	51	88	53	83	56
60	20	113	23	111	27	108	30	106	33	103	37	100	40	97	43	93	46	90	48	85	51	81	60
64	18	110	21	107	25	105	28	102	31	99	34	97	37	93	40	90	43	86	46	82	49	78	64
68	16	106	19	104	22	101	26	99	29	96	32	93	35	90	38	87	41	83	44	79	46	75	68
72	14	103	17	100	20	98	23	95	27	93	30	90	33	87	36	84	39	80	41	77	44	72	72
76	11	99	15	97	18	94	21	92	24	89	27	87	30	84	33	81	36	77	39	74	42	70	76
80	09	96	12	94	16	91	19	89	22	86	25	83	28	81	31	78	34	74	37	71	40	67	80
84	07	93	10	90	13	88	16	85	20	83	23	80	26	78	29	75	32	72	35	68	38	65	84
88	04	89	08	87	11	85	14	82	17	80	21	77	24	75	27	72	30	69	33	66	36	62	88
92	02	86	05	84	09	81	12	79	15	77	18	74	22	72	25	69	28	66	31	63	34	60	92
96	*00*	83	03	81	06	78	10	76	13	74	16	71	19	69	23	66	26	63	29	60	32	57	96
100	*02*	79	01	77	04	75	07	73	11	70	14	68	17	66	20	63	24	60	27	58	30	55	100
104	*05*	76	*01*	74	02	72	05	70	09	67	12	65	15	63	18	60	22	58	25	55	28	52	104
108	*07*	73	*04*	71	*00*	68	03	66	07	64	10	62	13	60	16	57	20	55	23	52	26	50	108
112	*09*	69	*06*	67	*02*	65	01	63	04	61	08	59	11	57	15	54	18	52	21	50	24	47	112
116	*11*	66	*08*	64	*04*	62	*01*	60	03	58	06	56	09	54	13	51	16	49	20	47	23	45	116
120	*13*	63	*10*	60	*06*	58	*03*	56	01	54	04	52	08	50	11	48	14	46	18	44	21	42	120
124	*15*	59	*12*	57	*08*	55	*05*	53	*01*	51	02	49	06	47	09	45	13	43	16	41	20	39	124
128	*17*	55	*14*	53	*10*	52	*07*	50	*03*	48	01	46	04	44	08	42	11	41	15	39	18	37	128
132	*19*	52	*15*	50	*12*	48	*08*	46	*05*	44	*01*	43	03	41	06	39	10	38	13	36	17	34	132
136	*21*	48	*17*	46	*13*	44	*10*	43	*06*	41	*03*	39	01	38	05	36	08	35	12	33	16	31	136
140	*22*	44	*19*	42	*15*	41	*11*	39	*08*	38	*04*	36	*00*	35	04	33	07	32	11	30	15	29	140
144	*24*	40	*20*	38	*16*	37	*13*	35	*09*	34	*05*	33	*01*	31	02	30	06	29	10	27	14	26	144
148	*25*	36	*22*	34	*18*	33	*14*	32	*10*	30	*06*	29	*03*	28	01	27	05	25	09	24	13	23	148
152	*27*	32	*23*	30	*19*	29	*15*	28	*11*	27	*07*	26	*04*	25	00	23	04	22	08	21	12	20	152
156	*28*	27	*24*	26	*20*	25	*16*	24	*12*	23	*08*	22	*04*	21	*01*	20	03	19	07	18	11	17	156
160	*29*	23	*25*	22	*21*	21	*17*	20	*13*	19	*09*	18	*05*	18	*01*	17	03	16	07	15	10	14	160
164	*30*	18	*26*	18	*22*	17	*18*	16	*14*	15	*10*	15	*06*	14	*02*	14	02	13	06	12	10	12	164
168	*30*	14	*26*	13	*22*	13	*18*	12	*14*	12	*10*	11	*06*	11	*02*	10	02	10	06	09	10	09	168
172	*31*	09	*27*	09	*23*	08	*19*	08	*15*	08	*11*	07	*07*	07	*03*	07	01	06	05	06	09	06	172
176	*31*	05	*27*	04	*23*	04	*19*	04	*15*	04	*11*	04	*07*	04	*03*	03	01	03	05	03	09	03	176
180	*31*	00	*27*	00	*23*	00	*19*	00	*15*	00	*11*	00	*07*	00	*03*	00	01	00	05	00	09	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

Lat. 55°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	83	180	87	180	89	00	85	00	81	00	77	00	73	00	69	00	65	00	61	00	57	00	00
4	83	159	86	140	88	65	85	22	81	11	77	07	73	04	69	03	65	02	61	01	57	00	4
8	81	141	84	119	85	74	83	37	80	21	76	13	73	08	69	05	65	03	61	02	57	01	8
12	80	128	82	108	83	77	82	47	79	29	76	19	72	12	69	08	65	05	61	03	57	01	12
16	78	119	80	101	81	77	80	53	78	35	75	24	72	16	68	10	64	06	61	03	57	01	16
20	76	111	78	96	79	77	78	57	77	40	74	28	71	19	68	13	64	08	61	04	57	01	20
24	74	105	75	92	76	76	76	59	75	44	73	31	70	22	67	15	64	09	60	05	57	01	24
28	71	100	73	89	74	75	74	60	73	46	72	34	69	24	67	17	63	11	60	06	57	02	28
32	69	96	71	86	72	74	72	61	72	48	70	36	68	26	66	18	63	12	60	06	57	02	32
36	67	93	69	83	70	72	70	61	70	49	69	38	67	28	65	20	63	13	60	07	57	02	36
40	65	89	66	81	68	71	68	60	68	50	68	39	66	29	64	21	62	14	59	08	57	02	40
44	62	86	64	78	65	69	66	60	67	50	66	40	65	31	63	22	61	15	59	08	56	03	44
48	60	83	62	76	63	68	64	59	65	50	65	40	64	31	63	23	61	15	59	09	56	03	48
52	58	80	60	74	61	66	62	58	63	50	63	41	63	32	62	24	60	16	58	09	56	03	52
56	55	78	57	72	59	65	60	57	61	49	62	41	61	32	61	24	60	17	58	09	56	03	56
60	53	75	55	69	57	63	59	56	60	48	60	41	60	33	60	25	59	17	58	10	56	03	60
64	51	73	53	67	55	61	57	55	58	48	59	40	59	33	59	25	58	17	57	10	56	03	64
68	49	70	51	65	53	60	55	53	56	47	57	40	58	32	58	25	58	17	57	10	56	03	68
72	47	68	49	63	51	58	53	52	54	46	56	39	56	32	57	25	57	18	56	10	56	03	72
76	45	66	47	61	49	56	51	51	53	45	54	38	55	32	56	25	56	18	56	10	55	03	76
80	42	63	45	59	47	54	49	49	51	44	53	38	54	31	55	25	55	18	56	10	55	03	80
84	40	61	43	57	45	52	48	48	50	42	51	37	53	31	54	24	55	17	55	10	55	03	84
88	38	59	41	55	44	51	46	46	48	41	50	36	52	30	53	24	54	17	55	10	55	03	88
92	37	56	39	53	42	49	44	44	47	40	49	35	51	29	52	23	53	17	54	10	55	03	92
96	35	54	37	51	40	47	43	43	45	38	47	33	50	28	51	23	53	17	54	10	55	03	96
100	33	52	36	48	39	45	41	41	44	37	46	32	48	27	50	22	52	16	54	10	55	03	100
104	31	49	34	46	37	43	40	39	42	35	45	31	47	26	50	21	52	16	53	10	54	03	104
108	29	47	32	44	35	41	38	37	41	34	44	30	46	25	49	20	51	15	53	09	54	03	108
112	28	44	31	42	34	39	37	35	40	32	43	28	45	24	48	20	50	15	52	09	54	03	112
116	26	42	29	39	33	37	36	34	39	30	42	27	45	23	47	19	50	14	52	09	54	03	116
120	25	40	28	37	31	35	34	32	38	29	41	25	44	22	47	18	49	13	52	08	54	03	120
124	23	37	27	35	30	32	33	30	37	27	40	24	43	20	46	17	49	13	51	08	54	03	124
128	22	35	25	32	29	30	32	28	36	25	39	22	42	19	45	16	48	12	51	08	54	03	128
132	21	32	24	30	28	28	31	26	35	23	38	21	41	18	45	15	48	11	51	07	54	03	132
136	19	30	23	28	27	26	30	24	34	21	37	19	41	16	44	14	47	10	50	07	54	02	136
140	18	27	22	25	26	24	29	22	33	20	37	17	40	15	44	12	47	09	50	06	53	02	140
144	17	24	21	23	25	21	29	20	32	18	36	16	39	14	43	11	47	09	50	05	53	02	144
148	16	22	20	20	24	19	28	17	32	16	35	14	39	12	43	10	46	08	50	05	53	02	148
152	16	19	19	18	23	17	27	15	31	14	35	12	39	11	42	09	46	07	50	04	53	02	152
156	15	16	19	15	23	14	27	13	30	12	34	11	38	09	42	08	46	06	49	04	53	01	156
160	14	14	18	13	22	12	26	11	30	10	34	09	38	08	42	06	45	05	49	03	53	01	160
164	14	11	18	10	22	10	26	09	30	08	34	07	37	06	41	05	45	04	49	03	53	01	164
168	13	08	17	08	21	07	25	07	29	06	33	05	37	05	41	04	45	03	49	02	53	01	168
172	13	05	17	05	21	05	25	04	29	04	33	04	37	03	41	03	45	02	49	01	53	00	172
176	13	03	17	03	21	02	25	02	29	02	33	02	37	02	41	01	45	01	49	01	53	00	176
180	13	00	17	00	21	00	25	00	29	00	33	00	37	00	41	00	45	00	49	00	53	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 56°

Lat. 57°

Lat 58°

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

Lat. 56°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	34 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	35 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	36 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	37 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	00
1	33 59.6	1.0 02	178.8	34 29.6	1.0 02	178.8	34 59.6	1.0 02	178.8	35 29.6	1.0 02	178.8	35 59.6	1.0 02	178.8	36 29.6	1.0 02	178.8	36 59.6	1.0 02	178.7	37 29.6	1.0 02	178.7	1
2	33 58.6	1.0 03	177.6	34 28.6	1.0 03	177.6	34 58.6	1.0 03	177.6	35 28.6	1.0 03	177.5	35 58.6	1.0 03	177.5	36 28.5	1.0 03	177.5	36 58.5	1.0 03	177.5	37 28.5	1.0 03	177.5	2
3	33 56.8	1.0 04	176.4	34 26.8	1.0 04	176.4	34 56.8	1.0 04	176.3	35 26.8	1.0 04	176.3	35 56.7	1.0 04	176.3	36 26.7	1.0 04	176.3	36 56.7	1.0 04	176.3	37 26.7	1.0 04	176.2	3
4	33 54.4	1.0 05	175.2	34 24.3	1.0 05	175.2	34 54.3	1.0 05	175.1	35 24.3	1.0 05	175.1	35 54.2	1.0 05	175.1	36 24.2	1.0 05	175.0	36 54.1	1.0 05	175.0	37 24.1	1.0 06	175.0	4
05	33 51.2	1.0 06	174.0	34 21.1	1.0 06	173.9	34 51.1	1.0 07	173.9	35 21.0	1.0 07	173.9	35 51.0	1.0 07	173.8	36 20.9	1.0 07	173.8	36 50.9	1.0 07	173.8	37 20.8	1.0 07	173.7	05
6	33 47.3	1.0 08	172.8	34 17.2	1.0 08	172.7	34 47.2	1.0 08	172.7	35 17.1	1.0 08	172.6	35 47.0	1.0 08	172.6	36 16.9	1.0 08	172.6	36 46.9	1.0 08	172.5	37 16.8	1.0 08	172.5	6
7	33 42.7	1.0 09	171.6	34 12.6	1.0 09	171.5	34 42.5	1.0 09	171.5	35 12.4	1.0 09	171.4	35 42.3	1.0 09	171.4	36 12.2	1.0 09	171.3	36 42.1	1.0 09	171.3	37 12.0	1.0 09	171.2	7
8	33 37.5	1.0 10	170.4	34 07.4	1.0 10	170.3	34 37.2	1.0 10	170.3	35 07.1	1.0 10	170.2	35 36.9	1.0 10	170.1	36 06.8	1.0 10	170.1	36 36.7	1.0 10	170.0	37 06.5	1.0 10	170.0	8
9	33 31.5	99 11	169.2	34 01.4	99 11	169.1	34 31.2	99 11	169.1	35 01.0	99 11	169.0	35 30.9	99 11	168.9	36 00.7	99 11	168.9	36 30.5	99 11	168.8	37 00.3	99 12	168.7	9
10	33 24.9	99 12	168.0	33 54.7	99 12	167.9	34 24.5	99 12	167.9	34 54.3	99 12	167.8	35 24.1	99 12	167.7	35 53.8	99 13	167.6	36 23.6	99 13	167.6	36 53.4	99 13	167.5	10
1	33 17.6	99 13	166.8	33 47.3	99 13	166.7	34 17.1	99 14	166.7	34 46.8	99 14	166.6	35 16.6	99 14	166.5	35 46.3	99 14	166.4	36 16.0	99 14	166.3	36 45.8	99 14	166.2	1
2	33 09.6	99 14	165.6	33 39.3	99 15	165.5	34 09.0	99 15	165.5	34 38.7	99 15	165.4	35 08.4	99 15	165.3	35 38.1	99 15	165.2	36 07.8	99 15	165.1	36 37.5	99 15	165.0	2
3	33 00.9	99 16	164.4	33 30.6	99 16	164.3	34 00.2	99 16	164.3	34 29.9	99 16	164.2	34 59.5	99 16	164.1	35 29.2	99 16	164.0	35 58.8	99 16	163.9	36 28.4	99 16	163.8	3
4	32 51.6	99 17	163.3	33 21.2	99 17	163.2	33 50.8	99 17	163.1	34 20.4	99 17	163.0	34 50.0	99 17	162.9	35 19.6	99 17	162.8	35 49.1	99 17	162.7	36 18.7	99 17	162.6	4
15	32 41.6	99 18	162.1	33 11.1	98 18	162.0	33 40.7	98 18	161.9	34 10.2	98 18	161.8	34 39.8	98 18	161.7	35 09.3	98 18	161.6	35 38.8	98 18	161.5	36 08.3	98 18	161.3	15
6	32 30.9	98 19	160.9	33 00.4	98 19	160.8	33 29.9	98 19	160.7	33 59.4	98 19	160.6	34 28.9	98 19	160.5	34 58.3	98 19	160.4	35 27.8	98 19	160.2	35 57.3	98 20	160.1	6
7	32 19.7	98 20	159.8	32 49.1	98 20	159.6	33 18.5	98 20	159.5	33 47.9	98 20	159.4	34 17.3	98 20	159.3	34 46.7	98 20	159.2	35 16.1	98 21	159.0	35 45.5	98 21	158.9	7
8	32 07.7	98 21	158.6	32 37.1	98 21	158.5	33 06.5	98 21	158.4	33 35.8	98 21	158.2	34 05.1	98 21	158.1	34 34.5	98 22	158.0	35 03.8	98 22	157.9	35 33.1	98 22	157.7	8
9	31 55.2	98 22	157.4	32 24.5	98 22	157.3	32 53.8	98 22	157.2	33 23.0	98 22	157.1	33 52.3	98 22	156.9	34 21.6	98 23	156.8	34 50.8	98 23	156.7	35 20.1	97 23	156.5	9
20	31 42.0	97 23	156.3	32 11.2	97 23	156.2	32 40.4	97 23	156.0	33 09.6	97 23	155.9	33 38.9	97 23	155.8	34 08.0	97 24	155.6	34 37.2	97 24	155.5	35 06.4	97 24	155.3	20
1	31 28.2	97 24	155.2	31 57.4	97 24	155.0	32 26.5	97 24	154.9	32 55.6	97 24	154.7	33 24.8	97 24	154.6	33 53.9	97 25	154.4	34 23.0	97 25	154.3	34 52.1	97 25	154.2	1
2	31 13.8	97 25	154.0	31 42.9	97 25	153.9	32 12.0	97 25	153.7	32 41.0	97 25	153.6	33 10.1	97 26	153.4	33 39.1	97 26	153.3	34 08.1	97 26	153.1	34 37.1	97 26	153.0	2
3	30 58.8	97 26	152.9	31 27.8	97 26	152.7	31 56.8	97 26	152.6	32 25.8	97 26	152.4	32 54.8	97 26	152.3	33 23.7	97 27	152.1	33 52.7	96 27	152.0	34 21.6	96 27	151.8	3
4	30 43.2	96 27	151.8	31 12.1	96 27	151.6	31 41.1	96 27	151.5	32 10.0	96 27	151.3	32 38.9	96 27	151.1	33 07.7	96 28	151.0	33 36.6	96 28	150.8	34 05.5	96 28	150.6	4
25	30 27.1	96 28	150.6	30 55.9	96 28	150.5	31 24.7	96 28	150.3	31 53.6	96 28	150.2	32 22.4	96 28	150.0	32 51.2	96 29	149.8	33 19.9	96 29	149.7	33 48.7	96 29	149.5	25
6	30 10.3	96 29	149.5	30 39.1	96 29	149.4	31 07.8	96 29	149.2	31 36.6	96 29	149.0	32 05.3	96 29	148.9	32 34.0	96 30	148.7	33 02.7	96 30	148.5	33 31.4	96 30	148.3	6
7	29 53.0	96 30	148.4	30 21.7	96 30	148.3	30 50.4	96 30	148.1	31 19.0	95 30	147.9	31 47.7	95 30	147.7	32 16.3	95 30	147.6	32 44.9	95 31	147.4	33 13.5	95 31	147.2	7
8	29 35.2	95 31	147.3	30 03.8	95 31	147.2	30 32.4	95 31	147.0	31 00.9	95 31	146.8	31 29.5	95 31	146.6	31 58.0	95 31	146.4	32 26.5	95 32	146.3	32 55.0	95 32	146.1	8
9	29 16.8	95 32	146.2	29 45.3	95 32	146.1	30 13.8	95 32	145.9	30 42.3	95 32	145.7	31 10.8	95 32	145.5	31 39.2	95 32	145.3	32 07.6	95 32	145.1	32 36.0	95 33	144.9	9
30	28 57.9	95 32	145.1	29 26.3	95 33	145.0	29 54.7	95 33	144.8	30 23.1	95 33	144.6	30 51.5	95 33	144.4	31 19.8	94 33	144.2	31 48.2	94 33	144.0	32 16.5	94 33	143.8	30
1	28 38.5	94 33	144.1	29 06.8	94 33	143.9	29 35.1	94 34	143.7	30 03.4	94 34	143.5	30 31.7	94 34	143.3	31 00.0	94 34	143.1	31 28.2	94 34	142.9	31 56.4	94 34	142.7	1
2	28 18.5	94 34	143.0	28 46.8	94 34	142.8	29 15.0	94 34	142.6	29 43.2	94 35	142.4	30 11.4	94 35	142.2	30 39.6	94 35	142.0	31 07.7	94 35	141.8	31 35.9	94 35	141.6	2
3	27 58.1	94 35	141.9	28 26.2	94 35	141.7	28 54.4	94 35	141.5	29 22.5	94 35	141.3	29 50.6	94 36	141.1	30 18.7	94 36	140.9	30 46.7	94 36	140.7	31 14.8	93 36	140.5	3
4	27 37.1	94 36	140.9	28 05.2	94 36	140.7	28 33.3	93 36	140.5	29 01.3	93 36	140.3	29 29.3	93 36	140.1	29 57.3	93 36	139.9	30 25.2	93 37	139.6	30 53.2	93 37	139.4	4
35	27 15.7	93 36	139.8	27 43.7	93 37	139.6	28 11.7	93 37	139.4	28 39.6	93 37	139.2	29 07.5	93 37	139.0	29 35.4	93 37	138.8	30 03.3	93 37	138.6	30 31.1	93 38	138.4	35
6	26 53.9	93 37	138.8	27 21.7	93 37	138.6	27 49.6	93 38	138.4	28 17.4	93 38	138.1	28 45.3	93 38	137.9	29 13.1	93 38	137.7	29 40.8	93 38	137.5	30 08.6	92 38	137.3	6
7	26 31.5	93 38	137.7	26 59.3	93 38	137.5	27 27.1	93 38	137.3	27 54.8	92 38	137.1	28 22.5	92 39	136.9	28 50.3	92 39	136.7	29 17.9	92 39	136.4	29 45.6	92 39	136.2	7
8	26 08.7	92 39	136.7	26 36.4	92 39	136.5	27 04.1	92 39	136.3	27 31.8	92 39	136.1	27 59.4	92 39	135.8	28 27.0	92 39	135.6	28 54.6	92 40	135.4	29 22.2	92 40	135.2	8
9	25 45.5	92 39	135.7	26 13.1	92 40	135.5	26 40.7	92 40	135.2	27 08.2	92 40	135.0	27 35.8	92 40	134.8	28 03.3	92 40	134.6	28 30.8	92 40	134.3	28 58.3	92 40	134.1	9
40	25 21.8	92 40	134.7	25 49.4	92 40	134.4	26 16.8	92 40	134.2	26 44.3	92 41	134.0	27 11.8	91 41	133.8	27 39.2	91 41	133.5	28 06.6	91 41	133.3	28 34.0	91 41	133.1	40
1	24 57.8	91 41	133.6	25 25.2	91 41	133.4	25 52.6	91 41	133.2	26 20.0	91 41	133.0	26 47.3	91 41	132.7	27 14.7	91 42	132.5	27 42.0	91 42	132.3	28 09.3	91 42	132.0	1
2	24 33.3	91 41	132.6	25 00.6	91 42	132.4	25 27.9	91 42	132.2	25 55.2	91 42	132.0	26 22.5	91 42	131.7	26 49.7	91 42	131.5	27 17.0	91 42	131.2	27 44.2	91 42	131.0	2
3	24 08.4	91 42	131.6	24 35.6	91 42	131.4	25 02.9	91 42	131.2	25 30.1	91 43	130.9	25 57.2	91 43	130.7	26 24.4	90 43	130.5	26 51.5	90 43	130.2	27 18.6	90 43	130.0	3
4	23 43.1	91 43	130.6	24 10.3	90 43	130.4	24 37.4	90 43	130.2	25 04.5	90 43	129.9	25 31.6	90 43	129.7	25 58.7	90 43	129.5	26 25.7	90 44	129.2	26 52.8	90 44	129.0	4
45	23 17.5	90 43	129.7	23 44.6	90 44	129.4	24 11.6	90 44	129.2	24 38.6	90 44	129.0	25 05.6	90 44	128.7	25 32.6	90 44	128.5	25 59.6	90 44	128.2	26 26.5	90 44	128.0	45
6	22 51.5	90 44	128.7	23 18.5	90 44	128.4	23 45.4	90 44	128.2	24 12.4	90 44	128.0	24 39.3	90 45	127.7	25 06.2	90 45	127.5	25 33.0	90 45	127.2	25 59.9	89 45	127.0	6
7	22 25.1	90 45	127.7	22 52.0	90 45	127.5	23 18.9	90 45	127.2	23 45.7	89 45	127.0	24 12.6	89 45	126.7	24 39.4	89 45	126.5	25 06.1	89 45	126.2	25 32.9	89 46	126.0	7
8	21 58.4	89 45	126.7	22 25.2	89 45	126.5	22 52.0	89 45	126.3	23 18.8	89 46	126.0	23 45.5	89 46	125.8	24 12.2	89 46	125.5	24 38.9	89 46	125.3	25 05.6	89 46	125.0	8
9	21 31.3	89 46	125.8	21 58.1	89 46	125.5	22 24.8	89 46	125.3	22 51.4	89 46	125.0	23 18.1	89 46	124.8	23 44.7	89 46	124.5	24 11.3	89 46	124.3	24 37.9	89 47	124.0	9
50	21 04.0	89 46	124.8	21 30.6	89 46	124.6	21 57.2	89 46	124.3	22 23.8	89 47	124.1	22 50.4	89 47	123.8	23 16.9	88 47	123.6	23 43.5	88 47	123.3	24 10.0	88 47	123.1	50
1	20 36.3	89 47	123.9	21 02.8	88 47	123.6	21 29.4	88 47	123.4	21 55.9	88 47	123.1	22 22.4	88 47	122.9	22 48.8	88 47	122.6	23 15.3	88 48	122.4	23 41.7	88 48	122.1	1
2	19 08.2	88 47	122.9	19 34.7	88 47	122.7	20 01.2	88 47	122.4	20 27.6	88 48	122.2	20 54.0	88 48	121.9	21 20.4	88 48	121.7	21 46.8	88 48	121.4	22 13.1	88 48	121.1	2
3	18 39.9	88 48	122.0	19 06.3	88 48	121.7	19 32.7	88 48	121.5	19 59.1	88 48	121.2	20 25.4	88 48	121.0	20 51.7	88 48	120.7	21 18.0	88 48	120.5	21 44.3	87 49	120.2	3
4	18 11.3	88 48	121.1	18 37.7	88 48	120.8	19 04.0	88 48	120.6	19 30.2	88 49	120.3	19 56.5	87 49	120.0	20 22.7	87 49	119.8	20 48.9	87 49	119.5	21 15.1	87 49	119.3	4
55	17 42.5	88 49	120.1	18 08.7	87 49	119.9	18 34.9	87 49	119.6	19 01.1	87 49	119.4	19 27.3	87 49	119.1	19 53.5	87 49	118.8	20 19.6	87 49	118.6	20 45.7	87 49	118.3	55
6	17 13.3	87 49	119.2	17 39.5	87 49	119.0	18 05.6	87 49	118.7	18 31.8	87 49	118.4	18 57.9	87 50	118.2	19 24.0	87 50	117.9	19 50.0	87 50	117.6	20 16.1	87 50	117.4	6
7	16 43.9	87 49	118.3	17 10.0	87 50	118.0	17 36.1	87 50	117.8	18 02.1	87 50	117.5	18 28.2	87 50	117.3	18 54.2	87 50	117.0	19 20.2	87 50	116.7	19 46.1	87 50	116.5	7
8	16 14.2	87 50	117.4	16 40.3	87 50	117.1	17 06.3	87 50	116.9	17 32.3	87 50	116.6	17 58.2	87 50	116.3	18 24.2	86 50	116.1	18 50.1	86 51	115.8	19 16.0	86 51	115.5	8
9	15 44.3	87 50	116.5	16 10.3	87 50	116.2	16 36.2	86 50	116.0	17 02.1	86 51	115.7	17 28.0	86 51	115.4	17 53.9	86 51	115.2	18 19.8	86 51	114.9	18 45.6	86 51	114.6	9
60	15 14.2	86 51	115.6	15 40.1	86 51	115.3	16 05.9	86 51	115.1	16 31.8	86 51	114.8	16 57.6	86 51	114.5	17 23.4	86 51	114.2	17 49.2	86 51	114.0	18 15.0	86 51	113.7	60
1	14 43.8	86 51	114.7	15 09.6	86 51	114.4	15 35.4	86 51	114.2	16 01.2	86 51	113.9	16 27.0	86 51	113.6	16 52.7	86 52	113.3	17 18.5	86 52	113.1	17 44.2	86 52	112.8	1
2	14 13.2	86 51	113.8	14 39.0	86 51	113.5	15 04.7	86 52	113.3	15 30.4	86 52	113.0	15 56.1	86 52	112.7	16 21.8	86 52	112.4	16 47.5	86 52	112.2	17 13.1	85 52	111.9	2
3	13 42.4	86 52	112.9	14 08.1	86 52	112.6	14 33.8	86 52	112.4	14 59.4	86 52	112.1	15 25.1	85 52	111.8	15 50.7	85 52	111.6	16 16.3	85 52	111.3	16 41.9	85 52	111.0	3
4	13 11.4	86 52	112.0	13 37.0	85 52	111.7	14 02.7	85 52	111.5	14 28.3	85 52	111.2	14 53.9	85 52	110.9	15 19.4	85 52	110.7	15 45.0	85 53	110.4	16 10.5	85 53	110.1	4
65	13 40.2	85 52	111.1	14 05.8	85 52	110.9	14 31.3	85 52	110.6	14 56.9	85 53	110.3	15 22.4	85 53	110.1	15 47.9	85 53	109.8	16 13.4	85 53	109.5	16 38.9	85 53	109.2	65
6	13 08.8	85 53	110.3	13 34.3	85 53	110.0	13 59.8	85 53	109.7	14 25.3	85 53	109.4	14 50.8	85 53	109.2	15 16.3	85 53	108.9	15 41.7	85 53	108.6	16 07.1	85 53	108.3	6
7	12 37.2	85 53	109.4	13 02.7	85 53	109.1	13 28.2	85 53	108.8	13 53.6	85 53	108.6	14 19.0	85 53	108.3	14 44.5	85 53	108.0	15 09.8	85 53	107.7	15 35.2	85 53	107.5	7
8	12 05.5	85 53	108.5	12 30.9	85 53	108.2	12 56.3	85 53	108.0	13 21.7	85 53	107.7	13 47.1	85 53	107.4	14 12.5	84 54	107.2	14 37.8	84 54	106.9	15 03.1	84 54	106.6	8
9	11 33.6	85 53	107.7	11 59.0	85 53	107.4	12 24.4	85 54	107.1	12 49.7	84 54	106.8	13 15.0	84 54	106.6	13 40.3	84 54	106.3	14 05.6	84 54	106.0	14 30.9	84 54	105.7	9
70	11 01.6	84 54	106.8	11 26.9	84 54	106.5	11 52.2	84 54	106.2	12 17.5	84 54	106.0	12 42.8	84 54	105.7	13 08.1	84 54	105.4	13 33.3	84 54	105.1	13 58.5	84 54	104.9	70
1	10 29.4	84 54	105.9	10 54.7	84 54	105.7	11 19.9	84 54	105.4	11 45.2	84 54	105.1	12 10.4	84 54	104.8	12 35.7	84 54	104.6	13 00.9	84 54	104.3	13 26.0	84 54	104.0	1
2	9 57.0	84 54	105.1	10 22.3	84 54	104.8	10 47.5	84 54	104.5	11 12.7	84 54	104.3	11 37.9	84 54	104.0	12 03.1	84 54	103.7	12 28.3	84 54	103.4	12 53.4	84 55	103.1	2
3	9 24.6	84 54	104.2	9 49.8	84 54	103.9	10 15.0	84 54	103.7	10 40.2	84 54	103.4	11 05.3	84 55	103.1	11 30.5	84 55	102.8	11 55.6	84 55	102.6	12 20.7	84 55	102.3	3
4	8 52.0	84 54	103.4	9 17.2	84 55	103.1	9 42.3	84 55	102.8	10 07.5	84 55	102.5	10 32.6	84 55	102.3	10 57.7	84 55	102.0	11 22.8	84 55	101.7	11 47.9	84 55	101.4	4
75	8 19.3	84 55	102.5	8 44.4	84 55	102.2	9 09.5	84 55	102.0	9 34.7	84 55	101.7	9 59.7	84 55	101.4	10 24.8	84 55	101.1	10 49.9	84 55	100.9	11 14.9	83 55	100.6	75
6	7 46.5	84 55	101.7	8 11.6	84 55	101.4	8 36.7	84 55	101.1	9 01.7	84 55	100.8	9 26.8	84 55	100.6	9 51.9	83 55	100.3	10 16.9	83 55	100.0	10 41.9	83 55	99.7	6
7	7 13.6	84 55	100.8	7 38.7	84 55	100.6	8 03.7	83 55	100.3	8 28.7	83 55	100.0	8 53.8	83 55	99.7	9 18.8	83 55	99.4	9 43.8	83 55	99.2	10 08.8	83 55	98.9	7
8	6 40.6	83 55	100.0	7 05.6	83 55	99.7	7 30.7	83 55	99.4	7 55.7	83 55	99.2	8 20.7	83 55	98.9	8 45.7	83 55	98.6	9 10.6	83 55	98.3	9 35.6	83 55	98.0	8
9	6 07.5	83 55	99.2	6 32.5	83 55	98.9	6 57.5	83 55	98.6	7 22.5	83 55	98.3	7 47.5	83 55	98.0	8 12.5	83 55	97.8	8 37.4	83 56	97.5	9 02.4	83 56	97.2	9
80	5 34.3	83 55	98.3	5 59.3	83 55	98.0	6 24.3	83 55	97.8	6 49.3	83 55	97.5	7 14.2	83 56	97.2	7 39.2	83 56	96.9	8 04.1	83 56	96.6	8 29.0	83 56	96.4	80
1	5 01.1	83 56	97.5	5 26.1	83 56	97.2	5 51.0	83 56	96.9	6 16.0	83 56	96.6	6 40.9	83 56	96.4	7 05.8	83 56	96.1	7 30.8	83 56	95.8	7 55.7	83 56	95.5	1
2							5 17.7	83 56	96.1	5 42.6	83 56	95.8	6 07.5	83 56	95.5	6 32.5	83 56	95.2	6 57.4	83 56	95.0	7 22.3	83 56	94.7	2
3										5 09.2	83 56	95.0	5 34.1	83 56	94.7	5 59.0	83 56	94.4	6 23.9	83 56	94.1	6 48.8	83 56	93.9	3
4													5 00.7	83 56	93.9	5 25.6	83 56	93.6	5 50.4	83 56	93.3	6 15.3	83 56	93.0	4
85																			5 16.9	83 56	92.5	5 41.8	83 56	92.2	85
6																						5 08.2	83 56	91.4	6

Digitized by Google

Lat. 56°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	34 00.0	1.0 01	180.0	33 30.0	1.0 01	180.0	33 00.0	1.0 01	180.0	32 30.0	1.0 01	180.0	32 00.0	1.0 01	180.0	31 30.0	1.0 01	180.0	31 00.0	1.0 01	180.0	30 30.0	1.0 01	180.0	00
1	33 59.6	1.0 02	178.8	33 29.6	1.0 02	178.8	32 59.7	1.0 02	178.8	32 29.7	1.0 02	178.8	31 59.7	1.0 02	178.8	31 29.7	1.0 02	178.8	30 59.7	1.0 02	178.8	30 29.7	1.0 02	178.8	1
2	33 58.6	1.0 03	177.6	33 28.6	1.0 03	177.6	32 58.6	1.0 03	177.6	32 28.6	1.0 03	177.6	31 58.6	1.0 03	177.6	31 28.6	1.0 03	177.7	30 58.6	1.0 03	177.7	30 28.6	1.0 03	177.7	2
3	33 56.8	1.0 04	176.4	33 26.8	1.0 04	176.4	32 56.9	1.0 04	176.4	32 26.9	1.0 04	176.4	31 56.9	1.0 04	176.5	31 26.9	1.0 04	176.5	30 56.9	1.0 04	176.5	30 26.9	1.0 04	176.5	3
4	33 54.4	1.0 05	175.2	33 24.4	1.0 05	175.2	32 54.4	1.0 05	175.2	32 24.5	1.0 05	175.3	31 54.5	1.0 05	175.3	31 24.5	1.0 05	175.3	30 54.5	1.0 05	175.3	30 24.6	1.0 05	175.4	4
05	33 51.2	1.0 06	174.0	33 21.2	1.0 06	174.0	32 51.3	1.0 06	174.0	32 21.3	1.0 06	174.1	31 51.4	1.0 06	174.1	31 21.4	1.0 06	174.1	30 51.5	1.0 06	174.2	30 21.5	1.0 06	174.2	05
6	33 47.3	1.0 08	172.8	33 17.4	1.0 08	172.8	32 47.5	1.0 08	172.9	32 17.5	1.0 07	172.9	31 47.6	1.0 07	172.9	31 17.7	1.0 07	173.0	30 47.7	1.0 07	173.0	30 17.8	1.0 07	173.1	6
7	33 42.7	1.0 09	171.6	33 12.8	1.0 09	171.6	32 42.9	1.0 09	171.7	32 13.0	1.0 09	171.7	31 43.1	1.0 09	171.8	31 13.2	1.0 09	171.8	30 43.3	1.0 08	171.9	30 13.4	1.0 08	171.9	7
8	33 37.5	1.0 10	170.4	33 07.6	1.0 10	170.4	32 37.7	1.0 10	170.5	32 07.9	1.0 10	170.5	31 38.0	1.0 10	170.6	31 08.1	1.0 10	170.7	30 38.2	1.0 10	170.7	30 08.4	1.0 10	170.8	8
9	33 31.5	99 11	169.2	33 01.7	99 11	169.2	32 31.9	99 11	169.3	32 02.0	99 11	169.4	31 32.2	99 11	169.4	31 02.3	99 11	169.5	30 32.5	99 11	169.5	30 02.6	99 11	169.6	9
10	33 24.9	99 12	168.0	32 55.1	99 12	168.1	32 25.3	99 12	168.1	31 55.5	99 12	168.2	31 25.7	99 12	168.3	30 55.9	99 12	168.3	30 26.1	99 12	168.4	29 56.3	99 12	168.5	10
1	33 17.6	99 13	166.8	32 47.8	99 13	166.9	32 18.1	99 13	167.0	31 48.3	99 13	167.0	31 18.5	99 13	167.1	30 48.8	99 13	167.2	30 19.0	99 13	167.2	29 49.2	99 13	167.3	1
2	33 09.6	99 14	165.6	32 39.9	99 14	165.7	32 10.2	99 14	165.8	31 40.4	99 14	165.9	31 10.7	99 14	165.9	30 41.0	99 14	166.0	30 11.3	99 14	166.1	29 41.5	99 14	166.2	2
3	33 00.9	99 16	164.4	32 31.2	99 15	164.5	32 01.6	99 15	164.6	31 31.9	99 15	164.7	31 02.2	99 15	164.8	30 32.6	99 15	164.9	30 02.9	99 15	165.0	29 33.2	99 15	165.0	3
4	32 51.6	99 17	163.3	32 22.0	99 17	163.4	31 52.4	99 16	163.5	31 22.7	99 16	163.5	30 53.1	99 16	163.6	30 23.5	99 16	163.7	29 53.9	99 16	163.8	29 24.2	99 16	163.9	4
15	32 41.6	99 18	162.1	32 12.0	99 18	162.2	31 42.5	99 18	162.3	31 12.9	99 17	162.4	30 43.3	99 17	162.5	30 13.8	99 17	162.6	29 44.2	99 17	162.7	29 14.6	99 17	162.8	15
6	32 30.9	98 19	160.9	32 01.4	98 19	161.0	31 31.9	98 19	161.1	31 02.4	98 18	161.2	30 32.9	98 18	161.3	30 03.4	98 18	161.4	29 33.9	98 18	161.6	29 04.4	98 18	161.7	6
7	32 19.7	98 20	159.8	31 50.2	98 20	159.9	31 20.8	98 20	160.0	30 51.3	98 20	160.1	30 21.9	98 19	160.2	29 52.4	98 19	160.3	29 22.9	98 19	160.4	28 53.5	98 19	160.5	7
8	32 07.7	98 21	158.6	31 38.4	98 21	158.7	31 09.0	98 21	158.8	30 39.6	98 21	159.0	30 10.2	98 20	159.1	29 40.8	98 20	159.2	29 11.4	98 20	159.3	28 42.0	98 20	159.4	8
9	31 55.2	98 22	157.4	31 25.9	98 22	157.6	30 56.6	98 22	157.7	30 27.2	98 22	157.8	29 57.9	98 22	157.9	29 28.6	98 21	158.1	28 59.2	98 21	158.2	28 29.9	98 21	158.3	9
20	31 42.0	97 23	156.3	31 12.8	97 23	156.4	30 43.5	97 23	156.6	30 14.3	98 23	156.7	29 45.0	98 23	156.8	29 15.7	98 22	156.9	28 46.5	98 22	157.1	28 17.2	98 22	157.2	20
1	31 28.2	97 24	155.2	30 59.0	97 24	155.3	30 29.9	97 24	155.4	30 00.7	97 24	155.6	29 31.5	97 24	155.7	29 02.3	97 23	155.8	28 33.1	97 23	156.0	28 03.9	97 23	156.1	1
2	31 13.8	97 25	154.0	30 44.7	97 25	154.2	30 15.6	97 25	154.3	29 46.5	97 25	154.4	29 17.4	97 24	154.6	28 48.3	97 24	154.7	28 19.1	97 24	154.9	27 50.0	97 24	155.0	2
3	30 58.8	97 26	152.9	30 29.8	97 26	153.0	30 00.8	97 26	153.2	29 31.7	97 26	153.3	29 02.7	97 25	153.5	28 33.6	97 25	153.6	28 04.6	97 25	153.8	27 35.5	97 25	153.9	3
4	30 43.2	96 27	151.8	30 14.3	96 27	151.9	29 45.3	97 27	152.1	29 16.4	97 27	152.2	28 47.4	97 26	152.4	28 18.4	97 26	152.5	27 49.4	97 26	152.7	27 20.5	97 26	152.8	4
25	30 27.1	96 28	150.6	29 58.2	96 28	150.8	29 29.3	96 28	151.0	29 00.5	96 27	151.1	28 31.6	96 27	151.3	28 02.7	96 27	151.4	27 33.8	96 27	151.6	27 04.8	96 27	151.7	25
6	30 10.3	96 29	149.5	29 41.6	96 29	149.7	29 12.8	96 29	149.9	28 44.0	96 28	150.0	28 15.2	96 28	150.2	27 46.3	96 28	150.3	27 17.5	96 28	150.5	26 48.7	96 28	150.6	6
7	29 53.0	96 30	148.4	29 24.3	96 30	148.6	28 55.6	96 29	148.8	28 26.9	96 29	148.9	27 58.2	96 29	149.1	27 29.5	96 29	149.2	27 00.7	96 29	149.4	26 31.9	96 29	149.6	7
8	29 35.2	95 31	147.3	29 06.6	95 30	147.5	28 38.0	95 30	147.7	28 09.3	95 30	147.8	27 40.7	96 30	148.0	27 12.0	96 30	148.2	26 43.4	96 30	148.3	26 14.7	96 30	148.5	8
9	29 16.8	95 32	146.2	28 48.3	95 31	146.4	28 19.8	95 31	146.6	27 51.2	95 31	146.8	27 22.6	95 31	146.9	26 54.1	95 31	147.1	26 25.5	95 31	147.3	25 56.9	95 31	147.4	9
30	28 57.9	95 32	145.1	28 29.5	95 32	145.3	28 01.0	95 32	145.5	27 32.6	95 32	145.7	27 04.1	95 32	145.9	26 35.6	95 32	146.0	26 07.1	95 32	146.2	25 38.6	95 31	146.4	30
1	28 38.5	94 33	144.1	28 10.1	95 33	144.3	27 41.8	95 33	144.4	27 13.4	95 33	144.6	26 45.0	95 33	144.8	26 16.6	95 32	145.0	25 48.2	95 32	145.2	25 19.7	95 32	145.3	1
2	28 18.5	94 34	143.0	27 50.3	94 34	143.2	27 22.0	94 34	143.4	26 53.7	94 34	143.6	26 25.4	94 33	143.7	25 57.1	94 33	143.9	25 28.8	94 33	144.1	25 00.4	95 33	144.3	2
3	27 58.1	94 35	141.9	27 29.9	94 35	142.1	27 01.7	94 35	142.3	26 33.5	94 34	142.5	26 05.3	94 34	142.7	25 37.1	94 34	142.9	25 08.8	94 34	143.1	24 40.6	94 34	143.3	3
4	27 37.1	94 36	140.9	27 09.1	94 36	141.1	26 41.0	94 35	141.3	26 12.9	94 35	141.5	25 44.7	94 35	141.7	25 16.6	94 35	141.8	24 48.4	94 35	142.0	24 20.3	94 35	142.2	4
35	27 15.7	93 36	139.8	26 47.7	93 36	140.0	26 19.7	93 36	140.2	25 51.7	93 36	140.4	25 23.7	93 36	140.6	24 55.6	94 36	140.8	24 27.6	94 36	141.0	23 59.5	94 35	141.2	35
6	26 53.9	93 37	138.8	26 26.0	93 37	139.0	25 58.0	93 37	139.2	25 30.1	93 37	139.4	25 02.2	93 37	139.6	24 34.2	93 36	139.8	24 06.2	93 36	140.0	23 38.2	93 36	140.2	6
7	26 31.5	93 38	137.7	26 03.7	93 38	137.9	25 35.9	93 38	138.1	25 08.0	93 38	138.4	24 40.2	93 37	138.6	24 12.3	93 37	138.8	23 44.4	93 37	139.0	23 16.5	93 37	139.2	7
8	26 08.7	92 39	136.7	25 41.0	92 39	136.9	25 13.3	92 38	137.1	24 45.5	93 38	137.3	24 17.8	93 38	137.5	23 50.0	93 38	137.7	23 22.2	93 38	138.0	22 54.3	93 38	138.2	8
9	25 45.5	92 39	135.7	25 17.9	92 39	135.9	24 50.2	92 39	136.1	24 22.6	92 39	136.3	23 54.9	92 39	136.5	23 27.2	92 39	136.7	22 59.5	92 39	136.9	22 31.7	92 38	137.2	9
40	25 21.8	92 40	134.7	24 54.3	92 40	134.9	24 26.8	92 40	135.1	23 59.2	92 40	135.3	23 31.6	92 40	135.5	23 04.0	92 39	135.7	22 36.4	92 39	135.9	22 08.7	92 39	136.2	40
1	24 57.8	91 41	133.6	24 30.3	92 41	133.9	24 02.9	92 40	134.1	23 35.4	92 40	134.3	23 07.9	92 40	134.5	22 40.4	92 40	134.7	22 12.8	92 40	135.0	21 45.3	92 40	135.2	1
2	24 33.3	91 41	132.6	24 05.9	91 41	132.9	23 38.6	91 41	133.1	23 11.2	91 41	133.3	22 43.7	91 41	133.5	22 16.3	91 41	133.7	21 48.9	92 41	134.0	21 21.4	92 40	134.2	2
3	24 08.4	91 42	131.6	23 41.1	91 42	131.9	23 13.9	91 42	132.1	22 46.5	91 42	132.3	22 19.2	91 42	132.5	21 51.9	91 41	132.8	21 24.5	91 41	133.0	20 57.1	91 41	133.2	3
4	23 43.1	91 43	130.6	23 16.0	91 43	130.9	22 48.8	91 42	131.1	22 21.5	91 42	131.3	21 54.3	91 42	131.6	21 27.1	91 42	131.8	20 59.8	91 42	132.0	20 32.5	91 42	132.2	4
45	23 17.5	90 43	129.7	22 50.4	90 43	129.9	22 23.3	90 43	130.1	21 56.2	90 43	130.4	21 29.0	91 43	130.6	21 01.9	91 43	130.8	20 34.7	91 42	131.0	20 07.5	91 42	131.3	45
6	22 51.5	90 44	128.7	22 24.5	90 44	128.9	21 57.5	90 44	129.2	21 30.4	90 44	129.4	21 03.4	90 43	129.6	20 36.3	90 43	129.8	20 09.2	90 43	130.1	19 42.1	90 43	130.3	6
7	22 25.1	90 45	127.7	21 58.2	90 44	127.9	21 31.3	90 44	128.2	21 04.3	90 44	128.4	20 37.3	90 44	128.7	20 10.3	90 44	128.9	19 43.3	90 44	129.1	19 16.3	90 44	129.3	7
8	21 58.4	89 45	126.7	21 31.6	89 45	127.0	21 04.7	90 45	127.2	20 37.8	90 45	127.5	20 11.0	90 45	127.7	19 44.0	90 44	127.9	19 17.1	90 44	128.2	18 50.2	90 44	128.4	8
9	21 31.3	89 46	125.8	21 04.6	89 46	126.0	20 37.8	89 45	126.3	20 11.0	89 45	126.5	19 44.2	89 45	126.7	19 17.4	89 45	127.0	18 50.6	90 45	127.2	18 23.7	90 45	127.5	9
50	21 04.0	89 46	124.8	20 37.3	89 46	125.1	20 10.6	89 46	125.3	19 43.9	89 46	125.6	19 17.2	89 46	125.8	18 50.4	89 45	126.0	18 23.7	89 45	126.3	17 56.9	89 45	126.5	50
1	20 36.3	89 47	123.9	20 09.7	89 47	124.1	19 43.1	89 46	124.4	19 16.5	89 46	124.6	18 49.8	89 46	124.9	18 23.1	89 46	125.1	17 56.5	89 46	125.3	17 29.8	89 46	125.6	1
2	20 08.2	88 47	122.9	19 41.7	88 47	123.2	19 15.2	88 47	123.4	18 48.7	89 47	123.7	18 22.1	89 47	123.9	17 55.5	89 47	124.2	17 28.9	89 46	124.4	17 02.3	89 46	124.6	2
3	19 39.9	88 48	122.0	19 13.5	88 48	122.2	18 47.1	88 47	122.5	18 20.6	88 47	122.7	17 54.1	88 47	123.0	17 27.6	88 47	123.2	17 01.1	88 47	123.5	16 34.6	88 47	123.7	3
4	19 11.3	88 48	121.1	18 45.0	88 48	121.3	18 18.6	88 48	121.6	17 52.2	88 48	121.8	17 25.8	88 48	122.1	16 59.4	88 48	122.3	16 33.0	88 47	122.6	16 06.5	88 47	122.8	4
55	18 42.5	88 49	120.1	18 16.2	88 48	120.4	17 49.9	88 48	120.6	17 23.6	88 48	120.9	16 57.3	88 48	121.1	16 30.9	88 48	121.4	16 04.6	88 48	121.6	15 38.2	88 48	121.9	55
6	18 13.3	87 49	119.2	17 47.1	87 49	119.5	17 20.9	87 49	119.7	16 54.7	87 49	120.0	16 28.4	88 49	120.2	16 02.1	88 48	120.5	15 35.9	88 48	120.7	15 09.6	88 48	121.0	6
7	17 43.9	87 49	118.3	17 17.8	87 49	118.6	16 51.6	87 49	118.8	16 25.5	87 49	119.1	15 59.3	87 49	119.3	15 33.1	87 49	119.6	15 06.9	87 49	119.8	14 40.7	87 49	120.1	7
8	17 14.2	87 50	117.4	16 48.2	87 50	117.6	16 22.1	87 50	117.9	15 56.0	87 50	118.2	15 29.9	87 49	118.4	15 03.8	87 49	118.7	14 37.6	87 49	118.9	14 11.5	87 49	119.2	8
9	16 44.3	87 50	116.5	16 18.3	87 50	116.7	15 52.3	87 50	117.0	15 26.3	87 50	117.3	15 00.3	87 50	117.5	14 34.2	87 50	117.8	14 08.2	87 50	118.0	13 42.1	87 49	118.3	9
60	16 14.2	86 51	115.6	15 48.3	86 50	115.8	15 22.3	86 50	116.1	14 56.4	87 50	116.4	14 30.4	87 50	116.6	14 04.4	87 50	116.9	13 38.4	87 50	117.1	13 12.4	87 50	117.4	60
1	15 43.8	86 51	114.7	15 17.9	86 51	114.9	14 52.1	86 51	115.2	14 26.2	86 51	115.5	14 00.3	86 51	115.7	13 34.4	86 50	116.0	13 08.4	86 50	116.2	12 42.5	87 50	116.5	1
2	15 13.2	86 51	113.8	14 47.4	86 51	114.1	14 21.6	86 51	114.3	13 55.8	86 51	114.6	13 30.0	86 51	114.8	13 04.1	86 51	115.1	12 38.2	86 51	115.4	12 12.3	86 51	115.6	2
3	14 42.4	86 52	112.9	14 16.7	86 52	113.2	13 50.9	86 51	113.4	13 25.2	86 51	113.7	12 59.4	86 51	114.0	12 33.6	86 51	114.2	12 07.8	86 51	114.5	11 42.0	86 51	114.7	3
4	14 11.4	86 52	112.0	13 45.7	86 52	112.3	13 20.0	86 52	112.5	12 54.3	86 52	112.8	12 28.6	86 52	113.1	12 02.9	86 52	113.3	11 37.2	86 51	113.6	11 11.4	86 51	113.9	4
65	13 40.2	85 52	111.1	13 14.6	85 52	111.4	12 49.0	85 52	111.7	12 23.3	85 52	111.9	11 57.7	86 52	112.2	11 32.0	86 52	112.5	11 06.3	86 52	112.7	10 40.6	86 52	113.0	65
6	13 08.8	85 53	110.3	12 43.2	85 53	110.5	12 17.7	85 52	110.8	11 52.1	85 52	111.1	11 26.5	85 52	111.3	11 00.9	85 52	111.6	10 35.3	85 52	111.9	10 09.6	85 52	112.1	6
7	12 37.2	85 53	109.4	12 11.7	85 53	109.7	11 46.2	85 53	109.9	11 20.7	85 53	110.2	10 55.2	85 53	110.5	10 29.6	85 52	110.7	10 04.0	85 52	111.0	9 38.5	85 52	111.3	7
8	12 05.5	85 53	108.5	11 40.1	85 53	108.8	11 14.6	85 53	109.1	10 49.1	85 53	109.3	10 23.6	85 53	109.6	9 58.1	85 53	109.9	9 32.6	85 53	110.1	9 07.1	85 53	110.4	8
9	11 33.6	85 53	107.7	11 08.2	85 53	107.9	10 42.8	85 53	108.2	10 17.4	85 53	108.5	9 52.0	85 53	108.7	9 26.5	85 53	109.0	9 01.0	85 53	109.3	8 35.6	85 53	109.5	9
70	11 01.6	84 54	106.8	10 36.2	85 54	107.1	10 10.9	85 54	107.3	9 45.5	85 53	107.6	9 20.1	85 53	107.9	8 54.7	85 53	108.1	8 29.3	85 53	108.4	8 03.9	85 53	108.7	70
1	10 29.4	84 54	105.9	10 04.1	84 54	106.2	9 38.8	84 54	106.5	9 13.4	84 54	106.7	8 48.1	84 54	107.0	8 22.7	85 54	107.3	7 57.4	85 53	107.6	7 32.0	85 53	107.8	1
2	9 57.0	84 54	105.1	9 31.8	84 54	105.3	9 06.5	84 54	105.6	8 41.2	84 54	105.9	8 15.9	84 54	106.2	7 50.6	84 54	106.4	7 25.3	84 54	106.7	7 00.0	84 54	107.0	2
3	9 24.6	84 54	104.2	8 59.4	84 54	104.5	8 34.1	84 54	104.8	8 08.9	84 54	105.0	7 43.6	84 54	105.3	7 18.4	84 54	105.6	6 53.1	84 54	105.9	6 27.8	84 54	106.1	3
4	8 52.0	84 54	103.4	8 26.8	84 54	103.6	8 01.6	84 54	103.9	7 36.4	84 54	104.2	7 11.2	84 54	104.5	6 46.0	84 54	104.7	6 20.8	84 54	105.0	5 55.5	84 54	105.3	4
75	8 19.3	84 55	102.5	7 54.2	84 55	102.8	7 29.0	84 55	103.1	7 03.8	84 55	103.3	6 38.7	84 54	103.6	6 13.5	84 54	103.9	5 48.3	84 54	104.2	5 23.1	84 54	104.4	75
6	7 46.5	84 55	101.7	7 21.4	84 55	102.0	6 56.3	84 55	102.2	6 31.1	84 55	102.5	6 06.0	84 55	102.8	5 40.9	84 55	103.1	5 15.7	84 54	103.3				6
7	7 13.6	84 55	100.8	6 48.5	84 55	101.1	6 23.4	84 55	101.4	5 58.3	84 55	101.7	5 33.2	84 55	101.9	5 08.1	84 55	102.2							7
8	6 40.6	83 55	100.0	6 15.5	83 55	100.3	5 50.5	84 55	100.5	5 25.4	84 55	100.8	5 00.4	84 55	101.1										8
9	6 07.5	83 55	99.2	5 42.5	83 55	99.4	5 17.5	83 55	99.7																9
80	5 34.3	83 55	98.3	5 09.3	83 55	98.6																			80
1	5 01.1	83 56	97.5																						1

Lat. 56°

Lat. 57°

Lat. 58°

Lat. 59°

Digitized by Google

Lat. 56°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	38 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	39 00.0	1.0 01	180.0	39 30.0	1.0 01	180.0	40 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	41 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	00
1	37 59.6	1.0 02	178.7	38 29.6	1.0 02	178.7	38 59.6	1.0 02	178.7	39 29.6	1.0 02	178.7	39 59.6	1.0 02	178.7	40 29.6	1.0 02	178.7	40 59.6	1.0 02	178.7	41 29.6	1.0 02	178.7	1
2	37 58.5	1.0 03	177.5	38 28.5	1.0 03	177.5	38 58.5	1.0 03	177.4	39 28.5	1.0 03	177.4	39 58.5	1.0 03	177.4	40 28.5	1.0 03	177.4	40 58.5	1.0 03	177.4	41 28.4	1.0 03	177.4	2
3	37 56.7	1.0 04	176.2	38 26.6	1.0 04	176.2	38 56.6	1.0 04	176.2	39 26.6	1.0 04	176.1	39 56.6	1.0 04	176.1	40 26.6	1.0 04	176.1	40 56.5	1.0 04	176.1	41 26.5	1.0 05	176.0	3
4	37 54.1	1.0 06	174.9	38 24.0	1.0 06	174.9	38 54.0	1.0 06	174.9	39 24.0	1.0 06	174.8	39 53.9	1.0 06	174.8	40 23.9	1.0 06	174.8	40 53.8	1.0 06	174.7	41 23.8	1.0 06	174.7	4
05	37 50.7	1.0 07	173.7	38 20.7	1.0 07	173.6	38 50.6	1.0 07	173.6	39 20.6	1.0 07	173.6	39 50.5	1.0 07	173.5	40 20.5	1.0 07	173.5	40 50.4	1.0 07	173.4	41 20.3	1.0 07	173.4	05
6	37 46.7	1.0 08	172.4	38 16.6	1.0 08	172.4	38 46.5	1.0 08	172.3	39 16.4	1.0 08	172.3	39 46.4	1.0 08	172.2	40 16.3	1.0 08	172.2	40 46.2	1.0 08	172.1	41 16.1	1.0 08	172.1	6
7	37 41.9	1.0 09	171.2	38 11.8	1.0 09	171.1	38 41.7	1.0 09	171.1	39 11.6	1.0 09	171.0	39 41.4	1.0 09	170.9	40 11.3	1.0 09	170.9	40 41.2	1.0 10	170.8	41 11.1	1.0 10	170.8	7
8	37 36.4	1.0 10	169.9	38 06.2	1.0 10	169.8	38 36.1	1.0 11	169.8	39 05.9	99 11	169.7	39 35.8	99 11	169.7	40 05.6	99 11	169.6	40 35.5	99 11	169.5	41 05.3	99 11	169.5	8
9	37 30.1	99 12	168.7	38 00.0	99 12	168.6	38 29.8	99 12	168.5	38 59.6	99 12	168.4	39 29.4	99 12	168.4	39 59.2	99 12	168.3	40 29.0	99 12	168.2	40 58.8	99 12	168.1	9
10	37 23.2	99 13	167.4	37 53.0	99 13	167.3	38 22.7	99 13	167.3	38 52.5	99 13	167.2	39 22.3	99 13	167.1	39 52.0	99 13	167.0	40 21.8	99 13	166.9	40 51.5	99 13	166.8	10
1	37 15.5	99 14	166.2	37 45.2	99 14	166.1	38 15.0	99 14	166.0	38 44.7	99 14	165.9	39 14.4	99 14	165.8	39 44.1	99 14	165.7	40 13.8	99 14	165.6	40 43.5	99 15	165.5	1
2	37 07.1	99 15	164.9	37 36.8	99 15	164.8	38 06.5	99 15	164.7	38 36.2	99 15	164.6	39 05.8	99 16	164.5	39 35.5	99 16	164.5	40 05.1	99 16	164.4	40 34.8	99 16	164.3	2
3	36 58.1	99 16	163.7	37 27.7	99 16	163.6	37 57.3	99 16	163.5	38 26.9	99 17	163.4	38 56.5	99 17	163.3	39 26.1	99 17	163.2	39 55.7	99 17	163.1	40 25.3	99 17	163.0	3
4	36 48.3	99 17	162.5	37 17.9	99 18	162.4	37 47.4	99 18	162.2	38 17.0	99 18	162.1	38 46.5	98 18	162.0	39 16.1	98 18	161.9	39 45.6	98 18	161.8	40 15.1	98 18	161.7	4
15	36 37.8	98 19	161.2	37 07.3	98 19	161.1	37 36.8	98 19	161.0	38 06.3	98 19	160.9	38 35.8	98 19	160.8	39 05.3	98 19	160.7	39 34.8	98 19	160.5	40 04.2	98 19	160.4	15
6	36 26.7	98 20	160.0	36 56.1	98 20	159.9	37 25.6	98 20	159.8	37 55.0	98 20	159.6	38 24.4	98 20	159.5	38 53.8	98 20	159.4	39 23.2	98 20	159.3	39 52.6	98 20	159.1	6
7	36 14.9	98 21	158.8	36 44.3	98 21	158.7	37 13.6	98 21	158.5	37 43.0	98 21	158.4	38 12.3	98 21	158.3	38 41.7	98 21	158.1	39 11.0	98 22	158.0	39 40.3	98 22	157.9	7
8	36 02.4	98 22	157.6	36 31.7	98 22	157.5	37 01.0	98 22	157.3	37 30.3	98 22	157.2	37 59.6	98 22	157.0	38 28.9	98 22	156.9	38 58.1	97 23	156.8	39 27.4	97 23	156.6	8
9	35 49.3	97 23	156.4	36 18.6	97 23	156.2	36 47.8	97 23	156.1	37 17.0	97 23	156.0	37 46.2	97 23	155.8	38 15.4	97 24	155.7	38 44.5	97 24	155.5	39 13.7	97 24	155.4	9
20	35 35.6	97 24	155.2	36 04.7	97 24	155.0	36 33.9	97 24	154.9	37 03.0	97 24	154.8	37 32.1	97 25	154.6	38 01.2	97 25	154.4	38 30.3	97 25	154.3	38 59.4	97 25	154.1	20
1	35 21.2	97 26	154.0	35 50.2	97 25	153.9	36 19.3	97 25	153.7	36 48.4	97 26	153.5	37 17.4	97 26	153.4	37 46.4	97 26	153.2	38 15.4	97 26	153.1	38 44.4	97 26	152.9	1
2	35 06.2	97 26	152.8	35 35.1	97 26	152.7	36 04.1	97 26	152.5	36 33.1	97 26	152.3	37 02.1	96 27	152.2	37 31.0	96 27	152.0	37 59.9	96 27	151.8	38 28.8	96 27	151.7	2
3	34 50.5	96 27	151.6	35 19.4	96 27	151.5	35 48.3	96 27	151.3	36 17.2	96 27	151.2	36 46.1	96 28	151.0	37 14.9	96 28	150.8	37 43.8	96 28	150.6	38 12.6	96 28	150.5	3
4	34 34.3	96 28	150.5	35 03.1	96 28	150.3	35 31.9	96 28	150.1	36 00.7	96 28	150.0	36 29.5	96 29	149.8	36 58.3	96 29	149.6	37 27.0	96 29	149.4	37 55.8	96 29	149.3	4
25	34 17.5	96 29	149.3	34 46.2	96 29	149.1	35 14.9	96 29	149.0	35 43.6	96 29	148.8	36 12.3	96 30	148.6	36 41.0	96 30	148.4	37 09.7	96 30	148.2	37 38.3	95 30	148.1	25
6	34 00.1	96 30	148.2	34 28.7	95 30	148.0	34 57.3	95 30	147.8	35 26.0	95 30	147.6	35 54.6	95 31	147.4	36 23.1	95 31	147.2	36 51.7	95 31	147.1	37 20.3	95 31	146.9	6
7	33 42.1	95 31	147.0	34 10.6	95 31	146.8	34 39.2	95 31	146.6	35 07.7	95 31	146.5	35 36.2	95 32	146.3	36 04.7	95 32	146.1	36 33.2	95 32	145.9	37 01.6	95 32	145.7	7
8	33 23.5	95 32	145.9	33 52.0	95 32	145.7	34 20.4	95 32	145.5	34 48.9	95 32	145.3	35 17.3	95 32	145.1	35 45.7	95 33	144.9	36 14.1	95 33	144.7	36 42.4	94 33	144.5	8
9	33 04.4	95 33	144.7	33 32.8	95 33	144.6	34 01.2	94 33	144.4	34 29.5	94 33	144.2	34 57.8	94 33	144.0	35 26.1	94 34	143.8	35 54.4	94 34	143.6	36 22.7	94 34	143.3	9
30	32 44.8	94 34	143.6	33 13.1	94 34	143.4	33 41.4	94 34	143.2	34 09.6	94 34	143.0	34 37.8	94 34	142.8	35 06.0	94 34	142.6	35 34.2	94 35	142.4	36 02.4	94 35	142.2	30
1	32 24.6	94 34	142.5	32 52.8	94 35	142.3	33 21.0	94 35	142.1	33 49.2	94 35	141.9	34 17.3	94 35	141.7	34 45.4	94 35	141.5	35 13.5	94 35	141.3	35 41.5	94 36	141.0	1
2	32 04.0	94 35	141.4	32 32.1	94 35	141.2	33 00.1	94 36	141.0	33 28.2	93 36	140.8	33 56.2	93 36	140.6	34 24.2	93 36	140.3	34 52.2	93 36	140.1	35 20.2	93 36	139.9	2
3	31 42.8	93 36	140.3	32 10.8	93 36	140.1	32 38.8	93 36	139.9	33 06.7	93 37	139.7	33 34.7	93 37	139.4	34 02.6	93 37	139.2	34 30.5	93 37	139.0	34 58.3	93 37	138.8	3
4	31 21.1	93 37	139.2	31 49.0	93 37	139.0	32 16.9	93 37	138.8	32 44.8	93 37	138.6	33 12.6	93 38	138.3	33 40.4	93 38	138.1	34 08.2	93 38	137.9	34 36.0	93 38	137.7	4
35	30 59.0	93 38	138.1	31 26.8	93 38	137.9	31 54.6	93 38	137.7	32 22.3	93 38	137.5	32 50.1	92 38	137.2	33 17.8	92 39	137.0	33 45.5	92 39	136.8	34 13.1	92 39	136.6	35
6	30 36.3	92 38	137.1	31 04.0	92 39	136.8	31 31.7	92 39	136.6	31 59.4	92 39	136.4	32 27.1	92 39	136.2	32 54.7	92 39	135.9	33 22.3	92 39	135.7	33 49.8	92 40	135.4	6
7	30 13.3	92 39	136.0	30 40.9	92 39	135.8	31 08.5	92 40	135.5	31 36.0	92 40	135.3	32 03.6	92 40	135.1	32 31.1	92 40	134.8	32 58.6	92 40	134.6	33 26.1	92 40	134.4	7
8	29 49.7	92 40	134.9	30 17.2	92 40	134.7	30 44.7	92 40	134.5	31 12.2	92 40	134.2	31 39.7	91 41	134.0	32 07.1	91 41	133.8	32 34.5	91 41	133.5	33 01.9	91 41	133.3	8
9	29 25.7	91 41	133.9	29 53.2	91 41	133.6	30 20.6	91 41	133.4	30 48.0	91 41	133.2	31 15.3	91 41	132.9	31 42.6	91 41	132.7	32 09.9	91 42	132.4	32 37.2	91 42	132.2	9
40	29 01.4	91 41	132.8	29 28.7	91 42	132.6	29 56.0	91 42	132.4	30 23.3	91 42	132.1	30 50.5	91 42	131.9	31 17.8	91 42	131.6	31 45.0	91 42	131.4	32 12.1	91 42	131.1	40
1	28 36.5	91 42	131.8	29 03.8	91 42	131.6	29 31.0	91 42	131.3	29 58.2	91 42	131.1	30 25.4	90 43	130.8	30 52.5	90 43	130.6	31 19.6	90 43	130.3	31 46.7	90 43	130.1	1
2	28 11.3	91 43	130.8	28 38.5	90 43	130.5	29 05.6	90 43	130.3	29 32.7	90 43	130.0	29 59.8	90 43	129.8	30 26.8	90 43	129.5	30 53.8	90 44	129.3	31 20.8	90 44	129.0	2
3	27 45.7	90 43	129.8	28 12.8	90 43	129.5	28 39.8	90 44	129.3	29 06.8	90 44	129.0	29 33.8	90 44	128.8	30 00.7	90 44	128.5	30 27.7	90 44	128.3	30 54.6	90 44	128.0	3
4	27 19.7	90 44	128.7	27 46.7	90 44	128.5	28 13.7	90 44	128.2	28 40.6	90 44	128.0	29 07.5	90 45	127.7	29 34.3	89 45	127.5	30 01.1	89 45	127.2	30 27.9	89 45	127.0	4
45	26 53.4	90 44	127.7	27 20.3	90 45	127.5	27 47.1	89 45	127.2	28 13.9	89 45	127.0	28 40.7	89 45	126.7	29 07.5	89 45	126.5	29 34.2	89 45	126.2	30 00.9	89 46	125.9	45
6	26 26.7	89 45	126.7	26 53.5	89 45	126.5	27 20.2	89 45	126.2	27 47.0	89 46	126.0	28 13.7	89 46	125.7	28 40.3	89 46	125.5	29 07.0	89 46	125.2	29 33.6	89 46	124.9	6
7	25 59.6	89 46	125.7	26 26.3	89 46	125.5	26 53.0	89 46	125.2	27 19.6	89 46	125.0	27 46.3	89 46	124.7	28 12.8	89 46	124.4	28 39.4	88 47	124.2	29 05.9	88 47	123.9	7
8	25 32.2	89 46	124.8	25 58.8	89 46	124.5	26 25.4	89 46	124.2	26 52.0	88 47	124.0	27 18.5	88 47	123.7	27 45.0	88 47	123.5	28 11.5	88 47	123.2	28 37.9	88 47	122.9	8
9	25 04.5	88 47	123.8	25 31.0	88 47	123.5	25 57.5	88 47	123.3	26 24.0	88 47	123.0	26 50.4	88 47	122.7	27 16.9	88 47	122.5	27 43.2	88 48	122.2	28 09.6	88 48	121.9	9
50	24 36.4	88 47	122.8	25 02.9	88 47	122.5	25 29.3	88 48	122.3	25 55.7	88 48	122.0	26 22.1	88 48	121.8	26 48.4	88 48	121.5	27 14.7	88 49	121.2	27 41.0	88 48	120.9	50
1	24 08.1	88 48	121.8	24 34.5	88 48	121.6	25 00.8	88 48	121.3	25 27.1	88 48	121.1	25 53.4	88 48	120.8	26 19.6	87 48	120.5	26 45.9	87 49	120.2	27 12.1	87 49	120.0	1
2	23 39.4	88 48	120.9	24 05.7	88 48	120.6	24 32.0	87 48	120.4	24 58.2	87 49	120.1	25 24.4	87 49	119.8	25 50.6	87 49	119.5	26 16.7	87 49	119.3	26 42.8	87 49	119.0	2
3	23 10.5	87 49	119.9	23 36.7	87 49	119.7	24 02.9	87 49	119.4	24 29.0	87 49	119.1	24 55.2	87 49	118.9	25 21.3	87 49	118.6	25 47.3	87 49	118.3	26 13.4	87 50	118.0	3
4	22 41.3	87 49	119.0	23 07.4	87 49	118.7	23 33.5	87 49	118.5	23 59.6	87 50	118.2	24 25.7	87 50	117.9	24 51.7	87 50	117.6	25 17.7	87 50	117.4	25 43.6	86 50	117.1	4
55	22 11.8	87 50	118.0	22 37.9	87 50	117.8	23 03.9	87 50	117.5	23 29.9	87 50	117.2	23 55.9	87 50	117.0	24 21.8	86 50	116.7	24 47.7	86 50	116.4	25 13.6	86 50	116.1	55
6	21 42.1	87 50	117.1	22 08.1	87 50	116.8	22 34.0	86 50	116.6	22 59.9	86 50	116.3	23 25.8	86 50	116.0	23 51.7	86 51	115.8	24 17.6	86 51	115.5	24 43.4	86 51	115.2	6
7	21 12.1	86 50	116.2	21 38.0	86 50	115.9	22 03.9	86 51	115.6	22 29.7	86 51	115.4	22 55.6	86 51	115.1	23 21.4	86 51	114.8	23 47.2	86 51	114.5	24 12.9	86 51	114.3	7
8	20 41.9	86 51	115.3	21 07.7	86 51	115.0	21 33.5	86 51	114.7	21 59.3	86 51	114.4	22 25.1	86 51	114.2	22 50.8	86 51	113.9	23 16.5	86 51	113.6	23 42.2	86 52	113.3	8
9	20 11.4	86 51	114.3	20 37.2	86 51	114.1	21 02.9	86 51	113.8	21 28.7	86 51	113.5	21 54.4	86 52	113.2	22 20.0	86 52	113.0	22 45.7	85 52	112.7	23 11.3	85 52	112.4	9
60	19 40.7	86 52	113.4	20 06.4	86 52	113.2	20 32.1	86 52	112.9	20 57.8	86 52	112.6	21 23.4	85 52	112.3	21 49.0	85 52	112.1	22 14.6	85 52	111.8	22 40.2	85 52	111.5	60
1	19 09.8	86 52	112.5	19 35.5	85 52	112.3	20 01.1	85 52	112.0	20 26.7	85 52	111.7	20 52.3	85 52	111.4	21 17.8	85 52	111.1	21 43.4	85 52	110.9	22 08.9	85 52	110.6	1
2	18 38.7	85 52	111.6	19 04.3	85 52	111.4	19 29.9	85 52	111.1	19 55.5	85 52	110.8	20 21.0	85 53	110.5	20 46.5	85 53	110.2	21 11.9	85 53	110.0	21 37.4	85 53	109.7	2
3	18 07.5	85 52	110.7	18 33.0	85 53	110.5	18 58.5	85 53	110.2	19 24.0	85 53	109.9	19 49.5	85 53	109.6	20 14.9	85 53	109.3	20 40.3	85 53	109.1	21 05.7	85 53	108.8	3
4	17 36.0	85 53	109.8	18 01.5	85 53	109.6	18 26.9	85 53	109.3	18 52.4	85 53	109.0	19 17.8	85 53	108.7	19 43.1	85 53	108.4	20 08.5	84 53	108.2	20 33.8	84 53	107.9	4
65	17 04.3	85 53	109.0	17 29.8	85 53	108.7	17 55.2	85 53	108.4	18 20.6	85 53	108.1	18 45.9	84 53	107.8	19 11.2	84 53	107.6	19 36.5	84 54	107.3	20 01.8	84 54	107.0	65
6	16 32.5	85 53	108.1	16 57.9	85 53	107.8	17 23.3	84 53	107.5	17 48.6	84 54	107.2	18 13.9	84 54	106.9	18 39.2	84 54	106.7	19 04.4	84 54	106.4	19 29.6	84 54	106.1	6
7	16 00.6	84 54	107.2	16 25.9	84 54	106.9	16 51.2	84 54	106.6	17 16.5	84 54	106.4	17 41.7	84 54	106.1	18 07.0	84 54	105.8	18 32.2	84 54	105.5	18 57.3	84 54	105.2	7
8	15 28.4	84 54	106.3	15 53.7	84 54	106.0	16 19.0	84 54	105.8	16 44.2	84 54	105.5	17 09.4	84 54	105.2	17 34.6	84 54	104.9	17 59.8	84 54	104.6	18 24.9	84 54	104.3	8
9	14 56.2	84 54	105.4	15 21.4	84 54	105.2	15 46.6	84 54	104.9	16 11.8	84 54	104.6	16 37.0	84 54	104.3	17 02.1	84 54	104.0	17 27.2	84 54	103.7	17 52.3	84 54	103.5	9
70	14 23.8	84 54	104.6	14 48.9	84 54	104.3	15 14.1	84 54	104.0	15 39.3	84 54	103.7	16 04.4	84 54	103.5	16 29.5	84 55	103.2	16 54.6	84 55	102.9	17 19.6	83 55	102.6	70
1	13 51.2	84 54	103.7	14 16.4	84 54	103.4	14 41.5	84 55	103.2	15 06.6	84 55	102.9	15 31.7	84 55	102.6	15 56.8	84 55	102.3	16 21.8	83 55	102.0	16 46.8	83 55	101.7	1
2	13 18.6	84 55	102.9	13 43.7	84 55	102.6	14 08.8	84 55	102.3	14 33.9	84 55	102.0	14 58.9	83 55	101.7	15 23.9	83 55	101.4	15 49.0	83 55	101.2	16 13.9	83 55	100.9	2
3	12 45.8	84 55	102.0	13 10.9	84 55	101.7	13 35.9	84 55	101.4	14 01.0	83 55	101.2	14 26.0	83 55	100.9	14 51.0	83 55	100.6	15 16.0	83 55	100.3	15 40.9	83 55	100.0	3
4	12 12.9	84 55	101.1	12 38.0	83 55	100.9	13 03.0	83 55	100.6	13 28.0	83 55	100.3	13 53.0	83 55	100.0	14 18.0	83 55	99.7	14 42.9	83 55	99.4	15 07.9	83 55	99.2	4
75	11 40.0	83 55	100.3	12 05.0	83 55	100.0	12 30.0	83 55	99.7	12 55.0	83 55	99.4	13 19.9	83 55	99.2	13 44.9	83 55	98.9	14 09.8	83 55	98.6	14 34.7	83 55	98.3	75
6	11 06.9	83 55	99.4	11 31.9	83 55	99.2	11 56.9	83 55	98.9	12 21.8	83 55	98.6	12 46.8	83 55	98.3	13 11.7	83 55	98.0	13 36.6	83 55	97.7	14 01.5	83 56	97.5	6
7	10 33.8	83 55	98.6	10 58.7	83 55	98.3	11 23.7	83 55	98.0	11 48.6	83 55	97.8	12 13.5	83 56	97.5	12 38.4	83 56	97.2	13 03.3	83 56	96.9	13 28.2	83 56	96.6	7
8	10 00.6	83 55	97.8	10 25.5	83 56	97.5	10 50.4	83 56	97.2	11 15.3	83 56	96.9	11 40.2	83 56	96.6	12 05.1	83 56	96.3	12 30.0	83 56	96.1	12 54.8	83 56	95.8	8
9	9 27.3	83 56	96.9	9 52.2	83 56	96.6	10 17.1	83 56	96.4	10 42.0	83 56	96.1	11 06.9	83 56	95.8	11 31.7	83 56	95.5	11 56.6	83 56	95.2	12 21.4	83 56	94.9	9
80	8 54.0	83 56	96.1	9 18.9	83 56	95.8	9 43.7	83 56	95.5	10 08.6	83 56	95.2	10 33.5	83 56	94.9	10 58.3	83 56	94.7	11 23.1	83 56	94.4	11 48.0	83 56	94.1	80
1	8 20.6	83 56	95.2	8 45.5	83 56	95.0	9 10.3	83 56	94.7	9 35.2	83 56	94.4	10 00.0	83 56	94.1	10 24.9	83 56	93.8	10 49.7	83 56	93.5	11 14.5	83 56	93.2	1
2	7 47.1	83 56	94.4	8 12.0	83 56	94.1	8 36.9	83 56	93.8	9 01.7	83 56	93.6	9 26.5	83 56	93.3	9 51.4	83 56	93.0	10 16.2	83 56	92.7	10 41.0	83 56	92.4	2
3	7 13.7	83 56	93.6	7 38.5	83 56	93.3	8 03.4	83 56	93.0	8 28.2	83 56	92.7	8 53.0	83 56	92.4	9 17.8	83 56	92.2	9 42.6	83 56	91.9	10 07.4	83 56	91.6	3
4	6 40.2	83 56	92.7	7 05.0	83 56	92.5	7 29.9	83 56	92.2	7 54.7	83 56	91.9	8 19.5	83 56	91.6	8 44.3	83 56	91.3	9 09.1	83 56	91.0	9 33.9	83 56	90.8	4
85	6 06.6	83 56	91.9	6 31.5	83 56	91.6	6 56.3	83 56	91.3	7 21.1	83 56	91.1	7 46.0	83 56	90.8	8 10.8	83 56	90.5	8 35.6	83 56	90.2	9 00.3	83 56	89.9	85
6	5 33.1	83 56	91.1	5 57.9	83 56	90.8	6 22.8	83 56	90.5	6 47.6	83 56	90.2	7 12.4	83 56	89.9	7 37.2	83 56	89.7	8 02.0	83 56	89.4	8 26.8	83 56	89.1	6
7				5 24.4	83 56	90.0	5 49.2	83 56	89.7	6 14.0	83 56	89.4	6 38.9	83 56	89.1	7 03.7	83 56	88.8	7 28.5	83 56	88.6	7 53.2	83 56	88.3	7
8							5 15.7	83 56	88.9	5 40.5	83 56	88.6	6 05.3	83 56	88.3	6 30.1	83 56	88.0	6 54.9	83 56	87.7	7 19.7	83 56	87.4	8
9										5 07.0	83 56	87.7	5 31.8	83 56	87.5	5 56.6	83 56	87.2	6 21.4	83 56	86.9	6 46.2	83 56	86.6	9
90																5 23.1	83 56	86.4	5 47.9	83 56	86.1	6 12.7	83 56	85.8	90

Digitized by Google

Lat. 56°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	30 00.0	1.0 01	180.0	29 30.0	1.0 01	180.0	29 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	28 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	27 00.0	1.0 01	180.0	26 30.0	1.0 01	180.0	00
1	29 59.7	1.0 02	178.8	29 29.7	1.0 02	178.9	28 59.7	1.0 02	178.9	28 29.7	1.0 02	178.9	27 59.7	1.0 02	178.9	27 29.7	1.0 02	178.9	26 59.7	1.0 02	178.9	26 29.7	1.0 02	178.9	1
2	29 58.7	1.0 03	177.7	29 28.7	1.0 03	177.7	28 58.7	1.0 03	177.7	28 28.7	1.0 03	177.7	27 58.7	1.0 03	177.7	27 28.7	1.0 03	177.8	26 58.7	1.0 03	177.8	26 28.7	1.0 03	177.8	2
3	29 57.0	1.0 04	176.5	29 27.0	1.0 04	176.6	28 57.0	1.0 04	176.6	28 27.0	1.0 04	176.6	27 57.0	1.0 04	176.6	27 27.0	1.0 04	176.6	26 57.1	1.0 04	176.7	26 27.1	1.0 04	176.7	3
4	29 54.6	1.0 05	175.4	29 24.6	1.0 05	175.4	28 54.7	1.0 05	175.4	28 24.7	1.0 05	175.5	27 54.7	1.0 05	175.5	27 24.8	1.0 05	175.5	26 54.8	1.0 05	175.5	26 24.8	1.0 05	175.6	4
05	29 51.6	1.0 06	174.2	29 21.6	1.0 06	174.3	28 51.7	1.0 06	174.3	28 21.7	1.0 06	174.3	27 51.8	1.0 06	174.4	27 21.8	1.0 06	174.4	26 51.9	1.0 06	174.4	26 21.9	1.0 06	174.5	05
6	29 47.9	1.0 07	173.1	29 18.0	1.0 07	173.1	28 48.0	1.0 07	173.2	28 18.1	1.0 07	173.2	27 48.1	1.0 07	173.3	27 18.2	1.0 07	173.3	26 48.3	1.0 07	173.3	26 18.3	1.0 07	173.4	6
7	29 43.5	1.0 08	172.0	29 13.6	1.0 08	172.0	28 43.7	1.0 08	172.0	28 13.8	1.0 08	172.1	27 43.9	1.0 08	172.1	27 14.0	1.0 08	172.2	26 44.1	1.0 08	172.2	26 14.1	1.0 08	172.3	7
8	29 38.5	1.0 09	170.8	29 08.6	1.0 09	170.9	28 38.7	1.0 09	170.9	28 08.8	1.0 09	171.0	27 39.0	1.0 09	171.0	27 09.1	1.0 09	171.1	26 39.2	1.0 09	171.1	26 09.3	1.0 09	171.2	8
9	29 32.8	99 11	169.7	29 03.0	99 11	169.7	28 33.1	1.0 10	169.8	28 03.2	1.0 10	169.8	27 33.4	1.0 10	169.9	27 03.5	1.0 10	169.9	26 33.7	1.0 10	170.0	26 03.8	1.0 10	170.1	9
10	29 26.5	99 12	168.5	28 56.6	99 12	168.6	28 26.8	99 12	168.7	27 57.0	99 11	168.7	27 27.2	99 11	168.8	26 57.4	99 11	168.8	26 27.5	99 11	168.9	25 57.7	99 11	169.0	10
1	29 19.5	99 13	167.4	28 49.7	99 13	167.5	28 19.9	99 13	167.5	27 50.1	99 13	167.6	27 20.3	99 12	167.7	26 50.6	99 12	167.7	26 20.8	99 12	167.8	25 51.0	99 12	167.9	1
2	29 11.8	99 14	166.3	28 42.1	99 14	166.3	28 12.3	99 14	166.4	27 42.6	99 14	166.5	27 12.9	99 14	166.6	26 43.1	99 13	166.6	26 13.4	99 13	166.7	25 43.6	99 13	166.8	2
3	29 03.5	99 15	165.1	28 33.8	99 15	165.2	28 04.1	99 15	165.3	27 34.4	99 15	165.4	27 04.7	99 15	165.4	26 35.0	99 14	165.5	26 05.3	99 14	165.6	25 35.6	99 14	165.7	3
4	28 54.6	99 16	164.0	28 24.9	99 16	164.1	27 55.3	99 16	164.2	27 25.6	99 16	164.3	26 56.0	99 16	164.3	26 26.3	99 16	164.4	25 56.7	99 15	164.5	25 27.0	99 15	164.6	4
15	28 45.0	99 17	162.9	28 15.4	99 17	163.0	27 45.8	99 17	163.1	27 16.2	99 17	163.2	26 46.6	99 17	163.2	26 17.0	99 17	163.3	25 47.4	99 16	163.4	25 17.8	99 16	163.5	15
6	28 34.8	98 18	161.8	28 05.3	98 18	161.9	27 35.7	98 18	162.0	27 06.2	98 18	162.0	26 36.6	99 18	162.1	26 07.1	99 18	162.2	25 37.5	99 17	162.3	25 08.0	99 17	162.4	6
7	28 24.0	98 19	160.6	27 54.5	98 19	160.7	27 25.0	98 19	160.8	26 55.6	98 19	160.9	26 26.1	98 19	161.1	25 56.6	98 19	161.2	25 27.1	98 18	161.3	24 57.6	98 18	161.4	7
8	28 12.6	98 20	159.5	27 43.2	98 20	159.6	27 13.7	98 20	159.7	26 44.3	98 20	159.9	26 14.9	98 20	160.0	25 45.4	98 20	160.1	25 16.0	98 19	160.2	24 46.5	98 19	160.3	8
9	28 00.5	98 21	158.4	27 31.2	98 21	158.5	27 01.8	98 21	158.6	26 32.4	98 21	158.8	26 03.1	98 21	158.9	25 33.7	98 21	159.0	25 04.3	98 20	159.1	24 34.9	98 20	159.2	9
20	27 47.9	98 22	157.3	27 18.6	98 22	157.4	26 49.3	98 22	157.6	26 20.0	98 22	157.7	25 50.7	98 22	157.8	25 21.4	98 22	157.9	24 52.0	98 21	158.0	24 22.7	98 21	158.1	20
1	27 34.7	97 23	156.2	27 05.4	97 23	156.3	26 36.2	97 23	156.5	26 07.0	97 23	156.6	25 37.7	97 23	156.7	25 08.5	98 22	156.8	24 39.2	98 22	157.0	24 09.9	98 22	157.1	1
2	27 20.8	97 24	155.1	26 51.7	97 24	155.3	26 22.5	97 24	155.4	25 53.3	97 24	155.5	25 24.2	97 24	155.6	24 55.0	97 23	155.8	24 25.8	97 23	155.9	23 56.6	97 23	156.0	2
3	27 06.4	97 25	154.0	26 37.3	97 25	154.2	26 08.2	97 25	154.3	25 39.1	97 25	154.4	25 10.0	97 24	154.6	24 40.9	97 24	154.7	24 11.8	97 24	154.8	23 42.7	97 24	155.0	3
4	26 51.4	97 26	152.9	26 22.4	97 26	153.1	25 53.4	97 26	153.2	25 24.4	97 26	153.4	24 55.3	97 25	153.5	24 26.3	97 25	153.6	23 57.3	97 25	153.8	23 28.2	97 25	153.9	4
25	26 35.9	96 27	151.9	26 07.0	96 27	152.0	25 38.0	97 27	152.2	25 09.1	97 26	152.3	24 40.1	97 26	152.4	24 11.1	97 26	152.6	23 42.2	97 26	152.7	23 13.2	97 26	152.9	25
6	26 19.8	96 28	150.8	25 51.0	96 28	150.9	25 22.1	96 27	151.1	24 53.2	96 27	151.2	24 24.3	96 27	151.4	23 55.4	96 27	151.5	23 26.5	96 27	151.7	22 57.6	96 27	151.8	6
7	26 03.2	96 29	149.7	25 34.4	96 28	149.9	25 05.6	96 28	150.0	24 36.8	96 28	150.2	24 08.0	96 28	150.3	23 39.2	96 28	150.5	23 10.3	96 28	150.6	22 41.5	96 28	150.8	7
8	25 46.0	96 30	148.7	25 17.3	96 29	148.8	24 48.6	96 29	149.0	24 19.9	96 29	149.1	23 51.1	96 29	149.3	23 22.4	96 29	149.5	22 53.6	96 29	149.6	22 24.9	96 29	149.8	8
9	25 28.3	95 30	147.6	24 59.7	95 30	147.8	24 31.0	95 30	147.9	24 02.4	95 30	148.1	23 33.7	96 30	148.3	23 05.1	96 30	148.4	22 36.4	96 30	148.6	22 07.7	96 29	148.7	9
30	25 10.0	95 31	146.6	24 41.5	95 31	146.7	24 13.0	95 31	146.9	23 44.4	95 31	147.1	23 15.8	95 31	147.2	22 47.2	95 31	147.4	22 18.7	95 30	147.6	21 50.0	95 30	147.7	30
1	24 51.3	95 32	145.5	24 22.8	95 32	145.7	23 54.4	95 32	145.9	23 25.9	95 32	146.0	22 57.4	95 32	146.2	22 28.9	95 31	146.4	22 00.4	95 31	146.5	21 31.9	95 31	146.7	1
2	24 32.1	95 33	144.5	24 03.7	95 33	144.7	23 35.3	95 33	144.8	23 06.9	95 32	145.0	22 38.5	95 32	145.2	22 10.1	95 32	145.4	21 41.7	95 32	145.5	21 13.2	95 32	145.7	2
3	24 12.3	94 34	143.4	23 44.0	94 34	143.6	23 15.7	94 33	143.8	22 47.4	94 33	144.0	22 19.1	94 33	144.2	21 50.8	94 33	144.3	21 22.4	95 33	144.5	20 54.1	95 33	144.7	3
4	23 52.1	94 34	142.4	23 23.9	94 34	142.6	22 55.7	94 34	142.8	22 27.4	94 34	143.0	21 59.2	94 34	143.1	21 31.0	94 34	143.3	21 02.7	94 34	143.5	20 34.4	94 34	143.7	4
35	23 31.4	94 35	141.4	23 03.3	94 35	141.6	22 35.1	94 35	141.8	22 07.0	94 35	142.0	21 38.9	94 35	142.1	21 10.7	94 35	142.3	20 42.5	94 34	142.5	20 14.3	94 34	142.7	35
6	23 10.2	93 36	140.4	22 42.2	93 36	140.6	22 14.2	93 36	140.8	21 46.1	94 36	140.9	21 18.0	94 35	141.1	20 50.0	94 35	141.3	20 21.9	94 35	141.5	19 53.8	94 35	141.7	6
7	22 48.6	93 37	139.4	22 20.6	93 37	139.6	21 52.7	93 36	139.8	21 24.7	93 36	139.9	20 56.8	93 36	140.1	20 28.8	93 36	140.3	20 00.8	93 36	140.5	19 32.7	93 36	140.7	7
8	22 26.5	93 38	138.4	21 58.7	93 37	138.6	21 30.8	93 37	138.8	21 02.9	93 37	139.0	20 35.0	93 37	139.2	20 07.1	93 37	139.3	19 39.2	93 37	139.5	19 11.3	93 36	139.7	8
9	22 04.0	93 38	137.4	21 36.2	93 38	137.6	21 08.5	93 38	137.8	20 40.7	93 38	138.0	20 12.9	93 38	138.2	19 45.1	93 38	138.4	19 17.2	93 37	138.6	18 49.4	93 37	138.8	9
40	21 41.1	92 39	136.4	21 13.4	92 39	136.6	20 45.7	92 39	136.8	20 18.0	92 38	137.0	19 50.3	92 38	137.2	19 22.6	92 38	137.4	18 54.8	93 38	137.6	18 27.0	93 38	137.8	40
1	21 17.7	92 40	135.4	20 50.1	92 39	135.6	20 22.5	92 39	135.8	19 54.9	92 39	136.0	19 27.3	92 39	136.2	18 59.6	92 39	136.4	18 32.0	92 39	136.6	18 04.3	92 39	136.8	1
2	20 53.9	92 40	134.4	20 26.4	92 40	134.6	19 58.9	92 40	134.8	19 31.4	92 40	135.0	19 03.8	92 40	135.2	18 36.3	92 40	135.5	18 08.7	92 39	135.7	17 41.1	92 39	135.9	2
3	20 29.8	91 41	133.4	20 02.3	91 41	133.6	19 34.9	91 41	133.9	19 07.5	91 40	134.1	18 40.0	92 40	134.3	18 12.6	92 40	134.5	17 45.1	92 40	134.7	17 17.6	92 40	134.9	3
4	20 05.2	91 42	132.5	19 37.9	91 41	132.7	19 10.5	91 41	132.9	18 43.2	91 41	133.1	18 15.8	91 41	133.3	17 48.4	91 41	133.5	17 21.0	91 41	133.8	16 53.6	91 41	134.0	4
45	19 40.2	91 42	131.5	19 13.0	91 42	131.7	18 45.8	91 42	131.9	18 18.5	91 42	132.2	17 51.2	91 42	132.4	17 23.9	91 41	132.6	16 56.6	91 41	132.8	16 29.3	91 41	133.0	45
6	19 14.9	90 43	130.5	18 47.8	91 43	130.8	18 20.6	91 43	131.0	17 53.4	91 42	131.2	17 26.2	91 42	131.4	16 59.0	91 42	131.6	16 31.8	91 42	131.9	16 04.6	91 42	132.1	6
7	18 49.2	90 43	129.6	18 22.2	90 43	129.8	17 55.1	90 43	130.0	17 28.0	90 43	130.3	17 00.9	90 43	130.5	16 33.8	90 43	130.7	16 06.6	90 43	130.9	15 39.5	91 42	131.1	7
8	18 23.2	90 44	128.6	17 56.2	90 44	128.9	17 29.2	90 44	129.1	17 02.2	90 44	129.3	16 35.2	90 43	129.5	16 08.2	90 43	129.8	15 41.1	90 43	130.0	15 14.0	90 43	130.2	8
9	17 56.8	90 45	127.7	17 29.9	90 44	127.9	17 03.0	90 44	128.2	16 36.1	90 44	128.4	16 09.2	90 44	128.6	15 42.2	90 44	128.8	15 15.2	90 44	129.1	14 48.2	90 44	129.3	9
50	17 30.1	89 45	126.7	17 03.3	89 45	127.0	16 36.5	89 45	127.2	16 09.6	90 45	127.4	15 42.8	90 45	127.7	15 15.9	90 44	127.9	14 49.0	90 44	128.1	14 22.1	90 44	128.4	50
1	17 03.1	89 46	125.8	16 36.3	89 45	126.1	16 09.6	89 45	126.3	15 42.8	89 45	126.5	15 16.0	89 45	126.8	14 49.3	89 45	127.0	14 22.5	89 45	127.2	13 55.6	89 45	127.5	1
2	16 35.7	89 46	124.9	16 09.0	89 46	125.1	15 42.4	89 46	125.4	15 15.7	89 46	125.6	14 49.0	89 46	125.8	14 22.3	89 45	126.1	13 55.6	89 45	126.3	13 28.8	89 45	126.5	2
3	16 08.0	89 47	124.0	15 41.5	89 46	124.2	15 14.9	89 46	124.4	14 48.3	89 46	124.7	14 21.7	89 46	124.9	13 55.0	89 46	125.2	13 28.4	89 46	125.4	13 01.7	89 46	125.6	3
4	15 40.0	88 47	123.1	15 13.6	88 47	123.3	14 47.1	88 47	123.5	14 20.5	88 47	123.8	13 54.0	88 47	124.0	13 27.4	89 46	124.3	13 00.9	89 46	124.5	12 34.3	89 46	124.7	4
55	15 11.8	88 48	122.1	14 45.4	88 47	122.4	14 18.9	88 47	122.6	13 52.5	88 47	122.9	13 26.0	88 47	123.1	12 59.6	88 47	123.4	12 33.1	88 47	123.6	12 06.6	88 47	123.8	55
6	14 43.2	88 48	121.2	14 16.9	88 48	121.5	13 50.5	88 48	121.7	13 24.2	88 48	122.0	12 57.8	88 48	122.2	12 31.4	88 47	122.5	12 05.0	88 47	122.7	11 38.6	88 47	122.9	6
7	14 14.4	88 48	120.3	13 48.1	88 48	120.6	13 21.9	88 48	120.8	12 55.6	88 48	121.1	12 29.3	88 48	121.3	12 02.9	88 48	121.6	11 36.6	88 48	121.8	11 10.3	88 48	122.1	7
8	13 45.3	87 49	119.4	13 19.1	87 49	119.7	12 52.9	87 49	119.9	12 26.7	87 49	120.2	12 00.5	87 48	120.4	11 34.2	88 48	120.7	11 08.0	88 48	120.9	10 41.7	88 48	121.2	8
9	13 16.0	87 49	118.5	12 49.8	87 49	118.8	12 23.7	87 49	119.0	11 57.6	87 49	119.3	11 31.4	87 49	119.5	11 05.2	87 49	119.8	10 39.1	87 49	120.0	10 12.9	87 49	120.3	9
60	12 46.4	87 50	117.6	12 20.3	87 50	117.9	11 54.3	87 50	118.2	11 28.2	87 49	118.4	11 02.1	87 49	118.7	10 36.0	87 49	118.9	10 09.9	87 49	119.2	9 43.8	87 49	119.4	60
1	12 16.5	87 50	116.8	11 50.5	87 50	117.0	11 24.6	87 50	117.3	10 58.5	87 50	117.5	10 32.5	87 50	117.8	10 06.5	87 50	118.0	9 40.5	87 49	118.3	9 14.4	87 49	118.5	1
2	11 46.5	86 50	115.9	11 20.5	86 50	116.1	10 54.6	86 50	116.4	10 28.7	86 50	116.6	10 02.7	87 50	116.9	9 36.8	87 50	117.2	9 10.8	87 50	117.4	8 44.8	87 50	117.7	2
3	11 16.2	86 51	115.0	10 50.3	86 51	115.3	10 24.4	86 51	115.5	9 58.6	86 51	115.8	9 32.7	86 50	116.0	9 06.8	86 50	116.3	8 40.9	86 50	116.5	8 15.0	86 50	116.8	3
4	10 45.6	86 51	114.1	10 19.9	86 51	114.4	9 54.1	86 51	114.6	9 28.3	86 51	114.9	9 02.4	86 51	115.2	8 36.6	86 51	115.4	8 10.8	86 51	115.7	7 44.9	86 50	115.9	4
65	10 14.9	86 52	113.3	9 49.2	86 51	113.5	9 23.5	86 51	113.8	8 57.7	86 51	114.0	8 32.0	86 51	114.3	8 06.2	86 51	114.6	7 40.4	86 51	114.8	7 14.6	86 51	115.1	65
6	9 44.0	86 52	112.4	9 18.3	86 52	112.6	8 52.7	86 52	112.9	8 27.0	86 52	113.2	8 01.3	86 51	113.4	7 35.6	86 51	113.7	7 09.9	86 51	114.0	6 44.1	86 51	114.2	6
7	9 12.9	85 52	111.5	8 47.3	85 52	111.8	8 21.7	85 52	112.1	7 56.0	85 52	112.3	7 30.4	85 52	112.6	7 04.7	85 52	112.8	6 39.1	86 52	113.1	6 13.4	86 52	113.4	7
8	8 41.6	85 52	110.7	8 16.0	85 52	110.9	7 50.5	85 52	111.2	7 24.9	85 52	111.5	6 59.3	85 52	111.7	6 33.7	85 52	112.0	6 08.1	85 52	112.2	5 42.5	85 52	112.5	8
9	8 10.1	85 53	109.8	7 44.6	85 53	110.1	7 19.1	85 53	110.3	6 53.6	85 52	110.6	6 28.1	85 52	110.9	6 02.5	85 52	111.1	5 37.0	85 52	111.4	5 11.4	85 52	111.7	9
70	7 38.4	85 53	109.0	7 13.0	85 53	109.2	6 47.5	85 53	109.5	6 22.1	85 53	109.8	5 56.6	85 53	110.0	5 31.1	85 53	110.3	5 05.7	85 52	110.5				70
1	7 06.6	85 53	108.1	6 41.2	85 53	108.4	6 15.8	85 53	108.6	5 50.4	85 53	108.9	5 25.0	85 53	109.2										1
2	6 34.7	84 54	107.2	6 09.3	84 53	107.5	5 44.0	85 53	107.8	5 18.6	85 53	108.1													2
3	6 02.5	84 54	106.4	5 37.2	84 54	106.7	5 11.9	84 54	106.9																3
4	5 30.3	84 54	105.6	5 05.0	84 54	105.8																			4

Lat 57°

Lat 58°

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91																			5 14.5	83 56	85.2	5 39.3	83 56	85.0	91
2																						5 05.9	83 56	84.1	2

Digitized by Google

Lat. 56°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	42 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0
1	41 59.6	1.0 02	178.7	42 29.6	1.0 02	178.7	42 59.6	1.0 02	178.6	43 29.6	1.0 02	178.6
2	41 58.4	1.0 03	177.3	42 28.4	1.0 03	177.3	42 58.4	1.0 03	177.3	43 28.4	1.0 03	177.3
3	41 56.5	1.0 05	176.0	42 26.5	1.0 05	176.0	42 56.4	1.0 05	176.0	43 26.4	1.0 05	175.9
4	41 53.8	1.0 06	174.7	42 23.7	1.0 06	174.6	42 53.7	1.0 06	174.6	43 23.6	1.0 06	174.6
05	41 50.3	1.0 07	173.3	42 20.2	1.0 07	173.3	42 50.1	1.0 07	173.3	43 20.1	1.0 07	173.2
6	41 46.0	1.0 08	172.0	42 15.9	1.0 08	172.0	42 45.8	1.0 08	171.9	43 15.7	1.0 09	171.9
7	41 41.0	1.0 10	170.7	42 10.8	1.0 10	170.6	42 40.7	1.0 10	170.6	43 10.6	1.0 10	170.5
8	41 35.2	99 11	169.4	42 05.0	99 11	169.3	42 34.8	99 11	169.2	43 04.7	99 11	169.2
9	41 28.6	99 12	168.1	41 58.4	99 12	168.0	42 28.2	99 12	167.9	42 58.0	99 12	167.8
10	41 21.3	99 13	166.8	41 51.0	99 14	166.7	42 20.8	99 14	166.6	42 50.5	99 14	166.5
1	41 13.2	99 15	165.5	41 42.9	99 15	165.4	42 12.6	99 15	165.3	42 42.3	99 15	165.2
2	41 04.4	99 16	164.2	41 34.1	99 16	164.0	42 03.7	99 16	163.9	42 33.3	99 16	163.8
3	40 54.9	99 17	162.9	41 24.5	99 17	162.7	41 54.0	99 17	162.6	42 23.6	99 17	162.5
4	40 44.6	98 18	161.6	41 14.2	98 18	161.4	41 43.7	98 18	161.3	42 13.2	98 19	161.2
15	40 33.7	98 19	160.3	41 03.1	98 20	160.2	41 32.6	98 20	160.0	42 02.0	98 20	159.9
6	40 22.0	98 21	159.0	40 51.4	98 21	158.9	41 20.8	98 21	158.7	41 50.1	98 21	158.6
7	40 09.6	98 22	157.7	40 38.9	98 22	157.6	41 08.2	98 22	157.5	41 37.5	98 22	157.3
8	39 56.6	97 23	156.5	40 25.8	97 23	156.3	40 55.0	97 23	156.2	41 24.2	97 23	156.0
9	39 42.9	97 24	155.2	40 12.0	97 24	155.1	40 41.1	97 24	154.9	41 10.3	97 24	154.7
20	39 28.5	97 25	154.0	39 57.5	97 25	153.8	40 26.6	97 25	153.6	40 55.6	97 26	153.5
1	39 13.4	97 26	152.7	39 42.4	97 26	152.6	40 11.4	96 26	152.4	40 40.3	96 27	152.2
2	38 57.7	96 27	151.5	39 26.6	96 27	151.3	39 55.5	96 28	151.2	40 24.3	96 28	151.0
3	38 41.4	96 28	150.3	39 10.2	96 28	150.1	39 39.0	96 29	149.9	40 07.7	96 29	149.7
4	38 24.5	96 29	149.1	38 53.2	96 29	148.9	39 21.9	96 30	148.7	39 50.5	96 30	148.5
25	38 06.9	95 30	147.9	38 35.5	95 30	147.7	39 04.1	95 31	147.5	39 32.7	95 31	147.3
6	37 48.8	95 31	146.7	38 17.3	95 31	146.5	38 45.8	95 32	146.3	39 14.3	95 32	146.1
7	37 30.1	95 32	145.5	37 58.5	95 32	145.3	38 26.9	95 32	145.1	38 55.2	95 33	144.9
8	37 10.8	94 33	144.3	37 39.1	94 33	144.1	38 07.4	94 33	143.9	38 35.6	94 34	143.7
9	36 50.9	94 34	143.1	37 19.1	94 34	142.9	37 47.3	94 34	142.7	38 15.5	94 34	142.5
30	36 30.5	94 35	142.0	36 58.6	94 35	141.8	37 26.7	94 35	141.5	37 54.8	94 35	141.3
1	36 09.6	93 36	140.8	36 37.6	93 36	140.6	37 05.6	93 36	140.4	37 33.5	93 36	140.1
2	35 48.1	93 37	139.7	36 16.0	93 37	139.5	36 43.9	93 37	139.2	37 11.8	93 37	139.0
3	35 26.2	93 37	138.6	35 54.0	92 38	138.3	36 21.8	93 38	138.1	36 49.5	92 38	137.9
4	35 03.7	92 38	137.4	35 31.4	92 38	137.2	35 59.1	92 39	137.0	36 26.8	92 39	136.7
35	34 40.8	92 39	136.3	35 08.4	92 39	136.1	35 36.0	92 39	135.8	36 03.5	92 40	135.6
6	34 17.4	92 40	135.2	34 44.9	92 40	135.0	35 12.4	92 40	134.7	35 39.8	91 40	134.5
7	33 53.5	91 40	134.1	34 20.9	91 41	133.9	34 48.3	91 41	133.6	35 15.6	91 41	133.4
8	33 29.2	91 41	133.0	33 56.5	91 41	132.8	34 23.8	91 42	132.5	34 51.0	91 42	132.3
9	33 04.5	91 42	132.0	33 31.7	91 42	131.7	33 58.8	91 42	131.4	34 26.0	90 42	131.2
40	32 39.3	90 43	130.9	33 06.4	90 43	130.6	33 33.5	90 43	130.4	34 00.5	90 43	130.1
1	32 13.7	90 43	129.8	32 40.7	90 43	129.6	33 07.7	90 44	129.3	33 34.7	90 44	129.0
2	31 47.8	90 44	128.8	32 14.7	90 44	128.5	32 41.6	90 44	128.3	33 08.4	89 44	128.0
3	31 21.4	89 45	127.7	31 48.2	89 45	127.5	32 15.0	89 45	127.2	32 41.8	89 45	126.9
4	30 54.7	89 45	126.7	31 21.4	89 45	126.4	31 48.1	89 45	126.2	32 14.8	89 46	125.9
45	30 27.6	89 46	125.7	30 54.3	89 46	125.4	31 20.9	89 46	125.1	31 47.4	89 46	124.9
6	30 00.2	89 46	124.7	30 26.7	88 46	124.4	30 53.3	88 47	124.1	31 19.7	88 47	123.8
7	29 32.4	88 47	123.6	29 58.9	88 47	123.4	30 25.3	88 47	123.1	30 51.7	88 47	122.8
8	29 04.3	88 47	122.6	29 30.7	88 47	122.4	29 57.0	88 48	122.1	30 23.4	88 48	121.8
9	28 35.9	88 48	121.7	29 02.2	88 48	121.4	29 28.5	87 48	121.1	29 54.7	87 48	120.8
50	28 07.2	87 48	120.7	28 33.4	87 48	120.4	28 59.6	87 49	120.1	29 25.7	87 49	119.8
1	27 38.2	87 49	119.7	28 04.3	87 49	119.4	28 30.4	87 49	119.1	28 56.5	87 49	118.9
2	27 08.9	87 49	118.7	27 35.0	87 49	118.4	28 01.0	87 50	118.2	28 27.0	87 50	117.9
3	26 39.4	87 50	117.8	27 05.3	87 50	117.5	27 31.3	86 50	117.2	27 57.2	86 50	116.9
4	26 09.6	86 50	116.8	26 35.4	86 50	116.5	27 01.3	86 50	116.2	27 27.1	86 50	116.0
55	25 39.5	86 51	115.9	26 05.3	86 51	115.6	26 31.1	86 51	115.3	26 56.8	86 51	115.0
6	25 09.2	86 51	114.9	25 34.9	86 51	114.6	26 00.6	86 51	114.3	26 26.3	86 51	114.1
7	24 38.6	86 51	114.0	25 04.3	86 51	113.7	25 30.0	85 52	113.4	25 55.6	85 52	113.1
8	24 07.9	85 52	113.0	24 33.5	85 52	112.8	24 59.1	85 52	112.5	25 24.6	85 52	112.2
9	23 36.9	85 52	112.1	24 02.4	85 52	111.8	24 27.9	85 52	111.5	24 53.4	85 52	111.3
60	23 05.7	85 52	111.2	23 31.2	85 52	110.9	23 56.6	85 52	110.6	24 22.1	85 53	110.3
1	22 34.3	85 53	110.3	22 59.7	85 53	110.0	23 25.1	85 53	109.7	23 50.5	85 53	109.4
2	22 02.8	85 53	109.4	22 28.1	85 53	109.1	22 53.5	84 53	108.8	23 18.8	84 53	108.5
3	21 31.0	84 53	108.5	21 56.3	84 53	108.2	22 21.6	84 53	107.9	22 46.9	84 53	107.6
4	20 59.1	84 53	107.6	21 24.4	84 54	107.3	21 49.6	84 54	107.0	22 14.8	84 54	106.7
65	20 27.1	84 54	106.7	20 52.3	84 54	106.4	21 17.5	84 54	106.1	21 42.6	84 54	105.8
6	19 54.8	84 54	105.8	20 20.0	84 54	105.5	20 45.2	84 54	105.2	21 10.3	84 54	104.9
7	19 22.5	84 54	104.9	19 47.6	84 54	104.6	20 12.7	84 54	104.3	20 37.8	84 54	104.0
8	18 50.0	84 54	104.0	19 15.1	84 54	103.8	19 40.1	83 54	103.5	20 05.2	83 55	103.2
9	18 17.4	84 55	103.2	18 42.4	83 55	102.9	19 07.5	83 55	102.6	19 32.5	83 55	102.3
70	17 44.7	83 55	102.3	18 09.7	83 55	102.0	18 34.7	83 55	101.7	18 59.6	83 55	101.4
1	17 11.8	83 55	101.4	17 36.8	83 55	101.1	18 01.8	83 55	100.9	18 26.7	83 55	100.6
2	16 38.9	83 55	100.6	17 03.8	83 55	100.3	17 28.8	83 55	100.0	17 53.7	83 55	99.7
3	16 05.9	83 55	99.7	16 30.8	83 55	99.4	16 55.7	83 55	99.1	17 20.5	83 55	98.8
4	15 32.8	83 55	98.9	15 57.7	83 55	98.6	16 22.5	83 55	98.3	16 47.4	83 55	98.0
75	14 59.6	83 55	98.0	15 24.4	83 55	97.7	15 49.3	83 56	97.4	16 14.1	83 56	97.1
6	14 26.3	83 56	97.2	14 51.2	83 56	96.9	15 16.0	83 56	96.6	15 40.8	83 56	96.3
7	13 53.0	83 56	96.3	14 17.8	83 56	96.0	14 42.6	83 56	95.7	15 07.4	83 56	95.4
8	13 19.6	83 56	95.5	13 44.4	83 56	95.2	14 09.2	83 56	94.9	14 34.0	82 56	94.6
9	12 46.2	83 56	94.6	13 11.0	83 56	94.3	13 35.8	83 56	94.1	14 00.5	82 56	93.8
80	12 12.7	83 56	93.8	12 37.5	82 56	93.5	13 02.3	82 56	93.2	13 27.0	82 56	92.9
1	11 39.3	83 56	93.0	12 04.0	83 56	92.7	12 28.8	82 56	92.4	12 53.5	82 56	92.1
2	11 05.7	83 56	92.1	11 30.5	83 56	91.8	11 55.2	82 56	91.6	12 20.0	82 56	91.3
3	10 32.2	83 56	91.3	10 57.0	82 56	91.0	11 21.7	82 56	90.7	11 46.4	82 56	90.4
4	9 58.7	83 56	90.5	10 23.4	82 56	90.2	10 48.1	82 56	89.9	11 12.9	82 56	89.6
85	9 25.1	83 56	89.6	9 49.9	82 56	89.3	10 14.6	82 56	89.1	10 39.3	82 56	88.8
6	8 51.6	83 56	88.8	9 16.3	82 56	88.5	9 41.1	82 56	88.2	10 05.8	82 56	87.9
7	8 18.0	83 56	88.0	8 42.8	83 56	87.7	9 07.5	82 56	87.4	9 32.3	82 56	87.1
8	7 44.5	83 56	87.2	8 09.3	83 56	86.9	8 34.0	82 56	86.6	8 58.8	82 56	86.3
9	7 11.0	83 56	86.3	7 35.8	83 56	86.0	8 00.5	83 56	85.8	8 25.3	82 56	85.5
90	6 37.5	83 56	85.5	7 02.3	83 56	85.2	7 27.1	83 56	84.9	7 51.9	83 56	84.7

10° 00′			10° 30′			11° 00′			11° 30′			H.A.
Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	°
44 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	00
43 59.6	1.0 02	178.6	44 29.6	1.0 02	178.6	44 59.6	1.0 02	178.6	45 29.6	1.0 02	178.6	1
43 58.4	1.0 03	177.3	44 28.4	1.0 03	177.2	44 58.4	1.0 03	177.2	45 28.4	1.0 03	177.2	2
43 56.4	1.0 05	175.9	44 26.4	1.0 06	175.9	44 56.3	1.0 05	175.8	45 26.3	1.0 05	175.8	3
43 53.6	1.0 06	174.5	44 23.6	1.0 06	174.5	44 53.5	1.0 06	174.5	45 23.5	1.0 06	174.4	4
43 50.0	1.0 07	173.2	44 19.9	1.0 07	173.1	44 49.9	1.0 07	173.1	45 19.8	1.0 07	173.0	05
43 45.6	1.0 09	171.8	44 15.5	1.0 09	171.7	44 45.4	1.0 09	171.7	45 15.3	1.0 09	171.6	6
43 40.4	1.0 10	170.4	44 10.3	1.0 10	170.4	44 40.2	1.0 10	170.3	45 10.0	1.0 10	170.2	7
43 34.5	99 11	169.1	44 04.3	99 11	169.0	44 34.1	99 11	168.9	45 03.9	99 11	168.9	8
43 27.7	99 13	167.7	43 57.5	99 13	167.7	44 27.3	99 13	167.6	44 57.1	99 13	167.5	9
43 20.2	99 14	166.4	43 50.0	99 14	166.3	44 19.7	99 14	166.2	44 49.4	99 14	166.1	10
43 12.0	99 15	165.1	43 41.6	99 15	165.0	44 11.3	99 15	164.9	44 41.0	99 15	164.8	1
43 02.9	99 16	163.7	43 32.6	99 16	163.6	44 02.2	99 16	163.5	44 31.8	99 17	163.4	2
42 53.2	99 18	162.4	43 22.7	98 18	162.3	43 52.3	98 18	162.2	44 21.8	98 18	162.0	3
42 42.7	98 19	161.1	43 12.1	98 19	161.0	43 41.6	98 19	160.8	44 11.1	98 19	160.7	4
42 31.4	98 20	159.8	43 00.8	98 20	159.6	43 30.2	98 20	159.5	43 59.6	98 20	159.4	15
42 19.5	98 21	158.5	42 48.8	98 21	158.3	43 18.1	98 21	158.2	43 47.4	98 22	158.0	6
42 06.8	98 22	157.2	42 36.0	98 22	157.0	43 05.3	97 23	156.9	43 34.5	97 23	156.7	7
41 53.4	97 23	155.9	42 22.6	97 24	155.7	42 51.7	97 24	155.6	43 20.9	97 24	155.4	8
41 39.4	97 25	154.6	42 08.4	97 25	154.4	42 37.5	97 25	154.3	43 06.6	97 25	154.1	9
41 24.6	97 26	153.3	41 53.6	97 26	153.1	42 22.6	97 26	153.0	42 51.6	97 26	152.8	20
41 09.2	96 27	152.0	41 38.1	96 27	151.9	42 07.0	96 27	151.7	42 35.9	96 27	151.5	1
40 53.2	96 28	150.8	41 22.0	96 28	150.6	41 50.8	96 28	150.4	42 19.6	96 28	150.2	2
40 36.5	96 29	149.5	41 05.2	96 29	149.4	41 33.9	96 29	149.2	42 02.6	96 29	149.0	3
40 19.2	95 30	148.3	40 47.8	95 30	148.1	41 16.4	95 30	147.9	41 45.0	95 30	147.7	4
40 01.2	95 31	147.1	40 29.8	95 31	146.9	40 58.3	95 31	146.7	41 26.7	95 31	146.5	25
39 42.7	95 32	145.9	40 11.1	95 32	145.7	40 39.5	95 32	145.4	41 07.9	95 32	145.2	6
39 23.6	94 33	144.7	39 51.9	94 33	144.4	40 20.2	94 33	144.2	40 48.5	94 33	144.0	7
39 03.9	94 34	143.5	39 32.1	94 34	143.2	40 00.3	94 34	143.0	40 28.5	94 34	142.8	8
38 43.6	94 35	142.3	39 11.7	94 35	142.0	39 39.8	94 35	141.8	40 07.9	94 35	141.6	9
38 22.8	93 36	141.1	38 50.8	93 36	140.9	39 18.8	93 36	140.6	39 46.8	93 36	140.4	30
38 01.5	93 36	139.9	38 29.4	93 37	139.7	38 57.3	93 37	139.4	39 25.1	93 37	139.2	1
37 39.6	93 37	138.8	38 07.4	93 37	138.5	38 35.2	93 38	138.3	39 02.9	92 38	138.0	2
37 17.2	92 38	137.6	37 44.9	92 38	137.4	38 12.6	92 38	137.1	38 40.3	92 39	136.9	3
36 54.4	92 39	136.5	37 22.0	92 39	136.2	37 49.5	92 39	136.0	38 17.1	92 39	135.7	4
36 31.0	92 40	135.3	36 58.5	92 40	135.1	37 26.0	91 40	134.8	37 53.4	91 40	134.6	35
36 07.2	91 40	134.2	36 34.6	91 41	134.0	37 02.0	91 41	133.7	37 29.3	91 41	133.5	6
35 43.0	91 41	133.1	36 10.2	91 41	132.9	36 37.5	91 42	132.6	37 04.7	91 42	132.3	7
35 18.2	91 42	132.0	35 45.4	91 42	131.8	36 12.6	90 42	131.5	36 39.7	90 42	131.2	8
34 53.1	90 43	130.9	35 20.2	90 43	130.7	35 47.2	90 43	130.4	36 14.2	90 43	130.1	9
34 27.6	90 43	129.8	34 54.5	90 43	129.6	35 21.5	90 44	129.3	35 48.4	90 44	129.0	40
34 01.6	90 44	128.8	34 28.5	90 44	128.5	34 55.3	89 44	128.2	35 22.1	89 44	128.0	1
33 35.2	89 45	127.7	34 02.0	89 45	127.4	34 28.8	89 45	127.2	34 55.5	89 45	126.9	2
33 08.5	89 45	126.7	33 35.2	89 45	126.4	34 01.9	89 45	126.1	34 28.5	89 46	125.8	3
32 41.4	89 46	125.6	33 08.0	89 46	125.3	33 34.6	88 46	125.1	34 01.1	88 46	124.8	4
32 14.0	88 46	124.6	32 40.5	88 46	124.3	33 06.9	88 47	124.0	33 33.4	88 47	123.7	45
31 46.2	88 47	123.6	32 12.6	88 47	123.3	32 39.0	88 47	123.0	33 05.3	88 47	122.7	6
31 18.1	88 47	122.5	31 44.4	88 48	122.3	32 10.7	88 48	122.0	32 36.9	87 48	121.7	7
30 49.6	88 48	121.5	31 15.9	87 48	121.3	31 42.1	87 48	121.0	32 08.2	87 48	120.7	8
30 20.9	87 48	120.5	30 47.0	87 49	120.3	31 13.1	87 49	120.0	31 39.2	87 49	119.7	9
29 51.8	87 49	119.6	30 17.9	87 49	119.3	30 43.9	87 49	119.0	31 09.9	87 49	118.7	50
29 22.5	87 49	118.6	29 48.5	87 49	118.3	30 14.4	86 50	118.0	30 40.3	86 50	117.7	1
28 52.9	86 50	117.6	29 18.8	86 50	117.3	29 44.7	86 50	117.0	30 10.5	86 50	116.7	2
28 23.0	86 50	116.6	28 48.9	86 50	116.3	29 14.7	86 50	116.0	29 40.4	86 51	115.7	3
27 52.9	86 51	115.7	28 18.7	86 51	115.4	28 44.4	86 51	115.1	29 10.1	86 51	114.8	4
27 22.6	86 51	114.7	27 48.2	86 51	114.4	28 13.9	85 51	114.1	28 39.5	85 51	113.8	55
26 52.0	85 51	113.8	27 17.6	85 51	113.5	27 43.2	85 52	113.2	28 08.7	85 52	112.9	6
26 21.1	85 52	112.8	26 46.7	85 52	112.5	27 12.2	85 52	112.2	27 37.7	85 52	111.9	7
25 50.1	85 52	111.9	26 15.6	85 52	111.6	26 41.0	85 52	111.3	27 06.5	85 52	111.0	8
25 18.9	85 52	111.0	25 44.3	85 52	110.7	26 09.7	85 53	110.4	26 35.0	84 53	110.1	9
24 47.5	85 53	110.0	25 12.8	84 53	109.7	25 38.1	84 53	109.4	26 03.4	84 53	109.2	60
24 15.9	84 53	109.1	24 41.2	84 53	108.8	25 06.4	84 53	108.5	25 31.6	84 53	108.2	1
23 44.1	84 53	108.2	24 09.3	84 53	107.9	24 34.5	84 53	107.6	24 59.7	84 54	107.3	2
23 12.1	84 54	107.3	23 37.3	84 54	107.0	24 02.5	84 54	106.7	24 27.6	84 54	106.4	3
22 40.0	84 54	106.4	23 05.1	84 54	106.1	23 30.3	84 54	105.8	23 55.3	84 54	105.5	4
22 07.7	84 54	105.5	22 32.8	84 54	105.2	22 57.9	83 54	104.9	23 22.9	83 54	104.6	65
21 35.4	84 54	104.6	22 00.4	83 54	104.3	22 25.4	83 54	104.0	22 50.4	83 54	103.7	6
21 02.8	83 54	103.8	21 27.8	83 54	103.5	21 52.8	83 55	103.2	22 17.8	83 55	102.9	7
20 30.2	83 55	102.9	20 55.1	83 55	102.6	21 20.1	83 55	102.3	21 45.0	83 55	102.0	8
19 57.4	83 55	102.0	20 22.3	83 55	101.7	20 47.2	83 55	101.4	21 12.1	83 55	101.1	9
19 24.5	83 55	101.1	19 49.4	83 55	100.8	20 14.3	83 55	100.5	20 39.2	83 55	100.2	70
18 51.6	83 55	100.3	19 16.4	83 55	100.0	19 41.3	83 55	99.7	20 06.1	83 55	99.4	1
18 18.5	83 55	99.4	18 43.4	83 55	99.1	19 08.2	83 55	98.8	19 32.9	83 55	98.5	2
17 45.4	83 55	98.6	18 10.2	83 55	98.3	18 35.0	83 55	98.0	18 59.7	82 55	97.7	3
17 12.2	83 55	97.7	17 37.0	83 56	97.4	18 01.7	82 56	97.1	18 26.4	82 56	96.8	4
16 38.9	83 56	96.8	17 03.6	83 56	96.6	17 28.4	82 56	96.3	17 53.1	82 56	96.0	75
16 05.5	83 56	96.0	16 30.3	82 56	95.7	16 55.0	82 56	95.4	17 19.7	82 56	95.1	6
15 32.1	82 56	95.2	15 56.9	82 56	94.9	16 21.6	82 56	94.6	16 46.3	82 56	94.3	7
14 58.7	82 56	94.3	15 23.4	82 56	94.0	15 48.1	82 56	93.7	16 12.8	82 56	93.4	8
14 25.2	82 56	93.5	14 49.9	82 56	93.2	15 14.6	82 56	92.9	15 39.3	82 56	92.6	9
13 51.7	82 56	92.6	14 16.4	82 56	92.3	14 41.1	82 56	92.1	15 05.8	82 56	91.8	80
13 18.2	82 56	91.8	13 42.9	82 56	91.5	14 07.6	82 56	91.2	14 32.2	82 56	90.9	1
12 44.7	82 56	91.0	13 09.4	82 56	90.7	13 34.0	82 56	90.4	13 58.7	82 56	90.1	2
12 11.1	82 56	90.1	12 35.8	82 56	89.8	13 00.5	82 56	89.6	13 25.1	82 56	89.3	3
11 37.6	82 56	89.3	12 02.3	82 56	89.0	12 26.9	82 56	88.7	12 51.6	82 56	88.4	4
11 04.0	82 56	88.5	11 28.7	82 56	88.2	11 53.4	82 56	87.9	12 18.0	82 56	87.6	85
10 30.5	82 56	87.7	10 55.2	82 56	87.4	11 19.9	82 56	87.1	11 44.5	82 56	86.8	6
9 57.0	82 56	86.8	10 21.7	82 56	86.5	10 46.4	82 56	86.3	11 11.0	82 56	86.0	7
9 23.5	82 56	86.0	9 48.2	82 56	85.7	10 12.9	82 56	85.4	10 37.6	82 56	85.1	8
8 50.0	82 56	85.2	9 14.8	82 56	84.9	9 39.5	82 56	84.6	10 04.2	82 56	84.3	9
8 16.6	83 56	84.4	8 41.4	82 56	84.1	9 06.1	82 56	83.8	9 30.8	82 56	83.5	90

Digitized by Google

Lat. 56°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	26 00.0	1.0 01	180.0	25 30.0	1.0 01	180.0	25 00.0	1.0 01	180.0	24 30.0	1.0 01	180.0	24 00.0	1.0 01	180.0	23 30.0	1.0 01	180.0	23 00.0	1.0 01	180.0	22 30.0	1.0 01	180.0	00
1	25 59.7	1.0 02	178.9	25 29.7	1.0 02	178.9	24 59.7	1.0 02	178.9	24 29.7	1.0 02	178.9	23 59.7	1.0 02	178.9	23 29.7	1.0 02	178.9	22 59.7	1.0 02	178.9	22 29.7	1.0 02	178.9	1
2	25 58.7	1.0 03	177.8	25 28.7	1.0 03	177.8	24 58.7	1.0 03	177.8	24 28.7	1.0 03	177.8	23 58.7	1.0 03	177.8	23 28.7	1.0 03	177.9	22 58.8	1.0 03	177.9	22 28.8	1.0 03	177.9	2
3	25 57.1	1.0 04	176.7	25 27.1	1.0 04	176.7	24 57.1	1.0 04	176.7	24 27.1	1.0 04	176.7	23 57.2	1.0 04	176.8	23 27.2	1.0 04	176.8	22 57.2	1.0 04	176.8	22 27.2	1.0 04	176.8	3
4	25 54.8	1.0 05	175.6	25 24.9	1.0 05	175.6	24 54.9	1.0 05	175.6	24 24.9	1.0 05	175.7	23 55.0	1.0 05	175.7	23 25.0	1.0 05	175.7	22 55.0	1.0 05	175.7	22 25.0	1.0 05	175.8	4
05	25 51.9	1.0 06	174.5	25 22.0	1.0 06	174.5	24 52.0	1.0 06	174.6	24 22.1	1.0 06	174.6	23 52.1	1.0 06	174.6	23 22.2	1.0 06	174.6	22 52.2	1.0 06	174.7	22 22.2	1.0 06	174.7	05
6	25 48.4	1.0 07	173.4	25 18.5	1.0 07	173.4	24 48.5	1.0 07	173.5	24 18.6	1.0 07	173.5	23 48.7	1.0 07	173.5	23 18.7	1.0 07	173.6	22 48.8	1.0 07	173.6	22 18.8	1.0 07	173.6	6
7	25 44.2	1.0 08	172.3	25 14.3	1.0 08	172.3	24 44.4	1.0 08	172.4	24 14.5	1.0 08	172.4	23 44.6	1.0 08	172.5	23 14.7	1.0 08	172.5	22 44.7	1.0 08	172.5	22 14.8	1.0 08	172.6	7
8	25 39.4	1.0 09	171.2	25 09.5	1.0 09	171.3	24 39.6	1.0 09	171.3	24 09.8	1.0 09	171.3	23 39.9	1.0 09	171.4	23 10.0	1.0 09	171.4	22 40.1	1.0 09	171.5	22 10.2	1.0 09	171.5	8
9	25 34.0	1.0 10	170.1	25 04.1	1.0 10	170.2	24 34.3	1.0 10	170.2	24 04.4	1.0 10	170.3	23 34.5	1.0 10	170.3	23 04.7	1.0 10	170.4	22 34.8	1.0 10	170.4	22 04.9	1.0 10	170.5	9
10	25 27.9	99 11	169.0	24 58.1	99 11	169.1	24 28.2	99 11	169.1	23 58.4	99 11	169.2	23 28.6	99 11	169.3	22 58.7	99 11	169.3	22 28.9	99 11	169.4	21 59.1	99 11	169.4	10
1	25 21.2	99 12	167.9	24 51.4	99 12	168.0	24 21.6	99 12	168.1	23 51.8	99 12	168.1	23 22.0	99 12	168.2	22 52.2	99 12	168.3	22 22.4	99 12	168.3	21 52.6	99 12	168.4	1
2	25 13.9	99 13	166.8	24 44.1	99 13	166.9	24 14.4	99 13	167.0	23 44.6	99 13	167.1	23 14.8	99 13	167.1	22 45.1	99 13	167.2	22 15.3	99 13	167.3	21 45.6	99 13	167.3	2
3	25 05.9	99 14	165.8	24 36.2	99 14	165.8	24 06.5	99 14	165.9	23 36.8	99 14	166.0	23 07.1	99 14	166.1	22 37.3	99 14	166.1	22 07.6	99 14	166.2	21 37.9	99 14	166.3	3
4	24 57.4	99 15	164.7	24 27.7	99 15	164.8	23 58.0	99 15	164.8	23 28.4	99 15	164.9	22 58.7	99 15	165.0	22 29.0	99 15	165.1	21 59.3	99 15	165.2	21 29.7	99 15	165.2	4
15	24 48.2	99 16	163.6	24 18.6	99 16	163.7	23 49.0	99 16	163.8	23 19.3	99 16	163.9	22 49.7	99 16	163.9	22 20.1	99 16	164.0	21 50.4	99 16	164.1	21 20.8	99 16	164.2	15
6	24 38.4	99 17	162.5	24 08.8	99 17	162.6	23 39.3	99 17	162.7	23 09.7	99 17	162.8	22 40.1	99 17	162.9	22 10.5	99 17	163.0	21 41.0	99 17	163.1	21 11.4	99 17	163.2	6
7	24 28.0	98 18	161.5	23 58.5	98 18	161.6	23 29.0	98 18	161.6	22 59.5	98 18	161.7	22 30.0	98 18	161.8	22 00.4	98 18	161.9	21 30.9	98 18	162.0	21 01.4	98 18	162.1	7
8	24 17.1	98 19	160.4	23 47.6	98 19	160.5	23 18.2	98 19	160.6	22 48.7	98 19	160.7	22 19.2	98 19	160.8	21 49.7	98 19	160.9	21 20.3	98 19	161.0	20 50.8	98 19	161.1	8
9	24 05.5	98 20	159.3	23 36.1	98 20	159.4	23 06.7	98 20	159.5	22 37.3	98 20	159.6	22 07.9	98 20	159.7	21 38.5	98 20	159.9	21 09.1	98 20	160.0	20 39.6	98 20	160.1	9
20	23 53.4	98 21	158.3	23 24.0	98 21	158.4	22 54.7	98 21	158.5	22 25.3	98 21	158.6	21 56.0	98 21	158.7	21 26.6	98 21	158.8	20 57.3	98 21	158.9	20 27.9	98 20	159.0	20
1	23 40.7	98 22	157.2	23 11.4	98 22	157.3	22 42.1	98 22	157.4	22 12.8	98 22	157.6	21 43.5	98 22	157.7	21 14.2	98 22	157.8	20 44.9	98 22	157.9	20 15.6	98 21	158.0	1
2	23 27.4	97 23	156.1	22 58.2	97 23	156.3	22 28.9	97 23	156.4	21 59.7	97 23	156.5	21 30.5	97 23	156.6	21 01.3	97 23	156.8	20 32.0	97 22	156.9	20 02.8	97 22	157.0	2
3	23 13.5	97 24	155.1	22 44.4	97 24	155.2	22 15.2	97 24	155.4	21 46.1	97 24	155.5	21 16.9	97 24	155.6	20 47.8	97 23	155.7	20 18.6	97 23	155.9	19 49.4	97 23	156.0	3
4	22 59.1	97 25	154.1	22 30.1	97 25	154.2	22 01.0	97 25	154.3	21 31.9	97 25	154.5	21 02.8	97 24	154.6	20 33.7	97 24	154.7	20 04.6	97 24	154.8	19 35.5	97 24	155.0	4
25	22 44.2	97 26	153.0	22 15.2	97 26	153.2	21 46.2	97 26	153.3	21 17.1	97 25	153.4	20 48.1	97 25	153.6	20 19.1	97 25	153.7	19 50.1	97 25	153.8	19 21.0	97 25	154.0	25
6	22 28.7	96 27	152.0	21 59.8	96 27	152.1	21 30.8	96 26	152.3	21 01.9	96 26	152.4	20 32.9	97 26	152.5	20 04.0	97 26	152.7	19 35.0	97 26	152.8	19 06.0	97 26	153.0	6
7	22 12.7	96 28	150.9	21 43.8	96 27	151.1	21 14.9	96 27	151.2	20 46.1	96 27	151.4	20 17.2	96 27	151.5	19 48.3	96 27	151.7	19 19.4	96 27	151.8	18 50.5	96 27	152.0	7
8	21 56.1	96 28	149.9	21 27.3	96 28	150.1	20 58.5	96 28	150.2	20 29.7	96 28	150.4	20 00.9	96 28	150.5	19 32.1	96 28	150.7	19 03.3	96 28	150.8	18 34.5	96 28	151.0	8
9	21 39.0	96 29	148.9	21 10.3	96 29	149.1	20 41.6	96 29	149.2	20 12.9	96 29	149.4	19 44.2	96 29	149.5	19 15.4	96 29	149.7	18 46.7	96 29	149.8	18 18.0	96 28	150.0	9
30	21 21.4	95 30	147.9	20 52.8	95 30	148.0	20 24.2	95 30	148.2	19 55.5	95 30	148.4	19 26.9	96 30	148.5	18 58.2	96 30	148.7	18 29.6	96 29	148.8	18 00.9	96 29	149.0	30
1	21 03.4	95 31	146.9	20 34.8	95 31	147.0	20 06.3	95 31	147.2	19 37.7	95 31	147.4	19 09.1	95 30	147.5	18 40.6	95 30	147.7	18 12.0	95 30	147.8	17 43.4	95 30	148.0	1
2	20 44.8	95 32	145.9	20 16.3	95 32	146.0	19 47.8	95 32	146.2	19 19.4	95 31	146.4	18 50.9	95 31	146.5	18 22.4	95 31	146.7	17 53.9	95 31	146.9	17 25.4	95 31	147.0	2
3	20 25.7	95 33	144.9	19 57.3	95 32	145.0	19 28.9	95 32	145.2	19 00.5	95 32	145.4	18 32.1	95 32	145.5	18 03.7	95 32	145.7	17 35.3	95 32	145.9	17 06.9	95 32	146.1	3
4	20 06.1	94 33	143.9	19 37.9	94 33	144.0	19 09.6	94 33	144.2	18 41.2	94 33	144.4	18 12.9	94 33	144.6	17 44.6	94 33	144.7	17 16.2	94 33	144.9	16 47.9	95 32	145.1	4
35	19 46.1	94 34	142.9	19 17.9	94 34	143.1	18 49.7	94 34	143.2	18 21.5	94 34	143.4	17 53.2	94 34	143.6	17 25.0	94 33	143.8	16 56.7	94 33	143.9	16 28.5	94 33	144.1	35
6	19 25.7	94 35	141.9	18 57.5	94 35	142.1	18 29.4	94 35	142.3	18 01.2	94 34	142.4	17 33.1	94 34	142.6	17 04.9	94 34	142.8	16 36.7	94 34	143.0	16 08.6	94 34	143.2	6
7	19 04.7	93 36	140.9	18 36.7	93 36	141.1	18 08.6	94 35	141.3	17 40.6	94 35	141.5	17 12.5	94 35	141.7	16 44.4	94 35	141.8	16 16.3	94 35	142.0	15 48.2	94 35	142.2	7
8	18 43.3	93 36	139.9	18 15.4	93 36	140.1	17 47.4	93 36	140.3	17 19.4	93 36	140.5	16 51.5	93 36	140.7	16 23.5	93 36	140.9	15 55.5	93 36	141.1	15 27.4	93 35	141.2	8
9	18 21.5	93 37	139.0	17 53.7	93 37	139.2	17 25.8	93 37	139.3	16 57.9	93 37	139.5	16 30.0	93 36	139.7	16 02.1	93 36	139.9	15 34.2	93 36	140.1	15 06.2	93 36	140.3	9
40	17 59.3	93 38	138.0	17 31.5	93 38	138.2	17 03.7	93 37	138.4	16 35.9	93 37	138.6	16 08.1	93 37	138.8	15 40.3	93 37	139.0	15 12.4	93 37	139.2	14 44.6	93 37	139.4	40
1	17 36.6	92 38	137.0	17 08.9	92 38	137.2	16 41.2	92 38	137.4	16 13.5	92 38	137.6	15 45.8	92 38	137.8	15 18.0	92 38	138.0	14 50.3	93 38	138.2	14 22.5	93 37	138.4	1
2	17 13.5	92 39	136.1	16 45.9	92 39	136.3	16 18.3	92 39	136.5	15 50.7	92 39	136.7	15 23.0	92 39	136.9	14 55.4	92 38	137.1	14 27.7	92 38	137.3	14 00.0	92 38	137.5	2
3	16 50.1	92 40	135.1	16 22.5	92 40	135.3	15 55.0	92 40	135.5	15 27.5	92 39	135.7	14 59.9	92 39	135.9	14 32.3	92 39	136.2	14 04.8	92 39	136.4	13 37.2	92 39	136.6	3
4	16 26.2	91 40	134.2	15 58.8	91 40	134.4	15 31.3	92 40	134.6	15 03.9	92 40	134.8	14 36.4	92 40	135.0	14 08.9	92 40	135.2	13 41.4	92 40	135.4	13 13.9	92 39	135.6	4
45	16 01.9	91 41	133.2	15 34.6	91 41	133.4	15 07.2	91 41	133.7	14 39.9	91 41	133.9	14 12.5	91 40	134.1	13 45.1	91 40	134.3	13 17.7	91 40	134.5	12 50.3	91 40	134.7	45
6	15 37.3	91 42	132.3	15 10.1	91 42	132.5	14 42.8	91 41	132.7	14 15.5	91 41	132.9	13 48.2	91 41	133.2	13 20.9	91 41	133.4	12 53.6	91 41	133.6	12 26.2	91 41	133.8	6
7	15 12.3	91 42	131.4	14 45.1	91 42	131.6	14 17.9	91 42	131.8	13 50.7	91 42	132.0	13 23.5	91 42	132.2	12 56.3	91 42	132.5	12 29.1	91 41	132.7	12 01.8	91 41	132.9	7
8	14 47.0	90 43	130.4	14 19.9	90 43	130.7	13 52.8	90 43	130.9	13 25.6	90 42	131.1	12 58.5	90 42	131.3	12 31.4	90 42	131.5	12 04.2	91 42	131.8	11 37.1	91 42	132.0	8
9	14 21.2	90 43	129.5	13 54.2	90 43	129.7	13 27.2	90 43	130.0	13 00.2	90 43	130.2	12 33.1	90 43	130.4	12 06.1	90 43	130.6	11 39.0	90 43	130.8	11 11.9	90 42	131.1	9
50	13 55.2	90 44	128.6	13 28.3	90 44	128.8	13 01.3	90 44	129.1	12 34.4	90 44	129.3	12 07.4	90 43	129.5	11 40.4	90 43	129.7	11 13.5	90 43	129.9	10 46.5	90 43	130.2	50
1	13 28.8	89 45	127.7	13 02.0	90 44	127.9	12 35.1	90 44	128.1	12 08.2	90 44	128.4	11 41.4	90 44	128.6	11 14.5	90 44	128.8	10 47.6	90 44	129.0	10 20.7	90 44	129.3	1
2	13 02.1	89 45	126.8	12 35.3	89 45	127.0	12 08.6	89 45	127.2	11 41.8	89 45	127.5	11 15.0	89 44	127.7	10 48.2	89 44	127.9	10 21.3	89 44	128.2	9 54.5	89 44	128.4	2
3	12 35.1	89 46	125.9	12 08.4	89 45	126.1	11 41.7	89 45	126.3	11 15.0	89 45	126.6	10 48.3	89 45	126.8	10 21.5	89 45	127.0	9 54.8	89 45	127.3	9 28.1	89 45	127.5	3
4	12 07.7	89 46	125.0	11 41.1	89 46	125.2	11 14.5	89 46	125.4	10 47.9	89 46	125.7	10 21.2	89 46	125.9	9 54.6	89 45	126.1	9 27.9	89 45	126.4	9 01.3	89 45	126.6	4
55	11 40.1	88 47	124.1	11 13.6	88 46	124.3	10 47.0	88 46	124.6	10 20.5	88 46	124.8	9 53.9	89 46	125.0	9 27.4	89 46	125.3	9 00.8	89 46	125.5	8 34.2	89 46	125.7	55
6	11 12.1	88 47	123.2	10 45.7	88 47	123.4	10 19.2	88 47	123.7	9 52.8	88 47	123.9	9 26.3	88 47	124.1	8 59.8	88 46	124.4	8 33.3	88 46	124.6	8 06.8	88 46	124.9	6
7	10 43.9	88 48	122.3	10 17.6	88 47	122.5	9 51.2	88 47	122.8	9 24.8	88 47	123.0	8 58.4	88 47	123.3	8 32.0	88 47	123.5	8 05.6	88 47	123.7	7 39.1	88 47	124.0	7
8	10 15.4	88 48	121.4	9 49.1	88 48	121.7	9 22.8	88 48	121.9	8 56.5	88 48	122.1	8 30.2	88 47	122.4	8 03.9	88 47	122.6	7 37.5	88 47	122.9	7 11.2	88 47	123.1	8
9	9 46.7	87 48	120.5	9 20.4	87 48	120.8	8 54.2	87 48	121.0	8 28.0	87 48	121.3	8 01.7	88 48	121.5	7 35.5	88 48	121.8	7 09.2	88 48	122.0	6 42.9	88 48	122.2	9
60	9 17.6	87 49	119.7	8 51.5	87 49	119.9	8 25.3	87 49	120.2	7 59.2	87 48	120.4	7 33.0	87 48	120.6	7 06.8	87 48	120.9	6 40.6	87 48	121.1	6 14.4	87 48	121.4	60
1	8 48.3	87 49	118.8	8 22.3	87 49	119.0	7 56.2	87 49	119.3	7 30.1	87 49	119.5	7 04.0	87 49	119.8	6 37.9	87 49	120.0	6 11.8	87 48	120.3	5 45.6	87 48	120.5	1
2	8 18.8	87 50	117.9	7 52.8	87 50	118.2	7 26.8	87 49	118.4	7 00.8	87 49	118.7	6 34.8	87 49	118.9	6 08.7	87 49	119.2	5 42.7	87 49	119.4	5 16.6	87 49	119.7	2
3	7 49.0	86 50	117.0	7 23.1	86 50	117.3	6 57.2	86 50	117.6	6 31.2	87 50	117.8	6 05.3	87 50	118.1	5 39.3	87 49	118.3	5 13.3	87 49	118.6				3
4	7 19.1	86 50	116.2	6 53.2	86 50	116.4	6 27.3	86 50	116.7	6 01.4	86 50	117.0	5 35.5	86 50	117.2	5 09.6	86 50	117.5							4
65	6 48.8	86 51	115.3	6 23.0	86 51	115.6	5 57.2	86 50	115.8	5 31.4	86 50	116.1	5 05.6	86 50	116.4										65
6	6 18.4	86 51	114.5	5 52.7	86 51	114.7	5 26.9	86 51	115.0	5 01.2	86 51	115.2													6
7	5 47.8	86 51	113.6	5 22.1	86 51	113.9																			7
8	5 16.9	85 52	112.8																						8

Lat. 57°

Lat. 58°

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	6 04.1	83 56	84.7	6 28.9	83 56	84.4	6 53.7	83 56	84.1	7 18.5	83 56	83.8	7 43.3	83 56	83.5	8 08.0	83 55	83.3	8 32.8	82 55	83.0	8 57.5	82 55	82.7	91
2	5 30.7	83 56	83.9	5 55.5	83 56	83.6	6 20.4	83 55	83.3	6 45.2	83 55	83.0	7 10.0	83 55	82.7	7 34.7	83 55	82.4	7 59.5	83 55	82.2	8 24.3	83 55	81.9	2
3				5 22.2	83 55	82.8	5 47.1	83 55	82.5	6 11.9	83 55	82.2	6 36.7	83 55	81.9	7 01.5	83 55	81.6	7 26.3	83 55	81.3	7 51.1	83 55	81.1	3
4							5 13.8	83 55	81.7	5 38.7	83 55	81.4	6 03.5	83 55	81.1	6 28.3	83 55	80.8	6 53.2	83 55	80.5	7 18.0	83 55	80.2	4
95										5 05.5	83 55	80.5	5 30.4	83 55	80.3	5 55.3	83 55	80.0	6 20.1	83 55	79.7	6 45.0	83 56	79.4	95
6																5 22.3	83 55	79.2	5 47.1	83 55	78.9	6 12.0	83 55	78.6	6
7																			5 14.3	83 55	78.1	5 39.2	83 55	77.8	7
8																						5 06.4	83 54	77.0	8

Digitized by Google

Lat. 56°

H.A. °	12° 00′ Alt. ° ′	Δd Δt	Az. °	12° 30′ Alt. ° ′	Δd Δt	Az. °	13° 00′ Alt. ° ′	Δd Δt	Az. °	13° 30′ Alt. ° ′	Δd Δt	Az. °
00	46 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0	47 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0
1	45 59.6	1.0 02	178.6	46 29.6	1.0 02	178.6	46 59.6	1.0 02	178.6	47 29.6	1.0 02	178.6
2	45 58.4	1.0 03	177.2	46 28.3	1.0 03	177.2	46 58.3	1.0 04	177.1	47 28.3	1.0 04	177.1
3	45 56.3	1.0 05	175.8	46 26.3	1.0 05	175.7	46 56.2	1.0 05	175.7	47 26.2	1.0 05	175.7
4	45 53.4	1.0 06	174.4	46 23.4	1.0 06	174.3	46 53.3	1.0 06	174.3	47 23.3	1.0 06	174.3
05	45 49.7	1.0 08	173.0	46 19.6	1.0 08	172.9	46 49.6	1.0 08	172.9	47 19.5	1.0 08	172.8
6	45 45.2	1.0 09	171.6	46 15.1	1.0 09	171.5	46 45.0	1.0 09	171.5	47 14.9	1.0 09	171.4
7	45 39.9	1.0 10	170.2	46 09.7	1.0 10	170.1	46 39.6	1.0 10	170.0	47 09.4	99 10	170.0
8	45 33.8	99 12	168.8	46 03.6	99 12	168.7	46 33.4	99 12	168.6	47 03.2	99 12	168.5
9	45 26.8	99 13	167.4	45 56.6	99 13	167.3	46 26.4	99 13	167.2	46 56.1	99 13	167.1
10	45 19.1	99 14	166.0	45 48.8	99 14	165.9	46 18.5	99 14	165.8	46 48.2	99 14	165.7
1	45 10.6	99 15	164.6	45 40.3	99 16	164.5	46 09.9	99 16	164.4	46 39.6	99 16	164.3
2	45 01.4	99 17	163.3	45 31.0	99 17	163.2	46 00.5	99 17	163.0	46 30.1	99 17	162.9
3	44 51.3	98 18	161.9	45 20.8	98 18	161.8	45 50.4	98 18	161.7	46 19.9	98 18	161.5
4	44 40.5	98 19	160.6	45 10.0	98 19	160.4	45 39.4	98 19	160.3	46 08.9	98 20	160.2
15	44 29.0	98 20	159.2	44 58.4	98 21	159.1	45 27.7	98 21	158.9	45 57.1	98 21	158.8
6	44 16.7	98 22	157.9	44 46.0	98 22	157.7	45 15.3	98 22	157.6	45 44.6	98 22	157.4
7	44 03.7	97 23	156.5	44 32.9	97 23	156.4	45 02.1	97 23	156.2	45 31.3	97 23	156.1
8	43 50.0	97 24	155.2	44 19.1	97 24	155.1	44 48.3	97 24	154.9	45 17.3	97 24	154.7
9	43 35.6	97 25	153.9	44 04.7	97 25	153.7	44 33.7	97 25	153.6	45 02.7	97 26	153.4
20	43 20.5	96 26	152.6	43 49.5	96 26	152.4	44 18.4	96 27	152.2	44 47.3	96 27	152.1
1	43 04.8	96 27	151.3	43 33.6	96 28	151.1	44 02.4	96 28	150.9	44 31.2	96 28	150.7
2	42 48.3	96 28	150.0	43 17.1	96 29	149.8	43 45.8	96 29	149.6	44 14.5	96 29	149.4
3	42 31.2	96 30	148.8	42 59.9	95 30	148.6	43 28.5	95 30	148.4	43 57.1	95 30	148.1
4	42 13.5	95 31	147.5	42 42.1	95 31	147.3	43 10.6	95 31	147.1	43 39.2	95 31	146.9
25	41 55.2	95 32	146.3	42 23.6	95 32	146.0	42 52.0	95 32	145.8	43 20.4	95 32	145.6
6	41 36.3	94 33	145.0	42 04.6	94 33	144.8	42 32.9	94 33	144.6	43 01.2	94 33	144.3
7	41 16.7	94 34	143.8	41 44.9	94 34	143.6	42 13.1	94 34	143.3	42 41.3	94 34	143.1
8	40 56.6	94 34	142.6	41 24.7	94 35	142.3	41 52.8	94 35	142.1	42 20.9	93 35	141.9
9	40 35.9	93 35	141.4	41 03.9	93 36	141.1	41 31.9	93 36	140.9	41 59.9	93 36	140.6
30	40 14.7	93 36	140.2	40 42.6	93 36	139.9	41 10.5	93 37	139.7	41 38.3	93 37	139.4
1	39 52.9	93 37	139.0	40 20.7	93 37	138.7	40 48.5	92 38	138.5	41 16.2	92 38	138.2
2	39 30.7	92 38	137.8	39 58.3	92 38	137.5	40 26.0	92 38	137.3	40 53.6	92 39	137.0
3	39 07.9	92 39	136.6	39 35.4	92 39	136.4	40 03.0	92 39	136.1	40 30.5	92 39	135.8
4	38 44.6	92 40	135.5	39 12.0	91 40	135.2	39 39.5	91 40	134.9	40 06.9	91 40	134.7
35	38 20.8	91 40	134.3	38 48.2	91 41	134.1	39 15.5	91 41	133.8	39 42.8	91 41	133.5
6	37 56.6	91 41	133.2	38 23.8	91 41	132.9	38 51.0	91 42	132.7	39 18.2	91 42	132.4
7	37 31.9	91 42	132.1	37 59.0	90 42	131.8	38 26.2	90 42	131.5	38 53.2	90 42	131.3
8	37 06.8	90 43	131.0	37 33.8	90 43	130.7	38 00.8	90 43	130.4	38 27.8	90 43	130.1
9	36 41.2	90 43	129.9	37 08.2	90 43	129.6	37 35.1	90 44	129.3	38 01.9	89 44	129.0
40	36 15.3	90 44	128.8	36 42.1	89 44	128.5	37 08.9	89 44	128.2	37 35.7	89 44	127.9
1	35 48.9	89 45	127.7	36 15.6	89 45	127.4	36 42.3	89 45	127.1	37 09.0	89 45	126.8
2	35 22.2	89 45	126.6	35 48.8	89 45	126.3	36 15.4	89 46	126.0	36 42.0	88 46	125.8
3	34 55.1	89 46	125.6	35 21.6	88 46	125.3	35 48.1	88 46	125.0	36 14.5	88 46	124.7
4	34 27.6	88 46	124.5	34 54.0	88 47	124.2	35 20.4	88 47	123.9	35 46.8	88 47	123.6
45	33 59.8	88 47	123.5	34 26.1	88 47	123.2	34 52.4	88 47	122.9	35 18.7	87 47	122.6
6	33 31.6	88 47	122.4	33 57.9	87 48	122.1	34 24.1	87 48	121.8	34 50.2	87 48	121.5
7	33 03.1	87 48	121.4	33 29.3	87 48	121.1	33 55.4	87 48	120.8	34 21.5	87 48	120.5
8	32 34.3	87 48	120.4	33 00.4	87 49	120.1	33 26.5	87 49	119.8	33 52.4	87 49	119.5
9	32 05.2	87 49	119.4	32 31.2	87 49	119.1	32 57.2	86 49	118.8	33 23.1	86 49	118.5
50	31 35.9	86 49	118.4	32 01.8	86 50	118.1	32 27.6	86 50	117.8	32 53.5	86 50	117.5
1	31 06.2	86 50	117.4	31 32.0	86 50	117.1	31 57.8	86 50	116.8	32 23.6	86 50	116.5
2	30 36.3	86 50	116.4	31 02.1	86 50	116.1	31 27.8	86 51	115.8	31 53.4	85 51	115.5
3	30 06.1	86 51	115.4	30 31.8	86 51	115.2	30 57.4	85 51	114.8	31 23.0	85 51	114.5
4	29 35.7	85 51	114.5	30 01.3	85 51	114.2	30 26.9	85 51	113.9	30 52.4	85 51	113.6
55	29 05.1	85 51	113.5	29 30.6	85 52	113.2	29 56.1	85 52	112.9	30 21.5	85 52	112.6
6	28 34.2	85 52	112.6	28 59.7	85 52	112.3	29 25.1	85 52	112.0	29 50.4	85 52	111.7
7	28 03.1	85 52	111.6	28 28.5	85 52	111.3	28 53.9	84 52	111.0	29 19.2	84 52	110.7
8	27 31.8	84 52	110.7	27 57.2	84 53	110.4	28 22.4	84 53	110.1	28 47.7	84 53	109.8
9	27 00.3	84 53	109.8	27 25.6	84 53	109.5	27 50.8	84 53	109.2	28 16.0	84 53	108.9
60	26 28.7	84 53	108.9	26 53.9	84 53	108.5	27 19.1	84 53	108.2	27 44.2	84 53	107.9
1	25 56.8	84 53	107.9	26 22.0	84 53	107.6	26 47.1	84 54	107.3	27 12.2	84 54	107.0
2	25 24.8	84 54	107.0	25 49.9	84 54	106.7	26 15.0	83 54	106.4	26 40.0	83 54	106.1
3	24 52.7	84 54	106.1	25 17.7	83 54	105.8	25 42.7	83 54	105.5	26 07.7	83 54	105.2
4	24 20.4	83 54	105.2	24 45.4	83 54	104.9	25 10.3	83 54	104.6	25 35.3	83 54	104.3
65	23 47.9	83 54	104.3	24 12.9	83 54	104.0	24 37.8	83 54	103.7	25 02.7	83 54	103.4
6	23 15.4	83 54	103.4	23 40.3	83 55	103.1	24 05.2	83 55	102.8	24 30.0	83 55	102.5
7	22 42.7	83 55	102.6	23 07.5	83 55	102.3	23 32.4	83 55	102.0	23 57.2	83 55	101.6
8	22 09.9	83 55	101.7	22 34.7	83 55	101.4	22 59.5	83 55	101.1	23 24.3	83 55	100.8
9	21 37.0	83 55	100.8	22 01.8	83 55	100.5	22 26.5	83 55	100.2	22 51.3	82 55	99.9
70	21 04.0	83 55	99.9	21 28.7	83 55	99.6	21 53.5	82 55	99.3	22 18.2	82 55	99.0
1	20 30.9	83 55	99.1	20 55.6	82 55	98.8	21 20.3	82 55	98.5	21 45.0	82 55	98.2
2	19 57.7	82 55	98.2	20 22.4	82 55	97.9	20 47.1	82 55	97.6	21 11.8	82 56	97.3
3	19 24.5	82 56	97.4	19 49.2	82 56	97.1	20 13.8	82 56	96.8	20 38.5	82 56	96.5
4	18 51.1	82 56	96.5	19 15.8	82 56	96.2	19 40.5	82 56	95.9	20 05.1	82 56	95.6
75	18 17.8	82 56	95.7	18 42.4	82 56	95.4	19 07.1	82 56	95.1	19 31.7	82 56	94.8
6	17 44.4	82 56	94.8	18 09.0	82 56	94.5	18 33.6	82 56	94.2	18 58.2	82 56	93.9
7	17 10.9	82 56	94.0	17 35.6	82 56	93.7	18 00.2	82 56	93.4	18 24.7	82 56	93.1
8	16 37.4	82 56	93.1	17 02.1	82 56	92.8	17 26.6	82 56	92.5	17 51.2	82 56	92.2
9	16 03.9	82 56	92.3	16 28.5	82 56	92.0	16 53.1	82 56	91.7	17 17.7	82 56	91.4
80	15 30.4	82 56	91.5	15 55.0	82 56	91.2	16 19.6	82 56	90.9	16 44.1	82 56	90.6
1	14 56.8	82 56	90.6	15 21.4	82 56	90.3	15 46.0	82 56	90.0	16 10.6	82 56	89.7
2	14 23.3	82 56	89.8	14 47.9	82 56	89.5	15 12.5	82 56	89.2	15 37.0	82 56	88.9
3	13 49.7	82 56	89.0	14 14.3	82 56	88.7	14 38.9	82 56	88.4	15 03.5	82 56	88.1
4	13 16.2	82 56	88.1	13 40.8	82 56	87.9	14 05.4	82 56	87.6	14 30.0	82 56	87.3
85	12 42.7	82 56	87.3	13 07.3	82 56	87.0	13 31.9	82 56	86.7	13 56.5	82 56	86.4
6	12 09.2	82 56	86.5	12 33.8	82 56	86.2	12 58.4	82 56	85.9	13 23.0	82 56	85.6
7	11 35.7	82 56	85.7	12 00.3	82 56	85.4	12 25.0	82 56	85.1	12 49.6	82 56	84.8
8	11 02.3	82 56	84.9	11 26.9	82 56	84.6	11 51.6	82 56	84.3	12 16.2	82 56	84.0
9	10 28.9	82 56	84.0	10 53.5	82 56	83.8	11 18.2	82 56	83.5	11 42.8	82 55	83.2
90	9 55.5	82 56	83.2	10 20.2	82 55	82.9	10 44.9	82 55	82.6	11 09.5	82 55	82.4

14° 00′ Alt. ° ′	Δd Δt	Az. °	14° 30′ Alt. ° ′	Δd Δt	Az. °	15° 00′ Alt. ° ′	Δd Δt	Az. °	15° 30′ Alt. ° ′	Δd Δt	Az. °	H.A. °
48 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0	49 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	00
47 59.6	1.0 02	178.6	48 29.6	1.0 02	178.5	48 59.6	1.0 02	178.5	49 29.6	1.0 02	178.5	1
47 58.3	1.0 04	177.1	48 28.3	1.0 04	177.1	48 58.3	1.0 04	177.1	49 28.3	1.0 04	177.0	2
47 56.2	1.0 05	175.7	48 26.2	1.0 05	175.6	48 56.1	1.0 05	175.6	49 26.1	1.0 05	175.6	3
47 53.2	1.0 06	174.2	48 23.2	1.0 06	174.2	48 53.1	1.0 06	174.1	49 23.1	1.0 06	174.1	4
47 49.4	1.0 08	172.8	48 19.3	1.0 08	172.7	48 49.2	1.0 08	172.7	49 19.2	1.0 08	172.6	05
47 44.8	1.0 09	171.3	48 14.7	1.0 09	171.3	48 44.5	1.0 09	171.2	49 14.4	1.0 09	171.1	6
47 39.3	99 10	169.9	48 09.1	99 11	169.8	48 39.0	99 11	169.7	49 08.8	99 11	169.7	7
47 33.0	99 12	168.5	48 02.8	99 12	168.4	48 32.6	99 12	168.3	49 02.4	99 12	168.2	8
47 25.9	99 13	167.0	47 55.6	99 13	166.9	48 25.4	99 13	166.8	48 55.1	99 14	166.7	9
47 17.9	99 15	165.6	47 47.6	99 15	165.5	48 17.3	99 15	165.4	48 47.0	99 15	165.3	10
47 09.2	99 16	164.2	47 38.8	99 16	164.1	48 08.4	99 16	164.0	48 38.1	99 16	163.8	1
46 59.7	99 17	162.8	47 29.2	99 17	162.7	47 58.8	98 17	162.5	48 28.3	98 18	162.4	2
46 49.4	98 18	161.4	47 18.8	98 19	161.3	47 48.3	98 19	161.1	48 17.8	98 19	161.0	3
46 38.3	98 20	160.0	47 07.7	98 20	159.9	47 37.1	98 20	159.7	48 06.5	98 20	159.6	4
46 26.4	98 21	158.6	46 55.7	98 21	158.5	47 25.1	98 21	158.3	47 54.4	98 21	158.2	15
46 13.8	97 22	157.3	46 43.1	97 22	157.1	47 12.3	97 23	156.9	47 41.5	97 23	156.8	6
46 00.5	97 23	155.9	46 29.6	97 24	155.7	46 58.8	97 24	155.5	47 27.9	97 24	155.4	7
45 46.4	97 25	154.5	46 15.5	97 25	154.4	46 44.5	97 25	154.2	47 13.5	97 25	154.0	8
45 31.6	97 26	153.2	46 00.6	97 26	153.0	46 29.5	96 26	152.8	46 58.5	96 26	152.6	9
45 16.2	96 27	151.9	45 45.0	96 27	151.7	46 13.9	96 27	151.5	46 42.7	96 27	151.3	20
45 00.0	96 28	150.5	45 28.8	96 28	150.3	45 57.5	96 28	150.1	46 26.2	96 29	149.9	1
44 43.2	96 29	149.2	45 11.8	95 29	149.0	45 40.5	95 30	148.8	46 09.1	95 30	148.6	2
44 25.7	95 30	147.9	44 54.2	95 30	147.7	45 22.8	95 31	147.5	45 51.3	95 31	147.3	3
44 07.5	95 31	146.6	44 36.0	95 31	146.4	45 04.4	95 32	146.2	45 32.8	95 32	146.0	4
43 48.8	94 32	145.4	44 17.1	94 32	145.1	44 45.4	94 33	144.9	45 13.7	94 33	144.7	25
43 29.4	94 33	144.1	43 57.6	94 33	143.9	44 25.8	94 34	143.6	44 54.0	94 34	143.4	6
43 09.5	94 34	142.9	43 37.6	94 34	142.6	44 05.6	94 35	142.4	44 33.7	93 35	142.1	7
42 48.9	93 35	141.6	43 16.9	93 35	141.4	43 44.9	93 36	141.1	44 12.8	93 36	140.9	8
42 27.8	93 36	140.4	42 55.7	93 36	140.1	43 23.5	93 36	139.9	43 51.3	93 37	139.6	9
42 06.1	93 37	139.2	42 33.9	93 37	138.9	43 01.6	92 37	138.6	43 29.3	92 38	138.4	30
41 43.9	92 38	138.0	42 11.6	92 38	137.7	42 39.2	92 38	137.4	43 06.8	92 38	137.2	1
41 21.2	92 39	136.8	41 48.7	92 39	136.5	42 16.2	92 39	136.2	42 43.7	92 39	136.0	2
40 58.0	92 40	135.6	41 25.4	91 40	135.3	41 52.8	91 40	135.0	42 20.1	91 40	134.8	3
40 34.2	91 40	134.4	41 01.6	91 41	134.1	41 28.8	91 41	133.9	41 56.1	91 41	133.6	4
40 10.0	91 41	133.3	40 37.2	91 41	133.0	41 04.4	90 42	132.7	41 31.5	90 42	132.4	35
39 45.4	90 42	132.1	40 12.5	90 42	131.8	40 39.5	90 42	131.5	41 06.5	90 42	131.3	6
39 20.3	90 43	131.0	39 47.2	90 43	130.7	40 14.2	90 43	130.4	40 41.1	90 43	130.1	7
38 54.7	90 43	129.9	39 21.6	90 43	129.6	39 48.4	89 44	129.3	40 15.2	89 44	129.0	8
38 28.7	89 44	128.7	38 55.5	89 44	128.4	39 22.3	89 44	128.2	39 48.9	89 44	127.9	9
38 02.4	89 45	127.6	38 29.0	89 45	127.3	38 55.7	89 45	127.0	39 22.3	89 45	126.7	40
37 35.6	89 45	126.5	38 02.2	88 45	126.3	38 28.7	88 46	126.0	38 55.2	88 46	125.7	1
37 08.5	88 46	125.5	37 34.9	88 46	125.2	38 01.4	88 46	124.9	38 27.7	88 46	124.6	2
36 41.0	88 46	124.4	37 07.3	88 47	124.1	37 33.6	88 47	123.8	37 59.9	88 47	123.5	3
36 13.1	88 47	123.3	36 39.4	87 47	123.0	37 05.6	87 47	122.7	37 31.8	87 47	122.4	4
35 44.9	87 48	122.3	36 11.1	87 48	122.0	36 37.2	87 48	121.7	37 03.3	87 48	121.4	45
35 16.4	87 48	121.2	35 42.5	87 48	120.9	36 08.5	87 48	120.6	36 34.5	87 49	120.3	6
34 47.5	87 49	120.2	35 13.5	87 49	119.9	35 39.5	86 49	119.6	36 05.4	86 49	119.3	7
34 18.4	86 49	119.2	34 44.3	86 49	118.9	35 10.2	86 49	118.6	35 36.0	86 49	118.3	8
33 49.0	86 50	118.2	34 14.8	86 50	117.9	34 40.6	86 50	117.6	35 06.3	86 50	117.3	9
33 19.3	86 50	117.2	33 45.0	86 50	116.9	34 10.7	86 50	116.6	34 36.3	85 50	116.3	50
32 49.3	86 50	116.2	33 14.9	85 51	115.9	33 40.5	85 51	115.6	34 06.1	85 51	115.3	1
32 19.0	85 51	115.2	32 44.6	85 51	114.9	33 10.2	85 51	114.6	33 35.6	85 51	114.3	2
31 48.6	85 51	114.2	32 14.1	85 51	113.9	32 39.5	85 51	113.6	33 04.9	85 52	113.3	3
31 17.9	85 52	113.3	31 43.3	85 52	113.0	32 08.7	85 52	112.6	32 34.0	84 52	112.3	4
30 46.9	85 52	112.3	31 12.3	84 52	112.0	31 37.6	84 52	111.7	32 02.9	84 52	111.4	55
30 15.8	84 52	111.4	30 41.1	84 52	111.0	31 06.3	84 52	110.7	31 31.5	84 53	110.4	6
29 44.4	84 53	110.4	30 09.7	84 53	110.1	30 34.8	84 53	109.8	31 00.0	84 53	109.5	7
29 12.9	84 53	109.5	29 38.1	84 53	109.2	30 03.2	84 53	108.8	30 28.3	84 53	108.5	8
28 41.2	84 53	108.5	29 06.3	84 53	108.2	29 31.3	83 53	107.9	29 56.4	83 53	107.6	9
28 09.3	84 53	107.6	28 34.3	83 54	107.3	28 59.3	83 54	107.0	29 24.3	83 54	106.7	60
27 37.2	83 54	106.7	28 02.2	83 54	106.4	28 27.2	83 54	106.1	28 52.1	83 54	105.8	1
27 05.0	83 54	105.8	27 30.0	83 54	105.5	27 54.9	83 54	105.2	28 19.7	83 54	104.9	2
26 32.7	83 54	104.9	26 57.6	83 54	104.6	27 22.4	83 54	104.3	27 47.2	83 54	103.9	3
26 00.2	83 54	104.0	26 25.0	83 54	103.7	26 49.8	83 54	103.4	27 14.6	82 55	103.1	4
25 27.5	83 55	103.1	25 52.4	83 55	102.8	26 17.1	82 56	102.5	26 41.9	82 55	102.2	65
24 54.8	83 55	102.2	25 19.6	82 55	101.9	25 44.3	82 55	101.6	26 09.0	82 55	101.3	6
24 22.0	83 55	101.3	24 46.7	82 55	101.0	25 11.4	82 55	100.7	25 36.0	82 55	100.4	7
23 49.0	82 55	100.5	24 13.7	82 55	100.1	24 38.4	82 55	99.8	25 03.0	82 55	99.5	8
23 16.0	82 55	99.6	23 40.6	82 55	99.3	24 05.3	82 55	99.0	24 29.9	82 55	98.6	9
22 42.9	82 55	98.7	23 07.5	82 55	98.4	23 32.1	82 55	98.1	23 56.7	82 55	97.8	70
22 09.7	82 55	97.9	22 34.3	82 55	97.5	22 58.8	82 56	97.2	23 23.4	82 56	96.9	1
21 36.4	82 56	97.0	22 01.0	82 56	96.7	22 25.5	82 56	96.4	22 50.1	82 56	96.1	2
21 03.1	82 56	96.1	21 27.6	82 56	95.8	21 52.2	82 56	95.5	22 16.7	82 56	95.2	3
20 29.7	82 56	95.3	20 54.2	82 56	95.0	21 18.7	82 56	94.7	21 43.2	82 56	94.4	4
19 56.2	82 56	94.4	20 20.8	82 56	94.1	20 45.3	82 56	93.8	21 09.8	82 56	93.5	75
19 22.8	82 56	93.6	19 47.3	82 56	93.3	20 11.8	82 56	93.0	20 36.3	81 56	92.7	6
18 49.3	82 56	92.8	19 13.8	82 56	92.5	19 38.3	82 56	92.2	20 02.7	81 56	91.8	7
18 15.8	82 56	91.9	18 40.3	82 56	91.6	19 04.7	82 56	91.3	19 29.2	81 56	91.0	8
17 42.2	82 56	91.1	18 06.7	82 56	90.8	18 31.2	82 56	90.5	18 55.6	81 56	90.2	9
17 08.7	82 56	90.3	17 33.2	82 56	90.0	17 57.6	82 56	89.7	18 22.1	81 56	89.4	80
16 35.1	82 56	89.4	16 59.6	82 56	89.1	17 24.1	82 56	88.8	17 48.5	81 56	88.5	1
16 01.6	82 56	88.6	16 26.1	82 56	88.3	16 50.6	82 56	88.0	17 15.0	81 56	87.7	2
15 28.0	82 56	87.8	15 52.5	82 56	87.5	16 17.0	82 56	87.2	16 41.5	82 56	86.9	3
14 54.5	82 56	87.0	15 19.0	82 56	86.7	15 43.5	82 56	86.4	16 08.0	82 56	86.1	4
14 21.0	82 56	86.1	14 45.6	82 56	85.8	15 10.1	82 56	85.5	15 34.6	82 56	85.2	85
13 47.6	82 56	85.3	14 12.1	82 56	85.0	14 36.6	82 56	84.7	15 01.1	82 56	84.4	6
13 14.1	82 56	84.5	13 38.7	82 56	84.2	14 03.3	82 56	83.9	14 27.8	82 56	83.6	7
12 40.8	82 56	83.7	13 05.4	82 56	83.4	13 29.9	82 55	83.1	13 54.5	82 55	82.8	8
12 07.5	82 55	82.9	12 32.1	82 55	82.6	12 56.6	82 55	82.3	13 21.2	82 55	82.0	9
11 34.2	82 55	82.1	11 58.8	82 55	81.8	12 23.4	82 55	81.5	12 48.0	82 55	81.2	90

Digitized by Google

10—15636

Lat. 56°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	22 00.0	1.0 01	180.0	21 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	20 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	19 00.0	1.0 00	180.0	18 30.0	1.0 00	180.0	00
1	21 59.7	1.0 02	178.9	21 29.7	1.0 02	179.0	20 59.7	1.0 02	179.0	20 29.7	1.0 02	179.0	19 59.7	1.0 02	179.0	19 29.7	1.0 02	179.0	18 59.7	1.0 02	179.0	18 29.7	1.0 01	179.0	1
2	21 58.8	1.0 03	177.9	21 28.8	1.0 03	177.9	20 58.8	1.0 03	177.9	20 28.8	1.0 03	177.9	19 58.8	1.0 02	177.9	19 28.8	1.0 02	177.9	18 58.8	1.0 02	178.0	18 28.8	1.0 02	178.0	2
3	21 57.2	1.0 04	176.8	21 27.2	1.0 04	176.9	20 57.3	1.0 04	176.9	20 27.3	1.0 04	176.9	19 57.3	1.0 04	176.9	19 27.3	1.0 04	176.9	18 57.3	1.0 03	176.9	18 27.3	1.0 03	177.0	3
4	21 55.1	1.0 05	175.8	21 25.1	1.0 05	175.8	20 55.1	1.0 05	175.8	20 25.1	1.0 05	175.8	19 55.2	1.0 05	175.9	19 25.2	1.0 05	175.9	18 55.2	1.0 04	175.9	18 25.2	1.0 04	175.9	4
05	21 52.3	1.0 06	174.7	21 22.3	1.0 06	174.8	20 52.4	1.0 06	174.8	20 22.4	1.0 06	174.8	19 52.4	1.0 06	174.8	19 22.5	1.0 06	174.9	18 52.5	1.0 05	174.9	18 22.6	1.0 05	174.9	05
6	21 48.9	1.0 07	173.7	21 19.0	1.0 07	173.7	20 49.0	1.0 07	173.7	20 19.1	1.0 07	173.8	19 49.1	1.0 07	173.8	19 19.2	1.0 06	173.8	18 49.2	1.0 06	173.9	18 19.3	1.0 06	173.9	6
7	21 44.9	1.0 08	172.6	21 15.0	1.0 08	172.7	20 45.1	1.0 08	172.7	20 15.1	1.0 08	172.7	19 45.2	1.0 08	172.8	19 15.3	1.0 08	172.8	18 45.4	1.0 07	172.9	18 15.5	1.0 07	172.9	7
8	21 40.3	1.0 09	171.6	21 10.4	1.0 09	171.6	20 40.5	1.0 09	171.7	20 10.6	1.0 09	171.7	19 40.7	1.0 08	171.8	19 10.8	1.0 08	171.8	18 40.9	1.0 08	171.8	18 11.0	1.0 08	171.9	8
9	21 35.1	1.0 10	170.5	21 05.2	1.0 10	170.6	20 35.3	1.0 10	170.6	20 05.5	1.0 10	170.7	19 35.6	1.0 10	170.7	19 05.7	1.0 09	170.8	18 35.9	1.0 09	170.8	18 06.0	1.0 09	170.9	9
10	21 29.2	99 11	169.5	20 59.4	99 11	169.5	20 29.6	99 11	169.6	19 59.7	99 11	169.6	19 29.9	99 10	169.7	19 00.1	99 10	169.8	18 30.2	99 10	169.8	18 00.4	99 10	169.9	10
1	21 22.8	99 12	168.4	20 53.0	99 12	168.5	20 23.2	99 12	168.6	19 53.4	99 12	168.6	19 23.6	99 11	168.7	18 53.8	99 11	168.7	18 24.0	99 11	168.8	17 54.2	99 11	168.9	1
2	21 15.8	99 13	167.4	20 46.0	99 13	167.5	20 16.3	99 13	167.5	19 46.5	99 12	167.6	19 16.7	99 12	167.7	18 46.9	99 12	167.7	18 17.2	99 12	167.8	17 47.4	99 12	167.9	2
3	21 08.2	99 14	166.4	20 38.5	99 14	166.4	20 08.7	99 14	166.5	19 39 0	99 13	166.6	19 09.3	99 13	166.6	18 39.5	99 13	166.7	18 09.8	99 13	166.8	17 40.1	99 13	166.8	3
4	21 00.0	99 15	165.3	20 30.3	99 15	165.4	20 00.6	99 15	165.5	19 30.9	99 14	165.5	19 01.2	99 14	165.6	18 31.5	99 14	165.7	18 01.8	99 14	165.8	17 32.1	99 14	165.8	4
15	20 51.2	99 16	164.3	20 21.5	99 16	164.4	19 51.9	99 15	164.4	19 22.2	99 15	164.5	18 52.6	99 15	164.6	18 23.0	99 15	164.7	17 53.3	99 15	164.8	17 23.6	99 15	164.8	15
6	20 41.8	99 17	163.2	20 12.2	99 16	163.3	19 42.6	99 16	163.4	19 13.0	99 16	163.5	18 43.4	99 16	163.6	18 13.8	99 16	163.7	17 44.2	99 16	163.8	17 14.6	99 16	163.9	6
7	20 31.8	98 18	162.2	20 02.3	98 17	162.3	19 32.7	98 17	162.4	19 03.2	98 17	162.5	18 33.7	99 17	162.6	18 04.1	99 17	162.7	17 34.5	99 17	162.8	17 05.0	99 17	162.9	7
8	20 21.3	98 18	161.2	19 51.8	98 18	161.3	19 22.3	98 18	161.4	18 52.8	98 18	161.5	18 23.3	98 18	161.6	17 53.8	98 18	161.7	17 24.3	98 18	161.8	16 54.8	98 18	161.9	8
9	20 10.2	98 19	160.2	19 40.8	98 19	160.3	19 11.3	98 19	160.4	18 41.9	98 19	160.5	18 12.5	98 19	160.6	17 43.0	98 19	160.7	17 13.6	98 19	160.8	16 44.1	98 19	160.9	9
20	19 58.5	98 20	159.1	19 29.2	98 20	159.3	18 59.8	98 20	159.4	18 30.4	98 20	159.5	18 01.0	98 20	159.6	17 31.6	98 20	159.7	17 02.2	98 20	159.8	16 32.8	98 20	159.9	20
1	19 46.3	98 21	158.1	19 17.0	98 21	158.2	18 47.7	98 21	158.4	18 18.4	98 21	158.5	17 49.0	98 21	158.6	17 19.7	98 21	158.7	16 50.4	98 21	158.8	16 21.0	98 21	158.9	1
2	19 33.5	97 22	157.1	19 04.3	98 22	157.2	18 35.0	98 22	157.4	18 05.8	98 22	157.5	17 36.5	98 22	157.6	17 07.2	98 22	157.7	16 38.0	98 22	157.8	16 08.7	98 21	157.9	2
3	19 20.2	97 23	156.1	18 51.0	97 23	156.2	18 21.8	97 23	156.4	17 52.6	97 23	156.5	17 23.4	97 23	156.6	16 54.2	97 23	156.7	16 25.0	97 22	156.8	15 55.8	97 22	156.9	3
4	19 06.4	97 24	155.1	18 37.2	97 24	155.2	18 08.1	97 24	155.4	17 39.0	97 24	155.5	17 09.9	97 24	155.6	16 40.7	97 23	155.7	16 11.6	97 23	155.9	15 42.4	97 23	156.0	4
25	18 52.0	97 25	154.1	18 22.9	97 25	154.2	17 53.9	97 25	154.4	17 24.8	97 25	154.5	16 55.7	97 24	154.6	16 26.7	97 24	154.7	15 57.6	97 24	154.9	15 28.5	97 24	155.0	25
6	18 37.1	97 26	153.1	18 08.1	97 26	153.2	17 39.1	97 26	153.4	17 10.1	97 25	153.5	16 41.1	97 25	153.6	16 12.1	97 25	153.8	15 43.1	97 25	153.9	15 14.1	97 25	154.0	6
7	18 21.6	96 27	152.1	17 52.7	96 26	152.2	17 23.8	96 26	152.4	16 54.9	96 26	152.5	16 25.9	96 26	152.7	15 57.0	96 26	152.8	15 28.1	96 26	152.9	14 59.1	96 26	153.1	7
8	18 05.7	96 27	151.1	17 36.8	96 27	151.3	17 08.0	96 27	151.4	16 39.1	96 27	151.5	16 10.3	96 27	151.7	15 41.4	96 27	151.8	15 12.6	96 27	152.0	14 43.7	96 27	152.1	8
9	17 49.2	96 28	150.1	17 20.4	96 28	150.3	16 51.7	96 28	150.4	16 22.9	96 28	150.6	15 54.1	96 28	150.7	15 25.3	96 28	150.9	14 56.5	96 28	151.0	14 27.7	96 27	151.2	9
30	17 32.2	96 29	149.1	17 03.6	96 29	149.3	16 34.9	96 29	149.4	16 06.2	96 29	149.6	15 37.5	96 29	149.8	15 08.7	96 28	149.9	14 40.0	96 28	150.1	14 11.3	96 28	150.2	30
1	17 14.8	95 30	148.2	16 46.2	95 30	148.3	16 17.6	95 30	148.5	15 48.9	95 30	148.6	15 20.3	95 29	148.8	14 51.7	95 29	148.9	14 23.0	95 29	149.1	13 54.4	95 29	149.3	1
2	16 56.8	95 31	147.2	16 28.3	95 31	147.4	15 59.8	95 30	147.5	15 31.2	95 30	147.7	15 02.7	95 30	147.8	14 34.1	95 30	148.0	14 05.6	95 30	148.1	13 37.0	95 30	148.3	2
3	16 38.4	95 31	146.2	16 10.0	95 31	146.4	15 41.5	95 31	146.5	15 13.1	95 31	146.7	14 44.6	95 31	146.9	14 16.1	95 31	147.0	13 47.6	95 31	147.2	13 19.1	95 31	147.4	3
4	16 19.5	95 32	145.3	15 51.2	95 32	145.4	15 22.8	95 32	145.6	14 54.4	95 32	145.8	14 26.0	95 32	145.9	13 57.6	95 32	146.1	13 29.2	95 31	146.3	13 00.8	95 31	146.4	4
35	16 00.2	94 33	144.3	15 31.9	94 33	144.5	15 03.6	94 33	144.6	14 35.3	94 33	144.8	14 07.0	94 32	145.0	13 38.7	94 32	145.2	13 10.4	94 32	145.3	12 42.0	94 32	145.5	35
6	15 40.4	94 34	143.3	15 12.2	94 34	143.5	14 44.0	94 34	143.7	14 15.7	94 33	143.9	13 47.5	94 33	144.0	13 19.3	94 33	144.2	12 51.0	94 33	144.4	12 22.8	94 33	144.6	6
7	15 20.1	94 34	142.4	14 52.0	94 34	142.6	14 23.9	94 34	142.7	13 55.7	94 34	142.9	13 27.6	94 34	143.1	12 59.4	94 34	143.3	12 31.3	94 34	143.5	12 03.1	94 34	143.6	7
8	14 59.4	93 35	141.4	14 31.4	93 35	141.6	14 03.3	93 35	141.8	13 35.3	94 35	142.0	13 07.2	94 35	142.2	12 39.2	94 35	142.3	12 11.1	94 34	142.5	11 43.0	94 34	142.7	8
9	14 38.3	93 36	140.5	14 10.3	93 36	140.7	13 42.4	93 36	140.9	13 14.4	93 36	141.0	12 46.4	93 35	141.2	12 18.4	93 35	141.4	11 50.5	93 35	141.6	11 22.5	93 35	141.8	9
40	14 16.7	93 37	139.5	13 48.9	93 36	139.7	13 21.0	93 36	139.9	12 53.1	93 36	140.1	12 25.2	93 36	140.3	11 57.3	93 36	140.5	11 29.4	93 36	140.7	11 01.5	93 36	140.9	40
1	13 54.7	93 37	138.6	13 27.0	93 37	138.8	12 59.2	93 37	139.0	12 31.4	93 37	139.2	12 03.6	93 37	139.4	11 35.8	93 37	139.6	11 07.9	93 36	139.8	10 40.1	93 36	140.0	1
2	13 32.4	92 38	137.7	13 04.7	92 38	137.9	12 37.0	92 38	138.1	12 09.3	92 38	138.3	11 41.5	92 37	138.5	11 13.8	92 37	138.7	10 46.1	92 37	138.9	10 18.3	92 37	139.1	2
3	13 09.6	92 39	136.8	12 42.0	92 38	137.0	12 14.4	92 38	137.2	11 46.7	92 38	137.4	11 19.1	92 38	137.6	10 51.4	92 38	137.8	10 23.8	92 38	138.0	9 56.1	92 38	138.1	3
4	12 46.4	92 39	135.8	12 18.9	92 39	136.0	11 51.3	92 39	136.2	11 23.8	92 39	136.4	10 56.3	92 39	136.6	10 28.7	92 39	136.8	10 01.1	92 38	137.0	9 33.6	92 38	137.2	4
45	12 22.8	91 40	134.9	11 55.4	91 40	135.1	11 27.9	92 40	135.3	11 00.5	92 39	135.5	10 33.0	92 39	135.7	10 05.6	92 39	135.9	9 38.1	92 39	136.1	9 10.6	92 39	136.4	45
6	11 58.9	91 41	134.0	11 31.5	91 40	134.2	11 04.2	91 40	134.4	10 36.8	91 40	134.6	10 09.4	91 40	134.8	9 42.0	91 40	135.0	9 14.6	91 40	135.3	8 47.2	91 40	135.5	6
7	11 34.6	91 41	133.1	11 07.3	91 41	133.3	10 40.0	91 41	133.5	10 12.7	91 41	133.7	9 45.4	91 41	133.9	9 18.1	91 40	134.2	8 50.8	91 40	134.4	8 23.5	91 40	134.6	7
8	11 09.9	91 42	132.2	10 42.7	91 42	132.4	10 15.5	91 41	132.6	9 48.3	91 41	132.8	9 21.1	91 41	133.0	8 53.9	91 41	133.3	8 26.7	91 41	133.5	7 59.4	91 41	133.7	8
9	10 44.8	90 42	131.3	10 17.8	90 42	131.5	9 50.6	90 42	131.7	9 23.5	90 42	131.9	8 56.4	90 42	132.2	8 29.3	90 42	132.4	8 02.2	90 41	132.6	7 35.0	90 41	132.8	9
50	10 19.5	90 43	130.4	9 52.5	90 43	130.6	9 25.4	90 43	130.8	8 58.4	90 42	131.1	8 31.4	90 42	131.3	8 04.3	90 42	131.5	7 37.3	90 42	131.7	7 10.2	90 42	131.9	50
1	9 53.7	90 43	129.5	9 26.8	90 43	129.7	8 59.9	90 43	129.9	8 32.9	90 43	130.2	8 06.0	90 43	130.4	7 39.0	90 43	130.6	7 12.1	90 43	130.8	6 45.1	90 42	131.1	1
2	9 27.7	89 44	128.6	9 00.8	89 44	128.8	8 34.0	90 44	129.1	8 07.1	90 44	129.3	7 40.3	90 43	129.5	7 13.4	90 43	129.7	6 46.5	90 43	130.0	6 19.6	90 43	130.2	2
3	9 01.3	89 44	127.7	8 34.5	89 44	128.0	8 07.8	89 44	128.2	7 41.0	89 44	128.4	7 14.2	89 44	128.6	6 47.4	89 44	128.9	6 20.6	89 44	129.1	5 53.8	89 44	129.3	3
4	8 34.6	89 45	126.8	8 07.9	89 45	127.1	7 41.2	89 45	127.3	7 14.5	89 45	127.5	6 47.8	89 44	127.8	6 21.1	89 44	128.0	5 54.4	89 44	128.2	5 27.7	89 44	128.5	4
55	8 07.6	89 46	126.0	7 41.0	89 45	126.2	7 14.4	89 45	126.4	6 47.8	89 45	126.7	6 21.2	89 45	126.9	5 54.5	89 45	127.1	5 27.9	89 45	127.4	5 01.3	89 44	127.6	55
6	7 40.3	88 46	125.1	7 13.8	88 46	125.3	6 47.3	88 46	125.6	6 20.7	88 46	125.8	5 54.2	88 45	126.0	5 27.6	88 45	126.3	5 01.1	89 45	126.5				6
7	7 12.7	88 46	124.2	6 46.3	88 46	124.5	6 19.8	88 46	124.7	5 53.4	88 46	124.9	5 26.9	88 46	125.2	5 00.4	88 46	125.4							7
8	6 44.8	88 47	123.4	6 18.5	88 47	123.6	5 52.1	88 47	123.8	5 25.7	88 47	124.1													8
9	6 16.7	88 47	122.5	5 50.4	88 47	122.7	5 24.1	88 47	123.0																9
60	5 48.2	87 48	121.6	5 22.0	87 48	121.9																			60
1	5 19.5	87 48	120.8																						1

DECLINATION SAME NAME AS LATITUDE

Lat 57°

Lat 58°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
91	9 22.2	82 55	82.4	9 47.0	82 55	82.1	10 11.6	82 55	81.8	10 36.3	82 55	81.5	11 01.0	82 55	81.3	11 25.6	82 55	81.0	11 50.3	82 55	80.7	12 14.9	82 55	80.4	91
2	8 49.0	82 55	81.6	9 13.7	82 55	81.3	9 38.5	82 55	81.0	10 03.2	82 55	80.7	10 27.9	82 55	80.4	10 52.5	82 55	80.1	11 17.2	82 55	79.9	11 41.9	82 55	79.6	2
3	8 15.9	83 55	80.8	8 40.6	83 55	80.5	9 05.4	82 55	80.2	9 30.1	82 55	79.9	9 54.8	82 55	79.6	10 19.5	82 55	79.3	10 44.2	82 55	79.0	11 08.9	82 55	78.8	3
4	7 42.8	83 55	80 0	8 07.6	83 55	79.7	8 32.3	83 55	79.4	8 57.1	83 55	79.1	9 21.9	82 55	78.8	9 46.6	82 55	78.5	10 11.3	82 55	78.2	10 36.0	82 55	78.0	4
95	7 09.8	83 55	79.1	7 34.6	83 55	78.9	7 59.4	83 55	78.6	8 24.2	83 55	78.3	8 49.0	83 55	78.0	9 13.8	83 55	77.7	9 38.5	83 54	77.4	10 03.3	82 54	77.1	95
6	6 36.9	83 55	78.3	7 01.7	83 55	78.0	7 26.6	83 55	77.8	7 51.4	83 54	77.5	8 16.2	83 54	77.2	8 41.0	83 54	76.9	9 05.8	83 54	76.6	9 30.6	83 54	76.3	6
7	6 04.1	83 55	77.5	6 29.0	83 54	77.2	6 53.8	83 54	76.9	7 18.7	83 54	76.7	7 43.6	83 54	76.4	8 08.4	83 54	76.1	8 33.2	83 54	75.8	8 58.1	83 54	75.5	7
8	5 31.4	83 54	76.7	5 56.3	83 54	76.4	6 21.2	83 54	76.1	6 46.1	83 54	75.9	7 11.0	83 54	75.6	7 35.9	83 54	75.3	8 00.8	83 54	75.0	8 25.6	83 54	74.7	8
9				5 23.7	83 54	75.6	5 48.7	83 54	75.3	6 13.6	83 54	75.0	6 38.6	83 54	74.8	7 03.5	83 54	74.5	7 28.4	83 54	74.2	7 53.3	83 54	73.9	9
100							5 16.3	83 54	74.5	5 41.3	83 54	74.2	6 06.3	83 54	73.9	6 31.3	83 54	73.7	6 56.2	83 53	73.4	7 21.2	83 53	73.1	100
1										5 09.1	83 54	73.4	5 34.1	83 53	73.1	5 59.1	83 53	72.9	6 24.1	83 53	72.6	6 49.1	83 53	72.3	1
2													5 02.1	84 53	72.3	5 27.1	84 53	72.0	5 52.2	84 53	71.8	6 17.2	83 53	71.5	2
3																			5 20.4	84 53	71.0	5 45.5	84 53	70.7	3
4																						5 13.9	84 52	69.9	4

Digitized by Google

Lat. 56°

H.A. °	16° 00′ Alt. ° ′	Δd Δt	Az. °	16° 30′ Alt. ° ′	Δd Δt	Az. °	17° 00′ Alt. ° ′	Δd Δt	Az. °	17° 30′ Alt. ° ′	Δd Δt	Az. °
00	50 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0
1	49 59.6	1.0 02	178.5	50 29.6	1.0 02	178.5	50 59.6	1.0 02	178.5	51 29.6	1.0 02	178.5
2	49 58.2	1.0 04	177.0	50 28.2	1.0 04	177.0	50 58.2	1.0 04	177.0	51 28.2	1.0 04	176.9
3	49 56.1	1.0 05	175.5	50 26.0	1.0 05	175.5	50 56.0	1.0 05	175.4	51 26.0	1.0 05	175.4
4	49 53.0	1.0 07	174.0	50 23.0	1.0 07	174.0	50 52.9	1.0 07	173.9	51 22.8	1.0 07	173.9
05	49 49.1	1.0 08	172.5	50 19.0	1.0 08	172.5	50 48.9	1.0 08	172.4	51 18.8	1.0 08	172.4
6	49 44.3	1.0 09	171.1	50 14.2	1.0 09	171.0	50 44.0	1.0 10	170.9	51 13.9	1.0 10	170.8
7	49 38.6	99 11	169.6	50 08.5	99 11	169.5	50 38.3	99 11	169.4	51 08.1	99 11	169.3
8	49 32.2	99 12	168.1	50 01.9	99 12	168.0	50 31.7	99 12	167.9	51 01.5	99 12	167.8
9	49 24.8	99 14	166.6	49 54.5	99 14	166.5	50 24.3	99 14	166.4	50 54.0	99 14	166.3
10	49 16.6	99 15	165.2	49 46.3	99 15	165.1	50 16.0	99 15	164.9	50 45.6	99 15	164.8
1	49 07.7	99 16	163.7	49 37.2	99 16	163.6	50 06.8	99 17	163.5	50 36.4	99 17	163.3
2	48 57.8	98 18	162.3	49 27.4	98 18	162.1	49 56.9	98 18	162.0	50 26.4	98 18	161.9
3	48 47.2	98 19	160.8	49 16.7	98 19	160.7	49 46.1	98 19	160.5	50 15.5	98 19	160.4
4	48 35.8	98 20	159.4	49 05.2	98 20	159.3	49 34.5	98 21	159.1	50 03.9	98 21	158.9
15	48 23.6	98 22	158.0	48 52.9	98 22	157.8	49 22.2	97 22	157.7	49 51.4	97 22	157.5
6	48 10.7	97 23	156.6	48 39.9	97 23	156.4	49 09.0	97 23	156.2	49 38.2	97 23	156.1
7	47 57.0	97 24	155.2	48 26.1	97 24	155.0	48 55.1	97 24	154.8	49 24.2	97 25	154.6
8	47 42.5	97 25	153.8	48 11.5	97 25	153.6	48 40.5	97 26	153.4	49 09.4	96 26	153.2
9	47 27.4	96 26	152.4	47 56.2	96 27	152.2	48 25.1	96 27	152.0	48 53.9	96 27	151.8
20	47 11.5	96 28	151.1	47 40.3	96 28	150.9	48 09.0	96 28	150.6	48 37.7	96 28	150.4
1	46 54.9	96 29	149.7	47 23.6	96 29	149.5	47 52.2	95 29	149.3	48 20.8	95 29	149.1
2	46 37.6	95 30	148.4	47 06.2	95 30	148.2	47 34.7	95 30	147.9	48 03.2	95 30	147.7
3	46 19.7	95 31	147.0	46 48.2	95 31	146.8	47 16.6	95 31	146.6	47 45.0	95 32	146.3
4	46 01.2	94 32	145.7	46 29.5	94 32	145.5	46 57.8	94 32	145.3	47 26.1	94 33	145.0
25	45 41.9	94 33	144.4	46 10.2	94 33	144.2	46 38.3	94 33	143.9	47 06.5	94 34	143.7
6	45 22.1	94 34	143.1	45 50.2	94 34	142.9	46 18.3	93 34	142.6	46 46.3	93 35	142.4
7	45 01.7	93 35	141.9	45 29.7	93 35	141.6	45 57.6	93 35	141.4	46 25.5	93 36	141.1
8	44 40.7	93 36	140.6	45 08.6	93 36	140.3	45 36.4	93 36	140.1	46 04.2	93 37	139.8
9	44 19.1	93 37	139.4	44 46.9	92 37	139.1	45 14.6	92 37	138.8	45 42.2	92 37	138.5
30	43 57.0	92 38	138.1	44 24.6	92 38	137.8	44 52.2	92 38	137.6	45 19.8	92 38	137.3
1	43 34.3	92 39	136.9	44 01.8	92 39	136.6	44 29.3	91 39	136.3	44 56.7	91 39	136.1
2	43 11.1	91 40	135.7	43 38.5	91 40	135.4	44 05.9	91 40	135.1	44 33.2	91 40	134.8
3	42 47.5	91 40	134.5	43 14.7	91 40	134.2	43 42.0	91 41	133.9	44 09.1	91 41	133.6
4	42 23.3	91 41	133.3	42 50.4	90 41	133.0	43 17.5	90 41	132.7	43 44.6	90 42	132.4
35	41 58.6	90 42	132.1	42 25.7	90 42	131.8	42 52.7	90 42	131.5	43 19.6	90 42	131.2
6	41 33.5	90 43	131.0	42 00.4	90 43	130.7	42 27.3	90 43	130.4	42 54.2	89 43	130.1
7	41 08.0	89 43	129.8	41 34.8	89 44	129.5	42 01.5	89 44	129.2	42 28.3	89 44	128.9
8	40 42.0	89 44	128.7	41 08.7	89 44	128.4	41 35.3	89 44	128.1	42 01.9	89 45	127.8
9	40 15.6	89 45	127.6	40 42.2	89 45	127.3	41 08.7	88 45	126.9	41 35.2	88 45	126.6
40	39 48.8	88 45	126.4	40 15.3	88 45	126.1	40 41.7	88 46	125.8	41 08.1	88 46	125.5
1	39 21.6	88 46	125.3	39 48.0	88 46	125.0	40 14.3	88 46	124.7	40 40.6	88 46	124.4
2	38 54.1	88 47	124.3	39 20.3	88 47	123.9	39 46.6	87 47	123.6	40 12.7	87 47	123.3
3	38 26.2	87 47	123.2	38 52.3	87 47	122.9	39 18.5	87 47	122.6	39 44.5	87 48	122.2
4	37 57.9	87 48	122.1	38 24.0	87 48	121.8	38 50.0	87 48	121.5	39 16.0	87 48	121.2
45	37 29.3	87 48	121.1	37 55.3	87 48	120.7	38 21.2	86 48	120.4	38 47.1	86 49	120.1
6	37 00.4	86 49	120.0	37 26.3	86 49	119.7	37 52.2	86 49	119.4	38 17.9	86 49	119.1
7	36 31.2	86 49	119.0	36 57.0	86 49	118.7	37 22.8	86 49	118.3	37 48.5	86 50	118.0
8	36 01.7	86 50	118.0	36 27.4	86 50	117.6	36 53.1	85 50	117.3	37 18.7	85 50	117.0
9	35 32.0	86 50	116.9	35 57.6	85 50	116.6	36 23.2	85 50	116.3	36 48.7	85 50	116.0
50	35 01.9	85 50	115.9	35 27.5	85 51	115.6	35 52.9	85 51	115.3	36 18.4	85 51	115.0
1	34 31.6	85 51	114.9	34 57.1	85 51	114.6	35 22.5	85 51	114.3	35 47.8	84 51	114.0
2	34 01.1	85 51	114.0	34 26.5	85 51	113.6	34 51.8	84 52	113.3	35 17.1	84 52	113.0
3	33 30.3	84 52	113.0	33 55.6	84 52	112.7	34 20.9	84 52	112.3	34 46.1	84 52	112.0
4	32 59.3	84 52	112.0	33 24.5	84 52	111.7	33 49.7	84 52	111.4	34 14.9	84 52	111.0
55	32 28.1	84 52	111.0	32 53.2	84 52	110.7	33 18.4	84 53	110.4	33 43.4	83 53	110.1
6	31 56.7	84 53	110.1	32 21.8	84 53	109.8	32 46.8	83 53	109.4	33 11.8	83 53	109.1
7	31 25.1	84 53	109.1	31 50.1	83 53	108.8	32 15.1	83 53	108.5	32 40.0	83 53	108.2
8	30 53.3	83 53	108.2	31 18.3	83 53	107.9	31 43.2	83 53	107.6	32 08.1	83 54	107.2
9	30 21.3	83 54	107.3	30 46.2	83 54	107.0	31 11.1	83 54	106.6	31 35.9	83 54	106.3
60	29 49.2	83 54	106.4	30 14.1	83 54	106.0	30 38.9	83 54	105.7	31 03.7	82 54	105.4
1	29 16.9	83 54	105.4	29 41.8	83 54	105.1	30 06.5	82 54	104.8	30 31.2	82 54	104.5
2	28 44.5	83 54	104.5	29 09.3	82 54	104.2	29 34.0	82 54	103.9	29 58.7	82 54	103.6
3	28 12.0	82 54	103.6	28 36.7	82 55	103.3	29 01.4	82 55	103.0	29 26.0	82 55	102.7
4	27 39.3	82 55	102.7	28 04.0	82 55	102.4	28 28.6	82 55	102.1	28 53.2	82 55	101.8
65	27 06.5	82 55	101.8	27 31.2	82 55	101.5	27 55.8	82 55	101.2	28 20.3	82 55	100.9
6	26 33.6	82 55	101.0	26 58.3	82 55	100.6	27 22.8	82 55	100.3	27 47.3	82 55	100.0
7	26 00.7	82 55	100.1	26 25.2	82 55	99.8	26 49.8	82 55	99.4	27 14.2	82 55	99.1
8	25 27.6	82 55	99.2	25 52.1	82 55	98.9	26 16.6	82 55	98.6	26 41.1	81 55	98.2
9	24 54.4	82 55	98.3	25 18.9	82 55	98.0	25 43.4	81 55	97.7	26 07.8	81 56	97.4
70	24 21.2	82 55	97.5	24 45.7	82 56	97.2	25 10.1	81 56	96.8	25 34.5	81 56	96.5
1	23 47.9	82 56	96.6	24 12.4	81 56	96.3	24 36.8	81 56	96.0	25 01.2	81 56	95.7
2	23 14.5	82 56	95.8	23 39.0	81 56	95.4	24 03.4	81 56	95.1	24 27.8	81 56	94.8
3	22 41.1	81 56	94.9	23 05.6	81 56	94.6	23 29.9	81 56	94.3	23 54.3	81 56	94.0
4	22 07.7	81 56	94.1	22 32.1	81 56	93.7	22 56.5	81 56	93.4	23 20.8	81 56	93.1
75	21 34.2	81 56	93.2	21 58.6	81 56	92.9	22 23.0	81 56	92.6	22 47.3	81 56	92.3
6	21 00.7	81 56	92.4	21 25.1	81 56	92.1	21 49.4	81 56	91.7	22 13.8	81 56	91.4
7	20 27.2	81 56	91.5	20 51.5	81 56	91.2	21 15.9	81 56	90.9	21 40.2	81 56	90.6
8	19 53.6	81 56	90.7	20 18.0	81 56	90.4	20 42.3	81 56	90.1	21 06.7	81 56	89.8
9	19 20.1	81 56	89.9	19 44.4	81 56	89.6	20 08.8	81 56	89.3	20 33.1	81 56	88.9
80	18 46.5	81 56	89.0	19 10.9	81 56	88.7	19 35.3	81 56	88.4	19 59.6	81 56	88.1
1	18 13.0	81 56	88.2	18 37.4	81 56	87.9	19 01.7	81 56	87.6	19 26.1	81 56	87.3
2	17 39.4	81 56	87.4	18 03.8	81 56	87.1	18 28.2	81 56	86.8	18 52.6	81 56	86.5
3	17 05.9	81 56	86.6	17 30.3	81 56	86.3	17 54.7	81 56	86.0	18 19.1	81 56	85.7
4	16 32.5	81 56	85.8	16 56.9	81 56	85.5	17 21.3	81 56	85.2	17 45.6	81 56	84.8
85	15 59.0	81 56	84.9	16 23.5	81 56	84.6	16 47.9	81 56	84.3	17 12.2	81 56	84.0
6	15 25.6	82 56	84.1	15 50.1	81 56	83.8	16 14.5	81 56	83.5	16 38.9	81 55	83.2
7	14 52.3	82 56	83.3	15 16.7	82 55	83.0	15 41.2	81 55	82.7	16 05.6	81 55	82.4
8	14 19.0	82 55	82.5	14 43.5	82 55	82.2	15 07.9	82 55	81.9	15 32.4	81 55	81.6
9	13 45.7	82 55	81.7	14 10.3	82 55	81.4	14 34.8	82 55	81.1	14 59.2	82 55	80.8
90	13 12.6	82 55	80.9	13 37.1	82 55	80.6	14 01.6	82 55	80.3	14 26.2	82 55	80.0

H.A. °	18° 00′ Alt. ° ′	Δd Δt	Az. °	18° 30′ Alt. ° ′	Δd Δt	Az. °	19° 00′ Alt. ° ′	Δd Δt	Az. °	19° 30′ Alt. ° ′	Δd Δt	Az. °
00	52 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0
1	51 59.5	1.0 02	178.5	52 29.5	1.0 02	178.4	52 59.5	1.0 02	178.4	53 29.5	1.0 02	178.4
2	51 58.2	1.0 04	176.9	52 28.2	1.0 04	176.9	52 58.2	1.0 04	176.9	53 28.1	1.0 04	176.8
3	51 55.9	1.0 05	175.4	52 25.9	1.0 05	175.3	52 55.9	1.0 05	175.3	53 25.8	1.0 05	175.2
4	51 52.8	1.0 07	173.8	52 22.7	1.0 07	173.8	52 52.7	1.0 07	173.7	53 22.6	1.0 07	173.7
05	51 48.7	1.0 08	172.3	52 18.6	1.0 08	172.2	52 48.5	1.0 08	172.2	53 18.4	1.0 08	172.1
6	51 43.8	1.0 10	170.8	52 13.6	1.0 10	170.7	52 43.5	1.0 10	170.6	53 13.4	1.0 10	170.5
7	51 38.0	99 11	169.2	52 07.8	99 11	169.1	52 37.6	99 11	169.1	53 07.4	99 11	169.0
8	51 31.3	99 13	167.7	52 01.0	99 13	167.6	52 30.8	99 13	167.5	53 00.5	99 13	167.4
9	51 23.7	99 14	166.2	51 53.4	99 14	166.1	52 23.1	99 14	166.0	52 52.8	99 14	165.9
10	51 15.3	99 15	164.7	51 44.9	99 16	164.6	52 14.5	99 16	164.4	52 44.1	99 16	164.3
1	51 06.0	99 17	163.2	51 35.5	99 17	163.1	52 05.1	98 17	162.9	52 34.6	98 17	162.8
2	50 55.9	98 18	161.7	51 25.3	98 18	161.6	51 54.8	98 18	161.4	52 24.3	98 19	161.3
3	50 44.9	98 20	160.2	51 14.3	98 20	160.1	51 43.7	98 20	159.9	52 13.1	98 20	159.8
4	50 33.2	98 21	158.8	51 02.5	98 21	158.6	51 31.8	98 21	158.4	52 01.1	98 21	158.3
15	50 20.6	97 22	157.3	50 49.8	97 22	157.1	51 19.0	97 23	156.9	51 48.2	97 23	156.8
6	50 07.3	97 24	155.9	50 36.4	97 24	155.7	51 05.5	97 24	155.5	51 34.6	97 24	155.3
7	49 53.2	97 25	154.4	50 22.2	97 25	154.2	50 51.2	97 25	154.0	51 20.2	97 25	153.8
8	49 38.4	96 26	153.0	50 07.3	96 26	152.8	50 36.1	96 26	152.6	51 05.0	96 27	152.4
9	49 22.8	96 27	151.6	49 51.5	96 27	151.4	50 20.3	96 28	151.2	50 49.1	96 28	150.9
20	49 06.4	96 28	150.2	49 35.1	96 29	150.0	50 03.8	96 29	149.8	50 32.4	95 29	149.5
1	48 49.4	95 30	148.8	49 18.0	95 30	148.6	49 46.5	95 30	148.4	50 15.0	95 30	148.1
2	48 31.7	95 31	147.5	49 00.2	95 31	147.2	49 28.6	95 31	147.0	49 57.0	95 31	146.7
3	48 13.3	94 32	146.1	48 41.7	94 32	145.9	49 09.9	94 32	145.6	49 38.2	94 32	145.3
4	47 54.3	94 33	144.8	48 22.5	94 33	144.5	48 50.7	94 33	144.2	49 18.8	94 33	144.0
25	47 34.6	94 34	143.4	48 02.7	94 34	143.2	48 30.7	93 34	142.9	48 58.7	93 34	142.6
6	47 14.3	93 35	142.1	47 42.3	93 35	141.8	48 10.2	93 35	141.6	48 38.1	93 35	141.3
7	46 53.4	93 36	140.8	47 21.2	93 36	140.5	47 49.0	93 36	140.3	48 16.8	92 36	140.0
8	46 31.9	92 37	139.5	46 59.6	92 37	139.3	47 27.3	92 37	139.0	47 54.9	92 37	138.7
9	46 09.9	92 38	138.3	46 37.5	92 38	138.0	47 05.0	92 38	137.7	47 32.5	92 38	137.4
30	45 47.3	92 39	137.0	46 14.7	91 39	136.7	46 42.1	91 39	136.4	47 09.5	91 39	136.1
1	45 24.1	91 39	135.8	45 51.4	91 40	135.5	46 18.7	91 40	135.2	46 46.0	91 40	134.9
2	45 00.4	91 40	134.5	45 27.7	91 40	134.2	45 54.8	90 41	133.9	46 21.9	90 41	133.6
3	44 36.3	90 41	133.3	45 03.4	90 41	133.0	45 30.4	90 41	132.7	45 57.4	90 42	132.4
4	44 11.6	90 42	132.1	44 38.6	90 42	131.8	45 05.5	90 42	131.5	45 32.4	89 42	131.2
35	43 46.5	90 43	130.9	44 13.4	89 43	130.6	44 40.2	89 43	130.3	45 06.9	89 43	130.0
6	43 20.9	89 43	129.8	43 47.7	89 44	129.4	44 14.4	89 44	129.1	44 41.0	89 44	128.8
7	42 54.9	89 44	128.6	43 21.6	89 44	128.3	43 48.1	88 44	128.0	44 14.6	88 45	127.6
8	42 28.5	88 45	127.5	42 55.0	88 45	127.1	43 21.5	88 45	126.8	43 47.9	88 45	126.5
9	42 01.7	88 45	126.3	42 28.1	88 46	126.0	42 54.4	88 46	125.7	43 20.7	88 46	125.3
40	41 34.4	88 46	125.2	42 00.7	88 46	124.9	42 27.0	87 46	124.5	42 53.1	87 47	124.2
1	41 06.8	87 47	124.1	41 33.0	87 47	123.8	41 59.1	87 47	123.4	42 25.2	87 47	123.1
2	40 38.9	87 47	123.0	41 04.9	87 47	122.7	41 31.0	87 48	122.3	41 56.9	86 48	122.0
3	40 10.6	87 48	121.9	40 36.5	86 48	121.6	41 02.4	86 48	121.2	41 28.3	86 48	120.9
4	39 41.9	86 48	120.8	40 07.8	86 48	120.5	40 33.6	86 49	120.2	40 59.3	86 49	119.8
45	39 12.9	86 49	119.8	39 38.7	86 49	119.4	40 04.4	86 49	119.1	40 30.1	85 49	118.8
6	38 43.7	86 49	118.7	39 09.4	85 49	118.4	39 35.0	85 50	118.1	40 00.5	85 50	117.7
7	38 14.1	85 50	117.7	38 39.7	85 50	117.4	39 05.2	85 50	117.0	39 30.7	85 50	116.7
8	37 44.3	85 50	116.7	38 09.8	85 50	116.3	38 35.2	85 50	116.0	39 00.6	84 51	115.6
9	37 14.1	85 51	115.6	37 39.5	85 51	115.3	38 04.9	84 51	115.0	38 30.2	84 51	114.6
50	36 43.8	85 51	114.6	37 09.1	84 51	114.3	37 34.4	84 51	114.0	37 59.6	84 51	113.6
1	36 13.1	84 51	113.6	36 38.4	84 52	113.3	37 03.6	84 52	113.0	37 28.7	84 52	112.6
2	35 42.3	84 52	112.6	36 07.5	84 52	112.3	36 32.6	84 52	112.0	36 57.6	83 52	111.6
3	35 11.2	84 52	111.7	35 36.3	84 52	111.3	36 01.4	83 52	111.0	36 26.3	83 52	110.6
4	34 39.9	84 52	110.7	35 05.0	83 53	110.4	35 29.9	83 53	110.0	35 54.8	83 53	109.7
55	34 08.4	83 53	109.7	34 33.4	83 53	109.4	34 58.3	83 53	109.1	35 23.2	83 53	108.7
6	33 36.8	83 53	108.8	34 01.7	83 53	108.4	34 26.5	83 53	108.1	34 51.3	83 53	107.8
7	33 04.9	83 53	107.8	33 29.8	83 53	107.5	33 54.5	83 54	107.2	34 19.3	82 54	106.8
8	32 32.9	83 54	106.9	32 57.7	82 54	106.6	33 22.4	82 54	106.2	33 47.1	82 54	105.9
9	32 00.7	82 54	106.0	32 25.4	82 54	105.6	32 50.1	82 54	105.3	33 14.7	82 54	105.0
60	31 28.4	82 54	105.0	31 53.1	82 54	104.7	32 17.7	82 54	104.4	32 42.2	82 54	104.0
1	30 55.9	82 54	104.1	31 20.5	82 54	103.8	31 45.1	82 54	103.5	32 09.6	82 55	103.1
2	30 23.3	82 55	103.2	30 47.9	82 55	102.9	31 12.4	82 55	102.6	31 36.9	81 55	102.2
3	29 50.6	82 55	102.3	30 15.1	82 55	102.0	30 39.6	82 55	101.7	31 04.0	81 55	101.3
4	29 17.8	82 55	101.4	29 42.3	82 55	101.1	30 06.7	81 55	100.8	30 31.1	81 55	100.4
65	28 44.8	82 55	100.5	29 09.3	81 55	100.2	29 33.7	81 55	99.9	29 58.0	81 55	99.5
6	28 11.8	81 55	99.7	28 36.2	81 55	99.3	29 00.6	81 55	99.0	29 24.9	81 55	98.7
7	27 38.7	81 55	98.8	28 03.1	81 55	98.5	28 27.4	81 55	98.1	28 51.7	81 55	97.8
8	27 05.5	81 55	97.9	27 29.8	81 55	97.6	27 54.2	81 56	97.3	28 18.4	81 56	96.9
9	26 32.2	81 56	97.0	26 56.6	81 56	96.7	27 20.9	81 56	96.4	27 45.1	81 56	96.1
70	25 58.9	81 56	96.2	26 23.2	81 56	95.9	26 47.5	81 56	95.5	27 11.7	81 56	95.2
1	25 25.5	81 56	95.3	25 49.8	81 56	95.0	26 14.1	81 56	94.7	26 38.3	81 56	94.3
2	24 52.1	81 56	94.5	25 16.4	81 56	94.2	25 40.6	81 56	93.8	26 04.8	81 56	93.5
3	24 18.6	81 56	93.6	24 42.9	81 56	93.3	25 07.1	81 56	93.0	25 31.3	81 56	92.7
4	23 45.1	81 56	92.8	24 09.4	81 56	92.5	24 33.6	81 56	92.1	24 57.8	81 56	91.8
75	23 11.6	81 56	91.9	23 35.8	81 56	91.6	24 00.1	81 56	91.3	24 24.2	81 56	91.0
6	22 38.1	81 56	91.1	23 02.3	81 56	90.8	23 26.5	81 56	90.5	23 50.7	81 56	90.1
7	22 04.5	81 56	90.3	22 28.8	81 56	90.0	22 53.0	81 56	89.6	23 17.1	81 56	89.3
8	21 31.0	81 56	89.5	21 55.2	81 56	89.1	22 19.4	81 56	88.8	22 43.6	81 56	88.5
9	20 57.4	81 56	88.6	21 21.7	81 56	88.3	21 45.9	81 56	88.0	22 10.1	81 56	87.7
80	20 23.9	81 56	87.8	20 48.1	81 56	87.5	21 12.4	81 56	87.2	21 36.5	81 56	86.9
1	19 50.4	81 56	87.0	20 14.6	81 56	86.7	20 38.9	81 56	86.4	21 03.1	81 56	86.0
2	19 16.9	81 56	86.2	19 41.1	81 56	85.9	20 05.4	81 56	85.5	20 29.6	81 56	85.2
3	18 43.4	81 56	85.4	19 07.7	81 56	85.0	19 32.0	81 56	84.7	19 56.2	81 56	84.4
4	18 10.0	81 56	84.5	18 34.3	81 56	84.2	18 58.6	81 56	83.9	19 22.8	81 56	83.6
85	17 36.6	81 56	83.7	18 00.9	81 56	83.4	18 25.2	81 55	83.1	18 49.5	81 55	82.8
6	17 03.3	81 55	82.9	17 27.6	81 55	82.6	17 52.0	81 55	82.3	18 16.2	81 55	82.0
7	16 30.0	81 55	82.1	16 54.4	81 55	81.8	17 18.7	81 55	81.5	17 43.1	81 55	81.2
8	15 56.8	81 55	81.3	16 21.2	81 55	81.0	16 45.6	81 55	80.7	17 09.9	81 55	80.4
9	15 23.7	81 55	80.5	15 48.1	81 55	80.2	16 12.5	81 55	79.9	16 36.9	81 55	79.6
90	14 50.6	82 55	79.7	15 15.1	81 55	79.4	15 39.5	81 55	79.1	16 03.9	81 55	78.8

Digitized by Google

Lat. 56°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	°
00	18 00.0	1.0	00	180.0	17 30.0	1.0	00	180.0	17 00.0	1.0	00	180.0	16 30.0	1.0	00	180.0	16 00.0	1.0	00	180.0	15 30.0	1.0	00	180.0	15 00.0	1.0	00	180.0	14 30.0	1.0	00	180.0	00
1	17 59.7	1.0	01	179.0	17 29.7	1.0	01	179.0	16 59.7	1.0	01	179.0	16 29.7	1.0	01	179.0	15 59.7	1.0	01	179.0	15 29.7	1.0	01	179.0	14 59.7	1.0	01	179.0	14 29.7	1.0	01	179.0	1
2	17 58.8	1.0	02	178.0	17 28.8	1.0	02	178.0	16 58.8	1.0	02	178.0	16 28.8	1.0	02	178.0	15 58.8	1.0	02	178.0	15 28.8	1.0	02	178.0	14 58.9	1.0	02	178.0	14 28.9	1.0	02	178.1	2
3	17 57.3	1.0	03	177.0	17 27.4	1.0	03	177.0	16 57.4	1.0	03	177.0	16 27.4	1.0	03	177.0	15 57.4	1.0	03	177.0	15 27.4	1.0	03	177.0	14 57.4	1.0	03	177.1	14 27.4	1.0	03	177.1	3
4	17 55.3	1.0	04	176.0	17 25.3	1.0	04	176.0	16 55.3	1.0	04	176.0	16 25.3	1.0	04	176.0	15 55.4	1.0	04	176.0	15 25.4	1.0	04	176.1	14 55.4	1.0	04	176.1	14 25.4	1.0	04	176.1	4
05	17 52.6	1.0	05	174.9	17 22.6	1.0	05	175.0	16 52.7	1.0	05	175.0	16 22.7	1.0	05	175.0	15 52.8	1.0	05	175.1	15 22.8	1.0	05	175.1	14 52.8	1.0	05	175.1	14 22.9	1.0	05	175.1	05
6	17 49.4	1.0	06	173.9	17 19.4	1.0	06	174.0	16 49.5	1.0	06	174.0	16 19.5	1.0	06	174.0	15 49.6	1.0	06	174.1	15 19.6	1.0	06	174.1	14 49.7	1.0	06	174.1	14 19.8	1.0	06	174.2	6
7	17 45.5	1.0	07	172.9	17 15.6	1.0	07	173.0	16 45.7	1.0	07	173.0	16 15.8	1.0	07	173.0	15 45.8	1.0	07	173.1	15 15.9	1.0	07	173.1	14 46.0	1.0	07	173.2	14 16.1	1.0	07	173.2	7
8	17 41.1	1.0	08	171.9	17 11.2	1.0	08	172.0	16 41.3	1.0	08	172.0	16 11.4	1.0	08	172.1	15 41.5	1.0	08	172.1	15 11.6	1.0	08	172.1	14 41.7	1.0	08	172.2	14 11.8	1.0	08	172.2	8
9	17 36.1	1.0	09	170.9	17 06.2	1.0	09	171.0	16 36.4	1.0	09	171.0	16 06.5	1.0	09	171.1	15 36.6	1.0	09	171.1	15 06.7	1.0	09	171.2	14 36.9	1.0	09	171.2	14 07.0	1.0	09	171.3	9
10	17 30.5	99	10	169.9	17 00.7	99	10	170.0	16 30.8	99	10	170.0	16 01.0	99	10	170.1	15 31.1	99	10	170.1	15 01.3	99	10	170.2	14 31.4	99	10	170.2	14 01.6	99	10	170.3	10
1	17 24.4	99	11	168.9	16 54.5	99	11	169.0	16 24.7	99	11	169.0	15 54.9	99	11	169.1	15 25.1	99	11	169.1	14 55.3	99	11	169.2	14 25.5	99	11	169.3	13 55.7	99	11	169.3	1
2	17 17.6	99	12	167.9	16 47.8	99	12	168.0	16 18.1	99	12	168.0	15 48.3	99	12	168.1	15 18.5	99	12	168.2	14 48.7	99	12	168.2	14 18.9	99	12	168.3	13 49.2	99	12	168.4	2
3	17 10.3	99	13	166.9	16 40.6	99	13	167.0	16 10.8	99	13	167.1	15 41.1	99	13	167.1	15 11.4	99	13	167.2	14 41.6	99	13	167.3	14 11.9	99	13	167.3	13 42.1	99	13	167.4	3
4	17 02 4	99	14	165.9	16 32.7	99	14	166.0	16 03.0	99	14	166.1	15 33.3	99	14	166.1	15 03.6	99	14	166.2	14 33.9	99	14	166.3	14 04.2	99	14	166.4	13 34.5	99	14	166.4	4
15	16 54.0	99	15	164.9	16 24.3	99	15	165.0	15 54.7	99	15	165.1	15 25.0	99	15	165.2	14 55.4	99	15	165.2	14 25.7	99	15	165.3	13 56.0	99	15	165.4	13 26.4	99	14	165.5	15
6	16 45.0	99	16	163.9	16 15.4	99	16	164.0	15 45.8	99	16	164.1	15 16.2	99	16	164.2	14 46.5	99	16	164.3	14 16.9	99	16	164.4	13 47.3	99	15	164.4	13 17.7	99	15	164.5	6
7	16 35.4	99	17	162.9	16 05.9	99	17	163.0	15 36.3	99	17	163.1	15 06.7	99	17	163.2	14 37.2	99	16	163.3	14 07.6	99	16	163.4	13 38.0	99	16	163.5	13 08.5	99	16	163.6	7
8	16 25.3	98	18	162.0	15 55.8	98	18	162.1	15 26.3	98	18	162.1	14 56.8	98	18	162.2	14 27.3	98	17	162.3	13 57.7	98	17	162.4	13 28.2	98	17	162.5	12 58.7	98	17	162.6	8
9	16 14.7	98	19	161.0	15 45.2	98	19	161.1	15 15.7	98	18	161.2	14 46.3	98	18	161.3	14 16.8	98	18	161.4	13 47.3	98	18	161.5	13 17.9	98	18	161.6	12 48.4	98	18	161.7	9
20	16 03.4	98	20	160.0	15 34.0	98	20	160.1	15 04.6	98	19	160.2	14 35.2	98	19	160.3	14 05.8	98	19	160.4	13 36.4	98	19	160.5	13 07.0	98	19	160.6	12 37.6	98	19	160.7	20
1	15 51.7	98	20	159.0	15 22.4	98	20	159.1	14 53.0	98	20	159.2	14 23.7	98	20	159.3	13 54.3	98	20	159.4	13 24.9	98	20	159.6	12 55.6	98	20	159.7	12 26.2	98	20	159.8	1
2	15 39.4	98	21	158.0	15 10.1	98	21	158.2	14 40.8	98	21	158.3	14 11.6	98	21	158.4	13 42.3	98	21	158.5	13 13.0	98	21	158.6	12 43.7	98	21	158.7	12 14.4	98	21	158.8	2
3	15 26.6	97	22	157.1	14 57.4	97	22	157.2	14 28.2	97	22	157.3	13 58.9	97	22	157.4	13 29.7	97	22	157.5	13 00.5	97	22	157.6	12 31.2	97	22	157.8	12 02.0	97	21	157.9	3
4	15 13.3	97	23	156.1	14 44.1	97	23	156.2	14 15.0	97	23	156.3	13 45.8	97	23	156.5	13 16.6	97	23	156.6	12 47.4	97	23	156.7	12 18.3	97	22	156.8	11 49.1	97	22	156.9	4
25	14 59.4	97	24	155.1	14 30.3	97	24	155.3	14 01.2	97	24	155.4	13 32.1	97	24	155.5	13 03.0	97	24	155.6	12 33.9	97	23	155.8	12 04.8	97	23	155.9	11 35.7	97	23	156.0	25
6	14 45.0	97	25	154.2	14 16.0	97	25	154.3	13 47.0	97	25	154.4	13 18.0	97	24	154.6	12 48.9	97	24	154.7	12 19.9	97	24	154.8	11 50.9	97	24	154.9	11 21.8	97	24	155.1	6
7	14 30.2	97	26	153.2	14 01.2	97	26	153.3	13 32.3	97	25	153.5	13 03.3	97	25	153.6	12 34.3	97	25	153.7	12 05.4	97	25	153.9	11 36.4	97	25	154.0	11 07.4	97	25	154.1	7
8	14 14.8	96	26	152.3	13 45.9	96	26	152.4	13 17.0	96	26	152.5	12 48.1	96	26	152.7	12 19.3	96	26	152.8	11 50.4	96	26	152.9	11 21.4	96	26	153.1	10 52.5	96	26	153.2	8
9	13 58.9	96	27	151.3	13 30.1	96	27	151.4	13 01.3	96	27	151.6	12 32.5	96	27	151.7	12 03.7	96	27	151.9	11 34.8	96	27	152.0	11 06.0	96	27	152.2	10 37.2	96	26	152.3	9
30	13 42.6	96	28	150.3	13 13.8	96	28	150.5	12 45.1	96	28	150.6	12 16.4	96	28	150.8	11 47.6	96	28	150.9	11 18.9	96	27	151.1	10 50.1	96	27	151.2	10 21.3	96	27	151.4	30
1	13 25.7	96	29	149.4	12 57.1	96	29	149.6	12 28.4	96	29	149.7	11 59.8	96	28	149.9	11 31.1	96	28	150.0	11 02.4	96	28	150.2	10 33.7	96	28	150.3	10 05.0	96	28	150.5	1
2	13 08.4	95	30	148.5	12 39.8	95	30	148.6	12 11.3	95	29	148.8	11 42.7	95	29	148.9	11 14.1	95	29	149.1	10 45.5	95	29	149.2	10 16.9	95	29	149.4	9 48.3	95	29	149.5	2
3	12 50.6	95	30	147.5	12 22.1	95	30	147.7	11 53.6	95	30	147.8	11 25.1	95	30	148.0	10 56.6	95	30	148.2	10 28.1	95	30	148.3	9 59.6	95	30	148.5	9 31.0	95	29	148.6	3
4	12 32.4	95	31	146.6	12 04.0	95	31	146.8	11 35.5	95	31	146.9	11 07.1	95	31	147.1	10 38.7	95	31	147.2	10 10.2	95	30	147.4	9 41.8	95	30	147.6	9 13.3	95	30	147.7	4
35	12 13.7	94	32	145.7	11 45.4	94	32	145.8	11 17.0	95	32	146.0	10 48.6	95	32	146.2	10 20.3	95	31	146.3	9 51.9	95	31	146.5	9 23.6	95	31	146.7	8 55.2	95	31	146.8	35
6	11 54.5	94	33	144.7	11 26.3	94	33	144.9	10 58.0	94	32	145.1	10 29.7	94	32	145.2	10 01.5	94	32	145.4	9 33.2	94	32	145.6	9 04.9	94	32	145.7	8 36.6	94	32	145.9	6
7	11 34.9	94	33	143.8	11 06.8	94	33	144.0	10 38.6	94	33	144.2	10 10.4	94	33	144.3	9 42.2	94	33	144.5	9 14.0	94	33	144.7	8 45.8	94	33	144.8	8 17.6	94	32	145.0	7
8	11 14.9	94	34	142.9	10 46.8	94	34	143.1	10 18.7	94	34	143.2	9 50.6	94	34	143.4	9 22.5	94	34	143.6	8 54.4	94	33	143.8	8 26.3	94	33	144.0	7 58.1	94	33	144.1	8
9	10 54.5	93	35	142.0	10 26.4	93	35	142.2	9 58.4	93	35	142.3	9 30.4	93	34	142.5	9 02.4	93	34	142.7	8 34.3	93	34	142.9	8 06.3	93	34	143.1	7 38.3	93	34	143.2	9
40	10 33.6	93	36	141.1	10 05.7	93	35	141.2	9 37.7	93	35	141.4	9 09.8	93	35	141.6	8 41.8	93	35	141.8	8 13.9	93	35	142.0	7 45.9	93	35	142.2	7 18.0	93	34	142.3	40
1	10 12.3	93	36	140.2	9 44.4	93	36	140.3	9 16.6	93	36	140.5	8 48.7	93	36	140.7	8 20.9	93	36	140.9	7 53.0	93	35	141.1	7 25.1	93	35	141.3	6 57.3	93	35	141.5	1
2	9 50.6	93	37	139.2	9 22.8	93	37	139.4	8 55.1	93	37	139.6	8 27.3	93	36	139.8	7 59.5	93	36	140.0	7 31.7	93	36	140.2	7 04.0	93	36	140.4	6 36.2	93	36	140.6	2
3	9 28.5	92	38	138.3	9 00.8	92	37	138.5	8 33.1	92	37	138.7	8 05.5	92	37	138.9	7 37.8	92	37	139.1	7 10.1	92	37	139.3	6 42.4	92	37	139.5	6 14.7	92	36	139.7	3
4	9 06.0	92	38	137.4	8 38.4	92	38	137.6	8 10.8	92	38	137.8	7 43.2	92	38	138.0	7 15.6	92	38	138.2	6 48.0	92	37	138.4	6 20.4	92	37	138.6	5 52.8	92	37	138.8	4
45	8 43.1	92	39	136.6	8 15.6	92	39	136.8	7 48.1	92	38	137.0	7 20.6	92	38	137.2	6 53.1	92	38	137.4	6 25.6	92	38	137.6	5 58.0	92	38	137.8	5 30.5	92	38	138.0	45
6	8 19 8	91	39	135.7	7 52.4	91	39	135.9	7 25.0	91	39	136.1	6 57.6	91	39	136.3	6 30.2	91	39	136.5	6 02.7	91	39	136.7	5 35.3	91	39	136.9	5 07.8	91	38	137.1	6
7	7 56.2	91	40	134.8	7 28.9	91	40	135.0	7 01.6	91	40	135.2	6 34.2	91	40	135.4	6 06.9	91	39	135.6	5 39.5	91	39	135.8	5 12.2	91	39	136.0					7
8	7 32.2	91	41	133.9	7 05.0	91	40	134.1	6 37.7	91	40	134.3	6 10.5	91	40	134.5	5 43.2	91	40	134.7	5 16.0	91	40	134.9									8
9	7 07.9	91	41	133.0	6 40.7	91	41	133.2	6 13.5	91	41	133.4	5 46.4	91	41	133.7	5 19.2	91	40	133.9													9
50	6 43.2	90	42	132.1	6 16.1	90	42	132.4	5 49.0	90	41	132.6	5 21.9	90	41	132.8																	50
1	6 18.1	90	42	131.3	5 51.1	90	42	131.5	5 24.1	90	42	131.7																					1
2	5 52.7	90	43	130.4	5 25.8	90	43	130.6																									2
3	5 27.0	89	43	129.5	5 00.2	89	43	129.8																									3
4	5 01.0	89	44	128.7																													4

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	°
91	12 39.5	82	55	80.1	13 04.1	82	55	79.8	13 28.6	82	55	79.5	13 53.2	82	55	79.2	14 17.7	82	55	78.9	14 42.2	82	55	78.6	15 06.6	82	55	78.3	15 31.1	81	55	78.0	91
2	12 06.5	82	55	79.3	12 31.1	82	55	79.0	12 55.7	82	55	78 7	13 20.2	82	55	78.4	13 44.8	82	55	78.1	14 09.3	82	55	77.8	14 33.8	82	54	77.5	14 58.3	82	54	77.2	2
3	11 33.6	82	55	78.5	11 58.2	82	55	78.2	12 22.8	82	55	77.9	12 47.4	82	55	77.6	13 12.0	82	54	77.3	13 36.6	82	54	77.0	14 01.1	82	54	76.7	14 25.6	82	54	76.4	3
4	11 00.7	82	55	77.7	11 25.4	82	54	77.4	11 50.1	82	54	77.1	12 14.7	82	54	76.8	12 39.3	82	54	76.5	13 03.9	82	54	76.2	13 28.5	82	54	75.9	13 53.1	82	54	75.6	4
95	10 28.0	82	54	76.9	10 52.7	82	54	76.6	11 17.4	82	54	76.3	11 42.1	82	54	76.0	12 06.8	82	54	75.7	12 31.4	82	54	75.4	12 56.0	82	54	75.1	13 20.6	82	54	74.8	95
6	9 55.4	83	54	76.1	10 20.1	82	54	75.8	10 44.9	82	54	75.5	11 09.6	82	54	75.2	11 34.3	82	54	74.9	11 59.0	82	54	74.6	12 23.7	82	54	74.3	12 48.3	82	54	74.0	6
7	9 22.9	83	54	75.2	9 47.7	83	54	75.0	10 12.5	83	54	74.7	10 37.2	83	54	74.4	11 02.0	82	54	74.1	11 26.7	82	54	73.8	11 51.4	82	54	73.5	12 16.1	82	53	73.2	7
8	8 50.5	83	54	74.4	9 15.3	83	54	74.2	9 40.2	83	54	73.9	10 05.0	83	54	73.6	10 29.8	83	53	73.3	10 54.6	83	53	73.0	11 19.3	83	53	72.7	11 44.1	82	53	72.4	8
9	8 18.2	83	54	73.6	8 43.1	83	53	73.4	9 08.0	83	53	73.1	9 32.9	83	53	72.8	9 57.7	83	53	72.5	10 22.5	83	53	72.2	10 47.4	83	53	71.9	11 12.2	83	53	71.6	9
100	7 46.1	83	53	72.8	8 11.1	83	53	72.5	8 36.0	83	53	72.3	9 00.9	83	53	72.0	9 25.8	83	53	71.7	9 50.7	83	53	71.4	10 15.5	83	53	71.1	10 40.4	83	53	70.8	100
1	7 14.1	83	53	72.0	7 39.1	83	53	71.7	8 04.1	83	53	71.5	8 29.0	83	53	71.2	8 54.0	83	53	70.9	9 18.9	83	53	70.6	9 43.9	83	53	70.3	10 08.8	83	52	70.1	1
2	6 42.3	83	53	71.2	7 07.3	83	53	70.9	7 32.4	83	53	70.7	7 57.4	83	53	70.4	8 22.4	83	52	70.1	8 47.4	83	52	69.8	9 12.3	83	52	69.5	9 37.3	83	52	69.3	2
3	6 10.6	84	53	70.4	6 35.7	84	52	70.1	7 00.8	84	52	69.9	7 25.8	84	52	69.6	7 50.9	84	52	69.3	8 16.0	83	52	69.0	8 41.0	83	52	68.7	9 06.0	83	52	68.5	3
4	5 39.1	84	52	69.6	6 04.2	84	52	69.3	6 29.4	84	52	69.0	6 54.5	84	52	68.8	7 19.6	84	52	68.5	7 44.7	84	52	68.2	8 09.8	84	52	67.9	8 34.9	84	52	67.7	4
105	5 07.7	84	52	68.8	5 32.9	84	52	68.5	5 58.1	84	52	68.2	6 23.3	84	52	68.0	6 48.5	84	52	67.7	7 13.6	84	51	67.4	7 38.8	84	51	67.1	8 03.9	84	51	66.9	105
6					5 01.8	84	52	67.7	5 27.0	84	52	67.4	5 52.3	84	51	67.2	6 17.5	84	51	66.9	6 42.8	84	51	66.6	7 08.0	84	51	66.3	7 33.2	84	51	66.1	6
7													5 21.5	84	51	66.4	5 46.8	84	51	66.1	6 12.0	84	51	65.8	6 37.3	84	51	65.5	7 02.6	84	51	65.3	7
8																	5 16.2	85	51	65.3	5 41.5	85	50	65.0	6 06.9	84	50	64.7	6 32.2	84	50	64.5	8
9																					5 11.2	85	50	64.2	5 36.7	85	50	63.9	6 02.1	85	50	63.7	9
110																									5 06.6	85	50	63.1	5 32.1	85	50	62.9	110
1																													5 02.3	85	49	62.1	1

Lat 57°

Lat 58°

Digitized by Google

Lat. 56°

H.A.	20° 00′				20° 30′				21° 00′				21° 30′			
°	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °
00	54 00.0	1.0	01	180.0	54 30.0	1.0	01	180.0	55 00.0	1.0	01	180.0	55 30.0	1.0	01	180.0
1	53 59.5	1.0	02	178.4	54 29.5	1.0	02	178.4	54 59.5	1.0	02	178.4	55 29.5	1.0	02	178.4
2	53 58.1	1.0	04	176.8	54 28.1	1.0	04	176.8	54 58.1	1.0	04	176.7	55 28.1	1.0	04	176.7
3	53 55.8	1.0	05	175.2	54 25.8	1.0	05	175.2	54 55.7	1.0	06	175.1	55 25.7	1.0	06	175.1
4	53 52.5	1.0	07	173.6	54 22.5	1.0	07	173.6	54 52.4	1.0	07	173.5	55 22.3	1.0	07	173.4
05	53 48.3	1.0	09	172.0	54 18.2	1.0	09	172.0	54 48.1	1.0	09	171.9	55 18.0	1.0	09	171.8
6	53 43.2	1.0	10	170.4	54 13.1	99	10	170.4	54 42.9	99	10	170.3	55 12.8	99	10	170.2
7	53 37.2	99	12	168.9	54 07.0	99	12	168.8	54 36.8	99	12	168.7	55 06.6	99	12	168.6
8	53 30.3	99	13	167.3	54 00.0	99	13	167.2	54 29.7	99	13	167.1	54 59.5	99	13	167.0
9	53 22.4	99	15	165.7	53 52.1	99	15	165.6	54 21.8	99	15	165.5	54 51.4	99	15	165.4
10	53 13.7	99	16	164.2	53 43.3	99	16	164.0	54 12.9	99	16	163.9	54 42.5	99	16	163.8
1	53 04.2	98	17	162.6	53 33.7	98	18	162.5	54 03.2	98	18	162.3	54 32.7	98	18	162.2
2	52 53.7	98	19	161.1	53 23.1	98	19	160.9	53 52.6	98	19	160.8	54 22.0	98	19	160.6
3	52 42.4	98	20	159.6	53 11.8	98	20	159.4	53 41.1	98	20	159.2	54 10.4	98	21	159.0
4	52 30.3	97	22	158.1	52 59.6	97	22	157.9	53 28.8	97	22	157.7	53 58.0	97	22	157.5
15	52 17.4	97	23	156.6	52 46.5	97	23	156.4	53 15.6	97	23	156.2	53 44.7	97	23	156.0
6	52 03.6	97	24	155.1	52 32.7	97	24	154.9	53 01.7	97	25	154.7	53 30.7	97	25	154.5
7	51 49.1	96	26	153.6	52 18.0	96	26	153.4	52 46.9	96	26	153.2	53 15.8	96	26	152.9
8	51 33.8	96	27	152.2	52 02.6	96	27	151.9	52 31.4	96	27	151.7	53 00.2	96	27	151.5
9	51 17.8	96	28	150.7	51 46.5	96	28	150.5	52 15.1	95	28	150.2	52 43.7	95	29	150.0
20	51 01.0	95	29	149.3	51 29.6	95	29	149.0	51 58.1	95	30	148.8	52 26.6	95	30	148.5
1	50 43.5	95	30	147.9	51 11.9	95	31	147.6	51 40.3	95	31	147.4	52 08.7	95	31	147.1
2	50 25.3	94	31	146.5	50 53.6	94	32	146.2	51 21.9	94	32	145.9	51 50.1	94	32	145.7
3	50 06.4	94	33	145.1	50 34.6	94	33	144.8	51 02.8	94	33	144.5	51 30.9	94	33	144.3
4	49 46.9	94	34	143.7	50 14.9	93	34	143.4	50 43.0	93	34	143.2	51 10.9	93	34	142.9
25	49 26.7	93	35	142.4	49 54.6	93	35	142.1	50 22.5	93	35	141.8	50 50.4	93	35	141.5
6	49 05.9	93	36	141.0	49 33.7	93	36	140.7	50 01.5	92	36	140.4	50 29.2	92	36	140.1
7	48 44.5	92	37	139.7	49 12.2	92	37	139.4	49 39.8	92	37	139.1	50 07.4	92	37	138.8
8	48 22.5	92	38	138.4	48 50.0	92	38	138.1	49 17.5	92	38	137.8	49 45.0	91	38	137.5
9	47 59.9	91	39	137.1	48 27.3	91	39	136.8	48 54.7	91	39	136.5	49 22.0	91	39	136.2
30	47 36.8	91	39	135.8	48 04.1	91	40	135.5	48 31.3	91	40	135.2	48 58.5	90	40	134.9
1	47 13.2	91	40	134.6	47 40.3	90	40	134.2	48 07.4	90	41	133.9	48 34.4	90	41	133.6
2	46 49.0	90	41	133.3	47 16.0	90	41	133.0	47 43.0	90	42	132.7	48 09.9	90	42	132.3
3	46 24.4	90	42	132.1	46 51.2	90	42	131.8	47 18.1	89	42	131.4	47 44.9	89	43	131.1
4	45 59.2	89	43	130.9	46 26.0	89	43	130.5	46 52.7	89	43	130.2	47 19.3	89	43	129.9
35	45 33.6	89	43	129.7	46 00.3	89	44	129.3	46 26.8	89	44	129.0	46 53.4	88	44	128.7
6	45 07.6	88	44	128.5	45 34.1	88	44	128.1	46 00.5	88	44	127.8	46 26.9	88	45	127.5
7	44 41.1	88	45	127.3	45 07.5	88	45	127.0	45 33.8	88	45	126.6	46 00.1	87	45	126.3
8	44 14.2	88	46	126.1	44 40.5	88	46	125.8	45 06.7	87	46	125.5	45 32.9	87	46	125.1
9	43 46.9	87	46	125.0	44 13.1	87	46	124.7	44 39.2	87	46	124.3	45 05.2	87	47	124.0
40	43 19.2	87	47	123.9	43 45.3	87	47	123.5	44 11.3	87	47	123.2	44 37.2	86	47	122.8
1	42 51.2	87	47	122.8	43 17.1	86	48	122.4	43 43.0	86	48	122.1	44 08.8	86	48	121.7
2	42 22.8	86	48	121.7	42 48.6	86	48	121.3	43 14.4	86	48	121.0	43 40.1	86	48	120.6
3	41 54.1	86	48	120.6	42 19.8	86	49	120.2	42 45.5	85	49	119.9	43 11.1	85	49	119.5
4	41 25.0	86	49	119.5	41 50.7	85	49	119.1	42 16.2	85	49	118.8	42 41.7	85	49	118.4
45	40 55.7	85	49	118.4	41 21.2	85	50	118.1	41 46.7	85	50	117.7	42 12.1	85	50	117.4
6	40 26.0	85	50	117.4	40 51.5	85	50	117.0	41 16.8	84	50	116.7	41 42.1	84	50	116.3
7	39 56.1	85	50	116.3	40 21.4	84	50	116.0	40 46.7	84	51	115.6	41 11.9	84	51	115.3
8	39 25.9	84	51	115.3	39 51.1	84	51	114.9	40 16.3	84	51	114.6	40 41.5	84	51	114.2
9	38 55.4	84	51	114.3	39 20.6	84	51	113.9	39 45.7	84	52	113.6	40 10.7	83	52	113.2
50	38 24.7	84	52	113.3	38 49.8	84	52	112.9	39 14.8	83	52	112.6	39 39.8	83	52	112.2
1	37 53.8	83	52	112.3	38 18.8	83	52	111.9	38 43.7	83	52	111.6	39 08.6	83	52	111.2
2	37 22.6	83	52	111.3	37 47.6	83	52	110.9	38 12.4	83	52	110.6	38 37.2	83	53	110.2
3	36 51.3	83	53	110.3	37 16.1	83	53	109.9	37 40.9	83	53	109.6	38 05.7	82	53	109.2
4	36 19.7	83	53	109.3	36 44.5	83	53	109.0	37 09.2	82	53	108.6	37 33.9	82	53	108.3
55	35 47.9	83	53	108.4	36 12.7	82	53	108.0	36 37.3	82	53	107.7	37 01.9	82	54	107.3
6	35 16.0	82	54	107.4	35 40.7	82	54	107.1	36 05.3	82	54	106.7	36 29.8	82	54	106.4
7	34 43.9	82	54	106.5	35 08.5	82	54	106.1	35 33.1	82	54	105.8	35 57.6	82	54	105.4
8	34 11.7	82	54	105.5	34 36.2	82	54	105.2	35 00.7	82	54	104.8	35 25.1	81	54	104.5
9	33 39.3	82	54	104.6	34 03.8	82	54	104.3	34 28.2	81	54	103.9	34 52.6	81	54	103.6
60	33 06.7	82	54	103.7	33 31.2	81	54	103.3	33 55.6	81	55	103.0	34 19.9	81	55	102.6
1	32 34.1	81	55	102.8	32 58.5	81	55	102.4	33 22.8	81	55	102.1	33 47.1	81	55	101.7
2	32 01.3	81	55	101.9	32 25.7	81	55	101.5	32 50.0	81	55	101.2	33 14.2	81	55	100.8
3	31 28.4	81	55	101.0	31 52.7	81	55	100.6	32 17.0	81	55	100.3	32 41.2	81	55	99.9
4	30 55.4	81	55	100.1	31 19.7	81	55	99.7	31 43.9	81	55	99.4	32 08.1	80	55	99.0
65	30 22.4	81	55	99.2	30 46.6	81	55	98.9	31 10.8	81	55	98.5	31 34.9	80	55	98.2
6	29 49.2	81	55	98.3	30 13.4	81	55	98.0	30 37.6	80	56	97.6	31 01.7	80	56	97.3
7	29 16.0	81	56	97.5	29 40.2	81	56	97.1	30 04.3	80	56	96.8	30 28.4	80	56	96.4
8	28 42.7	81	56	96.6	29 06.8	80	56	96.2	29 31.0	80	56	95.9	29 55.0	80	56	95.6
9	28 09.3	81	56	95.7	28 33.5	80	56	95.4	28 57.6	80	56	95.0	29 21.6	80	56	94.7
70	27 35.9	81	56	94.9	28 00.0	80	56	94.5	28 24.1	80	56	94.2	28 48.1	80	56	93.9
1	27 02.4	80	56	94.0	27 26.6	80	56	93.7	27 50.6	80	56	93.3	28 14.7	80	56	93.0
2	26 29.0	80	56	93.2	26 53.1	80	56	92.8	27 17.1	80	56	92.5	27 41.1	80	56	92.2
3	25 55.4	80	56	92.3	26 19.5	80	56	92.0	26 43.6	80	56	91.7	27 07.6	80	56	91.3
4	25 21.9	80	56	91.5	25 46.0	80	56	91.2	26 10.1	80	56	90.8	26 34.1	80	56	90.5
75	24 48.4	80	56	90.7	25 12.5	80	56	90.3	25 36.5	80	56	90.0	26 00.5	80	56	89.7
6	24 14.8	80	56	89.8	24 38.9	80	56	89.5	25 03.0	80	56	89.2	25 27.0	80	56	88.8
7	23 41.3	80	56	89.0	24 05.4	80	56	88.7	24 29.4	80	56	88.3	24 53.4	80	56	88.0
8	23 07.7	80	56	88.2	23 31.8	80	56	87.9	23 55.9	80	56	87.5	24 19.9	80	56	87.2
9	22 34.2	80	56	87.4	22 58.3	80	56	87.0	23 22.4	80	56	86.7	23 46.4	80	56	86.4
80	22 00.7	80	56	86.5	22 24.8	80	56	86.2	22 48.9	80	56	85.9	23 12.9	80	56	85.6
1	21 27.2	80	56	85.7	21 51.4	80	56	85.4	22 15.4	80	56	85.1	22 39.5	80	56	84.8
2	20 53.8	81	56	84.9	21 17.9	80	56	84.6	21 42.0	80	56	84.3	22 06.1	80	56	84.0
3	20 20.4	81	56	84.1	20 44.5	80	56	83.8	21 08.7	80	56	83.5	21 32.8	80	55	83.1
4	19 47.0	81	55	83.3	20 11.2	81	55	83.0	20 35.4	80	56	82.7	20 59.5	80	55	82.3
85	19 13.7	81	55	82.5	19 37.9	81	55	82.2	20 02.1	81	55	81.9	20 26.3	80	55	81.5
6	18 40.5	81	55	81.7	19 04.7	81	55	81.4	19 28.9	81	55	81.1	19 53.1	81	55	80.8
7	18 07.3	81	55	80.9	18 31.6	81	55	80.6	18 55.8	81	55	80.3	19 20.0	81	55	80.0
8	17 34.3	81	55	80.1	17 58.5	81	55	79.8	18 22.8	81	55	79.5	18 47.0	81	55	79.2
9	17 01.2	81	55	79.3	17 25.6	81	55	79.0	17 49.9	81	55	78.7	18 14.1	81	55	78.4
90	16 28.3	81	55	78.5	16 52.7	81	55	78.2	17 17.0	81	54	77.9	17 41.3	81	55	77.6

H.A.	22° 00′				22° 30′				23° 00′				23° 30′			
°	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °
00	56 00.0	1.0	01	180.0	56 30.0	1.0	01	180.0	57 00.0	1.0	01	180.0	57 30.0	1.0	01	180.0
1	55 59.5	1.0	02	178.3	56 29.5	1.0	02	178.3	56 59.5	1.0	02	178.3	57 29.5	1.0	02	178.3
2	55 58.1	1.0	04	176.7	56 28.0	1.0	04	176.7	56 58.0	1.0	04	176.6	57 28.0	1.0	04	176.6
3	55 55.6	1.0	06	175.0	56 25.6	1.0	06	175.0	56 55.6	1.0	06	174.9	57 25.5	1.0	06	174.9
4	55 52.2	1.0	07	173.4	56 22.2	1.0	07	173.3	56 52.1	1.0	07	173.3	57 22.0	1.0	07	173.2
05	55 47.9	1.0	09	171.7	56 17.8	1.0	09	171.7	56 47.7	1.0	09	171.6	57 17.6	1.0	09	171.5
6	55 42.6	99	10	170.1	56 12.4	99	10	170.0	56 42.3	99	11	169.9	57 12.1	99	11	169.8
7	55 36.4	99	12	168.5	56 06.1	99	12	168.4	56 35.9	99	12	168.2	57 05.7	99	12	168.1
8	55 29.2	99	14	166.8	55 58.9	99	14	166.7	56 28.6	99	14	166.6	56 58.3	99	14	166.5
9	55 21.1	99	15	165.2	55 50.7	99	15	165.1	56 20.4	99	15	164.9	56 50.0	99	15	164.8
10	55 12.1	99	16	163.6	55 41.6	99	17	163.5	56 11.2	98	17	163.3	56 40.7	98	17	163.1
1	55 02.2	98	18	162.0	55 31.6	98	18	161.9	56 01.1	98	18	161.7	56 30.5	98	18	161.5
2	54 51.4	98	20	160.4	55 20.7	98	20	160.3	55 50.1	98	20	160.1	56 19.4	98	20	159.9
3	54 39.7	98	21	158.9	55 09.0	98	21	158.7	55 38.2	97	21	158.5	56 07.5	97	21	158.3
4	54 27.2	97	22	157.3	54 56.3	97	22	157.1	55 25.5	97	23	156.9	55 54.6	97	23	156.7
15	54 13.8	97	24	155.8	54 42.9	97	24	155.5	55 11.9	97	24	155.3	55 40.9	97	24	155.1
6	53 59.6	97	25	154.2	54 28.6	96	25	154.0	54 57.5	96	25	153.8	55 26.4	96	26	153.5
7	53 44.6	96	26	152.7	54 13.5	96	26	152.5	54 42.2	96	27	152.2	55 11.0	96	27	152.0
8	53 28.9	96	28	151.2	53 57.6	96	28	151.0	54 26.2	95	28	150.7	54 54.9	95	28	150.5
9	53 12.3	95	29	149.7	53 40.9	95	29	149.5	54 09.4	95	29	149.2	54 37.9	95	29	148.9
20	52 55.1	95	30	148.3	53 23.5	95	30	148.0	53 51.9	95	30	147.7	54 20.2	94	31	147.5
1	52 37.1	94	31	146.8	53 05.4	94	31	146.5	53 33.6	94	32	146.3	54 01.8	94	32	146.0
2	52 18.3	94	32	145.4	52 46.5	94	33	145.1	53 14.6	94	33	144.8	53 42.7	94	33	144.5
3	51 58.9	93	33	144.0	52 27.0	93	34	143.7	52 55.0	93	34	143.4	53 22.9	93	34	143.1
4	51 38.9	93	34	142.6	52 06.8	93	35	142.3	52 34.6	93	35	142.0	53 02.4	93	35	141.7
25	51 18.2	93	35	141.2	51 45.9	92	36	140.9	52 13.6	92	36	140.6	52 41.3	92	36	140.3
6	50 56.8	92	36	139.8	51 24.4	92	37	139.5	51 52.0	92	37	139.2	52 19.5	92	37	138.9
7	50 34.9	92	37	138.5	51 02.4	91	38	138.2	51 29.8	91	38	137.8	51 57.1	91	38	137.5
8	50 12.4	91	38	137.1	50 39.7	91	39	136.8	51 07.0	91	39	136.5	51 34.2	91	39	136.2
9	49 49.3	91	39	135.8	50 16.4	91	40	135.5	50 43.6	90	40	135.2	51 10.7	90	40	134.8
30	49 25.6	90	40	134.5	49 52.7	90	41	134.2	50 19.7	90	41	133.9	50 46.6	90	41	133.5
1	49 01.4	90	41	133.3	49 28.4	90	41	132.9	49 55.2	89	42	132.6	50 22.0	89	42	132.2
2	48 36.7	89	42	132.0	49 03.5	89	42	131.7	49 30.3	89	42	131.3	49 56.9	89	43	131.0
3	48 11.6	89	43	130.8	48 38.2	89	43	130.4	49 04.8	89	43	130.1	49 31.3	88	43	129.7
4	47 45.9	89	44	129.5	48 12.4	88	44	129.2	48 38.9	88	44	128.8	49 05.3	88	44	128.5
35	47 19.8	88	44	128.3	47 46.2	88	44	128.0	48 12.5	88	45	127.6	48 38.8	87	45	127.2
6	46 53.3	88	45	127.1	47 19.5	87	45	126.8	47 45.7	87	45	126.4	48 11.9	87	46	126.0
7	46 26.3	87	46	125.9	46 52.5	87	46	125.6	47 18.5	87	46	125.2	47 44.5	87	46	124.8
8	45 58.9	87	46	124.8	46 25.0	87	46	124.4	46 50.9	86	47	124.0	47 16.8	86	47	123.7
9	45 31.2	86	47	123.6	45 57.1	86	47	123.3	46 22.9	86	47	122.9	46 48.7	86	47	122.5
40	45 03.1	86	47	122.5	45 28.9	86	48	122.1	45 54.6	86	48	121.7	46 20.2	85	48	121.4
1	44 34.6	86	48	121.4	45 00.3	85	48	121.0	45 25.9	85	48	120.6	45 51.4	85	49	120.2
2	44 05.8	85	48	120.2	44 31.3	85	49	119.9	44 56.8	85	49	119.5	45 22.3	85	49	119.1
3	43 36.6	85	49	119.2	44 02.1	85	49	118.8	44 27.5	85	49	118.4	44 52.8	84	50	118.0
4	43 07.2	85	50	118.1	43 32.5	84	50	117.7	43 57.8	84	50	117.3	44 23.0	84	50	117.0
45	42 37.4	84	50	117.0	43 02.7	84	50	116.6	43 27.9	84	50	116.3	43 53.0	84	51	115.9
6	42 07.4	84	50	115.9	42 32.6	84	51	115.6	42 57.7	84	51	115.2	43 22.7	83	51	114.8
7	41 37.1	84	51	114.9	42 02.2	83	51	114.5	42 27.2	83	51	114.2	42 52.1	83	51	113.8
8	41 06.5	83	51	113.9	41 31.5	83	51	113.5	41 56.4	83	52	113.1	42 21.3	83	52	112.7
9	40 35.7	83	52	112.8	41 00.6	83	52	112.5	41 25.5	83	52	112.1	41 50.2	82	52	111.7
50	40 04.7	83	52	111.8	40 29.5	83	52	111.5	40 54.3	82	52	111.1	41 18.9	82	52	110.7
1	39 33.4	83	52	110.8	39 58.2	82	53	110.5	40 22.9	82	53	110.1	40 47.5	82	53	109.7
2	39 02.0	82	53	109.9	39 26.7	82	53	109.5	39 51.3	82	53	109.1	40 15.8	82	53	108.7
3	38 30.3	82	53	108.9	38 54.9	82	53	108.5	39 19.5	82	53	108.1	39 43.9	81	53	107.8
4	37 58.5	82	53	107.9	38 23.0	82	53	107.5	38 47.5	81	54	107.2	39 11.9	81	54	106.8
55	37 26.5	82	54	106.9	37 50.9	81	54	106.6	38 15.3	81	54	106.2	38 39.7	81	54	105.8
6	36 54.3	81	54	106.0	37 18.7	81	54	105.6	37 43.1	81	54	105.3	38 07.3	81	54	104.9
7	36 22.0	81	54	105.1	36 46.3	81	54	104.7	37 10.6	81	54	104.3	37 34.8	81	54	104.0
8	35 49.5	81	54	104.1	36 13.8	81	54	103.8	36 33.0	81	54	103.4	37 02.2	80	55	103.0
9	35 16.9	81	54	103.2	35 41.2	81	55	102.8	36 05.3	81	55	102.5	36 29.5	80	55	102.1
60	34 44.2	81	55	102.3	35 08.4	81	55	101.9	35 32.5	80	55	101.6	35 56.6	80	55	101.2
1	34 11.3	81	55	101.4	34 35.5	80	55	101.0	34 59.6	80	55	100.7	35 23.6	80	55	100.3
2	33 38.4	81	55	100.5	34 02.5	80	55	100.1	34 26.6	80	55	99.8	34 50.6	80	55	99.4
3	33 05.4	80	55	99.6	33 29.4	80	55	99.2	33 53.5	80	55	98.9	34 17.4	80	55	98.5
4	32 32.2	80	55	98.7	32 56.3	80	55	98.3	33 20.3	80	56	98.0	33 44.2	80	56	97.6
65	31 59.0	80	56	97.8	32 23.1	80	56	97.5	32 47.0	80	56	97.1	33 10.9	80	56	96.7
6	31 25.8	80	56	96.9	31 49.8	80	56	96.6	32 13.7	80	56	96.2	32 37.6	80	56	95.9
7	30 52.4	80	56	96.1	31 16.4	80	56	95.7	31 40.3	80	56	95.4	32 04.2	79	56	95.0
8	30 19.0	80	56	95.2	30 43.0	80	56	94.9	31 06.9	80	56	94.5	31 30.7	79	56	94.2
9	29 45.6	80	56	94.4	30 09.5	80	56	94.0	30 33.4	80	56	93.7	30 57.3	79	56	93.3
70	29 12.1	80	56	93.5	29 36.1	80	56	93.2	29 59.9	79	56	92.8	30 23.7	79	56	92.5
1	28 38.6	80	56	92.7	29 02.5	80	56	92.3	29 26.4	79	56	92.0	29 50.2	79	56	91.6
2	28 05.1	80	56	91.8	28 29.0	80	56	91.5	28 52.9	79	56	91.1	29 16.7	79	56	90.8
3	27 31.6	80	56	91.0	27 55.5	80	56	90.6	28 19.3	79	56	90.3	28 43.1	79	56	90.0
4	26 58.0	80	56	90.2	27 21.9	80	56	89.8	27 45.8	79	56	89.5	28 09.6	79	56	89.1
75	26 24.5	80	56	89.3	26 48.4	80	56	89.0	27 12.2	79	56	88.6	27 36.0	79	56	88.3
6	25 50.9	80	56	88.5	26 14.8	80	56	88.2	26 38.7	79	56	87.8	27 02.5	79	56	87.5
7	25 17.4	80	56	87.7	25 41.3	80	56	87.3	26 05.2	79	56	87.0	26 29.0	79	56	86.7
8	24 43.9	80	56	86.9	25 07.8	80	56	86.5	25 31.7	80	56	86.2	25 55.5	79	56	85.9
9	24 10.4	80	56	86.1	24 34.3	80	56	85.7	24 58.2	80	56	85.4	25 22.1	79	56	85.1
80	23 36.9	80	56	85.2	24 00.9	80	56	84.9	24 24.8	80	56	84.6	24 48.7	79	56	84.2
1	23 03.5	80	56	84.4	23 27.5	80	56	84.1	23 51.4	80	56	83.8	24 15.3	80	56	83.4
2	22 30.1	80	56	83.6	22 54.1	80	56	83.3	23 18.1	80	56	83.0	23 42.0	80	55	82.6
3	21 56.8	80	55	82.8	22 20.8	80	55	82.5	22 44.8	80	55	82.2	23 08.8	80	55	81.9
4	21 23.6	80	55	82.0	21 47.6	80	55	81.7	22 11.6	80	55	81.4	22 35.6	80	55	81.1
85	20 50.4	80	55	81.2	21 14.4	80	55	80.9	21 38.5	80	55	80.6	22 02.5	80	55	80.3
6	20 17.2	80	55	80.4	20 41.3	80	55	80.1	21 05.4	80	55	79.8	21 29.4	80	55	79.5
7	19 44.2	80	55	79.6	20 08.3	80	55	79.3	20 32.4	80	55	79.0	20 56.5	80	55	78.7
8	19 11.2	81	55	78.8	19 35.4	81	55	78.5	19 59.5	80	55	78.2	20 23.6	80	55	77.9
9	18 38.4	81	55	78.1	19 02.6	81	55	77.7	19 26.7	81	54	77.4	19 50.9	80	54	77.1
90	18 05.6	81	54	77.3	18 29.8	81	54	77.0	18 54.0	81	54	76.6	19 18.2	81	54	76.3

Digitized by Google

Lat. 56°

H.A.	20° 00′ Alt.	Az.	20° 30′ Alt.	Az.	21° 00′ Alt.	Az.	21° 30′ Alt.	Az.	22° 00′ Alt.	Az.	22° 30′ Alt.	Az.	23° 00′ Alt.	Az.	23° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	14 00.0 1.0 00	180.0	13 30.0 1.0 00	180.0	13 00.0 1.0 00	180.0	12 30.0 1.0 00	180.0	12 00.0 1.0 00	180.0	11 30.0 1.0 00	180.0	11 00.0 1.0 00	180.0	10 30.0 1.0 00	180.0	00
1	13 59.7 1.0 01	179.0	13 29.7 1.0 01	179.0	12 59.7 1.0 01	179.0	12 29.7 1.0 01	179.0	11 59.7 1.0 01	179.1	11 29.7 1.0 01	179.1	10 59.7 1.0 01	179.1	10 29.7 1.0 01	179.1	1
2	13 58.9 1.0 02	178.1	13 28.9 1.0 02	178.1	12 58.9 1.0 02	178.1	12 28.9 1.0 02	178.1	11 58.9 1.0 02	178.1	11 28.9 1.0 02	178.1	10 58.9 1.0 02	178.1	10 28.9 1.0 02	178.1	2
3	13 57.4 1.0 03	177.1	13 27.5 1.0 03	177.1	12 57.5 1.0 03	177.1	12 27.5 1.0 03	177.1	11 57.5 1.0 03	177.2	11 27.5 1.0 03	177.2	10 57.5 1.0 03	177.2	10 27.5 1.0 03	177.2	3
4	13 55.5 1.0 04	176.1	13 25.5 1.0 04	176.1	12 55.5 1.0 04	176.2	12 25.5 1.0 04	176.2	11 55.6 1.0 04	176.2	11 25.6 1.0 04	176.2	10 55.6 1.0 04	176.3	10 25.6 1.0 04	176.3	4
05	13 52.9 1.0 05	175.2	13 23.0 1.0 05	175.2	12 53.0 1.0 05	175.2	12 23.0 1.0 05	175.2	11 53.1 1.0 05	175.3	11 23.1 1.0 05	175.3	10 53.1 1.0 05	175.3	10 23.2 1.0 05	175.3	05
6	13 49.8 1.0 06	174.2	13 19.9 1.0 06	174.2	12 49.9 1.0 06	174.3	12 20.0 1.0 06	174.3	11 50.0 1.0 06	174.3	11 20.1 1.0 06	174.3	10 50.1 1.0 06	174.4	10 20.2 1.0 06	174.4	6
7	13 46.1 1.0 07	173.2	13 16.2 1.0 07	173.3	12 46.3 1.0 07	173.3	12 16.4 1.0 07	173.3	11 46.4 1.0 07	173.4	11 16.5 1.0 07	173.4	10 46.6 1.0 07	173.4	10 16.6 1.0 07	173.5	7
8	13 41.9 1.0 08	172.3	13 12.0 1.0 08	172.3	12 42.1 1.0 08	172.3	12 12.2 1.0 08	172.4	11 42.3 1.0 08	172.4	11 12.4 1.0 08	172.5	10 42.5 1.0 08	172.5	10 12.6 1.0 08	172.5	8
9	13 37.1 1.0 09	171.3	13 07.2 1.0 09	171.3	12 37.3 1.0 09	171.4	12 07.5 1.0 09	171.4	11 37.6 1.0 09	171.5	11 07.7 1.0 09	171.5	10 37.8 1.0 09	171.6	10 07.9 1.0 09	171.6	9
10	13 31.7 1.0 10	170.3	13 01.9 1.0 10	170.4	12 32.0 1.0 10	170.4	12 02.2 1.0 10	170.5	11 32.3 1.0 10	170.5	11 02.5 1.0 10	170.6	10 32.6 1.0 10	170.6	10 02.8 1.0 10	170.7	10
1	13 25.8 99 11	169.4	12 56.0 99 11	169.4	12 26.2 99 11	169.5	11 56.4 99 11	169.5	11 26.6 99 10	169.6	10 56.7 99 10	169.7	10 26.9 99 10	169.7	9 57.1 99 10	169.8	1
2	13 19.4 99 12	168.4	12 49.6 99 12	168.5	12 19.8 99 12	168.5	11 50.0 99 12	168.6	11 20.2 99 12	168.7	10 50.4 99 11	168.7	10 20.7 99 11	168.8	9 50.9 99 11	168.8	2
3	13 12.4 99 13	167.5	12 42.6 99 13	167.5	12 12.9 99 12	167.6	11 43.1 99 12	167.7	11 13.4 99 12	167.7	10 43.6 99 12	167.8	10 13.9 99 12	167.9	9 44.1 99 12	167.9	3
4	13 04.8 99 14	166.5	12 35.1 99 13	166.6	12 05.4 99 13	166.6	11 35.7 99 13	166.7	11 06.0 99 13	166.8	10 36.2 99 13	166.9	10 06.5 99 13	166.9	9 36.8 99 13	167.0	4
15	12 56.7 99 14	165.5	12 27.0 99 14	165.6	11 57.4 99 14	165.7	11 27.7 99 14	165.8	10 58.0 99 14	165.9	10 28.4 99 14	165.9	9 58.7 99 14	166.0	9 29.0 99 14	166.1	15
6	12 48.1 99 15	164.6	12 18.4 99 15	164.7	11 48.8 99 15	164.8	11 19.2 99 15	164.8	10 49.6 99 15	164.9	10 19.9 99 15	165.0	9 50.3 99 15	165.1	9 20.7 99 15	165.2	6
7	12 38.9 99 16	163.6	12 09.3 99 16	163.7	11 39.7 99 16	163.8	11 10.1 99 16	163.9	10 40.6 99 16	164.0	10 11.0 99 16	164.1	9 41.4 99 16	164.2	9 11.8 99 16	164.2	7
8	12 29.2 98 17	162.7	11 59.6 98 17	162.8	11 30.1 98 17	162.9	11 00.6 98 17	163.0	10 31.0 98 17	163.1	10 01.5 98 17	163.1	9 32.0 98 16	163.2	9 02.4 98 16	163.3	8
9	12 18.9 98 18	161.8	11 49.5 98 18	161.8	11 20.0 98 18	161.9	10 50.5 98 18	162.0	10 21.0 98 18	162.1	9 51.5 98 18	162.2	9 22.0 98 17	162.3	8 52.6 98 17	162.4	9
20	12 08.2 98 19	160.8	11 38.7 98 19	160.9	11 09.3 98 19	161.0	10 39.9 98 19	161.1	10 10.5 98 18	161.2	9 41.0 98 18	161.3	9 11.6 98 18	161.4	8 42.2 98 18	161.5	20
1	11 56.9 98 20	159.9	11 27.5 98 20	160.0	10 58.1 98 20	160.1	10 28.8 98 19	160.2	9 59.4 98 19	160.3	9 30.0 98 19	160.4	9 00.6 98 19	160.5	8 31.3 98 19	160.6	1
2	11 45.1 98 21	158.9	11 15.8 98 20	159.0	10 46.4 98 20	159.1	10 17.1 98 20	159.3	9 47.8 98 20	159.4	9 18.5 98 20	159.5	8 49.2 98 20	159.6	8 19.9 98 20	159.7	2
3	11 32.7 97 21	158.0	11 03.5 97 21	158.1	10 34.2 97 21	158.2	10 05.0 98 21	158.3	9 35.7 98 21	158.4	9 06.5 98 21	158.6	8 37.2 98 21	158.7	8 08.0 98 21	158.8	3
4	11 19.9 97 22	157.1	10 50.7 97 22	157.2	10 21.5 97 22	157.3	9 52.4 97 22	157.4	9 23.2 97 22	157.5	8 54.0 97 22	157.6	8 24.8 97 22	157.8	7 55.6 97 21	157.9	4
25	11 06.6 97 23	156.1	10 37.5 97 23	156.2	10 08.3 97 23	156.4	9 39.2 97 23	156.5	9 10.1 97 23	156.6	8 41.0 97 22	156.7	8 11.8 97 22	156.9	7 42.7 97 22	157.0	25
6	10 52.8 97 24	155.2	10 23.7 97 24	155.3	9 54.7 97 24	155.5	9 25.6 97 24	155.6	8 56.5 97 23	155.7	8 27.5 97 23	155.8	7 58.4 97 23	156.0	7 29.3 97 23	156.1	6
7	10 38.4 97 25	154.3	10 09.5 97 25	154.4	9 40.5 97 24	154.5	9 11.5 97 24	154.7	8 42.5 97 24	154.8	8 13.5 97 24	154.9	7 44.5 97 24	155.1	7 15.5 97 24	155.2	7
8	10 23.6 96 25	153.4	9 54.7 96 25	153.5	9 25.8 96 25	153.6	8 56.9 96 25	153.8	8 28.0 96 25	153.9	7 59.0 96 25	154.0	7 30.1 96 25	154.2	7 01.2 96 25	154.3	8
9	10 08.3 96 26	152.4	9 39.5 96 26	152.6	9 10.7 96 26	152.7	8 41.8 96 26	152.8	8 13.0 96 26	153.0	7 44.1 96 26	153.1	7 15.2 96 26	153.3	6 46.4 96 25	153.4	9
30	9 52.6 96 27	151.5	9 23.8 96 27	151.7	8 55.0 96 27	151.8	8 26.3 96 27	151.9	7 57.5 96 26	152.1	7 28.7 96 26	152.2	6 59.9 96 26	152.4	6 31.1 96 26	152.5	30
1	9 36.3 96 28	150.6	9 07.7 96 28	150.8	8 39.0 96 28	150.9	8 10.3 96 27	151.0	7 41.6 96 27	151.2	7 12.8 96 27	151.3	6 44.1 96 27	151.5	6 15.4 96 27	151.6	1
2	9 19.6 95 29	149.7	8 51.0 95 28	149.8	8 22.4 95 28	150.0	7 53.8 95 28	150.1	7 25.2 95 28	150.3	6 56.5 95 28	150.4	6 27.9 95 28	150.6	5 59.3 95 28	150.7	2
3	9 02.5 95 29	148.8	8 33.9 95 29	148.9	8 05.4 95 29	149.1	7 36.9 95 29	149.3	7 08.3 95 29	149.4	6 39.7 95 29	149.6	6 11.2 95 29	149.7	5 42.6 95 28	149.9	3
4	8 44.9 95 30	147.9	8 16.4 95 30	148.0	7 47.9 95 30	148.2	7 19.5 95 30	148.4	6 51.0 95 30	148.5	6 22.5 95 29	148.7	5 54.1 95 29	148.8	5 25.6 95 29	149.0	4
35	8 26.8 95 31	147.0	7 58.4 95 31	147.1	7 30.0 95 30	147.3	7 01.7 95 30	147.5	6 33.3 95 30	147.6	6 04.9 95 30	147.8	5 36.5 95 30	148.0	5 08.1 95 30	148.1	35
6	8 08.3 94 32	146.1	7 40.0 94 31	146.3	7 11.7 94 31	146.4	6 43.4 94 31	146.6	6 15.1 94 31	146.8	5 46.8 94 31	146.9	5 18.5 94 31	147.1			6
7	7 49.4 94 32	145.2	7 21.2 94 32	145.4	6 52.9 94 32	145.5	6 24.7 94 32	145.7	5 56.5 94 32	145.9	5 28.2 94 32	146.0	5 00.0 94 31	146.2			7
8	7 30.0 94 33	144.3	7 01.9 94 33	144.5	6 33.7 94 33	144.7	6 05.6 94 33	144.8	5 37.4 94 32	145.0	5 09.3 94 32	145.2					8
9	7 10.2 93 34	143.4	6 42.2 94 34	143.6	6 14.1 94 33	143.8	5 46.1 94 33	143.9	5 18.0 94 33	144.1							9
40	6 50.0 93 34	142.5	6 22.0 93 34	142.7	5 54.1 93 34	142.9	5 26.1 93 34	143.1									40
1	6 29.4 93 35	141.6	6 01.5 93 35	141.8	5 33.6 93 35	142.0	5 05.7 93 35	142.2									1
2	6 08.4 93 36	140.8	5 40.6 93 36	141.0	5 12.8 93 36	141.2											2
3	5 47.0 92 36	139.9	5 19.3 92 36	140.1													3
4	5 25.2 92 37	139.0															4
45	5 03.0 92 38	138.2															45

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′ Alt.	Az.	20° 30′ Alt.	Az.	21° 00′ Alt.	Az.	21° 30′ Alt.	Az.	22° 00′ Alt.	Az.	22° 30′ Alt.	Az.	23° 00′ Alt.	Az.	23° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	15 55.5 81 55	77.7	16 19.9 81 54	77.4	16 44.3 81 54	77.1	17 08.6 81 54	76.8	17 32.9 81 54	76.5	17 57.2 81 54	76.2	18 21.5 81 54	75.9	18 45.7 81 54	75.6	91
2	15 22.8 81 54	76.9	15 47.2 81 54	76.6	16 11.6 81 54	76.3	16 36.0 81 54	76.0	17 00.3 81 54	75.7	17 24.7 81 54	75.4	17 49.0 81 54	75.1	18 13.3 81 54	74.8	2
3	14 50.1 82 54	76.1	15 14.6 82 54	75.8	15 39.1 81 54	75.5	16 03.5 81 54	75.2	16 27.9 81 54	74.9	16 52.3 81 54	74.6	17 16.6 81 54	74.3	17 40.9 81 54	74.0	3
4	14 17.6 82 54	75.3	14 42.1 82 54	75.0	15 06.6 82 54	74.7	15 31.1 82 54	74.4	15 55.6 81 54	74.1	16 20.0 81 54	73.8	16 44.4 81 54	73.5	17 08.8 81 53	73.2	4
95	13 45.2 82 54	74.5	14 09.8 82 54	74.2	14 34.3 82 54	73.9	14 58.9 82 54	73.6	15 23.4 82 54	73.3	15 47.8 82 53	73.0	16 12.3 81 53	72.7	16 36.7 81 53	72.4	95
6	13 13.0 82 54	73.7	13 37.6 82 54	73.4	14 02.2 82 54	73.1	14 26.7 82 53	72.8	14 51.3 82 53	72.6	15 15.8 82 53	72.3	15 40.3 82 53	72.0	16 04.8 82 53	71.7	6
7	12 40.8 82 53	72.9	13 05.5 82 53	72.6	13 30.1 82 53	72.4	13 54.7 82 53	72.1	14 19.3 82 53	71.8	14 43.9 82 53	71.5	15 08.5 82 53	71.2	15 33.0 82 53	70.9	7
8	12 08.8 82 53	72.1	12 33.5 82 53	71.9	12 58.2 82 53	71.6	13 22.9 82 53	71.3	13 47.5 82 53	71.0	14 12.2 82 53	70.7	14 36.8 82 52	70.4	15 01.4 82 52	70.1	8
9	11 36.9 83 53	71.4	12 01.7 83 53	71.1	12 26.5 82 53	70.8	12 51.2 82 53	70.5	13 15.9 82 52	70.2	13 40.6 82 52	69.9	14 05.3 82 52	69.6	14 29.9 82 52	69.3	9
100	11 05.2 83 53	70.6	11 30.0 83 52	70.3	11 54.9 83 52	70.0	12 19.6 83 52	69.7	12 44.4 83 52	69.4	13 09.2 82 52	69.1	13 33.9 82 52	68.8	13 58.6 82 52	68.5	100
1	10 33.7 83 52	69.8	10 58.5 83 52	69.5	11 23.4 83 52	69.2	11 48.2 83 52	68.9	12 13.1 83 52	68.6	12 37.9 83 52	68.3	13 02.7 83 52	68.1	13 27.5 83 52	67.8	1
2	10 02.3 83 52	69.0	10 27.2 83 52	68.7	10 52.1 83 52	68.4	11 17.0 83 52	68.1	11 41.9 83 52	67.8	12 06.8 83 52	67.6	12 31.7 83 52	67.3	12 56.5 83 51	67.0	2
3	9 31.0 83 52	68.2	9 56.0 83 52	67.9	10 21.0 83 52	67.6	10 46.0 83 51	67.3	11 10.9 83 51	67.1	11 35.9 83 51	66.8	12 00.8 83 51	66.5	12 25.7 83 51	66.2	3
4	9 00.0 84 51	67.4	9 25.0 84 51	67.1	9 50.1 83 51	66.8	10 15.1 83 51	66.6	10 40.1 83 51	66.3	11 05.1 83 51	66.0	11 30.1 83 51	65.7	11 55.1 83 51	65.4	4
105	8 29.1 84 51	66.6	8 54.2 84 51	66.3	9 19.3 84 51	66.0	9 44.4 84 51	65.8	10 09.5 84 51	65.5	10 34.6 84 51	65.2	10 59.6 84 50	64.9	11 24.7 83 50	64.6	105
6	7 58.4 84 51	65.8	8 23.6 84 51	65.5	8 48.8 84 51	65.2	9 13.9 84 50	65.0	9 39.1 84 50	64.7	10 04.2 84 50	64.4	10 29.3 84 50	64.1	10 54.5 84 50	63.9	6
7	7 27.9 84 51	65.0	7 53.1 84 50	64.7	8 18.4 84 50	64.5	8 43.6 84 50	64.2	9 08.8 84 50	63.9	9 34.1 84 50	63.6	9 59.3 84 50	63.4	10 24.4 84 50	63.1	7
8	6 57.6 84 50	64.2	7 22.9 84 50	63.9	7 48.2 84 50	63.7	8 13.5 84 50	63.4	8 38.8 84 50	63.1	9 04.1 84 50	62.8	9 29.4 84 50	62.6	9 54.6 84 49	62.3	8
9	6 27.5 85 50	63.4	6 52.9 85 50	63.1	7 18.3 85 50	62.9	7 43.6 85 49	62.6	8 09.0 85 49	62.3	8 34.4 85 49	62.1	8 59.7 84 49	61.8	9 25.0 84 49	61.5	9
110	5 57.6 85 49	62.6	6 23.0 85 49	62.3	6 48.5 85 49	62.1	7 14.0 85 49	61.8	7 39.4 85 49	61.5	8 04.8 85 49	61.3	8 30.2 85 49	61.0	8 55.7 85 49	60.7	110
1	5 27.9 85 49	61.8	5 53.4 85 49	61.5	6 19.0 85 49	61.3	6 44.5 85 49	61.0	7 10.0 85 49	60.7	7 35.5 85 48	60.5	8 01.0 85 48	60.2	8 26.5 85 48	59.9	1
2			5 24.1 85 49	60.7	5 49.7 85 48	60.5	6 15.3 85 48	60.2	6 40.9 85 48	59.9	7 06.4 85 48	59.7	7 32.0 85 48	59.4	7 57.6 85 48	59.2	2
3					5 20.6 86 48	59.7	5 46.3 86 48	59.4	6 11.9 86 48	59.1	6 37.6 86 48	58.9	7 03.2 85 48	58.6	7 28.9 85 47	58.4	3
4							5 17.5 86 48	58.6	5 43.2 86 47	58.4	6 09.0 86 47	58.1	6 34.7 86 47	57.8	7 00.4 86 47	57.6	4
115									5 14.8 86 47	57.5	5 40.6 86 47	57.3	6 06.4 86 47	57.0	6 32.2 86 47	56.8	115
6											5 12.5 86 46	56.5	5 38.4 86 46	56.2	6 04.3 86 46	56.0	6
7													5 10.7 87 46	55.4	5 36.6 87 46	55.2	7
8															5 09.2 87 45	54.4	8

Lat. 57°

Lat. 58°

Digitized by Google

Lat. 56°

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	58 00.0	1.0	01	180.0	58 30.0	1.0	01	180.0	59 00.0	1.0	01	180.0	59 30.0	1.0	01	180.0
1	57 59.5	1.0	02	178.3	58 29.5	1.0	03	178.3	58 59.5	1.0	02	178.2	59 29.5	1.0	03	178.2
2	57 58.0	1.0	04	176.6	58 28.0	1.0	04	176.5	58 57.9	1.0	04	176.5	59 27.9	1.0	04	176.4
3	57 55.5	1.0	06	174.8	58 25.4	1.0	06	174.8	58 55.4	1.0	06	174.7	59 25.3	1.0	06	174.7
4	57 51.9	1.0	08	173.1	58 21.9	1.0	08	173.0	58 51.8	1.0	08	173.0	59 21.7	1.0	08	172.9
05	57 47.4	1.0	09	171.4	58 17.3	1.0	09	171.3	58 47.2	1.0	09	171.2	59 17.0	1.0	09	171.1
6	57 41.9	99	11	169.7	58 11.7	99	11	169.6	58 41.5	99	11	169.5	59 11.4	99	11	169.4
7	57 35.4	99	12	168.0	58 05.2	99	13	167.9	58 34.9	99	13	167.8	59 04.7	99	13	167.6
8	57 28.0	99	14	166.3	57 57.7	99	14	166.2	58 27.3	99	14	166.0	58 57.0	99	14	165.9
9	57 19.6	99	16	164.6	57 49.2	99	16	164.5	58 18.8	99	16	164.3	58 48.3	99	16	164.2
10	57 10.2	98	17	163.0	57 39.7	98	17	162.8	58 09.2	98	18	162.6	58 38.7	98	18	162.5
1	56 59.9	98	19	161.3	57 29.4	98	19	161.2	57 58.8	98	19	161.0	58 28.1	98	19	160.8
2	56 48.8	98	20	159.7	57 18.1	98	20	159.5	57 47.4	98	20	159.3	58 16.6	98	21	159.1
3	56 36.7	97	22	158.1	57 05.9	97	22	157.9	57 35.0	97	22	157.6	58 04.2	97	22	157.4
4	56 23.7	97	23	156.5	56 52.8	97	23	156.2	57 21.8	97	24	156.0	57 50.9	97	24	155.8
15	56 09.9	97	24	154.9	56 38.8	96	25	154.6	57 07.8	96	25	154.4	57 36.7	96	25	154.1
6	55 55.2	96	26	153.3	56 24.0	96	26	153.0	56 52.8	96	26	152.8	57 21.6	96	26	152.5
7	55 39.7	96	27	151.7	56 08.4	96	27	151.5	56 37.1	95	28	151.2	57 05.7	95	28	150.9
8	55 23.4	95	28	150.2	55 52.0	95	29	149.9	56 20.5	95	29	149.6	56 49.0	95	29	149.4
9	55 06.4	95	30	148.7	55 34.8	95	30	148.4	56 03.2	95	30	148.1	56 31.5	94	30	147.8
20	54 48.6	94	31	147.2	55 16.8	94	31	146.9	55 45.1	94	32	146.6	56 13.3	94	32	146.3
1	54 30.0	94	32	145.7	54 58.1	94	32	145.4	55 26.2	94	33	145.1	55 54.3	93	33	144.8
2	54 10.7	93	33	144.2	54 38.7	93	34	143.9	55 06.7	93	34	143.6	55 34.6	93	34	143.3
3	53 50.8	93	34	142.8	54 18.6	93	35	142.4	54 46.4	93	35	142.1	55 14.2	92	35	141.8
4	53 30.2	92	36	141.3	53 57.8	92	36	141.0	54 25.5	92	36	140.7	54 53.1	92	36	140.3
25	53 08.9	92	36	139.9	53 36.4	92	37	139.6	54 03.9	92	37	139.3	54 31.3	91	37	138.9
6	52 47.0	91	38	138.5	53 14.4	91	38	138.2	53 41.7	91	38	137.9	54 09.0	91	38	137.5
7	52 24.4	91	38	137.2	52 51.7	91	39	136.8	53 18.9	91	39	136.5	53 46.0	90	39	136.1
8	52 01.4	90	39	135.8	52 28.5	90	40	135.5	52 55.5	90	40	135.1	53 22.5	90	40	134.7
9	51 37.7	90	40	134.5	52 04.6	90	41	134.1	52 31.5	90	41	133.8	52 58.4	89	41	133.4
30	51 13.5	89	41	133.2	51 40.3	89	41	132.8	52 07.0	89	42	132.4	52 33.7	89	42	132.1
1	50 48.7	89	42	131.9	51 15.4	89	42	131.5	51 42.0	89	42	131.1	52 08.5	88	43	130.8
2	50 23.5	89	43	130.6	50 50.0	88	43	130.2	51 16.5	88	43	129.9	51 42.9	88	44	129.5
3	49 57.8	88	44	129.3	50 24.2	88	44	129.0	50 50.5	88	44	128.6	51 16.8	87	44	128.2
4	49 31.6	88	44	128.1	49 57.9	87	45	127.7	50 24.1	87	45	127.3	50 50.2	87	45	126.9
35	49 05.0	87	45	126.9	49 31.1	87	45	126.5	49 57.2	87	46	126.1	50 23.1	86	46	125.7
6	48 37.9	87	46	125.7	49 03.9	87	46	125.3	49 29.8	86	46	124.9	49 55.7	86	46	124.5
7	48 10.5	86	46	124.5	48 36.3	86	47	124.1	49 02.1	86	47	123.7	49 27.8	86	47	123.3
8	47 42.6	86	47	123.3	48 08.4	86	47	122.9	48 34.0	85	48	122.5	48 59.6	85	48	122.1
9	47 14.4	86	48	122.1	47 40.0	85	48	121.8	48 05.6	85	48	121.4	48 31.0	85	48	121.0
40	46 45.8	85	48	121.0	47 11.3	85	48	120.6	47 36.7	85	49	120.2	48 02.1	84	49	119.8
1	46 16.9	85	49	119.9	46 42.3	84	49	119.5	47 07.6	84	49	119.1	47 32.8	84	49	118.7
2	45 47.6	84	49	118.8	46 12.9	84	49	118.4	46 38.1	84	50	118.0	47 03.2	84	50	117.6
3	45 18.1	84	50	117.7	45 43.2	84	50	117.3	46 08.3	83	50	116.9	46 33.3	83	50	116.5
4	44 48.2	84	50	116.6	45 13.3	83	50	116.2	45 38.2	83	50	115.8	46 03.1	83	51	115.4
45	44 18.0	83	51	115.5	44 43.0	83	51	115.1	45 07.9	83	51	114.7	45 32.7	83	51	114.3
6	43 47.6	83	51	114.4	44 12.5	83	51	114.1	44 37.3	82	52	113.7	45 02.0	82	52	113.3
7	43 17.0	83	52	113.4	43 41.7	82	52	113.0	44 06.4	82	52	112.6	44 31.1	82	52	112.2
8	42 46.0	82	52	112.4	43 10.7	82	52	112.0	43 35.3	82	52	111.6	43 59.9	82	52	111.2
9	42 14.9	82	52	111.3	42 39.5	82	52	111.0	43 04.0	82	52	110.6	43 28.5	81	53	110.2
50	41 43.5	82	53	110.3	42 08.1	82	53	109.9	42 32.5	81	53	109.6	42 56.9	81	53	109.2
1	41 12.0	82	53	109.3	41 36.4	81	53	109.0	42 00.8	81	53	108.6	42 25.1	81	53	108.2
2	40 40.2	81	53	108.4	41 04.6	81	53	108.0	41 28.9	81	54	107.6	41 53.1	81	54	107.2
3	40 08.3	81	54	107.4	40 32.6	81	54	107.0	40 56.8	81	54	106.6	41 21.0	80	54	106.2
4	39 36.2	81	54	106.4	40 00.4	81	54	106.0	40 24.6	80	54	105.6	40 48.7	80	54	105.3
55	39 03.9	81	54	105.5	39 28.1	80	54	105.1	39 52.2	80	54	104.7	40 16.3	80	54	104.3
6	38 31.5	81	54	104.5	38 55.7	80	54	104.1	39 19.7	80	54	103.7	39 43.7	80	54	103.4
7	37 59.0	80	54	103.6	38 23.1	80	55	103.2	38 47.1	80	55	102.8	39 11.0	80	55	102.4
8	37 26.3	80	55	102.7	37 50.3	80	55	102.3	38 14.3	80	55	101.9	38 38.2	79	55	101.5
9	36 53.5	80	55	101.7	37 17.5	80	55	101.4	37 41.4	80	55	101.0	38 05.2	79	55	100.6
60	36 20.6	80	55	100.8	36 44.5	80	55	100.4	37 08.4	79	55	100.1	37 32.2	79	55	99.7
1	35 47.6	80	55	99.9	36 11.5	80	55	99.5	36 35.3	79	55	99.2	36 59.1	79	55	98.8
2	35 14.5	80	55	99.0	35 38.4	79	55	98.7	36 02.2	79	55	98.3	36 25.9	79	55	97.9
3	34 41.3	80	55	98.1	35 05.2	79	55	97.8	35 28.9	79	56	97.4	35 52.6	79	56	97.0
4	34 08.1	79	56	97.3	34 31.9	79	56	96.9	34 55.6	79	56	96.5	35 19.3	79	56	96.1
65	33 34.8	79	56	96.4	33 58.5	79	56	96.0	34 22.3	79	56	95.6	34 45.9	79	56	95.3
6	33 01.4	79	56	95.5	33 25.2	79	56	95.2	33 48.8	79	56	94.8	34 12.5	79	56	94.4
7	32 28.0	79	56	94.7	32 51.7	79	56	94.3	33 15.4	79	56	93.9	33 39.0	79	56	93.6
8	31 54.5	79	56	93.8	32 18.2	79	56	93.4	32 41.9	79	56	93.1	33 05.5	79	56	92.7
9	31 21.0	79	56	93.0	31 44.7	79	56	92.6	32 08.4	79	56	92.2	32 32.0	79	56	91.9
70	30 47.5	79	56	92.1	31 11.2	79	56	91.7	31 34.9	79	56	91.4	31 58.4	79	56	91.0
1	30 14.0	79	56	91.3	30 37.7	79	56	90.9	31 01.3	79	56	90.6	31 24.9	78	56	90.2
2	29 40.4	79	56	90.4	30 04.1	79	56	90.1	30 27.8	79	56	89.7	30 51.3	78	56	89.4
3	29 06.9	79	56	89.6	29 30.6	79	56	89.3	29 54.2	79	56	88.9	30 17.8	79	56	88.5
4	28 33.3	79	56	88.8	28 57.0	79	56	88.4	29 20.7	79	56	88.1	29 44.3	79	56	87.7
75	27 59.8	79	56	88.0	28 23.5	79	56	87.6	28 47.1	79	56	87.3	29 10.7	79	56	86.9
6	27 26.3	79	56	87.1	27 50.0	79	56	86.8	28 13.6	79	56	86.4	28 37.3	79	56	86.1
7	26 52.8	79	56	86.3	27 16.5	79	56	86.0	27 40.2	79	56	85.6	28 03.8	79	56	85.3
8	26 19.3	79	56	85.5	26 43.0	79	56	85.2	27 06.7	79	56	84.8	27 30.4	79	56	84.5
9	25 45.9	79	56	84.7	26 09.6	79	56	84.4	26 33.3	79	56	84.0	26 57.0	79	56	83.7
80	25 12.5	79	56	83.9	25 36.3	79	56	83.6	26 00.0	79	56	83.2	26 23.7	79	55	82.9
1	24 39.2	79	56	83.1	25 03.0	79	55	82.8	25 26.7	79	55	82.4	25 50.4	79	55	82.1
2	24 05.9	80	55	82.3	24 29.7	79	55	82.0	24 53.5	79	55	81.6	25 17.2	79	55	81.3
3	23 32.7	80	55	81.5	23 56.5	79	55	81.2	24 20.3	79	55	80.9	24 44.1	79	55	80.5
4	22 59.5	80	55	80.7	23 23.4	80	55	80.4	23 47.2	79	55	80.1	24 11.0	79	55	79.7
85	22 26.4	80	55	79.9	22 50.3	80	55	79.6	23 14.2	80	55	79.3	23 38.1	79	55	79.0
6	21 53.4	80	55	79.2	22 17.4	80	55	78.8	22 41.3	80	55	78.5	23 05.2	80	55	78.2
7	21 20.5	80	55	78.4	21 44.5	80	55	78.0	22 08.5	80	54	77.7	22 32.4	80	54	77.4
8	20 47.7	80	54	77.6	21 11.7	80	54	77.3	21 35.7	80	54	76.9	21 59.7	80	54	76.6
9	20 15.0	80	54	76.8	20 39.1	80	54	76.5	21 03.1	80	54	76.2	21 27.1	80	54	75.8
90	19 42.4	80	54	76.0	20 06.5	80	54	75.7	20 30.6	80	54	75.4	20 54.6	80	54	75.1

H.A.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	60 00.0	1.0	01	180.0	60 30.0	1.0	01	180.0	61 00.0	1.0	01	180.0	61 30.0	1.0	01	180.0
1	59 59.5	1.0	03	178.2	60 29.5	1.0	03	178.2	60 59.5	1.0	03	178.2	61 29.5	1.0	03	178.1
2	59 57.9	1.0	04	176.4	60 27.9	1.0	04	176.4	60 57.8	1.0	04	176.3	61 27.8	1.0	05	176.3
3	59 55.3	1.0	06	174.6	60 25.2	1.0	06	174.6	60 55.2	1.0	06	174.5	61 25.1	1.0	06	174.4
4	59 51.6	1.0	08	172.8	60 21.5	1.0	08	172.7	60 51.4	1.0	08	172.7	61 21.3	1.0	08	172.6
05	59 46.9	1.0	10	171.0	60 16.8	1.0	10	170.9	60 46.6	1.0	10	170.8	61 16.5	99	10	170.7
6	59 41.2	99	11	169.3	60 11.0	99	11	169.2	60 40.7	99	12	169.0	61 10.5	99	12	168.9
7	59 34.4	99	13	167.5	60 04.1	99	13	167.4	60 33.8	99	13	167.2	61 03.6	99	13	167.1
8	59 26.6	99	14	165.8	59 56.3	99	15	165.6	60 25.9	99	15	165.4	60 55.5	99	15	165.3
9	59 17.9	99	16	164.0	59 47.4	98	16	163.8	60 17.0	98	16	163.7	60 46.5	98	17	163.5
10	59 08.2	98	18	162.3	59 37.6	98	18	162.1	60 07.1	98	18	161.9	60 36.5	98	18	161.7
1	58 57.5	98	19	160.6	59 26.8	98	20	160.4	59 56.2	98	20	160.2	60 25.5	98	20	159.9
2	58 45.9	97	21	158.9	59 15.1	97	21	158.7	59 44.3	97	21	158.4	60 13.5	97	22	158.2
3	58 33.3	97	22	157.2	59 02.4	97	23	157.0	59 31.5	97	23	156.7	60 00.5	97	23	156.5
4	58 19.9	97	24	155.5	58 48.8	97	24	155.3	59 17.8	96	24	155.0	59 46.7	96	25	154.8
15	58 05.5	96	25	153.9	58 34.4	96	26	153.6	59 03.2	96	26	153.4	59 31.9	96	26	153.1
6	57 50.3	96	27	152.3	58 19.0	96	27	152.0	58 47.7	95	27	151.7	59 16.3	95	27	151.4
7	57 34.3	95	28	150.7	58 02.9	95	28	150.4	58 31.4	95	28	150.1	58 59.8	95	29	149.8
8	57 17.5	95	30	149.1	57 45.9	95	30	148.8	58 14.2	94	30	148.5	58 42.5	94	30	148.1
9	56 59.8	94	31	147.5	57 28.1	94	31	147.2	57 56.3	94	31	146.9	58 24.4	94	31	146.5
20	56 41.4	94	32	146.0	57 09.5	94	32	145.6	57 37.6	93	32	145.3	58 05.6	93	33	145.0
1	56 22.3	93	33	144.4	56 50.2	93	33	144.1	57 18.1	93	34	143.8	57 45.9	93	34	143.4
2	56 02.4	93	34	142.9	56 30.2	93	35	142.6	56 57.9	92	35	142.2	57 25.6	92	35	141.9
3	55 41.8	92	35	141.5	56 09.5	92	36	141.1	56 37.0	92	36	140.7	57 04.5	92	36	140.4
4	55 20.6	92	36	140.0	55 48.1	91	37	139.6	56 15.5	91	37	139.3	56 42.8	91	37	138.9
25	54 58.7	91	38	138.6	55 26.0	91	38	138.2	55 53.3	91	38	137.8	56 20.4	90	38	137.4
6	54 36.2	91	38	137.1	55 03.3	90	39	136.8	55 30.4	90	39	136.4	55 57.4	90	39	136.0
7	54 13.1	90	40	135.7	54 40.1	90	40	135.4	55 07.0	90	40	135.0	55 33.8	89	40	134.6
8	53 49.4	90	40	134.4	54 16.2	89	41	134.0	54 43.0	89	41	133.6	55 09.6	89	41	133.2
9	53 25.1	89	41	133.0	53 51.8	89	42	132.6	54 18.4	89	42	132.2	54 44.9	88	42	131.8
30	53 00.3	89	42	131.7	53 26.8	88	42	131.3	53 53.3	88	43	130.9	54 19.7	88	43	130.5
1	52 35.0	88	43	130.4	53 01.4	88	43	130.0	53 27.7	88	44	129.6	53 53.9	87	44	129.2
2	52 09.2	88	44	129.1	52 35.4	87	44	128.7	53 01.6	87	44	128.3	53 27.6	87	45	127.9
3	51 42.9	87	44	127.8	52 09.0	87	45	127.4	52 35.0	87	45	127.0	53 00.9	86	45	126.6
4	51 16.2	87	45	126.6	51 42.1	86	46	126.1	52 08.0	86	46	125.7	52 33.8	86	46	125.3
35	50 49.0	86	46	125.3	51 14.8	86	46	124.9	51 40.5	86	46	124.5	52 06.2	85	47	124.1
6	50 21.4	86	46	124.1	50 47.1	85	47	123.7	51 12.7	85	47	123.3	51 38.2	85	47	122.9
7	49 53.5	85	47	122.9	50 19.0	85	47	122.5	50 44.4	85	48	122.1	51 09.8	84	48	121.7
8	49 25.1	85	48	121.7	49 50.5	85	48	121.3	50 15.8	84	48	120.9	50 41.1	84	48	120.5
9	48 56.4	84	48	120.6	49 21.7	84	49	120.1	49 46.9	84	49	119.7	50 12.0	84	49	119.3
40	48 27.3	84	49	119.4	48 52.5	84	49	119.0	49 17.6	83	49	118.6	49 42.6	83	50	118.2
1	47 57.9	84	50	118.3	48 23.0	83	50	117.9	48 47.9	83	50	117.4	49 12.8	83	50	117.0
2	47 28.2	83	50	117.2	47 53.2	83	50	116.8	48 18.0	83	50	116.3	48 42.8	82	51	115.9
3	46 58.2	83	50	116.1	47 23.1	83	51	115.7	47 47.8	82	51	115.2	48 12.5	82	51	114.8
4	46 28.0	83	51	115.0	46 52.7	82	51	114.6	47 17.3	82	51	114.1	47 41.9	82	51	113.7
45	45 57.4	82	51	113.9	46 22.0	82	52	113.5	46 46.6	82	52	113.1	47 11.0	81	52	112.7
6	45 26.6	82	52	112.9	45 51.2	82	52	112.4	46 15.6	81	52	112.0	46 40.0	81	52	111.6
7	44 55.6	82	52	111.8	45 20.0	81	52	111.4	45 44.4	81	52	111.0	46 08.6	81	53	110.6
8	44 24.3	81	52	110.8	44 48.7	81	53	110.4	45 13.0	81	53	110.0	45 37.1	80	53	109.5
9	43 52.8	81	53	109.8	44 17.1	81	53	109.4	44 41.3	80	53	108.9	45 05.4	80	53	108.5
50	43 21.2	81	53	108.8	43 45.4	81	53	108.4	44 09.5	80	53	107.9	44 33.5	80	53	107.5
1	42 49.3	81	53	107.8	43 13.4	80	54	107.4	43 37.5	80	54	106.9	44 01.4	80	54	106.5
2	42 17.3	80	54	106.8	42 41.3	80	54	106.4	43 05.3	80	54	106.0	43 29.2	79	54	105.6
3	41 45.1	80	54	105.8	42 09.1	80	54	105.4	42 33.0	80	54	105.0	42 56.8	79	54	104.6
4	41 12.7	80	54	104.9	41 36.6	80	54	104.5	42 00.5	79	54	104.0	42 24.2	79	54	103.6
55	40 40.2	80	54	103.9	41 04.1	79	54	103.5	41 27.9	79	54	103.1	41 51.6	79	55	102.7
6	40 07.6	80	55	103.0	40 31.4	79	55	102.6	40 55.1	79	55	102.2	41 18.8	79	55	101.8
7	39 34.8	79	55	102.0	39 58.6	79	55	101.6	40 22.3	79	55	101.2	40 45.9	79	55	100.8
8	39 02.0	79	55	101.1	39 25.7	79	55	100.7	39 49.3	79	55	100.3	40 12.9	78	55	99.9
9	38 29.0	79	55	100.2	38 52.7	79	55	99.8	39 16.3	79	55	99.4	39 39.8	78	55	99.0
60	37 55.9	79	55	99.3	38 19.6	79	55	98.9	38 43.1	78	55	98.5	39 06.6	78	55	98.1
1	37 22.8	79	56	98.4	37 46.4	79	55	98.0	38 09.9	78	56	97.6	38 33.4	78	56	97.2
2	36 49.5	79	56	97.5	37 13.1	78	56	97.1	37 36.6	78	56	96.7	38 00.0	78	56	96.3
3	36 16.2	79	56	96.6	36 39.8	78	56	96.2	37 03.3	78	56	95.9	37 26.7	78	56	95.5
4	35 42.9	79	56	95.8	36 06.4	78	56	95.4	36 29.9	78	56	95.0	36 53.2	78	56	94.6
65	35 09.5	78	56	94.9	35 33.0	78	56	94.5	35 56.4	78	56	94.1	36 19.8	78	56	93.7
6	34 36.0	78	56	94.0	34 59.5	78	56	93.7	35 22.9	78	56	93.3	35 46.3	78	56	92.9
7	34 02.5	78	56	93.2	34 26.0	78	56	92.8	34 49.4	78	56	92.4	35 12.8	78	56	92.0
8	33 29.0	78	56	92.3	33 52.5	78	56	92.0	34 15.9	78	56	91.6	34 39.2	78	56	91.2
9	32 55.5	78	56	91.5	33 19.0	78	56	91.1	33 42.4	78	56	90.7	34 05.7	78	56	90.4
70	32 22.0	78	56	90.7	32 45.4	78	56	90.3	33 08.8	78	56	89.9	33 32.1	78	56	89.5
1	31 48.4	78	56	89.8	32 11.9	78	56	89.5	32 35.3	78	56	89.1	32 58.6	78	56	88.7
2	31 14.9	78	56	89.0	31 38.3	78	56	88.6	32 01.7	78	56	88.3	32 25.0	78	56	87.9
3	30 41.3	78	56	88.2	31 04.8	78	56	87.8	31 28.2	78	56	87.5	31 51.5	78	56	87.1
4	30 07.8	78	56	87.4	30 31.3	78	56	87.0	30 54.7	78	56	86.6	31 18.0	78	56	86.3
75	29 34.3	78	56	86.6	29 57.8	78	56	86.2	30 21.2	78	56	85.8	30 44.6	78	56	85.5
6	29 00.8	78	56	85.7	29 24.3	78	56	85.4	29 47.8	78	56	85.0	30 11.1	78	56	84.7
7	28 27.4	78	56	84.9	28 50.9	78	56	84.6	29 14.3	78	56	84.2	29 37.8	78	56	83.9
8	27 54.0	79	56	84.1	28 17.5	78	56	83.8	28 41.0	78	56	83.4	29 04.4	78	55	83.1
9	27 20.6	79	56	83.3	27 44.2	78	55	83.0	28 07.7	78	55	82.6	28 31.1	78	55	82.3
80	26 47.3	79	55	82.6	27 10.9	79	55	82.2	27 34.4	78	55	81.9	27 57.9	78	55	81.5
1	26 14.1	79	55	81.8	26 37.7	79	55	81.4	27 01.3	78	55	81.1	27 24.8	78	55	80.7
2	25 40.9	79	55	81.0	26 04.6	79	55	80.6	26 28.2	79	55	80.3	26 51.7	78	55	79.9
3	25 07.8	79	55	80.2	25 31.5	79	55	79.8	25 55.1	79	55	79.5	26 18.7	79	55	79.2
4	24 34.8	79	55	79.4	24 58.5	79	55	79.1	25 22.2	79	55	78.7	25 45.8	79	55	78.4
85	24 01.9	79	55	78.6	24 25.6	79	55	78.3	24 49.3	79	55	78.0	25 13.0	79	55	77.6
6	23 29.0	79	54	77.8	23 52.8	79	54	77.5	24 16.6	79	54	77.2	24 40.3	79	54	76.8
7	22 56.3	80	54	77.1	23 20.1	79	54	76.7	23 43.9	79	54	76.4	24 07.6	79	54	76.1
8	22 23.6	80	54	76.3	22 47.5	80	54	76.0	23 11.3	79	54	75.6	23 35.1	79	54	75.3
9	21 51.1	80	54	75.5	22 15.0	80	54	75.2	22 38.9	80	54	74.9	23 02.7	79	54	74.5
90	21 18.6	80	54	74.7	21 42.6	80	54	74.4	22 06.6	80	54	74.1	22 30.5	80	54	73.8

Digitized by Google

Lat. 56°

H.A.	24° 00′		24° 30′		25° 00′		25° 30′		26° 00′		26° 30′		27° 00′		27° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	10 00.0 1.0 00	180.0	9 30.0 1.0 00	180.0	9 00.0 1.0 00	180.0	8 30.0 1.0 00	180.0	8 00.0 1.0 00	180.0	7 30.0 1.0 00	180.0	7 00.0 1.0 00	180.0	6 30.0 1.0 00	180.0	00
1	9 59.7 1.0 01	179.1	9 29.7 1.0 01	179.1	8 59.7 1.0 01	179.1	8 29.7 1.0 01	179.1	7 59.7 1.0 01	179.1	7 29.7 1.0 01	179.1	6 59.7 1.0 01	179.1	6 29.7 1.0 01	179.1	1
2	9 58.9 1.0 02	178.1	9 28.9 1.0 02	178.2	8 58.9 1.0 02	178.2	8 28.9 1.0 02	178.2	7 58.9 1.0 02	178.2	7 28.9 1.0 02	178.2	6 58.9 1.0 02	178.2	6 29.0 1.0 02	178.2	2
3	9 57.6 1.0 03	177.2	9 27.6 1.0 03	177.2	8 57.6 1.0 03	177.2	8 27.6 1.0 03	177.3	7 57.6 1.0 03	177.3	7 27.6 1.0 03	177.3	6 57.6 1.0 03	177.3	6 27.6 1.0 03	177.3	3
4	9 55.7 1.0 04	176.3	9 25.7 1.0 04	176.3	8 55.7 1.0 04	176.3	8 25.7 1.0 04	176.4	7 55.7 1.0 04	176.4	7 25.8 1.0 04	176.4	6 55.8 1.0 04	176.4	6 25.8 1.0 04	176.4	4
05	9 53.2 1.0 05	175.4	9 23.3 1.0 05	175.4	8 53.3 1.0 05	175.4	8 23.3 1.0 05	175.4	7 53.4 1.0 05	175.5	7 23.4 1.0 05	175.5	6 53.4 1.0 05	175.5	6 23.5 1.0 05	175.5	05
6	9 50.2 1.0 06	174.4	9 20.3 1.0 06	174.5	8 50.3 1.0 06	174.5	8 20.4 1.0 06	174.5	7 50.5 1.0 06	174.6	7 20.5 1.0 06	174.6	6 50.5 1.0 06	174.6	6 20.6 1.0 06	174.6	6
7	9 46.7 1.0 07	173.5	9 16.8 1.0 07	173.5	8 46.9 1.0 07	173.6	8 16.9 1.0 07	173.6	7 47.0 1.0 07	173.7	7 17.1 1.0 07	173.7	6 47.1 1.0 06	173.7	6 17.2 1.0 07	173.8	7
8	9 42.7 1.0 08	172.6	9 12.7 1.0 08	172.6	8 42.8 1.0 08	172.7	8 12.9 1.0 08	172.7	7 43.0 1.0 08	172.7	7 13.1 1.0 07	172.8	6 43.2 1.0 07	172.8	6 13.3 1.0 07	172.9	8
9	9 38.1 1.0 08	171.7	9 08.2 1.0 09	171.7	8 38.3 1.0 08	171.8	8 08.4 1.0 08	171.8	7 38.5 1.0 08	171.8	7 08.6 1.0 08	171.9	6 38.8 1.0 08	171.9	6 08.9 1.0 08	172.0	9
10	9 32.9 1.0 10	170.7	9 03.1 1.0 09	170.8	8 33.2 1.0 09	170.8	8 03.4 1.0 09	170.9	7 33.5 1.0 09	170.9	7 03.7 1.0 09	171.0	6 33.8 1.0 09	171.0	6 03.9 1.0 09	171.1	10
1	9 27.3 99 10	169.8	8 57.4 99 10	169.9	8 27.6 99 10	169.9	7 57.8 99 10	170.0	7 28.0 99 10	170.0	6 58.1 99 10	170.1	6 28.3 99 10	170.1	5 58.5 99 10	170.2	1
2	9 21.1 99 11	168.9	8 51.3 99 11	169.0	8 21.5 99 11	169.0	7 51.7 99 11	169.1	7 21.9 99 11	169.1	6 52.1 99 11	169.2	6 22.3 99 11	169.3	5 52.5 99 11	169.3	2
3	9 14.3 99 12	168.0	8 44.6 99 12	168.0	8 14.8 99 12	168.1	7 45.1 99 12	168.2	7 15.3 99 12	168.2	6 45.6 99 12	168.3	6 15.8 99 12	168.4	5 46.0 99 12	168.4	3
4	9 07.1 99 13	167.1	8 37.4 99 13	167.1	8 07.7 99 13	167.2	7 37.9 99 13	167.3	7 08.2 99 13	167.3	6 38.5 99 13	167.4	6 08.8 99 12	167.5	5 39.1 99 12	167.5	4
15	8 59.3 99 14	166.1	8 29.7 99 14	166.2	8 00.0 99 14	166.3	7 30.3 99 14	166.4	7 00.6 99 14	166.4	6 30.9 99 13	166.5	6 01.3 99 13	166.6	5 31.6 99 13	166.7	15
6	8 51.0 99 15	165.2	8 21.4 99 15	165.3	7 51.8 99 14	165.4	7 22.1 99 14	165.5	6 52.5 99 14	165.6	6 22.9 99 14	165.6	5 53.2 99 14	165.7	5 23.6 99 14	165.8	6
7	8 42.2 99 16	164.3	8 12.6 99 15	164.4	7 43.1 99 15	164.5	7 13.5 99 15	164.6	6 43.9 99 15	164.7	6 14.3 99 15	164.7	5 44.7 99 15	164.8	5 15.1 99 15	164.9	7
8	8 32.9 98 16	163.4	8 03.4 98 16	163.5	7 33.8 98 16	163.6	7 04.3 98 16	163.7	6 34.7 98 16	163.8	6 05.2 98 16	163.9	5 35.7 98 16	163.9	5 06.1 98 16	164.0	8
9	8 23.1 98 17	162.5	7 53.6 98 17	162.6	7 24.1 98 17	162.7	6 54.6 98 17	162.8	6 25.1 98 17	162.9	5 55.6 98 17	163.0	5 26.1 98 17	163.1			9
20	8 12.7 98 18	161.6	7 43.3 98 18	161.7	7 13.9 98 18	161.8	6 44.4 98 18	161.9	6 15.0 98 18	162.0	5 45.5 98 18	162.1	5 16.1 98 18	162.2			20
1	8 01.9 98 19	160.7	7 32.5 98 19	160.8	7 03.1 98 19	160.9	6 33.7 98 19	161.0	6 04.4 98 18	161.1	5 35.0 98 18	161.2	5 05.6 98 18	161.3			1
2	7 50.5 98 20	159.8	7 21.2 98 20	159.9	6 51.9 98 20	160.0	6 22.6 98 19	160.1	5 53.3 98 19	160.2	5 23.9 98 19	160.3					2
3	7 38.7 98 20	158.9	7 09.4 98 20	159.0	6 40.2 98 20	159.1	6 10.9 98 20	159.2	5 41.7 98 20	159.3	5 12.4 98 20	159.4					3
4	7 26.4 97 21	158.0	6 57.2 97 21	158.1	6 28.0 97 21	158.2	5 58.8 97 21	158.3	5 29.6 97 21	158.5	5 00.4 97 21	158.6					4
25	7 13.6 97 22	157.1	6 44.4 97 22	157.2	6 15.3 97 22	157.3	5 46.2 97 22	157.5	5 17.0 97 22	157.6							25
6	7 00.3 97 23	156.2	6 31.2 97 23	156.3	6 02.1 97 23	156.5	5 33.1 97 23	156.6	5 04.0 97 23	156.7							6
7	6 46.5 97 24	155.3	6 17.5 97 24	155.4	5 48.5 97 24	155.6	5 19.5 97 23	155.7									7
8	6 32.2 96 24	154.4	6 03.3 96 24	154.6	5 34.4 96 24	154.7	5 05.4 96 24	154.8									8
9	6 17.5 96 25	153.5	5 48.7 96 25	153.7	5 19.8 96 25	153.8											9
30	6 02.3 96 26	152.7	5 33.6 96 26	152.8	5 04.8 96 26	152.9											30
1	5 46.7 96 27	151.8	5 18.0 96 27	151.9													1
2	5 30.6 95 28	150.9	5 02.0 95 27	151.0													2
3	5 14.1 95 28	150.0															3

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′		24° 30′		25° 00′		25° 30′		26° 00′		26° 30′		27° 00′		27° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	19 09.9 81 54	75.2	19 34.0 80 54	74.9	19 58.2 80 54	74.6	20 22.3 80 54	74.3	20 46.3 80 54	74.0	21 10.4 80 54	73.7	21 34.4 80 54	73.3	21 58.3 80 53	73.0	91
2	18 37.5 81 54	74.5	19 01.7 81 54	74.1	19 25.9 81 54	73 8	19 50.0 80 54	73.5	20 14.2 80 54	73.2	20 38.2 80 53	72.9	21 02.3 80 53	72.6	21 26.3 80 53	72.2	2
3	18 05.2 81 54	73.7	18 29.5 81 53	73.4	18 53.7 81 53	73.1	19 17.9 81 53	72.7	19 42.1 81 53	72.4	20 06.2 80 53	72.1	20 30.3 80 53	71.8	20 54.4 80 53	71.5	3
4	17 33.1 81 53	72.9	17 57.4 81 53	72.6	18 21.7 81 53	72.3	18 46.0 81 53	72.0	19 10.2 81 53	71.7	19 34.4 81 53	71.4	19 58.5 80 53	71.0	20 22.7 80 53	70.7	4
95	17 01.1 81 53	72.1	17 25.5 81 53	71.8	17 49.8 81 53	71.5	18 14.1 81 53	71.2	18 38.4 81 53	70.9	19 02.7 81 53	70.6	19 26.9 81 52	70.3	19 51.1 81 52	70.0	95
6	16 29.2 81 53	71.4	16 53.7 81 53	71.0	17 18.1 81 53	70.7	17 42.4 81 53	70.4	18 06.8 81 52	70.1	18 31.1 81 52	69.8	18 55.4 81 52	69.5	19 19.6 81 52	69.2	6
7	15 57.5 82 53	70.6	16 22.0 82 52	70.3	16 46.5 81 52	70.0	17 10.9 81 52	69.7	17 35.3 81 52	69.4	17 59.7 81 52	69.1	18 24.0 81 52	68.8	18 48.3 81 52	68.4	7
8	15 26.0 82 52	69.8	15 50.5 82 52	69.5	16 15.0 82 52	69.2	16 39.5 82 52	68.9	17 04.0 82 52	68.6	17 28.4 81 52	68.3	17 52.8 81 52	68.0	18 17.2 81 52	67.7	8
9	14 54.5 82 52	69.0	15 19.1 82 52	68.7	15 43.7 82 52	68.4	16 08.3 82 52	68.1	16 32.8 82 52	67.8	16 57.3 82 52	67.5	17 21.8 82 52	67.2	17 46.3 81 51	66.9	9
100	14 23.3 82 52	68.2	14 48.0 82 52	68.0	15 12.6 82 52	67.7	15 37.2 82 51	67.4	16 01.8 82 51	67.1	16 26.4 82 51	66.8	16 51.0 82 51	66.5	17 15.5 82 51	66.2	100
1	13 52.2 82 52	67.5	14 17.0 82 51	67.2	14 41.7 82 51	66.9	15 06.4 82 51	66.6	15 31.0 82 51	66.3	15 55.7 82 51	66.0	16 20.3 82 51	65.7	16 44.9 82 51	65.4	1
2	13 21.3 83 51	66.7	13 46.1 83 51	66.4	14 10.9 83 51	66.1	14 35.7 82 51	65.8	15 00.4 82 51	65.5	15 25.1 82 51	65.2	15 49.8 82 50	64.9	16 14.5 82 50	64.6	2
3	12 50.6 83 51	65.9	13 15.5 83 51	65.6	13 40.3 83 51	65.3	14 05.1 83 51	65.1	14 30.0 83 50	64.8	14 54.7 83 50	64.5	15 19.5 83 50	64.2	15 44.2 82 50	63.9	3
4	12 20.1 83 50	65.1	12 45.0 83 50	64.9	13 09.9 83 50	64.6	13 34.8 83 50	64.3	13 59.7 83 50	64.0	14 24.6 82 50	63.7	14 49.4 83 50	63.4	15 14.2 83 50	63.1	4
105	11 49.7 83 50	64.4	12 14.7 83 50	64.1	12 39.7 83 50	63.8	13 04.7 83 50	63.5	13 29.6 83 50	63.2	13 54.6 83 50	62.9	14 19.5 83 50	62.7	14 44.4 83 49	62.4	105
6	11 19.6 84 50	63.6	11 44.6 84 50	63.3	12 09.7 84 50	63.0	12 34.8 83 50	62.7	12 59.8 83 50	62.5	13 24.8 83 49	62.2	13 49.8 83 49	61.9	14 14.8 83 49	61.6	6
7	10 49.6 84 50	62.8	11 14.8 84 49	62.5	11 39.9 84 49	62.2	12 05.0 84 49	62.0	12 30.1 84 49	61.7	12 55.2 84 49	61.4	13 20.3 84 49	61.1	13 45.4 83 49	60.8	7
8	10 19.9 84 49	62.0	10 45.1 84 49	61.7	11 10.3 84 49	61.5	11 35.5 84 49	61.2	12 00.7 84 49	60.9	12 25.9 84 49	60.6	12 51.0 84 48	60.4	13 16.2 84 48	60.1	8
9	9 50.4 84 49	61.2	10 15.7 84 49	61.0	10 41.0 84 48	60.7	11 06.2 84 48	60.4	11 31.5 84 48	60.1	11 56.8 84 48	59.9	12 22.0 84 48	59.6	12 47.2 84 48	59.3	9
110	9 21.1 85 48	60.5	9 46.4 85 48	60.2	10 11.8 85 48	59.9	10 37.2 85 48	59.6	11 02.5 84 48	59.4	11 27.8 84 48	59.1	11 53.2 84 48	58.8	12 18.5 84 48	58.6	110
1	8 52.0 85 48	59.7	9 17.4 85 48	59.4	9 42.9 85 48	59.1	10 08.3 85 48	58.9	10 33.8 85 48	58.6	10 59.2 85 47	58.3	11 24.6 85 47	58.1	11 50.0 85 47	57.8	1
2	8 23.1 85 48	58.9	8 48.7 85 48	58.6	9 14.2 85 47	58.4	9 39.7 85 47	58.1	10 05.2 85 47	57.8	10 30.7 85 47	57.6	10 56.2 85 47	57.3	11 21.7 85 47	57.0	2
3	7 54.5 85 47	58.1	8 20.2 85 47	57.8	8 45.8 85 47	57.6	9 11.4 85 47	57.3	9 37.0 85 47	57.0	10 02.5 85 47	56.8	10 28.1 85 46	56.5	10 53.7 85 46	56.3	3
4	7 26.2 86 47	57.3	7 51.9 86 47	57.1	8 17.6 86 47	56.8	8 43.3 86 46	56.5	9 08.9 86 46	56.3	9 34.6 86 46	56.0	10 00.3 85 46	55.7	10 25.9 85 46	55.5	4
115	6 58.0 86 46	56.5	7 23.8 86 46	56.3	7 49.6 86 46	56.0	8 15.4 86 46	55.8	8 41.2 86 46	55.5	9 06.9 86 46	55.2	9 32.7 86 46	55.0	9 58.4 86 45	54.7	115
6	6 30.2 86 46	55.7	6 56.1 86 46	55.5	7 21.9 86 46	55.2	7 47.8 86 46	55.0	8 13.6 86 45	54.7	8 39.5 86 45	54.5	9 05.3 86 45	54.2	9 31.1 86 45	53.9	6
7	6 02.6 87 46	54.9	6 28.6 87 45	54.7	6 54.5 86 45	54.4	7 20.5 86 45	54.2	7 46.4 86 45	53.9	8 12.3 86 45	53.7	8 38.2 86 45	53.4	9 04.1 86 45	53.2	7
8	5 35.3 87 45	54.1	6 01.3 87 45	53.9	6 27.4 87 45	53.6	6 53.4 87 45	53.4	7 19.4 87 44	53.1	7 45.4 87 44	52.9	8 11.4 87 44	52.6	8 37.4 87 44	52.4	8
9	5 08.2 87 45	53.3	5 34.3 87 44	53.1	6 00.5 87 44	52.8	6 26.6 87 44	52.6	6 52.7 87 44	52.4	7 18.8 87 44	52.1	7 44.9 87 44	51.9	8 11.0 87 44	51.6	9
120			5 07.7 87 44	52.3	5 33.9 87 44	52.1	6 00.1 87 44	51.8	6 26.3 87 44	51.6	6 52.5 87 43	51.3	7 18.7 87 43	51.1	7 44.8 87 43	50.8	120
1					5 07.6 88 43	51.3	5 33.8 88 43	51.0	6 00.1 88 43	50.8	6 26.4 88 43	50.5	6 52.7 88 43	50.3	7 19.0 88 43	50.0	1
2							5 07.9 88 43	50.2	5 34.3 88 43	50.0	6 00.7 88 42	49.7	6 27.0 88 42	49.5	6 53.4 88 42	49.3	2
3									5 08.7 88 42	49.2	5 35.2 88 42	49.0	6 01.7 88 42	48.7	6 28.1 88 42	48.5	3
4											5 10.1 89 41	48.2	5 36.6 88 41	47.9	6 03.2 88 41	47.7	4
125													5 11.9 89 41	47.1	5 38.5 89 41	46.9	125
6															5 14.2 89 40	46.1	6

Lat. 57°

Lat. 58°

Digitized by Google

Lat. 56°

H.A.	28° 00′		28° 30′		29° 00′		30° 00′		32° 00′		34° 00′		34° 30′		35° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	62 00.0 1.0 01	180.0	62 30.0 1.0 01	180.0	63 00.0 1.0 01	180.0	64 00.0 1.0 01	180.0	66 00.0 1.0 01	180.0	68 00.0 1.0 01	180.0	68 30.0 1.0 01	180.0	69 30.0 1.0 01	180.0	00
1	61 59.4 1.0 03	178.1	62 29.4 1.0 03	178.1	62 59.4 1.0 03	178.1	63 59.4 1.0 03	178.0	65 59.4 1.0 03	177.9	67 59.4 1.0 03	177.8	68 29.3 1.0 03	177.8	69 29.3 1.0 03	177.7	1
2	61 57.8 1.0 04	176.2	62 27.8 1.0 05	176.2	62 57.7 1.0 05	176.2	63 57.7 1.0 05	176.1	65 57.6 1.0 05	175.8	67 57.4 1.0 05	175.6	68 27.4 1.0 05	175.5	69 27.3 1.0 06	175.4	2
3	61 55.0 1.0 06	174.4	62 25.0 1.0 06	174.3	62 54.9 1.0 06	174.2	63 54.8 1.0 07	174.1	65 54.5 1.0 07	173.8	67 54.2 1.0 08	173.4	68 24.1 1.0 08	173.3	69 23.9 1.0 08	173.0	3
4	61 51.2 1.0 08	172.5	62 21.1 1.0 08	172.4	62 51.0 1.0 08	172.3	63 50.8 1.0 09	172.1	65 50.3 1.0 09	171.7	67 49.7 99 10	171.2	68 19.5 99 10	171.0	69 19.2 99 10	170.7	4
05	61 46.3 99 10	170.6	62 16.1 99 10	170.5	62 46.0 99 10	170.4	63 45.6 99 10	170.2	65 44.8 99 11	169.6	67 43.9 99 12	169.0	68 13.6 99 12	168.8	69 13.1 99 12	168.5	05
6	61 40.3 99 12	168.8	62 10.1 99 12	168.7	62 39.8 99 12	168.5	63 39.3 99 12	168.2	65 38.2 99 13	167.6	67 36.9 99 14	166.8	68 06.5 99 14	166.6	69 05.7 99 14	166.2	6
7	61 33.2 99 14	166.9	62 02.9 99 14	166.8	62 32.6 99 14	166.6	63 31.9 99 14	166.3	65 30.4 99 15	165.6	67 28.6 98 16	164.7	67 58.2 98 16	164.5	68 57.1 98 16	164.0	7
8	61 25.1 99 15	165.1	61 54.7 99 15	164.9	62 24.3 99 16	164.8	63 23.4 98 16	164.4	65 21.5 98 17	163.6	67 19.2 98 18	162.6	67 48.6 98 18	162.3	68 47.2 98 19	161.8	8
9	61 16.0 98 17	163.3	61 45.5 98 17	163.1	62 15.0 98 17	162.9	63 13.9 98 18	162.5	65 11.4 98 19	161.6	67 08.6 97 20	160.5	67 37.8 97 20	160.2	68 36.1 97 20	159.6	9
10	61 05.9 98 18	161.5	61 35.2 98 19	161.3	62 04.6 98 19	161.1	63 03.3 98 19	160.6	65 00.3 97 20	159.6	66 56.8 97 21	158.4	67 25.8 97 22	158.1	68 23.8 96 22	157.4	10
1	60 54.7 98 20	159.7	61 24.0 97 20	159.5	61 53.2 97 21	159.3	62 51.6 97 21	158.8	64 48.0 97 22	157.7	66 43.9 96 23	156.4	67 12.8 96 24	156.0	68 10.4 96 24	155.3	1
2	60 42.6 97 22	158.0	61 11.8 97 22	157.7	61 40.9 97 22	157.5	62 39.0 97 23	156.9	64 34.8 96 24	155.7	66 29.9 96 25	154.4	66 58.6 95 25	154.0	67 55.8 95 26	153.2	2
3	60 29.6 97 23	156.2	60 58.6 97 24	156.0	61 27.5 96 24	155.7	62 25.3 96 24	155.1	64 20.5 96 25	153.9	66 14.9 95 27	152.4	66 43.4 95 27	152.0	67 40.1 94 28	151.2	3
4	60 15.6 96 25	154.5	60 44.4 96 25	154.2	61 13.2 96 25	153.9	62 10.7 96 26	153.3	64 05.2 95 27	152.0	65 58.9 94 28	150.5	66 27.1 94 29	150.1	67 23.5 94 29	149.2	4
15	60 00.7 96 26	152.8	60 29.4 96 27	152.5	60 58.0 95 27	152.2	61 55.2 95 27	151.6	63 49.0 94 29	150.2	65 41.9 94 30	148.6	66 09.9 93 30	148.1	67 05.8 93 31	147.2	15
6	59 44.9 95 28	151.1	60 13.4 95 28	150.8	60 41.9 95 28	150.5	61 38.8 95 29	149.8	63 31.9 94 30	148.4	65 23.9 93 31	146.7	65 51.7 93 32	146.3	66 47.1 92 33	145.3	6
7	59 28.3 95 29	149.5	59 56.7 95 29	149.1	60 25.0 94 30	148.8	61 21.5 94 30	148.1	63 13.8 93 32	146.6	65 05.0 92 33	144.9	65 32.6 92 33	144.4	66 27.6 91 34	143.4	7
8	59 10.8 94 30	147.8	59 39.0 94 31	147.5	60 07.2 94 31	147.1	61 03.4 93 32	146.4	62 54.9 93 33	144.9	64 45.3 91 34	143.1	65 12.7 91 35	142.6	66 07.2 90 35	141.6	8
9	58 52.5 94 32	146.2	59 20.6 93 32	145.9	59 48.6 93 32	145.5	60 44.4 93 33	144.8	62 35.2 92 34	143.2	64 24.8 91 36	141.3	64 51.9 90 36	140.8	65 45.9 90 37	139.8	9
20	58 33.5 93 33	144.6	59 01.4 93 33	144.3	59 29.2 93 34	143.9	60 24.7 92 34	143.1	62 14.7 91 35	141.5	64 03.4 90 37	139.6	64 30.3 90 37	139.1	65 23.8 89 38	138.0	20
1	58 13.7 92 34	143.1	58 41.4 92 34	142.7	59 09.1 92 35	142.3	60 04.2 92 35	141.5	61 53.4 91 37	139.8	63 41.3 89 38	137.9	64 08.0 89 38	137.4	65 01.0 88 39	136.3	1
2	57 53.2 92 35	141.5	58 20.7 92 36	141.1	58 48.2 91 36	140.8	59 42.9 91 37	140.0	61 31.4 90 38	138.2	63 18.4 88 39	136.3	63 44.9 88 40	135.7	64 37.5 87 40	134.6	2
3	57 32.0 91 36	140.0	57 59.3 91 37	139.6	58 26.6 91 37	139.2	59 21.0 90 38	138.4	61 08.7 89 39	136.6	62 54.9 88 40	134.6	63 21.1 87 41	134.1	64 13.3 86 41	133.0	3
4	57 10.1 91 38	138.5	57 37.3 91 38	138.1	58 04.4 90 38	137.7	58 58.4 90 39	136.9	60 45.4 89 40	135.1	62 30.7 87 41	133.1	62 56.7 87 42	132.5	63 48.4 86 42	131.4	4
25	56 47.5 90 39	137.1	57 14.5 90 39	136.7	57 41.5 90 39	136.2	58 35.1 89 40	135.4	60 21.4 88 41	133.6	62 05.9 86 42	131.5	62 31.7 86 43	131.0	63 23.0 85 43	129.8	25
6	56 24.4 90 40	135.6	56 51.2 89 40	135.2	57 18.0 89 40	134.8	58 11.3 89 41	133.9	59 56.7 87 42	132.1	61 40.5 86 43	130.0	62 06.1 85 44	129.5	62 56.9 84 44	128.3	6
7	56 00.6 89 40	134.2	56 27.3 89 41	133.8	56 53.9 89 41	133.4	57 46.8 88 42	132.5	59 31.6 87 43	130.6	61 14.5 85 44	128.5	61 39.9 84 44	128.0	62 30.3 84 45	126.8	7
8	55 36.2 89 42	132.8	56 02.8 88 42	132.4	56 29.2 88 42	132.0	57 21.8 87 43	131.1	59 05.8 86 44	129.2	60 48.0 84 45	127.1	61 13.2 84 45	126.5	62 03.2 83 46	125.4	8
9	55 11.4 88 42	131.4	55 37.7 88 43	131.0	56 04.0 87 43	130.6	56 56.2 87 43	129.7	58 39.5 85 45	127.8	60 21.0 84 46	125.7	60 46.0 83 46	125.1	61 35.6 82 47	123.9	9
30	54 45.9 87 43	130.1	55 12.1 87 43	129.6	55 38.2 87 44	129.2	56 30.2 86 44	128.3	58 12.8 85 45	126.4	59 53.5 83 47	124.3	60 18.3 83 47	123.7	61 07.5 82 47	122.5	30
1	54 20.0 87 44	128.7	54 46.1 87 44	128.3	55 12.0 86 44	127.9	56 03.6 86 45	127.0	57 45.5 84 46	125.0	59 25.5 82 47	122.9	59 50.2 82 48	122.4	60 39.0 81 48	121.2	1
2	53 53.6 86 45	127.4	54 19.5 86 45	127.0	54 45.3 86 45	126.6	55 36.6 85 46	125.7	57 17.8 84 47	123.7	58 57.2 82 48	121.6	59 21.6 81 48	121.0	60 10.1 80 49	119.9	2
3	53 26.7 86 46	126.2	53 52.5 86 46	125.7	54 18.1 85 46	125.3	55 09.1 85 47	124.4	56 49.7 83 48	122.4	58 28.4 81 49	120.3	58 52.7 81 49	119.7	59 40.9 80 49	118.6	3
4	52 59.4 85 46	124.9	53 25.0 85 46	124.5	53 50.5 85 47	124.0	54 41.2 84 47	123.1	56 21.2 83 48	121.1	57 59.2 81 49	119.0	58 23.4 80 49	118.4	59 11.2 79 50	117.3	4
35	52 31.7 85 47	123.6	52 57.2 85 47	123.2	53 22.5 84 47	122.8	54 12.9 84 48	121.8	55 52.3 82 49	119.9	57 29.7 80 50	117.8	57 53.7 80 50	117.2	58 41.2 79 50	116.0	35
6	52 03.6 85 48	122.4	52 28.9 84 48	122.0	52 54.1 84 48	121.5	53 44.2 83 48	120.6	55 23.0 82 49	118.7	56 59.8 80 50	116.5	57 23.7 79 50	116.0	58 10.9 78 51	114.8	6
7	51 35.1 84 48	121.2	52 00.2 84 48	120.8	52 25.3 83 48	120.3	53 15.1 83 49	119.4	54 53.4 81 50	117.5	56 29.7 79 51	115.3	56 53.4 79 51	114.8	57 40.3 78 51	113.6	7
8	51 06.2 84 49	120.0	51 31.2 83 49	119.6	51 56.2 83 49	119.1	52 45.7 82 50	118.2	54 23.5 81 50	116.3	55 59.2 79 51	114.2	56 22.8 78 51	113.6	57 09.4 77 52	112.5	8
9	50 37.0 83 49	118.9	51 01.9 83 49	118.4	51 26.7 83 50	118.0	52 16.0 82 50	117.1	53 53.3 80 51	115.1	55 28.4 78 52	113.0	55 51.9 78 52	112.4	56 38.3 77 52	111.3	9
40	50 07.4 83 50	117.7	50 32.2 82 50	117.3	50 56.9 82 50	116.8	51 46.0 81 51	115.9	53 22.7 80 51	114.0	54 57.4 78 52	111.9	55 20.8 77 52	111.3	56 06.9 76 53	110.2	40
1	49 37.6 82 50	116.6	50 02.3 82 50	116.1	50 26.8 82 51	115.7	51 15.7 81 51	114.8	52 51.9 79 52	112.8	54 26.2 78 52	110.7	54 49.4 77 53	110.2	55 35.3 76 53	109.1	1
2	49 07.4 82 51	115.5	49 32.0 82 51	115.0	49 56.5 81 51	114.6	50 45.1 81 51	113.7	52 20.9 79 52	111.7	53 54.7 77 53	109.6	54 17.8 77 53	109.1	55 03.5 76 53	108.0	2
3	48 37.0 82 51	114.4	49 01.5 81 51	113.9	49 25.8 81 52	113.5	50 14.2 80 52	112.6	51 49.6 79 53	110.6	53 23.0 77 53	108.6	53 46.0 76 53	108.0	54 31.5 75 54	106.9	3
4	48 06.3 81 52	113.3	48 30.7 81 52	112.9	48 54.9 81 52	112.4	49 43.1 80 52	111.5	51 18.1 78 53	109.6	52 51.1 77 53	107.5	53 14.0 76 54	107.0	53 59.3 75 54	105.9	4
45	47 35.4 81 52	112.2	47 59.6 81 52	111.8	48 23.8 80 52	111.3	49 11.8 80 53	110.4	50 46.4 78 53	108.5	52 19.0 76 54	106.5	52 41.8 76 54	105.9	53 27.0 75 54	104.8	45
6	47 04.2 81 52	111.2	47 28.4 80 52	110.7	47 52.4 80 53	110.3	48 40.2 79 53	109.4	50 14.5 78 54	107.5	51 46.7 76 54	105.4	52 09.5 76 54	104.9	52 54.5 75 54	103.8	6
7	46 32.8 80 53	110.1	46 56.9 80 53	109.7	47 20.9 80 53	109.3	48 08.5 79 53	108.3	49 42.4 77 54	106.5	51 14.3 76 54	104.4	51 37.0 75 54	103.9	52 21.8 74 55	102.8	7
8	46 01.2 80 53	109.1	46 25.2 80 53	108.7	46 49.1 79 53	108.2	47 36.5 79 54	107.3	49 10.1 77 54	105.4	50 41.8 75 54	103.4	51 04.3 75 55	102.9	51 49.0 74 55	101.8	8
9	45 29.4 80 53	108.1	45 53.3 80 53	107.7	46 17.1 79 54	107.2	47 04.4 78 54	106.3	48 37.7 77 54	104.5	50 09.1 75 55	102.5	50 31.6 75 55	101.9	51 16.2 74 55	100.9	9
50	44 57.4 80 54	107.1	45 21.3 79 54	106.7	45 45.0 79 54	106.2	46 32.2 78 54	105.3	48 05.2 77 54	103.5	49 36.2 75 55	101.5	49 58.7 75 55	101.0	50 43.1 74 55	99.9	50
1	44 25.3 79 54	106.1	44 49.0 79 54	105.7	45 12.7 79 54	105.2	45 59.7 78 54	104.4	47 32.5 77 55	102.5	49 03.3 75 55	100.5	49 25.7 74 55	100.0	50 10.1 73 55	99.0	1
2	43 53.0 79 54	105.1	44 16.7 79 54	104.7	44 40.3 78 54	104.3	45 27.1 78 54	103.4	46 59.6 76 55	101.5	48 30.3 75 55	99.6	48 52.6 74 55	99.1	49 36.9 73 55	98.1	2
3	43 20.5 79 54	104.2	43 44.1 79 54	103.7	44 07.7 78 54	103.3	44 54.4 78 55	102.4	46 26.7 76 55	100.6	47 57.1 75 55	98.7	48 19.4 74 55	98.2	49 03.6 73 56	97.1	3
4	42 47.9 79 54	103.2	43 11.5 78 55	102.8	43 35.0 78 55	102.4	44 21.6 77 55	101.5	45 53.7 76 55	99.7	47 23.9 74 55	97.8	47 46.2 74 56	97.3	48 30.3 73 56	96.2	4
55	42 15.2 79 55	102.3	42 38.7 78 55	101.9	43 02.1 78 55	101.4	43 48.7 77 55	100.6	45 20.6 76 55	98.8	46 50.7 74 56	96.8	47 12.9 74 56	96.4	47 56.9 73 56	95.3	55
6	41 42.3 78 55	101.3	42 05.8 78 55	100.9	42 29.2 78 55	100.5	43 15.7 77 55	99.6	44 47.4 76 55	97.8	46 17.3 74 56	96.0	46 39.5 74 56	95.5	47 23.5 73 56	94.5	6
7	41 09.4 78 55	100.4	41 32.8 78 55	100.0	41 56.2 78 55	99.6	42 42.5 77 55	98.7	44 14.1 76 56	96.9	45 43.9 74 56	95.1	46 06.1 74 56	94.6	46 50.0 73 56	93.6	7
8	40 36.3 78 55	99.5	40 59.7 78 55	99.1	41 23.0 77 55	98.7	42 09.3 77 55	97.8	43 40.8 76 56	96.1	45 10.5 74 56	94.2	45 32.6 74 56	93.7	46 16.5 73 56	92.7	8
9	40 03.2 78 55	98.6	40 26.6 78 55	98.2	40 49.8 77 56	97.8	41 36.1 77 56	96.9	43 07.4 75 56	95.2	44 37.0 74 56	93.3	44 59.1 74 56	92.8	45 43.0 73 56	91.9	9
60	39 30.0 78 56	97.7	39 53.3 78 56	97.3	40 16.5 77 56	96.9	41 02.7 77 56	96.0	42 33.9 75 56	94.3	44 03.5 74 56	92.5	44 25.6 73 56	92.0	45 09.5 73 56	91.0	60
1	38 56.7 78 56	96.8	39 20.0 77 56	96.4	39 43.2 77 56	96.0	40 29.3 77 56	95.2	42 00.5 75 56	93.4	43 30.0 74 56	91.6	43 52.1 73 56	91.2	44 35.9 73 56	90.2	1
2	38 23.4 78 56	95.9	38 46.6 77 56	95.5	39 09.8 77 56	95.1	39 55.9 77 56	94.3	41 27.0 75 56	92.6	42 56.4 74 56	90.8	43 18.5 73 56	90.3	44 02.4 73 56	89.4	2
3	37 50.0 78 56	95.1	38 13.2 77 56	94.7	38 36.4 77 56	94.3	39 22.4 76 56	93.4	40 53.4 75 56	91.7	42 22.9 74 56	89.9	42 45.0 73 56	89.5	43 28.8 73 56	88.6	3
4	37 16.5 78 56	94.2	37 39.8 77 56	93.8	38 02.9 77 56	93.4	38 48.9 76 56	92.6	40 19.9 75 56	90.9	41 49.3 74 56	89.1	42 11.4 73 56	88.7	42 55.3 73 56	87.7	4
65	36 43.1 77 56	93.3	37 06.3 77 56	93.0	37 29.4 77 56	92.6	38 15.4 76 56	91.7	39 46.3 75 56	90.1	41 15.8 74 56	88.3	41 37.9 74 56	87.9	42 21.8 73 56	86.9	65
6	36 09.6 77 56	92.5	36 32.7 77 56	92.1	36 55.9 77 56	91.7	37 41.8 76 56	90.9	39 12.8 75 56	89.2	40 42.2 74 56	87.5	41 04.4 74 56	87.0	41 48.3 73 56	86.1	6
7	35 36.0 77 56	91.7	35 59.2 77 56	91.3	36 22.3 77 56	90.9	37 08.3 76 56	90.1	38 39.2 75 56	88.4	40 08.7 74 56	86.7	40 30.9 74 56	86.2	41 14.8 73 56	85.3	7
8	35 02.5 77 56	90.8	35 25.7 77 56	90.4	35 48.8 77 56	90.0	36 34.7 76 56	89.2	38 05.7 75 56	87.6	39 35.3 74 56	85.9	39 57.4 74 56	85.5	40 41.4 73 56	84.6	8
9	34 28.9 77 56	90.0	34 52.1 77 56	89.6	35 15.2 77 56	89.2	36 01.2 76 56	88.4	37 32.2 75 56	86.8	39 01.8 74 56	85.1	39 24.0 74 56	84.7	40 08.0 73 56	83.8	9
70	33 55.4 77 56	89.2	34 18.6 77 56	88.8	34 41.7 77 56	88.4	35 27.7 76 56	87.6	36 58.7 75 56	86.0	38 28.4 74 56	84.3	38 50.6 74 56	83.9	39 34.7 73 55	83.0	70
1	33 21.8 77 56	88.3	33 45.0 77 56	88.0	34 08.1 77 56	87.6	34 54.2 76 56	86.8	36 25.3 75 56	85.2	37 55.0 74 56	83.5	38 17.3 74 55	83.1	39 01.4 73 55	82.2	1
2	32 48.3 77 56	87.5	33 11.5 77 56	87.1	33 34.6 77 56	86.8	34 20.7 76 56	86.0	35 51.9 75 56	84.4	37 21.7 74 55	82.7	37 44.0 74 55	82.3	38 28.2 73 55	81.5	2
3	32 14.8 77 56	86.7	32 38.0 77 56	86.3	33 01.1 77 56	86.0	33 47.2 77 56	85.2	35 18.5 76 56	83.6	36 48.5 74 55	82.0	37 10.8 74 55	81.6	37 55.0 74 55	80.7	3
4	31 41.3 78 56	85.9	32 04.5 77 56	85.5	32 27.7 77 56	85.2	33 13.8 77 56	84.4	34 45.2 76 55	82.8	36 15.3 75 55	81.2	36 37.6 74 55	80.8	37 22.0 74 55	80.0	4
75	31 07.9 78 56	85.1	31 31.1 77 56	84.7	31 54.3 77 56	84.4	32 40.4 77 56	83.6	34 11.9 76 55	82.1	35 42.2 75 55	80.4	36 04.5 74 55	80.0	36 49.0 74 55	79.2	75
6	30 34.5 78 56	84.3	30 57.7 77 56	83.9	31 20.9 77 56	83.6	32 07.1 77 55	82.8	33 38.7 76 55	81.3	35 09.1 75 55	79.7	35 31.5 75 55	79.3	36 16.1 74 55	78.4	6
7	30 01.1 78 56	83.5	30 24.4 78 55	83.1	30 47.6 77 55	82.8	31 33.9 77 55	82.0	33 05.6 76 55	80.5	34 36.1 75 55	78.9	34 58.6 75 55	78.5	35 43.2 74 55	77.7	7
8	29 27.8 78 56	82.7	29 51.1 78 55	82.4	30 14.4 77 55	82.0	31 00.7 77 55	81.3	32 32.5 76 55	79.7	34 03.3 75 55	78.2	34 25.8 75 55	77.8	35 10.5 74 54	77.0	8
9	28 54.5 78 55	81.9	29 17.9 78 55	81.6	29 41.2 78 55	81.2	30 27.5 77 55	80.5	31 59.6 76 55	79.0	33 30.5 75 54	77.4	33 53.0 75 54	77.0	34 37.9 74 54	76.2	9
80	28 21.4 78 55	81.1	28 44.7 78 55	80.8	29 08.0 78 55	80.4	29 54.5 77 55	79.7	31 26.7 76 55	78.2	32 57.8 75 54	76.7	33 20.4 75 54	76.3	34 05.3 75 54	75.5	80
1	27 48.2 78 55	80.4	28 11.6 78 55	80.0	28 35.0 78 55	79.7	29 21.5 77 55	78.9	30 53.9 77 54	77.5	32 25.2 76 54	75.9	32 47.8 75 54	75.5	33 32.9 75 54	74.8	1
2	27 15.2 78 55	79.6	27 38.6 78 55	79.2	28 02.0 78 55	78.9	28 48.6 77 55	78.2	30 21.2 77 54	76.7	31 52.7 76 54	75.2	32 15.4 76 54	74.8	33 00.6 75 54	74.0	2
3	26 42.2 78 55	78.8	27 05.7 78 55	78.5	27 29.2 78 55	78.1	28 15.8 78 54	77.4	29 48.6 77 54	76.0	31 20.3 76 54	74.5	31 43.1 76 54	74.1	32 28.4 75 53	73.3	3
4	26 09.4 78 55	78.0	26 32.9 78 55	77.7	26 56.4 78 54	77.3	27 43.2 78 54	76.6	29 16.1 77 54	75.2	30 48.0 76 54	73.7	31 10.9 76 53	73.3	31 56.3 76 53	72.6	4
85	25 36.6 79 54	77.3	26 00.2 78 54	76.9	26 23.7 78 54	76.6	27 10.6 78 54	75.9	28 43.7 77 54	74.5	30 15.9 76 53	73.0	30 38.8 76 53	72.6	31 24.4 76 53	71.8	85
6	25 03.9 79 54	76.5	25 27.5 79 54	76.2	25 51.1 78 54	75.8	26 38.1 78 54	75.1	28 11.4 77 54	73.7	29 43.9 77 53	72.2	30 06.8 76 53	71.9	30 52.6 76 53	71.1	6
7	24 31.3 79 54	75.7	24 55.0 79 54	75.4	25 18.6 79 54	75.1	26 05.7 78 54	74.4	27 39.3 78 53	73.0	29 12.0 77 53	71.5	29 35.0 77 53	71.2	30 20.9 76 53	70.4	7
8	23 58.9 79 54	75.0	24 22.6 79 54	74.6	24 46.3 79 54	74.3	25 33.5 79 54	73.6	27 07.3 78 53	72.2	28 40.2 77 53	70.8	29 03.3 77 53	70.4	29 49.3 76 52	69.7	8
9	23 26.5 79 54	74.2	23 50.3 79 54	73.9	24 14.0 79 54	73.5	25 01.3 79 53	72.9	26 35.4 78 53	71.5	28 08.6 77 52	70.1	28 31.8 77 52	69.7	29 18.0 77 52	69.0	9
	22 54.3 79 54	73.4	23 18.1 79 53	73.1	23 41.9 79 53	72.8	24 29.3 79 53	72.1	26 03.6 78 53	70.7	27 37.1 78 52	69.3	28 00.4 77 52	69.0	28 46.7 77 52	68.3	90

Lat. 56°

H.A.	28° 00′ Alt.	Δd	Δt	Az.	28° 30′ Alt.	Δd	Δt	Az.	29° 00′ Alt.	Δd	Δt	Az.	30° 00′ Alt.	Δd	Δt	Az.	32° 00′ Alt.	Δd	Δt	Az.	34° 00′ Alt.	Δd	Δt	Az.	34° 30′ Alt.	Δd	Δt	Az.	35° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	6 00.0	1.0	00	180.0	5 30.0	1.0	00	180.0	5 00.0	1.0	00	180.0																					00
1	5 59.7	1.0	01	179.1	5 29.7	1.0	01	179.1																									1
2	5 59.0	1.0	02	178.2	5 29.0	1.0	02	178.2																									2
3	5 57.7	1.0	03	177.3	5 27.7	1.0	03	177.4																									3
4	5 55.8	1.0	04	176.4	5 25.9	1.0	04	176.5																									4
05	5 53.5	1.0	05	175.6	5 23.5	1.0	05	175.6																									05
6	5 50.7	1.0	06	174.7	5 20.7	1.0	06	174.7																									6
7	5 47.3	1.0	06	173.8	5 17.4	1.0	06	173.8																									7
8	5 43.4	1.0	07	172.9	5 13.5	1.0	07	172.9																									8
9	5 39.0	1.0	08	172.0	5 09.1	1.0	08	172.1																									9
10	5 34.1	1.0	09	171.1	5 04.2	1.0	09	171.2																									10
1	5 28.7	99	10	170.3																													1
2	5 22.7	99	11	169.4																													2
3	5 16.3	99	12	168.5																													3
4	5 09.3	99	12	167.6																													4
15	5 01.9	99	13	166.7																													15

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′ Alt.	Δd	Δt	Az.	28° 30′ Alt.	Δd	Δt	Az.	29° 00′ Alt.	Δd	Δt	Az.	30° 00′ Alt.	Δd	Δt	Az.	32° 00′ Alt.	Δd	Δt	Az.	34° 00′ Alt.	Δd	Δt	Az.	34° 30′ Alt.	Δd	Δt	Az.	35° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	22 22.2	80	53	72.7	22 46.1	80	53	72.4	23 09.9	79	53	72.0	23 57.5	79	53	71.4	25 32.0	78	52	70.0	27 05.8	78	52	68.6	27 29.1	78	52	68.3	28 15.6	77	52	67.5	91
2	21 50.3	80	53	71.9	22 14.2	80	53	71.6	22 38.1	80	53	71.3	23 25.8	79	53	70.6	25 00.6	79	52	69.3	26 34.7	78	52	67.9	26 58.1	78	52	67.5	27 44.7	78	51	66.8	2
3	21 18.4	80	53	71.2	21 42.4	80	53	70.8	22 06.4	80	53	70.5	22 54.2	80	52	69.9	24 29.3	79	52	68.5	26 03.7	78	51	67.2	26 27.1	78	51	66.8	27 13.9	78	51	66.1	3
4	20 46.8	80	52	70.4	21 10.8	80	52	70.1	21 34.8	80	52	69.8	22 22.8	80	52	69.1	23 58.1	79	52	67.8	25 32.8	79	51	66.4	25 56.4	78	51	66.1	26 43.3	78	51	65.4	4
95	20 15.2	80	52	69.6	20 39.3	80	52	69.3	21 03.4	80	52	69.0	21 51.5	80	52	68.4	23 27.2	79	51	67.1	25 02.2	79	51	65.7	25 25.8	79	51	65.4	26 12.9	78	50	64.7	95
6	19 43.8	81	52	68.9	20 08.0	81	52	68.6	20 32.2	80	52	68.3	21 20.4	80	52	67.6	22 56.3	80	51	66.3	24 31.7	79	51	65.0	24 55.4	79	50	64.7	25 42.7	79	50	64.0	6
7	19 12.6	81	52	68.1	19 36.9	81	52	67.8	20 01.1	81	52	67.5	20 49.4	80	51	66.9	22 25.7	80	51	65.6	24 01.3	79	50	64.3	24 25.2	79	50	63.9	25 12.6	79	50	63.3	7
8	18 41.6	81	52	67.4	19 05.9	81	51	67.1	19 30.2	81	51	66.8	20 18.7	81	51	66.1	21 55.2	80	50	64.9	23 31.2	80	50	63.6	23 55.1	80	50	63.2	24 42.8	79	49	62.6	8
9	18 10.7	81	51	66.6	18 35.1	81	51	66.3	18 59.4	81	51	66.0	19 48.1	81	51	65.4	21 25.0	81	50	64.1	23 01.3	80	50	62.8	23 25.2	80	49	62.5	24 13.1	80	49	61.8	9
100	17 40.0	82	51	65.9	18 04.4	82	51	65.6	18 28.9	81	51	65.3	19 17.7	81	50	64.6	20 54.9	81	50	63.4	22 31.5	80	49	62.1	22 55.6	80	49	61.8	23 43.6	80	49	61.1	100
1	17 09.5	82	50	65.1	17 34.0	82	50	64.8	17 58.5	82	50	64.5	18 47.5	81	50	63.9	20 25.0	81	50	62.7	22 02.0	81	49	61.4	22 26.1	80	49	61.1	23 14.3	80	48	60.4	1
2	16 39.1	82	50	64.4	17 03.7	82	50	64.1	17 28.3	82	50	63.8	18 17.4	82	50	63.1	19 55.3	81	49	61.9	21 32.6	81	49	60.7	21 56.8	81	48	60.4	22 45.2	81	48	59.7	2
3	16 09.0	82	50	63.6	16 33.7	82	50	63.3	16 58.3	82	50	63.0	17 47.6	82	49	62.4	19 25.8	82	49	61.2	21 03.5	81	48	60.0	21 27.8	81	48	59.6	22 16.4	81	48	59.0	3
4	15 39.0	83	50	62.8	16 03.8	83	49	62.5	16 28.5	82	49	62.2	17 18.0	82	49	61.7	18 56.5	82	48	60.5	20 34.5	81	48	59.2	20 59.0	81	48	58.9	21 47.7	81	47	58.3	4
105	15 09.3	83	49	62.1	15 34.1	83	49	61.8	15 58.9	83	49	61.5	16 48.5	83	49	60.9	18 27.4	82	48	59.7	20 05.8	82	48	58.5	20 30.3	82	47	58.2	21 19.3	81	47	57.6	105
6	14 39.7	83	49	61.3	15 04.7	83	49	61.0	15 29.6	83	49	60.7	16 19.3	83	48	60.2	17 58.5	83	48	59.0	19 37.3	82	47	57.8	20 01.9	82	47	57.5	20 51.1	82	47	56.9	6
7	14 10.4	83	48	60.6	14 35.4	83	48	60.3	15 00.4	83	48	60.0	15 50.3	83	48	59.4	17 29.9	83	47	58.2	19 09.0	82	47	57.1	19 33.7	82	47	56.8	20 23.1	82	46	56.2	7
8	13 41.3	84	48	59.8	14 06.4	84	48	59.5	14 31.5	84	48	59.2	15 21.6	83	48	58.7	17 01.5	83	47	57.5	18 41.0	83	46	56.3	19 05.8	83	46	56.0	19 55.3	82	46	55.4	8
9	13 12.4	84	48	59.0	13 37.6	84	48	58.8	14 02.7	84	48	58.5	14 53.0	84	47	57.9	16 33.3	83	47	56.8	18 13.2	83	46	55.6	18 38.1	83	46	55.3	19 27.8	83	45	54.7	9
110	12 43.7	84	47	58.3	13 09.0	84	47	58.0	13 34.3	84	47	57.7	14 24.7	84	47	57.2	16 05.3	84	46	56.0	17 45.6	83	46	54.9	18 10.6	83	45	54.6	19 00.6	83	45	54.0	110
1	12 15.3	85	47	57.5	12 40.7	84	47	57.2	13 06.0	84	47	57.0	13 56.6	84	46	56.4	15 37.6	84	46	55.3	17 18.3	84	45	54.2	17 43.4	84	45	53.9	18 33.5	83	45	53.3	1
2	11 47.1	85	47	56.8	12 12.6	85	46	56.5	12 38.0	85	46	56.2	13 28.8	85	46	55.7	15 10.2	84	45	54.6	16 51.2	84	45	53.4	17 16.4	84	45	53.2	18 06.8	84	44	52.6	2
3	11 19.2	85	46	56.0	11 44.7	85	46	55.7	12 10.2	85	46	55.4	13 01.2	85	46	54.9	14 43.0	85	45	53.8	16 24.4	84	44	52.7	16 49.7	84	44	52.4	17 40.2	84	44	51.9	3
4	10 51.5	85	46	55.2	11 17.1	85	46	55.0	11 42.7	85	45	54.7	12 33.9	85	45	54.2	14 16.0	85	44	53.1	15 57.8	85	44	52.0	16 23.2	85	44	51.7	17 14.0	84	43	51.1	4
115	10 24.1	86	45	54.4	10 49.8	86	45	54.2	11 15.5	86	45	53.9	12 06.8	86	45	53.4	13 49.3	85	44	52.3	15 31.5	85	43	51.2	15 57.0	85	43	51.0	16 48.0	85	43	50.4	115
6	9 56.9	86	45	53.7	10 22.7	86	45	53.4	10 48.5	86	44	53.2	11 40.0	86	44	52.6	13 22.9	86	44	51.6	15 05.5	85	43	50.5	15 31.1	85	43	50.2	16 22.3	85	42	49.7	6
7	9 30.0	86	44	52.9	9 55.9	86	44	52.6	10 21.8	86	44	52.4	11 13.5	86	44	51.9	12 56.8	86	43	50.8	14 39.8	86	42	49.8	15 05.5	86	42	49.5	15 56.8	86	42	49.0	7
8	9 03.4	87	44	52.1	9 29.4	87	44	51.9	9 55.3	87	44	51.6	10 47.2	86	43	51.1	12 30.9	86	43	50.1	14 14.3	86	42	49.0	14 40.1	86	42	48.8	15 31.6	86	42	48.2	8
9	8 37.1	87	44	51.4	9 03.1	87	43	51.1	9 29.2	87	43	50.9	10 21.3	87	43	50.4	12 05.3	87	42	49.3	13 49.1	86	42	48.3	14 15.0	86	41	48.0	15 06.8	86	41	47.5	9
120	8 11.0	87	43	50.6	8 37.2	87	43	50.3	9 03.3	87	43	50.1	9 55.6	87	42	49.6	11 40.0	87	42	48.6	13 24.2	87	41	47.6	13 50.2	87	41	47.3	14 42.2	87	40	46.8	120
1	7 45.2	88	42	49.8	8 11.5	87	42	49.6	8 37.7	87	42	49.3	9 30.2	87	42	48.8	11 15.0	87	41	47.8	12 59.6	87	41	46.8	13 25.7	87	40	46.6	14 17.8	87	40	46.1	1
2	7 19.7	88	42	49.0	7 46.1	88	42	48.8	8 12.4	88	42	48.5	9 05.1	88	41	48.1	10 50.2	88	41	47.1	12 35.2	87	40	46.1	13 01.4	87	40	45.8	13 53.8	87	40	45.3	2
3	6 54.6	88	42	48.2	7 21.0	88	41	48.0	7 47.4	88	41	47.8	8 40.3	88	41	47.3	10 25.8	88	40	46.3	12 11.2	88	40	45.3	12 37.5	88	39	45.1	13 30.1	88	39	44.6	3
4	6 29.7	88	41	47.5	6 56.2	88	41	47.2	7 22.7	88	41	47.0	8 15.8	88	40	46.5	10 01.7	88	40	45.6	11 47.5	88	39	44.6	12 13.9	88	39	44.4	13 06.7	88	38	43.9	4
125	6 05.1	89	40	46.7	6 31.8	89	40	46.4	6 58.4	89	40	46.2	7 51.6	89	40	45.7	9 37.9	89	39	44.8	11 24.1	88	38	43.9	11 50.6	88	38	43.6	12 43.6	88	38	43.1	125
6	5 40.9	89	40	45.9	6 07.6	89	40	45.6	6 34.3	89	40	45.4	7 27.7	89	39	45.0	9 14.4	89	39	44.0	11 01.0	89	38	43.1	11 27.6	89	38	42.9	12 20.8	89	37	42.4	6
7	5 17.0	89	39	45.1	5 43.8	89	39	44.9	6 10.6	89	39	44.6	7 04.2	89	39	44.2	8 51.3	89	38	43.3	10 38.3	89	37	42.4	11 05.0	89	37	42.1	11 58.4	89	37	41.7	7
8					5 20.3	90	39	44.1	5 47.2	90	38	43.8	6 41.0	90	38	43.4	8 28.4	90	38	42.5	10 15.8	89	37	41.6	10 42.6	89	37	41.4	11 36.2	89	36	40.9	8
9									5 24.1	90	38	43.1	6 18.1	90	38	42.6	8 05.9	90	37	41.7	9 53.7	90	36	40.8	10 20.6	90	36	40.6	11 14.4	90	36	40.2	9
130									5 01.4	90	37	42.3	5 55.5	90	37	41.8	7 43.8	90	36	41.0	9 31.9	90	36	40.1	9 58.9	90	36	39.9	10 53.0	90	35	39.4	130
1													5 33.3	91	36	41.0	7 22.0	90	36	40.2	9 10.5	90	35	39.3	9 37.6	90	35	39.1	10 31.8	90	35	38.7	1
2													5 11.5	91	36	40.3	7 00.5	91	35	39.4	8 49.4	91	35	38.6	9 16.6	91	34	38.4	10 11.0	91	34	37.9	2
3																	6 39.3	91	35	38.6	8 28.7	91	34	37.8	8 56.0	91	34	37.6	9 50.6	91	34	37.2	3
4																	6 18.6	91	34	37.9	8 08.3	91	33	37.0	8 35.7	91	33	36.8	9 30.5	91	33	36.4	4
135																	5 58.2	92	33	37.1	7 48.2	92	33	36.3	8 15.7	92	33	36.1	9 10.7	92	32	35.7	135
6																	5 38.1	92	33	36.3	7 28.6	92	32	35.5	7 56.2	92	32	35.3	8 51.3	92	32	34.9	6
7																	5 18.4	92	32	35.5	7 09.3	92	32	34.7	7 37.0	92	31	34.5	8 32.3	92	31	34.2	7
8																					6 50.3	93	31	34.0	7 18.1	93	31	33.8	8 13.7	93	30	33.4	8
9																					6 31.8	93	30	33.2	6 59.6	93	30	33.0	7 55.4	93	30	32.6	9
140																					6 13.6	93	30	32.4	6 41.6	93	30	32.2	7 37.5	93	29	31.9	140
1																					5 55.8	94	29	31.6	6 23.9	94	29	31.5	7 20.0	93	29	31.1	1
2																					5 38.4	94	28	30.9	6 06.5	94	28	30.7	7 02.8	94	28	30.3	2
3																					5 21.4	94	28	30.1	5 49.6	94	28	29.9	6 46.1	94	27	29.6	3
4																					5 04.8	94	27	29.3	5 33.1	94	27	29.1	6 29.7	94	27	28.8	4
145																									5 17.0	95	26	28.3	6 13.8	95	26	28.0	145
6																									5 01.2	95	26	27.6	5 58.2	95	25	27.2	6
7																													5 43.0	95	25	26.5	7
8																													5 28.3	95	24	25.7	8
9																													5 14.0	96	23	24.9	9
150																													5 00.0	96	22	24.1	150

Lat. 57°

Lat. 58°

Digitized by Google

Lat. 56°

H.A	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	
00	70 00.0	1.0 01	180.0	71 00.0	1.0 01	180.0	72 30.0	1.0 01	180.0	74 00.0	1.0 01	180.0	76 00.0	1.0 02	180.0	76 30.0	1.0 02	180.0	77 00.0	1.0 02	180.0	79 00.0	1.0 02	180.0	00
1	69 59.3	1.0 02	177.6	70 59.3	1.0 04	177.5	72 29.2	1.0 04	177.4	73 59.2	1.0 04	177.2	75 59.1	1.0 04	176.9	76 29.1	1.0 05	176.8	76 59.0	1.0 05	176.8	78 58.9	1.0 05	176.3	1
2	69 57.2	1.0 06	175.3	70 57.1	1.0 06	175.1	72 27.0	1.0 06	174.8	73 56.7	1.0 07	174.5	75 56.4	1.0 07	173.9	76 26.3	1.0 08	173.7	76 56.2	1.0 08	173.5	78 55.7	99 09	172.6	2
3	69 53.8	1.0 08	172.9	70 53.6	1.0 09	172.7	72 23.2	1.0 09	172.2	73 52.7	99 09	171.7	75 51.9	99 10	170.8	76 21.7	99 11	170.6	76 51.5	99 11	170.3	78 50.3	99 12	169.0	3
4	69 49.0	99 10	170.6	70 48.6	99 11	170.2	72 17.9	99 11	169.7	73 47.1	99 12	169.0	75 45.7	99 13	167.8	76 15.3	99 14	167.5	76 44.9	99 14	167.1	78 42.9	98 16	165.4	4
05	69 42.8	99 12	168.3	70 42.2	99 13	167.8	72 11.1	99 14	167.1	73 39.9	98 15	166.3	75 37.8	98 16	164.9	76 07.2	98 16	164.5	76 36.6	98 17	164.0	78 33.4	97 19	161.9	05
6	69 35.3	99 15	166.0	70 34.4	98 15	165.5	72 02.9	98 16	164.6	73 31.2	98 17	163.6	75 28.2	97 19	162.0	75 57.4	97 19	161.5	76 26.5	97 20	161.0	78 22.0	96 22	158.5	6
7	69 26.6	98 17	163.7	70 25.4	98 17	163.1	71 53.3	98 18	162.1	73 20.9	97 19	161.0	75 17.1	96 21	159.1	75 45.9	96 22	158.6	76 14.7	96 22	158.0	78 08.9	94 25	155.2	7
8	69 16.5	98 19	161.4	70 15.0	97 19	160.8	71 42.4	97 20	159.7	73 09.3	96 22	158.4	75 04.3	95 24	156.3	75 32.9	95 24	155.7	76 01.3	95 25	155.1	77 53.9	93 28	152.0	8
9	69 05.2	97 21	159.2	70 03.3	97 22	158.5	71 30.1	96 23	157.3	72 56.3	95 24	155.9	74 50.1	94 26	153.6	75 18.4	94 27	153.0	75 46.5	93 27	152.3	77 37.4	91 30	148.9	9
10	68 52.7	96 23	157.1	69 50.4	96 23	156.3	71 16.5	95 25	155.0	72 41.9	95 26	153.4	74 34.5	93 28	151.0	75 02.4	93 29	150.3	75 30.1	92 30	149.5	77 19.3	90 32	146.0	10
1	68 39.1	96 25	154.9	69 36.3	96 25	154.1	71 01.7	94 27	152.7	72 26.3	94 28	151.0	74 17.6	92 30	148.4	74 45.1	91 31	147.7	75 12.4	91 32	146.9	76 59.9	88 35	143.2	1
2	68 24.3	95 26	152.8	69 21.1	94 27	151.9	70 45.7	94 29	150.4	72 09.4	93 30	148.7	73 59.4	91 32	145.9	74 26.5	90 33	145.1	74 53.5	90 34	144.3	76 39.1	86 37	140.4	2
3	68 08.4	94 28	150.7	69 04.7	94 29	149.8	70 28.6	93 30	148.2	71 51.4	91 32	146.4	73 40.0	89 34	143.5	74 06.8	89 35	142.7	74 33.3	88 35	141.8	76 17.2	85 38	137.9	3
4	67 51.5	93 30	148.7	68 47.3	93 31	147.7	70 10.3	92 32	146.1	71 32.3	90 34	144.2	73 19.5	88 36	141.2	73 45.9	88 36	140.4	74 12.0	87 37	139.5	75 54.1	83 40	135.4	4
15	67 33.6	93 31	146.7	68 28.9	92 32	145.7	69 51.1	91 34	144.0	71 12.2	89 35	142.0	72 58.0	87 38	139.0	73 24.0	86 38	138.1	73 49.7	85 39	137.2	75 30.1	82 42	133.0	15
6	67 14.7	92 33	144.8	68 09.5	91 34	143.7	69 30.9	90 35	141.9	70 51.0	88 37	139.9	72 35.5	86 39	136.8	73 01.1	85 40	135.9	73 26.5	84 40	135.0	75 05.1	80 43	130.8	6
7	66 54.9	91 34	142.9	67 49.2	90 35	141.8	69 09.8	89 37	140.0	70 29.0	87 38	137.9	72 12.1	84 40	134.7	72 37.3	84 41	133.8	73 02.3	83 42	132.9	74 39.3	79 44	128.6	7
8	66 34.2	90 36	141.0	67 28.0	89 37	139.9	68 47.8	88 38	138.0	70 06.1	86 40	135.9	71 47.8	83 42	132.7	72 12.7	82 42	131.8	72 37.3	82 43	130.8	74 12.7	77 45	126.6	8
9	66 12.7	89 37	139.2	67 06.0	88 38	138.1	68 24.9	87 39	136.2	69 42.3	85 41	134.0	71 22.8	82 43	130.7	71 47.3	81 44	129.8	72 11.5	80 44	128.9	73 45.4	76 47	124.6	9
20	65 50.4	88 38	137.5	66 43.2	88 39	136.3	68 01.3	86 41	134.3	69 17.8	84 42	132.2	70 57.0	81 44	128.9	71 21.2	80 45	127.9	71 45.1	79 45	127.0	73 17.5	75 47	122.7	20
1	65 27.4	88 40	135.7	66 19.7	87 40	134.5	67 36.9	85 42	132.6	68 52.6	83 43	130.4	70 30.5	80 45	127.0	70 54.4	79 46	126.1	71 18.0	78 46	125.2	72 49.0	73 48	120.9	1
2	65 03.6	87 41	134.1	65 55.4	86 42	132.8	67 11.9	84 43	130.8	68 26.7	82 44	128.6	70 03.5	79 46	125.3	70 27.0	78 47	124.4	70 50.2	77 47	123.4	72 20.0	72 49	119.2	2
3	64 39.2	86 42	132.4	65 30.5	85 43	131.2	66 46.2	83 44	129.2	68 00.2	81 45	127.0	69 35.8	78 47	123.6	69 59.0	77 47	122.7	70 22.0	76 48	121.7	71 50.4	71 50	117.6	3
4	64 14.1	85 43	130.8	65 04.9	84 44	129.6	66 19.9	82 45	127.5	67 33.1	80 46	125.3	69 07.6	77 48	122.0	69 30.5	76 48	121.1	69 53.2	75 49	120.1	71 20.5	70 51	116.0	4
25	63 48.4	84 44	129.2	64 38.7	83 45	128.0	65 53.0	82 46	126.0	67 05.5	79 47	123.7	68 38.9	76 49	120.4	69 01.6	75 49	119.5	69 23.9	74 49	118.5	70 50.1	69 51	114.5	25
6	63 22.1	84 45	127.7	64 12.0	83 45	126.4	65 25.6	81 47	124.4	66 37.3	78 48	122.2	68 09.7	75 49	118.9	68 32.1	74 50	118.0	68 54.3	73 50	117.0	70 19.4	69 52	113.0	6
7	62 55.3	83 46	126.2	63 44.8	82 46	125.0	64 57.6	80 47	122.9	66 08.7	78 48	120.7	67 40.1	74 50	117.4	68 02.3	73 50	116.5	68 24.2	72 51	115.6	69 48.4	68 52	111.6	7
8	62 28.0	82 46	124.8	63 17.0	81 47	123.5	64 29.3	79 48	121.5	65 39.6	77 49	119.2	67 10.1	74 51	116.0	67 32.1	73 51	115.1	67 53.7	72 51	114.2	69 17.0	67 53	110.2	8
9	62 00.2	82 47	123.3	62 48.8	80 48	122.1	64 00.4	79 49	120.0	65 10.2	76 50	117.8	66 39.8	73 51	114.6	67 01.5	72 51	113.7	67 23.0	71 52	112.8	68 45.4	66 53	108.9	9
30	61 31.9	81 48	121.9	62 20.2	80 48	120.7	63 31.2	78 49	118.6	64 40.3	76 50	116.5	66 09.1	72 52	113.2	66 30.6	71 52	112.3	66 51.9	70 52	111.5	68 13.5	66 53	107.6	30
1	61 03.2	80 48	120.6	61 51.1	79 49	119.3	63 01.5	77 50	117.3	64 10.1	75 51	115.1	65 38.1	72 52	111.9	65 59.5	71 52	111.0	66 20.5	70 53	110.2	67 41.5	65 54	106.4	1
2	60 34.2	80 49	119.3	61 21.7	79 50	118.0	62 31.5	77 51	116.0	63 39.6	74 51	113.8	65 06.9	71 53	110.6	65 28.0	70 53	109.8	65 48.9	69 53	108.9	67 09.2	65 54	105.2	2
3	60 04.7	79 50	118.0	60 51.9	78 50	116.7	62 01.2	76 51	114.7	63 08.7	74 52	112.5	64 35.3	70 53	109.4	64 56.3	70 53	108.6	65 17.0	69 53	107.7	66 36.7	64 54	104.0	3
4	59 34.9	79 50	116.7	60 21.7	77 51	115.4	61 30.6	76 52	113.4	62 37.6	73 52	111.3	64 03.6	70 53	108.2	64 24.4	69 54	107.4	64 45.0	68 54	106.5	66 04.1	64 55	102.9	4
35	59 04.7	78 51	115.4	59 51.3	77 51	114.2	60 59.7	75 52	112.2	62 06.2	73 53	110.1	63 31.6	69 54	107.0	63 52.3	69 54	106.2	64 12.7	68 54	105.4	65 31.3	63 55	101.8	35
6	58 34.3	78 51	114.2	59 20.5	76 52	113.0	60 28.5	75 52	111.0	61 34.6	72 53	108.9	62 59.4	69 54	105.9	63 20.0	68 54	105.1	63 40.3	67 54	104.2	64 58.4	63 55	100.7	6
7	58 03.6	77 52	113.0	58 49.5	76 52	111.8	59 57.0	74 53	109.9	61 02.7	72 53	107.8	62 27.1	69 54	104.8	62 47.5	68 54	104.0	63 07.7	67 55	103.2	64 25.4	63 55	99.7	7
8	57 32.5	77 52	111.9	58 18.2	76 53	110.6	59 25.4	74 53	108.7	60 30.7	71 54	106.6	61 54.5	68 54	103.7	62 14.9	67 55	102.9	62 34.9	66 55	102.1	63 52.3	62 55	98.7	8
9	57 01.3	76 52	110.7	57 46.7	75 53	109.5	58 53.5	73 53	107.6	59 58.4	71 54	105.5	61 21.9	68 55	102.6	61 42.1	67 55	101.8	62 02.1	66 55	101.0	63 19.1	62 55	97.7	9
40	56 29.8	76 53	109.6	57 15.0	75 53	108.4	58 21.4	73 54	106.5	59 26.0	71 54	104.5	60 49.1	68 55	101.6	61 09.2	67 55	100.8	61 29.1	66 55	100.0	62 45.8	62 56	96.7	40
1	55 58.1	76 53	108.5	56 43.0	74 54	107.3	57 49.1	72 54	105.4	58 53.5	70 54	103.4	60 16.1	67 55	100.5	60 36.2	66 55	99.8	60 56.0	66 55	99.0	62 12.4	62 56	95.8	1
2	55 26.2	75 54	107.4	56 10.9	74 54	106.2	57 16.7	72 54	104.4	58 20.8	70 55	102.4	59 43.1	67 55	99.6	60 03.1	66 55	98.8	60 22.8	65 55	98.1	61 39.0	62 56	94.9	2
3	54 54.0	75 54	106.3	55 38.6	74 54	105.2	56 44.1	72 55	103.3	57 47.9	70 55	101.4	59 10.0	67 55	98.6	59 29.9	66 55	97.8	59 49.6	65 56	97.1	61 05.6	61 56	94.0	3
4	54 21.8	75 54	105.3	55 06.2	73 54	104.1	56 11.4	72 55	102.3	57 15.0	70 55	100.4	58 36.7	67 55	97.6	58 56.6	66 56	96.9	59 16.2	65 56	96.2	60 32.1	61 56	93.1	4
45	53 49.3	74 54	104.3	54 33.6	73 55	103.1	55 38.6	71 55	101.3	56 41.9	69 55	99.4	58 03.5	66 56	96.7	58 23.3	66 56	96.0	58 42.8	65 56	95.2	59 58.6	61 56	92.2	45
6	53 16.7	74 55	103.3	54 00.8	73 55	102.1	55 05.6	71 55	100.3	56 08.8	69 55	98.4	57 30.1	66 56	95.7	57 49.9	66 56	95.0	58 09.4	65 56	94.3	59 25.0	61 56	91.3	6
7	52 44.0	74 55	102.3	53 27.9	73 55	101.1	54 32.6	71 55	99.4	55 35.6	69 56	97.5	56 56.7	66 56	94.8	57 16.4	65 56	94.1	57 35.9	65 56	93.4	58 51.5	61 56	90.5	7
8	52 11.2	74 55	101.3	52 55.0	72 55	100.2	53 59.4	71 55	98.4	55 02.3	69 56	96.6	56 23.2	66 56	93.9	56 42.9	65 56	93.3	57 02.4	65 56	92.6	58 17.9	61 56	89.7	8
9	51 38.2	73 55	100.3	52 21.9	72 55	99.2	53 26.2	71 56	97.5	54 28.9	69 56	95.7	55 49.8	66 56	93.1	56 09.4	65 56	92.4	56 28.9	64 56	91.7	57 44.4	61 56	88.8	9
50	51 05.2	73 55	99.4	51 48.7	72 55	98.3	52 52.9	70 56	96.6	53 55.5	69 56	94.8	55 16.2	66 56	92.2	55 35.9	65 56	91.5	55 55.4	64 56	90.9	57 10.8	61 56	88.0	50
1	50 32.0	73 55	98.4	51 15.5	72 56	97.4	52 19.5	70 56	95.7	53 22.0	69 56	93.9	54 42.7	66 56	91.3	55 02.4	65 56	90.7	55 21.8	64 56	90.0	56 37.3	61 56	87.2	1
2	49 58.8	73 56	97.5	50 42.2	72 56	96.4	51 46.1	70 56	94.8	52 48.5	68 56	93.0	54 09.2	66 56	90.5	54 28.8	65 56	89.9	54 48.3	64 56	89.2	56 03.8	61 56	86.5	2
3	49 25.5	73 56	96.6	50 08.8	72 56	95.5	51 12.7	70 56	93.9	52 15.0	68 56	92.1	53 35.6	66 56	89.7	53 55.3	65 56	89.0	54 14.7	64 56	88.4	55 30.3	61 56	85.7	3
4	48 52.1	73 56	95.7	49 35.4	72 56	94.7	50 39.2	70 56	93.0	51 41.5	68 56	91.3	53 02.1	66 56	88.9	53 21.7	65 56	88.2	53 41.2	65 56	87.6	54 56.9	62 56	84.9	4
55	48 18.7	73 56	94.8	49 01.9	72 56	93.8	50 05.7	70 56	92.1	51 07.9	68 56	90.4	52 28.5	66 56	88.0	52 48.2	65 56	87.4	53 07.7	65 56	86.8	54 23.5	62 56	84.2	55
6	47 45.3	72 56	94.0	48 28.5	71 56	92.9	49 32.1	70 56	91.3	50 34.4	68 56	89.6	51 55.0	66 56	87.2	52 14.7	65 56	86.6	52 34.2	65 56	86.0	53 50.1	62 56	83.4	6
7	47 11.8	72 56	93.1	47 54.9	71 56	92.1	48 58.6	70 56	90.5	50 00.8	68 56	88.8	51 21.5	66 56	86.5	51 41.2	65 56	85.8	52 00.7	65 56	85.2	53 16.8	62 55	82.7	7
8	46 38.3	72 56	92.2	47 21.4	71 56	91.2	48 25.0	70 56	89.6	49 27.3	68 56	88.0	50 48.0	66 56	85.7	51 07.8	65 56	85.1	51 27.3	65 56	84.5	52 43.6	62 55	82.0	8
9	46 04.7	72 56	91.4	46 47.9	71 56	90.4	47 51.5	70 56	88.8	48 53.8	68 56	87.2	50 14.6	66 56	84.9	50 34.4	66 56	84.3	50 53.9	65 56	83.7	52 10.4	62 55	81.2	9
60	45 31.2	72 56	90.5	46 14.3	71 56	89.5	47 17.9	70 56	88.0	48 20.3	69 56	86.4	49 41.2	66 56	84.1	50 01.0	66 56	83.6	50 20.6	65 55	83.0	51 37.3	63 55	80.5	60
1	44 57.6	72 56	89.7	45 40.8	71 56	88.7	46 44.4	70 56	87.2	47 46.8	69 56	85.6	49 07.8	66 56	83.4	49 27.7	66 55	82.8	49 47.3	65 55	82.2	51 04.2	63 55	79.8	1
2	44 24.1	72 56	88.9	45 07.2	71 56	87.9	46 10.9	70 56	86.4	47 13.4	69 56	84.8	48 34.5	67 55	82.6	48 54.4	66 55	82.1	49 14.1	65 55	81.5	50 31.2	63 55	79.1	2
3	43 50.6	72 56	88.1	44 33.7	71 56	87.1	45 37.4	70 56	85.6	46 40.0	69 56	84.1	48 01.3	67 55	81.9	48 21.2	66 55	81.3	48 41.0	66 55	80.8	49 58.3	63 55	78.4	3
4	43 17.0	72 56	87.3	44 00.2	72 56	86.3	45 04.0	70 56	84.8	46 06.6	69 56	83.3	47 28.1	67 55	81.1	47 48.1	66 55	80.6	48 07.9	66 55	80.0	49 25.5	63 55	77.7	4
65	42 43.5	72 56	86.5	43 26.7	72 56	85.5	44 30.6	70 56	84.1	45 33.3	69 55	82.5	46 55.0	67 55	80.4	47 15.0	67 55	79.9	47 34.9	66 55	79.3	48 52.8	64 54	77.0	65
6	42 10.1	72 56	85.7	42 53.3	72 56	84.7	43 57.3	70 56	83.3	45 00.1	69 55	81.8	46 21.9	67 55	79.7	46 42.0	67 55	79.1	47 02.0	66 55	78.6	48 20.1	64 54	76.3	6
7	41 36.6	73 56	84.9	42 19.9	72 56	84.0	43 24.0	71 55	82.5	44 26.9	69 55	81.0	45 49.0	67 55	79.0	46 09.1	67 55	78.4	46 29.1	66 55	77.9	47 47.6	64 54	75.7	7
8	41 03.2	73 56	84.1	41 46.6	72 55	83.2	42 50.7	71 55	81.8	43 53.8	69 55	80.3	45 16.1	68 55	78.2	45 36.3	67 55	77.7	45 56.4	67 54	77.2	47 15.1	65 54	75.0	8
9	40 29.9	73 56	83.3	41 13.3	72 55	82.4	42 17.6	71 55	81.0	43 20.8	70 55	79.6	44 43.3	68 55	77.5	45 03.6	67 54	77.0	45 23.7	67 54	76.5	46 42.7	65 54	74.3	9
70	39 56.6	73 55	82.6	40 40.1	72 55	81.7	41 44.5	71 55	80.3	42 47.8	70 55	78.8	44 10.6	68 54	76.8	44 30.9	68 54	76.3	44 51.1	67 54	75.8	46 10.5	65 54	73.7	70
1	39 23.3	73 55	81.8	40 06.9	72 55	80.9	41 11.4	71 55	79.5	42 15.0	70 55	78.1	43 37.9	68 54	76.1	43 58.4	68 54	75.6	44 18.6	67 54	75.1	45 38.3	65 53	73.0	1
2	38 50.2	73 55	81.0	39 33.8	72 55	80.1	40 38.5	71 55	78.8	41 42.2	70 54	77.4	43 05.4	69 54	75.4	43 25.9	68 54	74.9	43 46.3	68 54	74.4	45 06.3	66 53	72.3	2
3	38 17.1	73 55	80.3	39 00.8	73 55	79.4	40 05.6	72 55	78.0	41 09.5	70 54	76.7	42 33.0	69 54	74.7	42 53.6	68 54	74.2	43 14.0	68 54	73.7	44 34.4	66 53	71.7	3
4	37 44.0	73 55	79.5	38 27.8	73 55	78.7	39 32.8	72 54	77.3	40 36.9	71 54	75.9	42 00.7	69 54	74.0	42 21.3	69 54	73.5	42 41.9	68 53	73.1	44 02.6	66 53	71.0	4
75	37 11.1	74 55	78.8	37 55.0	73 55	77.9	39 00.2	72 54	76.6	40 04.4	71 54	75.2	41 28.5	69 53	73.3	41 49.2	69 53	72.9	42 09.8	68 53	72.4	43 31.0	67 53	70.4	75
6	36 38.2	74 55	78.0	37 22.2	73 54	77.2	38 27.6	72 54	75.9	39 32.0	71 54	74.5	40 56.4	70 53	72.7	41 17.2	69 53	72.2	41 37.9	69 53	71.7	42 59.4	67 52	69.7	6
7	36 05.4	74 54	77.3	36 49.6	73 54	76.4	37 55.1	72 54	75.2	38 59.7	71 54	73.8	40 24.4	70 53	72.0	40 45.3	69 53	71.5	41 06.1	69 53	71.0	42 28.0	67 52	69.1	7
8	35 32.8	74 54	76.6	36 17.0	73 54	75.7	37 22.7	73 54	74.4	38 27.6	72 53	73.1	39 52.6	70 53	71.3	40 13.6	70 53	70.8	40 34.4	69 53	70.4	41 56.8	68 52	68.4	8
9	35 00.2	74 54	75.8	35 44.5	73 54	75.0	36 50.4	73 54	73.7	37 55.5	72 53	72.4	39 20.9	70 53	70.6	39 41.9	70 52	70.2	40 02.9	70 52	69.7	41 25.6	68 52	67.8	9
80	34 27.7	74 54	75.1	35 12.2	74 54	74.3	36 18.3	73 53	73.0	37 23.6	72 53	71.7	38 49.3	71 52	69.9	39 10.5	70 52	69.5	39 31.5	70 52	69.0	40 54.6	68 51	67.1	80
1	33 55.3	75 54	74.4	34 40.9	74 54	73.5	35 46.3	73 53	72.3	36 51.8	72 53	71.0	38 17.8	71 52	69.3	38 39.1	71 52	68.8	39 00.3	70 52	68.4	40 23.8	69 51	66.5	1
2	33 23.1	75 54	73.6	34 07.8	74 53	72.8	35 14.4	74 53	71.6	36 20.1	73 53	70.3	37 46.5	71 52	68.6	38 07.9	71 52	68.2	38 29.1	71 52	67.7	39 53.1	69 51	65.9	2
3	32 50.9	75 53	72.9	33 35.8	75 53	72.1	34 42.6	74 53	70.9	35 48.6	73 52	69.6	37 15.4	72 52	67.9	37 36.8	71 52	67.5	37 58.2	71 51	67.0	39 22.6	70 51	65.2	3
4	32 18.9	75 53	72.2	33 04.0	75 53	71.4	34 11.0	74 52	70.2	35 17.2	73 52	69.0	36 44.3	72 51	67.3	37 05.9	72 51	66.8	37 27.4	71 51	66.4	38 52.2	70 50	64.6	4
85	31 47.1	76 53	71.5	32 32.2	75 53	70.7	33 39.5	74 52	69.5	34 46.0	73 52	68.3	36 13.5	72 51	66.6	36 35.1	72 51	66.2	36 56.7	72 51	65.7	38 21.9	70 50	64.0	85
6	31 15.3	76 53	70.7	32 00.7	75 52	70.0	33 08.1	75 52	68.8	34 14.9	74 52	67.6	35 42.8	73 51	65.9	36 04.5	72 51	65.5	36 26.2	72 51	65.1	37 51.9	71 50	63.3	6
7	30 43.7	76 52	70.0	31 29.2	76 52	69.3	32 36.9	75 52	68.1	33 43.9	74 51	66.9	35 12.2	73 51	65.3	35 34.1	73 50	64.8	35 55.8	72 50	64.4	37 22.0	71 50	62.7	7
8	30 12.3	76 52	69.3	30 57.9	76 52	68.6	32 05.8	75 52	67.4	33 13.2	74 51	66.2	34 41.8	73 50	64.6	35 03.8	73 50	64.2	35 25.7	73 50	63.8	36 52.3	72 49	62.0	8
9	29 40.9	77 52	68.6	30 26.7	76 52	67.9	31 35.0	75 51	66.7	32 42.5	75 51	65.5	34 11.6	74 50	63.9	34 33.7	73 50	63.5	34 55.7	73 50	63.1	36 22.7	72 49	61.4	9
90	29 09.8	77 52	67.9	29 55.7	76 51	67.2	31 04.2	76 51	66.0	32 12.1	75 50	64.9	33 41.5	74 50	63.3	34 03.7	74 50	62.9	34 25.8	74 49	62.5	35 53.3	72 49		

Lat. 56°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	28 38.8	77 51	67.2	29 24.9	77 51	66.4	30 33.6	76 51	65.3	31 41.8	75 50	64.2	33 11.7	74 50	62.6	33 33.9	74 49	62.2	33 56.2	74 49	61.8	35 24.2	73 48	60.2	91
2	28 07.9	77 51	66.5	28 54.2	77 51	65.7	30 03.2	76 50	64.6	31 11.7	76 50	63.5	32 42.0	75 49	62.0	33 04.4	75 49	61.6	33 26.7	74 49	61.2	34 55.1	73 48	59.5	2
3	27 37.3	78 51	65.8	28 23.7	77 51	65.0	29 33.0	77 50	63.9	30 41.7	76 50	62.8	32 12.4	75 49	61.3	32 34.9	75 49	60.9	32 57.4	75 49	60.5	34 26.3	74 48	58.9	3
4	27 06.7	78 51	65.1	27 53.4	78 50	64.3	29 03.0	77 50	63.3	30 12.0	76 49	62.2	31 43.1	75 49	60.6	32 05.7	75 48	60.2	32 28.3	75 48	59.9	33 57.7	74 47	58.3	4
95	26 36.4	78 50	64.3	27 23.2	78 50	63.6	28 33.1	77 49	62.6	29 42.4	77 49	61.5	31 14.0	76 48	60.0	31 36.7	76 48	59.6	31 59.3	75 48	59.2	33 29.3	74 47	57.6	95
6	26 06.3	79 50	63.6	26 53.3	78 50	62.9	28 03.4	78 49	61.9	29 13.0	77 49	60.8	30 45.0	76 48	59.3	31 07.9	76 48	58.9	31 30.6	76 48	58.6	33 01.0	75 47	57.0	6
7	25 36.3	79 50	62.9	26 23.5	78 49	62.2	27 33.9	78 49	61.2	28 43.8	77 48	60.1	30 16.3	77 48	58.7	30 39.2	76 47	58.3	31 02.1	76 47	57.9	32 33.0	75 46	56.4	7
8	25 06.5	79 49	62.2	25 53.9	79 49	61.5	27 04.6	78 48	60.5	28 14.8	78 48	59.4	29 47.7	77 47	58.0	30 10.8	77 47	57.6	30 33.8	77 47	57.3	32 05.1	76 46	55.7	8
9	24 36.9	79 49	61.5	25 24.5	79 49	60.8	26 35.5	79 48	59.8	27 46.0	78 48	58.8	29 19.4	77 47	57.3	29 42.5	77 47	57.0	30 05.7	77 47	56.6	31 37.5	76 46	55.1	9
100	24 07.5	80 49	60.8	24 55.3	79 48	60.1	26 06.6	79 48	59.1	27 17.5	78 47	58.1	28 51.2	78 47	56.7	29 14.5	78 46	56.3	29 37.8	77 46	56.0	31 10.1	77 45	54.5	100
1	23 38.3	80 48	60.1	24 26.3	80 48	59.4	25 37.9	79 47	58.4	26 49.1	79 47	57.4	28 23.3	78 46	56.0	28 46.7	78 46	55.7	29 10.1	78 46	55.3	30 42.9	77 45	53.8	1
2	23 09.4	80 48	59.4	23 57.5	80 48	58.7	25 09.4	80 47	57.8	26 20.9	79 47	56.7	27 55.6	79 46	55.4	28 19.1	78 46	55.0	28 42.6	78 45	54.7	30 15.9	77 45	53.2	2
3	22 40.6	81 48	58.7	23 28.9	80 47	58.0	24 41.2	80 47	57.1	25 53.0	80 46	56.1	27 28.1	79 45	54.7	27 51.7	79 45	54.3	28 15.3	79 45	54.0	29 49.2	78 44	52.6	3
4	22 12.0	81 47	58.0	23 00.6	81 47	57.3	24 13.1	80 46	56.4	25 25.3	80 46	55.4	27 00.8	79 45	54.0	27 24.6	79 45	53.7	27 48.3	79 45	53.3	29 22.6	78 44	51.9	4
105	21 43.7	81 47	57.3	22 32.4	81 47	56.6	23 45.3	81 46	55.7	24 57.8	80 45	54.7	26 33.8	80 45	53.4	26 57.7	80 44	53.0	27 21.5	79 44	52.7	28 56.3	79 43	51.3	105
6	21 15.6	82 46	56.6	22 04.5	81 46	55.9	23 17.7	81 46	55.0	24 30.5	81 45	54.0	26 07.0	80 44	52.7	26 31.0	80 44	52.4	26 54.9	80 44	52.0	28 30.3	79 43	50.7	6
7	20 47.7	82 46	55.9	21 36.9	82 46	55.2	22 50.3	81 45	54.3	24 03.4	81 45	53.3	25 40.4	80 44	52.0	26 04.5	80 44	51.7	26 28.6	80 44	51.4	28 04.4	80 43	50.0	7
8	20 20.1	82 46	55.1	21 09.4	82 45	54.5	22 23.2	82 45	53.6	23 36.7	81 44	52.7	25 14.0	81 44	51.4	25 38.3	81 43	51.1	26 02.5	81 43	50.7	27 38.8	80 42	49.4	8
9	19 52.6	83 45	54.4	20 42.2	82 45	53.8	21 56.3	82 44	52.9	23 10.1	82 44	52.0	24 48.0	81 43	50.7	25 12.3	81 43	50.4	25 36.6	81 43	50.1	27 13.5	80 42	48.8	9
110	19 25.5	83 45	53.7	20 15.2	83 45	53.1	21 29.7	83 44	52.2	22 43.8	82 43	51.3	24 22.1	82 43	50.1	24 46.6	82 42	49.7	25 11.0	81 42	49.4	26 48.4	81 41	48.1	110
1	18 58.6	83 44	53.0	19 48.5	83 44	52.4	21 03.3	83 44	51.5	22 17.7	83 43	50.6	23 56.5	82 42	49.4	24 21.1	82 42	49.1	24 45.7	82 42	48.8	26 23.5	81 41	47.5	1
2	18 31.9	84 44	52.3	19 22.1	84 44	51.7	20 37.1	83 43	50.8	21 51.9	83 43	49.9	23 31.2	82 42	48.7	23 55.9	82 42	48.4	24 20.6	82 41	48.1	25 58.9	82 41	46.8	2
3	18 05.5	84 44	51.6	18 55.9	84 43	51.0	20 11.2	84 43	50.1	21 26.4	83 42	49.2	23 06.1	83 41	48.0	23 30.9	83 41	47.7	23 55.7	83 41	47.4	25 34.6	82 40	46.2	3
4	17 39.3	84 43	50.9	18 29.9	84 43	50.3	19 45.6	84 42	49.4	21 01.1	84 42	48.6	22 41.3	83 41	47.4	23 06.2	83 41	47.1	23 31.2	83 41	46.8	25 10.5	83 40	45.5	4
115	17 13.4	85 43	50.1	18 04.2	85 42	49.6	19 20.3	84 42	48.7	20 36.1	84 41	47.9	22 16.7	84 40	46.7	22 41.8	84 40	46.4	23 06.9	83 40	46.1	24 46.7	83 39	44.9	115
6	16 47.8	85 42	49.4	17 38.8	85 42	48.9	18 55.2	85 41	48.0	20 11.3	84 41	47.2	21 52.4	84 40	46.0	22 17.6	84 40	45.7	22 42.8	84 40	45.4	24 23.2	83 39	44.3	6
7	16 22.5	85 42	48.7	17 13.7	85 41	48.2	18 30.4	85 41	47.3	19 46.8	85 40	46.5	21 28.4	84 40	45.4	21 53.7	84 39	45.1	22 19.0	84 39	44.8	23 59.9	84 38	43.6	7
8	15 57.4	86 41	48.0	16 48.8	86 41	47.4	18 05.8	85 40	46.6	19 22.6	85 40	45.8	21 04.7	85 39	44.7	21 30.1	85 39	44.4	21 55.5	85 39	44.1	23 36.9	84 38	43.0	8
9	15 32.6	86 41	47.3	16 24.3	86 40	46.7	17 41.6	86 40	45.9	18 58.7	86 39	45.1	20 41.2	85 39	44.0	21 06.8	85 38	43.7	21 32.3	85 38	43.4	23 14.2	85 37	42.3	9
120	15 08.1	87 40	46.5	16 00.0	86 40	46.0	17 17.6	86 39	45.2	18 35.1	86 39	44.4	20 18.1	86 38	43.3	20 43.7	86 38	43.1	21 09.4	85 38	42.8	22 51.7	85 37	41.6	120
1	14 43.9	87 40	45.8	15 36.0	87 40	45.3	16 54.0	87 39	44.5	18 11.8	86 38	43.7	19 55.2	86 38	42.7	20 21.0	86 37	42.4	20 46.8	86 37	42.1	22 29.6	85 36	41.0	1
2	14 20.0	87 39	45.1	15 12.3	87 39	44.6	16 30.6	87 38	43.8	17 48.7	87 38	43.0	19 32.6	86 37	42.0	19 58.5	86 37	41.7	20 24.4	86 37	41.4	22 07.7	86 36	40.3	2
3	13 56.4	88 39	44.4	14 48.9	87 38	43.9	16 07.5	87 38	43.1	17 26.0	87 37	42.3	19 10.3	87 37	41.3	19 36.3	87 36	41.0	20 02.4	87 36	40.8	21 46.1	86 35	39.7	3
4	13 33.1	88 38	43.6	14 25.8	88 38	43.1	15 44.7	88 37	42.4	17 03.5	87 37	41.6	18 48.3	87 36	40.6	19 14.5	87 36	40.3	19 40.6	87 36	40.1	21 24.9	87 35	39.0	4
125	13 10.1	88 38	42.9	14 03.0	88 37	42.4	15 22.3	88 37	41.7	16 41.4	88 36	40.9	18 26.6	88 36	39.9	18 52.9	88 35	39.7	19 19.1	87 35	39.4	21 03.9	87 34	38.4	125
6	12 47.4	89 37	42.2	13 40.5	88 37	41.7	15 00.1	88 36	41.0	16 19.6	88 36	40.2	18 05.3	88 35	39.2	18 31.6	88 35	39.0	18 58.0	88 35	38.7	20 43.2	88 34	37.7	6
7	12 25.1	89 37	41.4	13 18.4	89 36	41.0	14 38.3	89 36	40.2	15 58.1	89 35	39.5	17 44.2	88 35	38.5	18 10.7	88 34	38.3	18 37.2	88 34	38.0	20 22.8	88 33	37.0	7
8	12 03.0	89 36	40.7	12 56.6	89 36	40.2	14 16.8	89 35	39.5	15 36.9	89 35	38.8	17 23.5	89 34	37.9	17 50.1	89 34	37.6	18 16.6	89 34	37.4	20 02.8	88 33	36.4	8
9	11 41.3	90 36	39.9	12 35.1	90 35	39.5	13 55.6	89 35	38.8	15 16.0	89 34	38.1	17 03.0	89 34	37.2	17 29.7	89 33	36.9	17 56.4	89 33	36.7	19 43.0	89 32	35.7	9
130	11 19.9	90 35	39.2	12 13.9	90 35	38.8	13 34.7	90 34	38.1	14 55.5	90 34	37.4	16 42.9	89 33	36.5	17 09.7	89 33	36.2	17 36.6	89 33	36.0	19 23.6	89 32	35.0	130
1	10 58.9	90 34	38.5	11 53.1	90 34	38.0	13 14.2	90 34	37.4	14 35.3	90 33	36.7	16 23.1	90 32	35.8	16 50.1	90 32	35.5	17 17.0	90 32	35.3	19 04.5	89 31	34.4	1
2	10 38.2	91 34	37.7	11 32.6	91 34	37.3	12 54.0	90 33	36.6	14 15.4	90 33	36.0	16 03.7	90 32	35.1	16 30.7	90 32	34.9	16 57.8	90 32	34.6	18 45.7	90 31	33.7	2
3	10 17.9	91 33	37.0	11 12.4	91 33	36.5	12 34.2	91 32	35.9	13 55.8	91 32	35.3	15 44.6	91 31	34.4	16 11.7	90 31	34.2	16 38.9	90 31	33.9	18 27.3	90 30	33.0	3
4	9 57.9	91 33	36.2	10 52.6	91 32	35.8	12 14.7	91 32	35.2	13 36.7	91 31	34.5	15 25.8	91 31	33.7	15 53.1	91 31	33.5	16 20.3	91 30	33.2	18 09.1	91 30	32.4	4
135	9 38.2	92 32	35.5	10 33.2	92 32	35.1	11 55.5	91 31	34.4	13 17.8	91 31	33.8	15 07.4	91 30	33.0	15 34.7	91 30	32.8	16 02.1	91 30	32.6	17 51.3	91 29	31.7	135
6	9 18.9	92 32	34.7	10 14.1	92 31	34.3	11 36.7	92 31	33.7	12 59.3	92 30	33.1	14 49.3	92 30	32.3	15 16.7	92 29	32.1	15 44.2	91 29	31.9	17 33.9	91 29	31.0	6
7	9 00.0	92 31	34.0	9 55.3	92 31	33.6	11 18.3	92 30	33.0	12 41.2	92 30	32.4	14 31.5	92 29	31.6	14 59.1	92 29	31.4	15 26.7	92 29	31.2	17 16.8	92 28	30.3	7
8	8 41.4	93 30	33.2	9 37.0	93 30	32.8	11 00.2	92 30	32.2	12 23.4	92 29	31.7	14 14.1	92 28	30.9	14 41.8	92 28	30.7	15 09.5	92 28	30.5	17 00.0	92 27	29.7	8
9	8 23.3	93 30	32.4	9 19.0	93 29	32.1	10 42.5	93 29	31.5	12 05.9	93 28	30.9	13 57.1	93 28	30.2	14 24.9	93 28	30.0	14 52.6	93 27	29.8	16 43.6	92 27	29.0	9
140	8 05.4	93 29	31.7	9 01.3	93 29	31.3	10 25.1	93 28	30.8	11 48.9	93 28	30.2	13 40.4	93 27	29.4	14 08.3	93 27	29.3	14 36.2	93 27	29.1	16 27.5	93 26	28.3	140
1	7 48.0	93 28	30.9	8 44.1	93 28	30.6	10 08.2	93 28	30.0	11 32.2	93 27	29.5	13 24.1	93 27	28.7	13 52.1	93 26	28.5	14 20.0	93 26	28.4	16 11.8	93 26	27.6	1
2	7 31.0	94 28	30.2	8 27.2	94 27	29.8	9 51.6	94 27	29.3	11 15.9	94 27	28.7	13 08.2	94 26	28.0	13 36.2	94 26	27.8	14 04.3	93 26	27.7	15 56.4	93 25	26.9	2
3	7 14.3	94 27	29.4	8 10.7	94 27	29.0	9 35.3	94 26	28.5	10 59.9	94 26	28.0	12 52.6	94 25	27.3	13 20.7	94 25	27.1	13 48.9	94 25	27.0	15 41.4	94 24	26.2	3
4	6 58.0	94 26	28.6	7 54.6	94 26	28.3	9 19.5	94 26	27.8	10 44.4	94 25	27.3	12 37.4	94 25	26.6	13 05.6	94 25	26.4	13 33.9	94 24	26.2	15 26.7	94 24	25.5	4
145	6 42.2	95 26	27.9	7 38.9	95 26	27.5	9 04.1	95 25	27.0	10 29.2	95 25	26.5	12 22.6	94 24	25.9	12 50.9	94 24	25.7	13 19.2	94 24	25.5	15 12.5	94 23	24.9	145
6	6 26.7	95 25	27.1	7 23.6	95 25	26.8	8 49.0	95 24	26.3	10 14.4	95 24	25.8	12 08.1	95 23	25.2	12 36.5	95 23	25.0	13 04.9	95 23	24.8	14 58.5	95 23	24.2	6
7	6 11.6	95 24	26.3	7 08.7	95 24	26.0	8 34.4	95 24	25.5	10 00.0	95 23	25.1	11 54.0	95 23	24.4	12 22.5	95 23	24.3	12 51.0	95 23	24.1	14 45.0	95 22	23.5	7
8	5 56.9	95 24	25.5	6 54.2	95 24	25.2	8 20.1	95 23	24.8	9 45.9	95 23	24.3	11 40.4	95 22	23.7	12 08.9	95 22	23.6	12 37.5	95 22	23.4	14 31.8	95 21	22.8	8
9	5 42.7	96 23	24.8	6 40.1	96 23	24.5	8 06.2	96 22	24.0	9 32.3	96 22	23.6	11 27.1	96 22	23.0	11 55.7	96 21	22.8	12 24.4	96 21	22.7	14 19.0	95 21	22.1	9
150	5 28.8	96 22	24.0	6 26.4	96 22	23.7	7 52.8	96 22	23.3	9 19.1	96 21	22.8	11 14.2	96 21	22.3	11 42.9	96 21	22.1	12 11.7	96 21	22.0	14 06.6	96 20	21.4	150
1	5 15.4	96 22	23.2	6 13.1	96 21	22.9	7 39.7	96 21	22.5	9 06.3	96 21	22.1	11 01.6	96 20	21.5	11 30.5	96 20	21.4	11 59.3	96 20	21.3	13 54.6	96 19	20.7	1
2	5 02.4	96 21	22.4	6 00.3	96 21	22.1	7 27.1	96 20	21.7	8 53.9	96 20	21.3	10 49.5	96 20	20.8	11 18.4	96 19	20.7	11 47.3	96 19	20.5	13 42.9	96 19	20.0	2
3				5 47.8	97 20	21.4	7 14.9	97 20	21.0	8 41.9	97 19	20.6	10 37.8	97 19	20.1	11 06.8	97 19	19.9	11 35.8	97 19	19.8	13 31.6	97 18	19.3	3
4				5 35.8	97 19	20.6	7 03.0	97 19	20.2	8 30.3	97 19	19.8	10 26.5	97 18	19.3	10 55.5	97 18	19.2	11 24.6	97 18	19.1	13 20.7	97 18	18.6	4
155				5 24.2	97 19	19.8	6 51.7	97 18	19.5	8 19.1	97 18	19.1	10 15.6	97 18	18.6	10 44.7	97 17	18.5	11 13.8	97 17	18.4	13 10.3	97 17	17.9	155
6				5 13.1	97 18	19.0	6 40.7	97 18	18.7	8 08.3	97 17	18.3	10 05.1	97 17	17.9	10 34.3	97 17	17.8	11 03.4	97 17	17.6	13 00.2	97 16	17.2	6
7				5 02.4	98 17	18.3	6 30.2	98 17	17.9	7 57.9	98 17	17.6	9 55.0	98 16	17.1	10 24.2	98 16	17.0	10 53.5	97 16	16.9	12 50.4	97 16	16.5	7
8							6 20.0	98 16	17.2	7 48.0	98 16	16.8	9 45.3	98 15	16.4	10 14.6	98 15	16.3	10 43.9	98 15	16.2	12 41.1	98 15	15.8	8
9							6 10.4	98 15	16.4	7 38.5	98 15	16.1	9 36.0	98 15	15.7	10 05.4	98 15	15.6	10 34.8	98 15	15.5	12 32.2	98 14	15.0	9
160							6 01.1	98 15	15.6	7 29.4	98 14	15.3	9 27.2	98 14	14.9	9 56.6	98 14	14.8	10 26.0	98 14	14.7	12 23.7	98 14	14.3	160
1							5 52.3	98 14	14.8	7 20.8	98 14	14.6	9 18.7	98 13	14.2	9 48.2	98 13	14.1	10 17.7	98 13	14.0	12 15.6	98 13	13.6	1
2							5 43.9	98 13	14.1	7 12.6	98 13	13.8	9 10.7	98 13	13.5	9 40.3	98 13	13.4	10 09.8	98 13	13.3	12 07.9	98 12	12.9	2
3							5 36.0	99 12	13.3	7 04.8	99 12	13.0	9 03.1	99 12	12.7	9 32.7	99 12	12.6	10 02.3	99 12	12.5	12 00.6	99 11	12.2	3
4							5 28.5	99 12	12.5	6 57.4	99 12	12.3	8 56.0	99 11	12.0	9 25.6	99 11	11.9	9 55.2	99 11	11.8	11 53.7	99 11	11.5	4
165							5 21.5	99 11	11.7	6 50.5	99 11	11.5	8 49.2	99 11	11.2	9 18.9	99 10	11.1	9 48.6	99 10	11.1	11 47.2	99 10	10.8	165
6							5 14.9	99 10	11.0	6 44.0	99 10	10.8	8 42.9	99 10	10.5	9 12.6	99 10	10.4	9 42.3	99 10	10.3	11 41.2	99 09	10.1	6
7							5 08.7	99 10	10.2	6 38.0	99 09	10.0	8 37.0	99 09	09.7	9 06.8	99 09	09.7	9 36.5	99 09	09.6	11 35.5	99 09	09.3	7
8							5 03.0	99 09	09.4	6 32.4	99 09	09.2	8 31.5	99 08	09.0	9 01.3	99 08	08.9	9 31.1	99 08	08.9	11 30.3	99 08	08.6	8
9										6 27.2	99 08	08.5	8 26.5	99 08	08.2	8 56.3	99 08	08.2	9 26.2	99 08	08.1	11 25.5	99 07	07.9	9
170										6 22.5	1.0 07	07.7	8 21.9	1.0 07	07.5	8 51.8	1.0 07	07.4	9 21.6	1.0 07	07.4	11 21.1	1.0 07	07.2	170
1										6 18.2	1.0 06	06.9	8 17.8	1.0 06	06.7	8 47.6	1.0 06	06.7	9 17.5	1.0 06	06.7	11 17.1	1.0 06	06.5	1
2										6 14.4	1.0 06	06.2	8 14.0	1.0 06	06.0	8 44.0	1.0 05	06.0	9 13.9	1.0 05	05.9	11 13.5	1.0 05	05.8	2
3										6 11.0	1.0 05	05.4	8 10.8	1.0 05	05.2	8 40.7	1.0 05	05.2	9 10.6	1.0 05	05.2	11 10.3	1.0 05	05.0	3
4										6 08.1	1.0 04	04.6	8 07.9	1.0 04	04.5	8 37.9	1.0 04	04.5	9 07.8	1.0 04	04.4	11 07.6	1.0 04	04.3	4
175										6 05.6	1.0 03	03.8	8 05.5	1.0 03	03.8	8 35.5	1.0 03	03.7	9 05.4	1.0 03	03.7	11 05.3	1.0 03	03.6	175
6										6 03.6	1.0 03	03.1	8 03.5	1.0 03	03.0	8 33.5	1.0 03	03.0	9 03.5	1.0 03	03.0	11 03.4	1.0 02	02.9	6
7										6 02.0	1.0 02	02.3	8 02.0	1.0 02	02.3	8 32.0	1.0 02	02.2	9 02.0	1.0 02	02.2	11 01.9	1.0 02	02.2	7
8										6 00.9	1.0 01	01.5	8 00.9	1.0 01	01.5	8 30.9	1.0 01	01.5	9 00.9	1.0 01	01.5	11 00.8	1.0 01	01.4	8
9										6 00.2	1.0 00	00.8	8 00.2	1.0 00	00.8	8 30.2	1.0 00	00.7	9 00.2	1.0 00	00.7	11 00.2	1.0 00	00.7	9
180										6 00.0	1.0 00	00.0	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	9 00.0	1.0 00	00.0	11 00.0	1.0 00	00.0	180

Lat. 57°

Lat. 58°

Lat. 59°

Lat. 56°

H.A	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	80 00.0	1.0 02	180.0	81 00.0	1.0 02	180.0	82 30.0	1.0 02	180.0	83 30.0	1.0 03	180.0	84 30.0	1.0 03	180.0	85 30.0	1.0 04	180.0	86 30.0	1.0 05	180.0	88 00.0	1.0 08	180.0	00
1	79 58.8	1.0 06	176.0	80 58.7	1.0 06	175.6	82 28.5	1.0 07	174.9	83 28.3	1.0 08	174.3	84 28.1	99 10	173.4	85 27.7	99 11	172.1	86 27.1	99 14	170.1	87 55.2	96 22	163.6	1
2	79 55.3	99 10	172.0	80 54.9	99 10	171.3	82 24.1	99 12	169.9	83 23.3	99 14	168.6	84 22.3	98 16	166.9	85 20.9	97 18	164.5	86 18.6	95 22	160.7	87 41.7	87 33	149.3	2
3	79 49.6	99 13	168.1	80 48.6	98 14	167.1	82 16.8	98 17	165.0	83 15.2	97 19	163.2	84 13.0	96 21	160.7	85 09.8	94 25	157.3	86 05.2	90 29	152.2	87 21.7	77 41	138.1	3
4	79 41.6	98 17	164.3	80 40.0	97 18	162.9	82 06.8	96 21	160.3	83 04.0	95 23	158.0	84 00.3	93 26	154.9	84 55.1	90 30	150.6	85 47.6	85 35	144.6	86 57.4	68 45	129.4	4
05	79 31.4	96 20	160.6	80 29.0	96 22	158.9	81 54.3	94 25	155.8	82 50.1	92 27	153.0	83 44.6	89 31	149.4	84 37.1	85 34	144.7	85 25.6	79 39	138.1	86 30.3	60 48	122.8	05
6	79 19.2	95 23	156.9	80 15.9	94 25	155.1	81 39.4	92 28	151.5	82 33.6	89 31	148.4	83 26.2	86 34	144.4	84 16.4	81 38	139.3	85 03.0	74 43	132.5	86 01.3	54 50	117.7	6
7	79 05.2	93 26	153.4	80 00.7	92 28	151.4	81 22.3	89 32	147.4	82 15.0	86 34	144.1	83 05.6	82 38	139.9	83 53.5	77 41	134.5	84 37.3	69 46	127.7	85 31.0	49 52	113.6	7
8	78 49.3	92 29	150.1	79 43.8	90 31	147.8	81 03.3	87 35	143.6	81 54.3	83 37	140.1	82 43.1	79 40	135.7	83 28.7	73 44	130.3	84 10.0	64 48	123.5	84 59.9	45 53	110.2	8
9	78 31.7	90 32	146.9	79 25.1	88 34	144.5	80 42.6	84 37	140.1	81 32.0	80 40	136.4	82 18.9	76 43	131.9	83 02.4	69 46	126.5	83 41.5	61 49	119.9	84 28.1	42 54	107.4	9
10	78 12.7	88 34	143.8	79 04.8	86 36	141.3	80 20.3	82 39	136.7	81 08.1	78 42	133.0	81 53.2	73 45	128.5	82 34.9	66 48	123.2	83 11.9	57 51	116.8	83 55.9	40 54	105.1	10
1	77 52.2	86 36	140.9	78 43.2	84 38	138.3	79 56.6	79 41	133.6	80 42.9	75 44	129.8	81 26.4	70 46	125.4	82 06.3	63 49	120.1	82 41.6	54 52	114.0	83 23.4	38 55	103.0	1
2	77 30.4	84 38	138.1	78 20.2	82 40	135.5	79 31.8	77 43	130.7	80 16.6	73 45	126.9	80 58.6	67 48	122.5	81 36.9	60 50	117.4	82 10.7	52 52	111.6	82 50.6	36 55	101.2	2
3	77 07.4	83 40	135.5	77 56.1	80 42	132.8	79 05.8	75 45	128.0	79 49.3	70 47	124.2	80 29.9	65 49	119.9	81 06.8	58 51	115.0	81 39.2	50 53	109.4	82 17.6	35 55	99.6	3
4	76 43.4	81 42	133.0	77 31.0	78 43	130.2	78 38.9	73 46	125.5	79 21.2	68 48	121.7	80 00.5	63 50	117.5	80 36.1	56 52	112.7	81 07.4	48 54	107.4	81 44.4	34 55	98.2	4
15	76 18.3	79 43	130.6	77 05.0	76 45	127.9	78 11.2	71 47	123.1	78 52.3	66 49	119.4	79 30.4	61 51	115.3	80 04.9	54 53	110.7	80 35.2	47 54	105.6	81 11.2	33 56	96.9	15
6	75 52.4	78 44	128.3	76 38.1	75 46	125.6	77 42.7	69 48	120.9	78 22.8	64 50	117.3	78 59.8	59 52	113.3	79 33.4	53 53	108.8	80 02.8	45 54	103.9	80 37.8	32 56	95.6	6
7	75 25.7	76 46	126.2	76 10.4	73 47	123.4	77 13.6	67 49	118.8	77 52.7	63 51	115.3	78 28.8	57 52	111.4	79 01.4	51 54	107.1	79 30.1	44 55	102.4	80 04.4	32 56	94.5	7
8	74 58.3	75 47	124.1	75 42.1	71 48	121.4	76 44.0	66 50	116.8	77 22.1	61 52	113.4	77 57.4	56 53	109.6	78 29.2	50 54	105.5	78 57.2	43 55	100.9	79 30.9	31 56	93.5	8
9	74 30.2	73 48	122.2	75 13.2	70 49	119.5	76 13.8	64 51	115.0	76 51.1	60 52	111.6	77 25.6	55 53	108.0	77 56.8	49 54	103.9	78 24.2	42 55	99.6	78 57.4	31 56	92.5	9
20	74 01.5	72 49	120.3	74 43.7	69 50	117.7	75 43.2	63 52	113.3	76 19.8	59 53	110.0	76 53.5	54 54	106.4	77 24.1	48 55	102.5	77 51.1	42 55	98.4	78 23.9	31 56	91.6	20
1	73 32.3	71 50	118.5	74 13.8	68 51	115.9	75 12.1	62 52	111.6	75 48.1	58 53	108.4	76 21.2	53 54	104.9	76 51.3	47 55	101.2	77 17.8	41 56	97.2	77 50.3	31 56	90.7	1
2	73 02.6	70 50	116.8	73 43.4	66 51	114.3	74 40.8	61 53	110.0	75 16.1	57 54	106.9	75 48.7	52 55	103.6	76 18.3	47 55	99.9	76 44.5	41 56	96.1	77 16.8	31 56	89.8	2
3	72 32.4	69 51	115.2	73 12.6	65 52	112.7	74 09.1	60 53	108.5	74 43.9	56 54	105.5	75 16.0	51 55	102.2	75 45.2	46 55	98.7	76 11.1	40 56	95.0	76 43.2	31 56	89.0	3
4	72 01.9	68 52	113.7	72 41.5	64 52	111.2	73 37.2	59 54	107.1	74 11.4	55 54	104.2	74 43.1	51 55	101.0	75 12.0	46 56	97.6	75 37.7	40 56	94.0	76 09.7	31 56	88.3	4
25	71 31.0	67 52	112.2	72 10.1	64 53	109.7	73 05.0	58 54	105.8	73 38.8	54 55	102.9	74 10.1	50 55	99.8	74 38.7	45 56	96.5	75 04.2	40 56	93.1	75 36.2	31 56	87.5	25
6	70 59.7	66 53	110.7	71 38.4	63 53	108.4	72 32.6	58 54	104.5	73 06.0	54 55	101.7	73 37.0	49 55	98.7	74 05.3	45 56	95.5	74 30.7	40 56	92.1	75 02.7	31 56	86.8	6
7	70 28.2	65 53	109.4	71 06.4	62 54	107.0	72 00.0	57 55	103.2	72 33.1	53 55	100.5	73 03.8	49 55	97.6	73 31.9	45 56	94.5	73 57.1	40 56	91.3	74 29.2	31 56	86.1	7
8	69 56.5	64 53	108.0	70 34.2	61 54	105.7	71 27.3	56 55	102.0	72 00.1	53 55	99.3	72 30.5	49 56	96.5	72 58.4	44 56	93.5	73 23.6	40 56	90.4	73 55.7	32 56	85.4	8
9	69 24.4	64 54	106.8	70 01.8	61 54	104.5	70 54.4	56 55	100.9	71 26.9	52 55	98.3	71 57.1	48 56	95.5	72 24.9	44 56	92.6	72 50.0	40 56	89.6	73 22.3	32 56	84.7	9
30	68 52.2	63 54	105.5	69 29.2	60 55	103.3	70 21.4	56 55	99.8	70 53.7	52 56	97.2	71 23.7	48 56	94.5	71 51.4	44 56	91.7	72 16.5	40 56	88.8	72 48.9	32 56	84.1	30
1	68 19.8	63 54	104.3	68 56.5	60 55	102.2	69 48.3	55 55	98.7	70 20.3	52 56	96.2	70 50.3	48 56	93.6	71 17.9	44 56	90.8	71 43.0	40 56	88.0	72 15.5	33 56	83.5	1
2	67 47.2	62 55	103.2	68 23.6	59 55	101.0	69 15.1	55 56	97.6	69 47.0	51 56	95.2	70 16.8	48 56	92.7	70 44.3	44 56	90.0	71 09.4	40 56	87.2	71 42.2	33 55	82.8	2
3	67 14.5	62 55	102.0	67 50.7	59 55	100.0	68 41.8	55 56	96.6	69 13.5	51 56	94.3	69 43.2	48 56	91.8	70 10.8	44 56	89.2	70 35.9	40 56	86.5	71 09.0	33 55	82.2	3
4	66 41.6	61 55	101.0	67 17.6	59 55	98.9	68 08.4	54 56	95.6	68 40.0	51 56	93.3	69 09.7	48 56	90.9	69 37.2	44 56	88.4	70 02.5	40 56	85.8	70 35.7	34 55	81.6	4
35	66 08.6	61 55	99.9	66 44.4	58 55	97.9	67 35.0	54 56	94.7	68 06.5	51 56	92.4	68 36.1	48 56	90.1	69 03.7	44 56	87.6	69 29.0	40 56	85.1	70 02.6	34 55	81.0	35
6	65 35.5	61 55	98.9	66 11.1	58 56	96.9	67 01.5	54 56	93.8	67 33.0	51 56	91.6	68 02.6	48 56	89.3	68 30.2	44 56	86.9	68 55.6	41 56	84.4	69 29.5	35 55	80.4	6
7	65 02.3	60 55	97.9	65 37.8	58 56	95.9	66 28.0	54 56	92.9	66 59.5	51 56	90.7	67 29.0	48 56	88.5	67 56.7	44 56	86.1	68 22.2	41 56	83.7	68 56.4	35 55	79.9	7
8	64 29.0	60 56	96.9	65 04.4	58 56	95.0	65 54.5	54 56	92.0	66 25.9	51 56	89.9	66 55.5	48 56	87.7	67 23.2	45 56	85.4	67 48.9	41 55	83.0	68 23.4	36 55	79.3	8
9	63 55.7	60 56	95.9	64 30.9	58 56	94.1	65 21.0	54 56	91.1	65 52.4	51 56	89.0	66 22.0	48 56	86.9	66 49.8	45 56	84.7	67 15.6	41 55	82.4	67 50.5	36 55	78.7	9
40	63 22.3	60 56	95.0	63 57.4	57 56	93.2	64 47.4	54 56	90.3	65 18.8	51 56	88.2	65 48.5	48 56	86.1	66 16.4	45 56	84.0	66 42.4	42 55	81.7	67 17.6	36 55	78.2	40
1	62 48.8	60 56	94.1	63 23.9	57 56	92.3	64 13.9	54 56	89.4	64 45.3	51 56	87.5	65 15.0	48 56	85.4	65 43.1	45 56	83.3	66 09.2	42 55	81.1	66 44.8	37 55	77.6	1
2	62 15.3	59 56	93.2	62 50.4	57 56	91.4	63 40.3	54 56	88.6	64 11.8	51 56	86.7	64 41.6	48 56	84.7	65 09.8	45 55	82.6	65 36.1	42 55	80.4	66 12.1	37 54	77.1	2
3	61 41.8	59 56	92.3	62 16.8	57 56	90.6	63 06.8	54 56	87.8	63 38.3	51 56	85.9	64 08.2	49 56	84.0	64 36.5	46 55	81.9	65 03.1	43 55	79.8	65 39.4	38 54	76.5	3
4	61 08.3	59 56	91.4	61 43.3	57 56	89.7	62 33.3	54 56	87.1	63 04.8	51 56	85.2	63 34.9	49 55	83.3	64 03.3	46 55	81.3	64 30.1	43 55	79.2	65 06.8	38 54	76.0	4
45	60 34.7	59 56	90.6	61 09.7	57 56	88.9	61 59.8	54 56	86.3	62 31.4	52 56	84.5	63 01.6	49 55	82.6	63 30.2	46 55	80.6	63 57.1	43 55	78.6	64 34.3	39 54	75.5	45
6	60 01.2	59 56	89.7	60 36.2	57 56	88.1	61 26.3	54 56	85.5	61 58.1	52 56	83.7	62 28.4	49 55	81.9	62 57.1	47 55	80.0	63 24.3	44 55	78.0	64 01.8	40 54	74.9	6
7	59 27.6	59 56	88.9	60 02.7	57 56	87.3	60 52.9	54 56	84.8	61 24.7	52 55	83.0	61 55.2	50 55	81.2	62 24.1	47 55	79.3	62 51.5	44 54	77.4	63 29.5	40 54	74.4	7
8	58 54.1	59 56	88.1	59 29.2	57 56	86.5	60 19.5	54 56	84.1	60 51.4	52 55	82.3	61 22.0	50 55	80.6	61 51.2	47 55	78.7	62 18.8	45 54	76.8	62 57.2	41 54	73.9	8
9	58 20.6	59 56	87.3	58 55.7	58 56	85.8	59 46.1	55 56	83.3	60 18.2	52 55	81.6	60 49.0	50 55	79.9	61 18.3	48 55	78.1	61 46.2	45 54	76.2	62 25.0	41 54	73.3	9
50	57 47.1	60 56	86.6	58 22.2	58 56	85.0	59 12.8	55 55	82.6	59 45.1	53 55	81.0	60 16.0	50 55	79.2	60 45.5	48 55	77.5	61 13.6	46 54	75.7	61 52.9	42 53	72.8	50
1	57 13.6	60 56	85.8	57 48.8	58 56	84.3	58 39.6	55 55	81.9	59 12.0	53 55	80.3	59 43.0	51 55	78.6	60 12.8	48 54	76.9	60 41.2	46 54	75.1	61 20.9	42 53	72.3	1
2	56 40.2	60 56	85.0	57 15.5	58 56	83.5	58 06.4	55 55	81.2	58 38.9	53 55	79.6	59 10.2	51 55	78.0	59 40.2	49 54	76.3	60 08.8	47 54	74.5	60 49.0	43 53	71.8	2
3	56 06.7	60 56	84.3	56 42.2	58 55	82.8	57 33.3	55 55	80.5	58 06.0	53 55	79.0	58 37.4	51 54	77.3	59 07.6	49 54	75.7	59 36.5	47 54	73.9	60 17.2	43 53	71.3	3
4	55 33.4	60 56	83.5	56 08.9	58 55	82.1	57 00.2	55 55	79.9	57 33.1	54 55	78.3	58 04.7	52 54	76.7	58 35.2	50 54	75.1	59 04.3	47 54	73.4	59 45.5	44 53	70.8	4
55	55 00.1	60 55	82.8	55 35.7	59 55	81.4	56 27.2	55 55	79.2	57 00.2	54 55	77.7	57 32.1	52 54	76.1	58 02.8	50 54	74.5	58 32.2	48 53	72.8	59 13.8	45 53	70.2	55
6	54 26.8	60 55	82.1	55 02.6	59 55	80.7	55 54.3	55 55	78.5	56 27.5	54 54	77.0	56 59.6	53 54	75.5	57 30.5	51 54	73.9	58 00.2	48 53	72.3	58 42.3	45 52	69.7	6
7	53 53.6	61 55	81.4	54 29.5	59 55	80.0	55 21.5	57 55	77.9	55 54.9	55 54	76.4	56 27.2	53 54	74.9	56 58.3	51 53	73.3	57 28.3	49 53	71.7	58 10.9	46 52	69.2	7
8	53 20.5	61 55	80.6	53 56.5	59 55	79.3	54 48.7	57 54	77.2	55 22.3	55 54	75.7	55 54.8	53 54	74.3	56 26.2	51 53	72.7	56 56.5	49 53	71.2	57 39.6	46 52	68.7	8
9	52 47.4	61 55	79.9	53 23.5	59 55	78.6	54 16.0	57 54	76.5	54 49.8	55 54	75.1	55 22.6	54 54	73.7	55 54.2	52 53	72.2	56 24.8	50 53	70.6	57 08.4	47 52	68.2	9
60	52 14.4	61 55	79.2	52 50.7	60 55	77.9	53 43.5	57 54	75.9	54 17.4	56 54	74.5	54 50.4	54 53	73.1	55 22.4	52 53	71.6	55 53.2	50 52	70.1	56 37.3	47 52	67.7	60
1	51 41.5	61 55	78.6	52 17.9	60 54	77.3	53 11.0	58 54	75.3	53 45.2	56 54	73.9	54 18.4	55 53	72.5	54 50.6	53 53	71.0	55 21.7	51 52	69.5	56 06.3	48 51	67.2	1
2	51 08.6	62 55	77.9	51 45.2	60 54	76.6	52 38.6	58 54	74.6	53 13.0	57 53	73.3	53 46.4	55 53	71.9	54 18.9	53 53	70.4	54 50.3	51 52	69.0	55 35.4	49 51	66.7	2
3	50 35.9	62 54	77.2	51 12.7	61 54	75.9	52 06.3	58 54	74.0	52 40.9	57 53	72.7	53 14.6	55 53	71.3	53 47.3	54 52	69.9	54 19.1	52 52	68.4	55 04.6	49 51	66.2	3
4	50 03.2	62 54	76.5	50 40.2	61 54	75.3	51 34.1	59 54	73.4	52 08.9	57 53	72.0	52 42.9	56 53	70.7	53 15.9	54 52	69.3	53 47.9	53 52	67.9	54 34.0	50 51	65.7	4
65	49 30.6	63 54	75.8	50 07.8	61 54	74.6	51 02.0	59 53	72.7	51 37.1	58 53	71.4	52 11.3	56 52	70.1	52 44.6	55 52	68.7	53 16.9	53 52	67.3	54 03.5	50 51	65.2	65
6	48 58.1	63 54	75.2	49 35.5	62 54	74.0	50 30.0	60 53	72.1	51 05.3	58 53	70.8	51 39.8	57 52	69.5	52 13.4	55 52	68.2	52 46.0	54 51	66.8	53 33.1	51 50	64.7	6
7	48 25.8	63 54	74.5	49 03.3	62 53	73.3	49 58.1	60 53	71.5	50 33.7	59 53	70.2	51 08.4	57 52	68.9	51 42.3	56 52	67.6	52 15.2	54 51	66.3	53 02.8	52 50	64.2	7
8	47 53.5	63 54	73.8	48 31.2	62 53	72.7	49 26.4	60 53	70.9	50 02.2	59 52	69.6	50 37.2	58 52	68.4	51 11.3	56 51	67.1	51 44.6	55 51	65.7	52 32.7	52 50	63.7	8
9	47 21.3	64 53	73.2	47 59.2	63 53	72.0	48 54.7	61 53	70.3	49 30.8	59 52	69.0	50 06.0	58 52	67.8	50 40.5	57 51	66.5	51 14.1	55 51	65.2	52 02.7	53 50	63.2	9
70	46 49.2	64 53	72.5	47 27.3	63 53	71.4	48 23.2	61 52	69.7	48 59.5	60 52	68.4	49 35.0	59 51	67.2	50 09.8	57 51	65.9	50 43.7	56 50	64.6	51 32.8	53 50	62.6	70
1	46 17.3	64 53	71.9	46 55.6	63 53	70.8	47 51.8	62 52	69.0	48 28.4	60 52	67.9	49 04.2	59 51	66.6	49 39.2	58 51	65.4	50 13.4	56 50	64.1	51 03.1	54 49	62.1	1
2	45 45.5	65 53	71.2	46 24.0	64 52	70.1	47 20.5	62 52	68.4	47 57.4	61 51	67.3	48 33.4	60 51	66.1	49 08.8	58 50	64.8	49 43.3	57 50	63.6	50 33.5	55 49	61.6	2
3	45 13.8	65 53	70.6	45 52.5	64 52	69.5	46 49.4	62 52	67.8	47 26.5	61 51	66.7	48 02.9	60 51	65.5	48 38.5	59 50	64.3	49 13.3	57 50	63.0	50 04.1	55 49	61.1	3
4	44 42.2	65 52	70.0	45 21.1	64 52	68.9	46 18.4	63 51	67.2	46 55.7	62 51	66.1	47 32.4	60 51	64.9	48 08.3	59 50	63.7	48 43.5	58 50	62.5	49 34.8	56 49	60.6	4
75	44 10.7	66 52	69.3	44 49.9	65 52	68.3	45 47.5	63 51	66.6	46 25.1	62 51	65.5	47 02.1	61 50	64.4	47 38.3	60 50	63.2	48 13.8	59 49	62.0	49 05.6	57 48	60.1	75
6	43 39.4	66 52	68.7	44 18.8	65 52	67.6	45 16.8	64 51	66.0	45 54.7	63 51	64.9	46 31.9	61 50	63.8	47 08.4	60 50	62.6	47 44.3	59 49	61.4	48 36.6	57 48	59.6	6
7	43 08.2	67 52	68.1	43 47.8	66 51	67.0	44 46.2	64 51	65.4	45 24.4	63 50	64.3	46 01.9	62 50	63.2	46 38.7	61 49	62.1	47 14.9	60 49	60.9	48 07.7	58 48	59.1	7
8	42 37.2	67 52	67.4	43 17.0	66 51	66.4	44 15.8	65 50	64.8	44 54.2	64 50	63.8	45 32.0	62 50	62.6	46 09.2	61 49	61.5	46 45.6	60 48	60.4	47 39.0	58 48	58.6	8
9	42 06.2	67 51	66.8	42 46.3	66 51	65.8	43 45.5	65 50	64.2	44 24.2	64 50	63.2	45 02.3	63 49	62.1	45 39.7	62 49	61.0	46 16.5	61 48	59.8	47 10.4	59 47	58.1	9
80	41 35.5	68 51	66.2	42 15.8	67 51	65.2	43 15.3	65 50	63.6	43 54.3	64 50	62.6	44 32.7	63 49	61.5	45 10.5	62 48	60.4	45 47.6	61 48	59.3	46 42.0	60 47	57.6	80
1	41 04.9	68 51	65.5	41 45.4	67 50	64.6	42 45.4	66 50	63.0	43 24.6	65 49	62.0	44 03.3	64 49	60.9	44 41.4	63 48	59.9	45 18.8	62 48	58.8	46 13.8	60 47	57.1	1
2	40 34.4	68 50	64.9	41 15.2	68 50	63.9	42 15.5	66 49	62.4	42 55.1	65 49	61.4	43 34.0	64 48	60.4	44 12.4	63 48	59.3	44 50.2	62 47	58.2	45 45.7	61 47	56.5	2
3	40 04.1	69 50	64.3	40 45.2	68 50	63.3	41 45.9	67 49	61.9	42 25.7	66 49	60.8	43 05.0	65 48	59.8	43 43.7	64 48	58.8	44 21.8	63 47	57.7	45 17.8	61 46	56.0	3
4	39 33.9	69 50	63.7	40 15.3	68 50	62.7	41 16.4	67 49	61.3	41 56.5	66 48	60.3	42 36.0	66 48	59.2	43 15.1	65 47	58.2	43 53.5	64 47	57.2	44 50.1	62 46	55.5	4
85	39 04.0	70 50	63.0	39 45.5	69 49	62.1	40 47.0	68 49	60.7	41 27.4	67 48	59.7	42 07.3	66 48	58.7	42 46.6	65 47	57.7	43 25.4	64 47	56.6	44 22.5	63 46	55.0	85
6	38 34.1	70 49	62.4	39 16.0	69 49	61.5	40 17.9	68 48	60.1	40 58.5	67 48	59.1	41 38.7	67 47	58.1	42 18.4	66 47	57.1	42 57.5	65 46	56.1	43 55.1	63 45	54.5	6
7	38 04.5	70 49	61.8	38 46.6	70 49	60.9	39 48.9	69 48	59.5	40 29.8	68 48	58.5	41 10.3	67 47	57.6	41 50.3	66 47	56.6	42 29.7	65 46	55.5	43 27.9	64 45	54.0	7
8	37 35.0	71 49	61.2	38 17.3	70 48	60.3	39 20.1	69 48	58.9	40 01.3	68 47	57.9	40 42.1	68 47	57.0	41 22.4	67 46	56.0	42 02.2	66 46	55.0	43 00.8	64 45	53.5	8
9	37 05.7	71 49	60.5	37 48.3	71 48	59.7	38 51.4	70 47	58.3	39 33.0	69 47	57.4	40 14.1	68 46	56.4	40 54.7	67 46	55.4	41 34.8	66 45	54.5	42 34.0	65 44	52.9	9
90	36 36.6	72 48	59.9	37 19.4	71 48	59.1	38 23.0	70 47	57.7	39 04.8	69 47	56.8	39 46.2	69 46	55.8	40 27.1	68 46	54.9	41 07.6	67 45	53.9	42 07.3	66 44	52.4	90

Digitized by Google

Lat. 56°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
91	36 07.6	72 48	59.3	36 50.8	72 48	58.4	37 54.7	71 47	57.1	38 36.8	70 46	56.2	39 18.5	69 46	55.3	39 59.8	68 45	54.3	40 40.6	68 45	53.4	41 40.8	66 44	51.9	91
2	35 38.9	73 48	58.7	36 22.3	72 47	57.8	37 26.6	71 46	56.5	38 09.0	70 46	55.6	38 51.0	70 45	54.7	39 32.6	69 45	53.8	40 13.7	68 44	52.8	41 14.5	67 44	51.4	2
3	35 10.3	73 47	58.1	35 53.9	72 47	57.2	36 58.7	72 46	55.9	37 41.4	71 46	55.0	38 23.7	70 45	54.1	39 05.6	69 45	53.2	39 47.1	69 44	52.3	40 48.4	68 43	50.8	3
4	34 41.9	73 47	57.4	35 25.8	73 47	56.6	36 31.0	72 46	55.3	37 14.0	71 45	54.5	37 56.7	71 45	53.6	38 38.9	70 44	52.7	39 20.6	69 44	51.7	40 22.5	68 43	50.3	4
95	34 13.8	74 47	56.8	34 57.9	73 46	56.0	36 03.5	72 46	54.7	36 46.8	72 45	53.9	37 29.8	71 44	53.0	38 12.3	71 44	52.1	38 54.4	70 43	51.2	39 56.7	69 43	49.8	95
6	33 45.8	74 46	56.2	34 30.2	74 46	55.4	35 36.2	73 45	54.1	36 19.8	72 45	53.3	37 03.1	72 44	52.4	37 45.9	71 44	51.6	38 28.3	70 43	50.7	39 31.2	69 42	49.3	6
7	33 18.0	75 46	55.6	34 02.7	74 46	54.8	35 09.2	73 45	53.6	35 53.0	73 44	52.7	36 36.6	72 44	51.9	37 19.7	72 43	51.0	38 02.5	71 43	50.1	39 05.9	70 42	48.7	7
8	32 50.4	75 46	55.0	33 35.4	75 45	54.2	34 42.3	74 44	53.0	35 26.5	73 44	52.1	36 10.3	73 43	51.3	36 53.8	72 43	50.4	37 36.9	72 42	49.6	38 40.8	70 42	48.2	8
9	32 23.0	76 45	54.3	33 08.3	75 45	53.6	34 15.6	74 44	52.4	35 00.1	74 44	51.5	35 44.2	73 43	50.7	36 28.0	73 43	49.9	37 11.4	72 42	49.0	38 15.8	71 41	47.7	9
100	31 55.9	76 45	53.7	32 41.4	76 44	52.9	33 49.1	75 44	51.8	34 33.9	74 43	51.0	35 18.4	74 43	50.1	36 02.5	73 42	49.3	36 46.2	73 42	48.5	37 51.1	72 41	47.1	100
1	31 29.0	77 45	53.1	32 14.7	76 44	52.3	33 22.9	75 43	51.2	34 08.0	75 43	50.4	34 52.7	74 42	49.6	35 37.1	74 42	48.7	36 21.2	73 41	47.9	37 26.7	72 40	46.6	1
2	31 02.2	77 44	52.5	31 48.3	77 44	51.7	32 56.9	76 43	50.6	33 42.2	75 42	49.8	34 27.3	75 42	49.0	35 12.0	74 41	48.2	35 56.4	74 41	47.3	37 02.4	73 40	46.1	2
3	30 35.7	77 44	51.8	31 22.1	77 43	51.1	32 31.1	76 43	50.0	33 16.7	76 42	49.2	34 02.1	75 42	48.4	34 47.1	75 41	47.6	35 31.9	74 41	46.8	36 38.3	73 40	45.5	3
4	30 09.5	78 43	51.2	30 56.1	77 43	50.5	32 05.5	77 42	49.4	32 51.4	76 42	48.6	33 37.1	76 41	47.8	34 22.5	75 41	47.0	35 07.5	75 40	46.2	36 14.5	74 39	45.0	4
105	29 43.4	78 43	50.6	30 30.3	78 43	49.9	31 40.1	77 42	48.8	32 26.4	77 41	48.0	33 12.3	76 41	47.2	33 58.0	76 40	46.5	34 43.4	75 40	45.7	35 50.9	75 39	44.5	105
6	29 17.6	79 43	50.0	30 04.8	78 42	49.3	31 15.0	78 41	48.2	32 01.6	77 41	47.4	32 47.8	77 40	46.7	33 33.8	76 40	45.9	34 19.5	76 39	45.1	35 27.5	75 39	43.9	6
7	28 52.1	79 42	49.3	29 39.5	79 42	48.6	30 50.1	78 41	47.6	31 37.0	78 41	46.8	32 23.5	77 40	46.1	33 09.8	77 40	45.3	33 55.9	76 39	44.6	35 04.3	76 38	43.4	7
8	28 26.7	80 42	48.7	29 14.4	79 41	48.0	30 25.5	79 41	47.0	31 12.6	78 40	46.2	31 59.5	78 40	45.5	32 46.1	77 39	44 8	33 32.4	77 39	44.0	34 41.4	76 38	42.8	8
9	28 01.6	80 41	48.1	28 49.6	80 41	47.4	30 01.1	79 40	46.4	30 48.5	79 40	45.6	31 35.7	78 39	44.9	32 22.6	78 39	44.2	33 09.2	78 38	43.4	34 18.7	77 37	42.3	9
110	27 36.8	81 41	47.4	28 25.0	80 41	46.8	29 37.0	80 40	45.7	30 24.6	79 39	45.0	31 12.1	79 39	44.3	31 59.3	78 38	43.6	32 46.3	78 38	42.9	33 56.2	77 37	41.7	110
1	27 12.2	81 41	46.8	28 00.7	81 40	46.2	29 13.0	80 39	45.1	30 01.0	80 39	44.4	30 48.8	79 38	43.7	31 36.3	79 38	43.0	32 23.6	79 37	42.3	33 34.0	78 37	41.2	1
2	26 47.9	81 40	46.2	27 36.6	81 40	45.5	28 49.4	81 39	44.5	29 37.7	80 39	43.8	30 25.7	80 38	43.2	31 13.5	80 38	42.5	32 01.1	79 37	41.7	33 12.1	78 36	40.6	2
3	26 23.8	82 40	45.6	27 12.8	82 39	44.9	28 26.0	81 39	43.9	29 14.5	81 38	43.2	30 02.9	80 38	42.6	30 51.0	80 37	41.9	31 38.9	80 37	41.2	32 50.3	79 36	40.1	3
4	26 00.0	82 39	44.9	26 49.3	82 39	44.3	28 02.8	82 38	43.3	28 51.7	81 38	42.6	29 40.3	81 37	42.0	30 28.7	81 37	41.3	31 17.0	80 36	40.6	32 28.8	80 35	39.5	4
115	25 36.4	83 39	44.3	26 26.0	82 38	43.7	27 40.0	82 38	42.7	28 29.1	82 37	42.0	29 18.0	81 37	41.4	30 06.7	81 36	40.7	30 55.3	81 36	40.0	32 07.6	80 35	39.0	115
6	25 13.1	83 38	43.6	26 02.9	83 38	43.0	27 17.3	82 37	42.1	28 06.7	82 37	41.4	28 56.0	82 36	40.8	29 45.0	82 36	40.1	30 33.8	81 35	39.5	31 46.6	81 35	38.4	6
7	24 50.1	84 38	43.0	25 40.2	83 37	42.4	26 55.0	83 37	41.5	27 44.7	83 36	40.8	28 34.2	82 36	40.2	29 23.5	82 35	39.5	30 12.6	82 35	38.9	31 25.9	81 34	37.9	7
8	24 27.4	84 37	42.4	25 17.7	84 37	41.8	26 32.9	83 36	40.8	27 22.9	83 36	40.2	28 12.7	83 35	39.6	29 02.3	83 35	39.0	29 51.7	82 34	38.3	31 05.5	82 34	37.3	8
9	24 04.9	84 37	41.7	24 55.5	84 37	41.1	26 11.1	84 36	40.2	27 01.3	84 35	39.6	27 51.4	83 35	39.0	28 41.3	83 34	38.4	29 31.0	83 34	37.7	30 45.3	82 33	36.7	9
120	23 42.7	85 36	41.1	24 33.6	85 36	40.5	25 49.6	84 35	39.6	26 40.1	84 35	39.0	27 30.4	84 34	38.4	28 20.6	84 34	37.8	29 10.6	83 34	37.1	30 25.3	83 33	36.2	120
1	23 20.8	85 36	40.4	24 11.9	85 36	39.9	25 28.3	85 35	39.0	26 19.1	85 34	38.4	27 09.7	84 34	37.8	28 00.2	84 34	37.2	28 50.5	84 33	36.6	30 05.6	83 32	35.6	1
2	22 59.2	86 36	39.8	23 50.6	86 35	39.2	25 07.4	85 34	38.4	25 58.4	85 34	37.8	26 49.3	85 34	37.2	27 40.1	84 33	36.6	28 30.7	84 33	36.0	29 46.2	84 32	35.0	2
3	22 37.9	86 35	39.1	23 29.5	86 35	38.6	24 46.7	86 34	37.7	25 38.0	85 34	37.2	26 29.2	85 33	36.6	27 20.2	85 33	36.0	28 11.1	85 32	35.4	29 27.1	84 31	34.5	3
4	22 16.8	87 35	38.5	23 08.7	86 34	37.9	24 26.3	86 34	37.1	25 17.9	86 33	36.6	26 09.3	86 33	36.0	27 00.6	85 32	35.4	27 51.8	85 32	34.8	29 08.2	85 31	33.9	4
125	21 56.1	87 34	37.8	22 48.2	87 34	37.3	24 06.2	86 33	36.5	24 58.0	86 33	35.9	25 49.8	86 32	35.4	26 41.3	86 32	34.8	27 32.8	86 31	34.2	28 49.7	85 30	33.3	125
6	21 35.7	87 34	37.2	22 28.0	87 33	36.7	23 46.4	87 32	35.9	24 38.5	87 32	35.3	25 30.5	87 32	34.8	26 22.3	86 31	34.2	27 14.1	86 31	33.6	28 31.4	86 30	32.8	6
7	21 15.5	88 33	36.5	22 08.2	88 33	36.0	23 26.9	87 32	35.2	24 19.3	87 32	34.7	25 11.5	87 31	34.2	26 03.6	87 31	33.6	26 55.6	87 30	33.0	28 13.4	86 30	32.2	7
8	20 55.7	88 33	35.9	21 48.6	88 32	35.4	23 07.7	88 32	34.6	24 00.3	88 31	34.1	24 52.8	87 31	33.5	25 45.2	87 30	33.0	26 37.5	87 30	32.5	27 55.6	87 29	31.6	8
9	20 36.2	89 32	35.2	21 29.3	88 32	34.7	22 48.8	88 31	34.0	23 41.7	88 31	33.4	24 34.4	88 30	32.9	25 27.1	88 30	32.4	26 19.6	87 29	31.9	27 38.2	87 29	31.0	9
130	20 17.0	89 31	34.6	21 10.4	89 31	34.1	22 30.2	89 30	33.3	23 23.3	88 30	32.8	24 16.3	88 30	32.3	25 09.2	88 29	31.8	26 02.0	88 29	31.3	27 21.0	88 28	30.5	130
1	19 58.2	89 31	33.9	20 51.7	89 31	33.4	22 11.9	89 30	32.7	23 05.3	89 30	32.2	23 58.6	89 29	31.7	24 51.7	89 29	31.2	25 44.8	88 28	30.7	27 04.2	88 28	29.9	1
2	19 39.6	90 30	33.2	20 33.4	90 30	32.8	21 54.0	89 29	32.1	22 47.6	89 29	31.6	23 41.1	89 29	31.1	24 34.5	89 28	30.6	25 27.8	89 28	30.1	26 47.6	89 27	29.3	2
3	19 21.4	90 30	32.6	20 15.4	90 29	32.1	21 36.3	90 29	31.4	22 30.2	90 28	30.9	23 23.9	90 28	30.5	24 17.6	89 28	30.0	25 11.2	89 27	29.5	26 31.3	89 27	28.7	3
4	19 03.5	90 29	31.9	19 57.7	90 29	31.5	21 19.0	90 28	30.8	22 13.1	90 28	30.3	23 07.1	90 28	29.8	24 01.0	90 27	29.4	24 54.8	90 27	28.9	26 15.4	89 26	28.1	4
135	18 45.9	91 29	31.2	19 40.4	91 28	30.8	21 02.0	91 28	30.1	21 56.3	90 27	29.7	22 50.5	90 27	29.2	23 44.7	90 27	28.7	24 38.8	90 26	28.3	25 59.7	90 26	27.5	135
6	18 28.7	91 28	30.6	19 23.4	91 28	30.1	20 45.3	91 27	29.5	21 39.8	91 27	29.0	22 34.3	91 26	28.6	23 28.7	91 26	28.1	24 23.0	90 26	27.7	25 44.3	90 25	27.0	6
7	18 11.8	92 28	29.9	19 06.7	91 27	29.5	20 29.0	91 27	28.8	21 23.7	91 26	28.4	22 18.4	91 26	28.0	23 13.1	91 26	27.5	24 07.6	91 25	27.1	25 29.3	91 25	26.4	7
8	17 55.2	92 27	29.2	18 50.3	92 27	28.8	20 12.9	92 26	28.2	21 07.9	92 26	27.8	22 02.9	91 25	27.3	22 57.7	91 25	26.9	23 52.5	91 25	26.5	25 14.5	91 24	25.8	8
9	17 39.0	92 26	28.6	18 34.3	92 26	28.2	19 57.2	92 26	27.5	20 52.5	92 25	27.1	21 47.6	92 25	26.7	22 42.7	92 24	26.3	23 37.7	92 24	25.8	25 00.1	91 24	25.2	9
140	17 23.1	93 26	27.9	18 18.7	93 26	27.5	19 41.9	92 25	26.9	20 37.3	92 25	26.5	21 32.7	92 24	26.1	22 28.0	92 24	25.7	23 23.2	92 24	25.2	24 46.0	92 23	24.6	140
1	17 07.6	93 25	27.2	18 03.3	93 25	26.8	19 26.9	93 24	26.2	20 22.5	93 24	25.8	21 18.1	93 24	25.4	22 13.6	92 23	25.0	23 09.1	92 23	24.6	24 32.2	92 22	24.0	1
2	16 52.4	93 25	26.5	17 48.4	93 24	26.2	19 12.2	93 24	25.6	20 08.1	93 24	25.2	21 03.9	93 23	24.8	21 59.6	93 23	24.4	22 55.3	93 22	24.0	24 18.7	93 22	23.4	2
3	16 37.6	94 24	25.9	17 33.7	94 24	25.5	18 57.9	93 23	24.9	19 54.0	93 23	24.6	20 50.0	93 23	24.2	21 45.9	93 22	23.8	22 41.8	93 22	23.4	24 05.5	93 21	22.8	3
4	16 23.1	94 24	25.2	17 19.5	94 23	24.8	18 43.9	94 23	24.3	19 40.2	94 22	23.9	20 36.4	94 22	23.5	21 32.5	94 22	23.2	22 28.6	93 21	22.8	23 52.7	93 21	22.2	4
145	16 09.0	94 23	24.5	17 05.6	94 23	24.2	18 30.3	94 22	23.6	19 26.8	94 22	23.3	20 23.2	94 21	22.9	21 19.5	94 21	22.5	22 15.8	94 21	22.2	23 40.2	94 20	21.6	145
6	15 55.3	95 22	23.8	16 52.0	95 22	23.5	18 17.0	94 22	23.0	19 13.7	94 21	22.6	20 10.3	94 21	22.3	21 06.8	94 21	21.9	22 03.3	94 20	21.5	23 28.0	94 20	21.0	6
7	15 41.9	95 22	23.1	16 38.8	95 21	22.8	18 04.1	95 21	22.3	19 00.9	95 21	22.0	19 57.7	95 20	21.6	20 54.5	95 20	21.3	21 51.2	94 20	20.9	23 16.1	94 19	20.4	7
8	15 28.9	95 21	22.5	16 26.0	95 21	22.1	17 51.6	95 20	21.6	18 48.6	95 20	21.3	19 45.5	95 20	21.0	20 42.5	95 19	20.7	21 39.4	95 19	20.3	23 04.6	95 19	19.8	8
9	15 16.3	95 20	21.8	16 13.5	95 20	21.5	17 39.4	95 20	21.0	18 36.5	95 19	20.7	19 33.7	95 19	20.3	20 30.8	95 19	20.0	21 27.9	95 19	19.7	22 53.4	95 18	19.2	9
150	15 04.0	96 20	21.1	16 01.5	96 20	20.8	17 27.5	96 19	20.3	18 24.9	96 19	20.0	19 22.2	96 19	19.7	20 19.5	95 18	19.4	21 16.7	95 18	19.1	22 42.6	95 18	18.6	150
1	14 52.2	96 19	20.4	15 49.7	96 19	20.1	17 16.1	96 18	19.7	18 13.6	96 18	19.4	19 11.1	96 18	19.1	20 08.5	96 18	18.8	21 06.0	96 17	18.4	22 32.0	96 17	18.0	1
2	14 40.7	96 19	19.7	15 38.4	96 18	19.4	17 05.0	96 18	19.0	18 02.6	96 18	18.7	19 00.3	96 17	18.4	19 57.9	96 17	18.1	20 55.5	96 17	17.8	22 21.9	96 16	17.4	2
3	14 29.5	97 18	19.0	15 27.4	96 18	18.7	16 54.2	96 17	18.3	17 52.1	96 17	18.0	18 49.9	96 17	17.8	19 47.7	96 16	17.5	20 45.4	96 16	17.2	22 12.0	96 16	16.8	3
4	14 18.8	97 17	18.3	15 16.8	97 17	18.1	16 43.9	97 17	17.7	17 41.9	97 16	17.4	18 39.8	97 16	17.1	19 37.8	97 16	16.8	20 35.7	97 16	16.6	22 02.5	96 15	16.1	4
155	14 08.5	97 17	17.6	15 06.6	97 16	17.4	16 33.9	97 16	17.0	17 32.0	97 16	16.7	18 30.1	97 16	16.5	19 28.2	97 15	16.2	20 26.3	97 15	15.9	21 53.4	97 15	15.5	155
6	13 58.5	97 16	16.9	14 56.8	97 16	16.7	16 24.3	97 15	16.3	17 22.5	97 15	16.1	18 20.8	97 15	15.8	19 19.0	97 15	15.6	20 17.3	97 14	15.3	21 44.6	97 14	14.9	6
7	13 48.9	97 15	16.2	14 47.4	97 15	16.0	16 15.0	97 15	15.6	17 13.4	97 15	15.4	18 11.8	97 14	15.2	19 10.2	97 14	14.9	20 08.6	97 14	14.7	21 36.1	97 14	14.3	7
8	13 39.7	98 15	15.5	14 38.3	98 14	15.3	16 06.2	98 14	15.0	17 04.7	98 14	14.7	18 03.2	98 14	14.5	19 01.8	98 14	14.3	20 00.3	97 13	14.0	21 28.0	97 13	13.7	8
9	13 30.9	98 14	14.8	14 29.6	98 14	14.6	15 57.7	98 13	14.3	16 56.4	98 13	14.1	17 55.0	98 13	13.9	18 53.7	98 13	13.6	19 52.3	98 13	13.4	21 20.2	98 12	13.1	9
160	13 22.6	98 13	14.1	14 21.4	98 13	13.9	15 49.6	98 13	13.6	16 48.4	98 13	13.4	17 47.2	98 12	13.2	18 45.9	98 12	13.0	19 44.7	98 12	12.8	21 12.8	98 12	12.5	160
1	13 14.6	98 13	13.4	14 13.5	98 12	13.2	15 41.9	98 12	12.9	16 40.8	98 12	12.8	17 39.7	98 12	12.6	18 38.6	98 12	12.4	19 37.5	98 11	12.1	21 05.7	98 11	11.8	1
2	13 07.0	98 12	12.7	14 06.0	98 12	12.6	15 34.6	98 12	12.3	16 33.6	98 11	12.1	17 32.6	98 11	11.9	18 31.6	98 11	11.7	19 30.6	98 11	11.5	20 59.0	98 11	11.2	2
3	12 59.8	99 11	12.0	13 58.9	99 11	11.9	15 27.6	99 11	11.6	16 26.7	99 11	11.4	17 25.9	99 11	11.2	18 25.0	99 10	11.1	19 24.1	98 10	10.9	20 52.7	98 10	10.6	3
4	12 53.0	99 11	11.3	13 52.2	99 10	11.2	15 21.1	99 10	10.9	16 20.3	99 10	10.8	17 19.5	99 10	10.6	18 18.7	99 10	10.4	19 17.9	99 10	10.2	20 46.7	99 09	10.0	4
165	12 46.6	99 10	10.6	13 45.9	99 10	10.5	15 14.9	99 10	10.2	16 14.2	99 09	10.1	17 13.5	99 09	09.9	18 12.8	99 09	09.8	19 12.1	99 09	09.6	20 41.1	99 09	09.4	165
6	12 40.6	99 09	09.9	13 40.0	99 09	09.8	15 09.1	99 09	09.6	16 08.5	99 09	09.4	17 07.9	99 09	09.3	18 07.3	99 09	09.1	19 06.7	99 08	09.0	20 35.8	99 08	08.7	6
7	12 35.0	99 09	09.2	13 34.5	99 08	09.1	15 03.8	99 08	08.9	16 03.3	99 08	08.7	17 02.7	99 08	08.6	18 02.2	99 08	08.5	19 01.7	99 08	08.3	20 30.9	99 08	08.1	7
8	12 29.9	99 08	08.5	13 29.4	99 08	08.4	14 58.8	99 08	08.2	15 58.3	99 08	08.1	16 57.9	99 07	07.9	17 57.5	99 07	07.8	18 57.0	99 07	07.7	20 26.3	99 07	07.5	8
9	12 25.1	99 07	07.8	13 24.7	99 07	07.7	14 54.2	99 07	07.5	15 53.8	99 07	07.4	16 53.5	99 07	07.3	17 53.1	99 07	07.2	18 52.7	99 07	07.1	20 22.1	99 06	06.9	9
170	12 20.8	1.0 07	07.1	13 20.5	1.0 06	07.0	14 50.0	99 06	06.8	15 49.7	99 06	06.7	16 49.4	99 06	06.6	17 49.1	99 06	06.5	18 48.8	99 06	06.4	20 18.3	99 06	06.2	170
1	12 16.8	1.0 06	06.4	13 16.6	1.0 06	06.3	14 46.2	1.0 06	06.2	15 46.0	1.0 06	06.1	16 45.7	1.0 06	06.0	17 45.5	1.0 05	05.9	18 45.2	1.0 05	05.8	20 14.8	1.0 05	05.6	1
2	12 13.3	1.0 05	05.7	13 13.1	1.0 05	05.6	14 42.8	1.0 05	05.5	15 42.6	1.0 05	05.4	16 42.4	1.0 05	05.3	17 42.2	1.0 05	05.2	18 42.0	1.0 05	05.1	20 11.7	1.0 05	05.0	2
3	12 10.2	1.0 04	05.0	13 10.0	1.0 04	04.9	14 39.8	1.0 04	04.8	15 39.7	1.0 04	04.7	16 39.5	1.0 04	04.6	17 39.4	1.0 04	04.6	18 39.2	1.0 04	04.5	20 09.0	1.0 04	04.4	3
4	12 07.5	1.0 04	04.3	13 07.4	1.0 04	04.2	14 37.2	1.0 04	04.1	15 37.1	1.0 04	04.0	16 37.0	1.0 04	04.0	17 36.9	1.0 04	03.9	18 36.8	1.0 03	03.8	20 06.6	1.0 03	03.8	4
175	12 05.2	1.0 03	03.5	13 05.1	1.0 03	03.5	14 35.0	1.0 03	03.4	15 34.9	1.0 03	03.4	16 34.9	1.0 03	03.3	17 34.8	1.0 03	03.3	18 34.7	1.0 03	03.2	20 04.6	1.0 03	03.1	175
6	12 03.3	1.0 02	02.8	13 03.3	1.0 02	02.8	14 33.2	1.0 02	02.7	15 33.2	1.0 02	02.7	16 33.1	1.0 02	02.7	17 33.1	1.0 02	02.6	18 33.0	1.0 02	02.6	20 02.9	1.0 02	02.5	6
7	12 01.9	1.0 02	02.1	13 01.8	1.0 02	02.1	14 31.8	1.0 02	02.1	15 31.8	1.0 02	02.0	16 31.7	1.0 02	02.0	17 31.7	1.0 02	02.0	18 31.7	1.0 02	01.9	20 01.6	1.0 02	01.9	7
8	12 00.8	1.0 01	01.4	13 00.8	1.0 01	01.4	14 30.8	1.0 01	01.4	15 30.8	1.0 01	01.3	16 30.8	1.0 01	01.3	17 30.8	1.0 01	01.3	18 30.8	1.0 01	01.3	20 00.7	1.0 01	01.3	8
9	12 00.2	1.0 00	00.7	13 00.2	1.0 00	00.7	14 30.2	1.0 00	00.7	15 30.2	1.0 00	00.7	16 30.2	1.0 00	00.7	17 30.2	1.0 00	00.7	18 30.2	1.0 00	00.6	20 00.2	1.0 00	00.6	9
180	12 00.0	1.0 00	00.0	13 00.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 30.0	1.0 00	00.0	16 30.0	1.0 00	00.0	17 30.0	1.0 00	00.0	18 30.0	1.0 00	00.0	20 00.0	1.0 00	00.0	180

Lat 57°

Lat 58°

La 59

Digitized by Google

Lat. 56°

H.A.	54° 30′ Alt.	Δd Δt	Az.	55° 00′ Alt.	Δd Δt	Az.	56° 00′ Alt.	Δd Δt	Az.	56° 30′ Alt.	Δd Δt	Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	88 30.0	1.0 10	180.0	89 00.0	1.0 15	180.0	90 00.0	.. 56	....	89 30.0	1.0 25	00.0
1	88 23.7	94 28	158.8	88 51.0	87 36	150.1	89 26.4	01 56	89.6	89 15.1	66 47	47.6
2	88 07.0	80 39	141.9	88 29.4	67 46	130.6	88 52.9	01 56	89.2	88 46.9	40 52	64.9
3	87 43.5	69 45	130.0	88 01.7	53 50	119.2	88 19.3	02 56	88.8	88 15.6	27 54	72.1
4	87 16.3	57 49	121.7	87 31.4	43 53	112.2	87 45.8	03 56	88.3	87 43.4	19 54	75.7
05	86 46.8	50 51	115.7	86 59.8	37 54	107.4	87 12.3	04 56	87.9	87 10.7	14 55	77.7
6	86 16.0	44 53	111.2	86 27.5	32 55	103.9	86 38.8	04 56	87.5	86 37.8	11 55	79.0
7	85 44.4	40 54	107.7	85 54.8	29 55	101.3	86 05.2	05 56	87.1	86 04.8	08 55	79.8
8	85 12.2	37 54	104.9	85 21.8	27 55	99.1	85 31.7	06 56	86.7	85 31.8	05 55	80.3
9	84 39.6	34 55	102.6	84 48.6	26 56	97.4	84 58.2	07 56	86.3	84 58.7	03 55	80.6
10	84 06.7	32 55	100.6	84 15.2	24 56	95.9	84 24.8	07 56	85.9	84 25.6	02 55	80.7
1	83 33.6	31 55	98.9	83 41.8	24 56	94.6	83 51.3	08 56	85.4	83 52.5	00 55	80.8
2	83 00.4	30 56	97.4	83 08.3	23 56	93.4	83 17.9	09 56	85.0	83 19.4	01 55	80.7
3	82 27.1	29 56	96.0	82 34.8	23 56	92.3	82 44.5	09 56	84.6	82 46.3	03 55	80.6
4	81 53.7	28 56	94.8	82 01.3	22 56	91.4	82 11.1	10 56	84.2	82 13.2	04 55	80.5
15	81 20.2	28 56	93.7	81 27.8	22 56	90.5	81 37.7	11 56	83.8	81 40.1	05 55	80.3
6	80 46.8	27 56	92.7	80 54.2	22 56	89.6	81 04.4	12 56	83.4	81 07.0	06 55	80.1
7	80 13.2	27 56	91.7	80 20.6	22 56	88.9	80 31.1	12 55	82.9	80 34.0	07 55	79.9
8	79 39.7	27 56	90.8	79 47.1	22 56	88.1	79 57.8	13 55	82.5	80 01.0	08 55	79.7
9	79 06.1	27 56	90.0	79 13.6	23 56	87.4	79 24.5	14 55	82.1	79 28.0	09 55	79.4
20	78 32.6	27 56	89.2	78 40.1	23 56	86.7	78 51.3	14 55	81.7	78 55.0	10 55	79.1
1	77 59.0	27 56	88.4	78 06.6	23 56	86.1	78 18.1	15 55	81.3	78 22.1	11 55	78.8
2	77 25.5	27 56	87.7	77 33.1	24 56	85.4	77 45.0	16 55	80.8	77 49.2	12 55	78.5
3	76 52.0	27 56	86.9	76 59.7	24 56	84.8	77 11.9	17 55	80.4	77 16.3	13 55	78.2
4	76 18.5	28 56	86.3	76 26.3	24 56	84.2	76 38.8	17 55	80.0	76 43.5	14 55	77.9
25	75 45.0	28 56	85.6	75 52.9	25 56	83.6	76 05.8	18 55	79.6	76 10.7	15 55	77.5
6	75 11.6	28 56	84.9	75 19.6	25 55	83.0	75 32.8	19 55	79.2	75 38.0	16 54	77.2
7	74 38.2	29 56	84.3	74 46.3	26 55	82.5	74 59.9	20 55	78.7	75 05.3	16 54	76.8
8	74 04.8	29 56	83.7	74 13.1	26 55	81.9	74 27.0	20 55	78.3	74 32.6	17 54	76.5
9	73 31.5	29 55	83.1	73 39.9	27 55	81.4	73 54.2	21 55	77.9	74 00.0	18 54	76.1
30	72 58.2	30 55	82.5	73 06.7	27 55	80.8	73 21.4	22 55	77.5	73 27.5	19 54	75.8
1	72 25.0	30 55	81.9	72 33.6	28 55	80.3	72 48.7	22 54	77.1	72 55.0	20 54	75.4
2	71 51.8	31 55	81.3	72 00.6	28 55	79.8	72 16.0	23 54	76.6	72 22.6	21 54	75.0
3	71 18.6	31 55	80.8	71 27.6	29 55	79.3	71 43.4	24 54	76.2	71 50.2	21 54	74.6
4	70 45.5	32 55	80.2	70 54.7	29 55	78.7	71 10.8	25 54	75.8	71 17.8	22 54	74.3
35	70 12.5	32 55	79.6	70 21.8	30 55	78.2	70 38.4	25 54	75.4	70 45.6	23 54	73.9
6	69 39.5	33 55	79.1	69 49.0	30 55	77.7	70 05.9	26 54	74.9	70 13.4	24 54	73.5
7	69 06.6	33 55	78.6	69 16.2	31 54	77.2	69 33.6	27 54	74.5	69 41.2	25 53	73.1
8	68 33.8	34 55	78.0	68 43.5	32 54	76.7	69 01.3	27 54	74.1	69 09.2	25 53	72.7
9	68 01.0	34 55	77.5	68 10.9	32 54	76.2	68 29.0	28 54	73.6	68 37.2	26 53	72.3
40	67 28.3	35 54	77.0	67 38.4	33 54	75.7	67 56.9	29 53	73.2	68 05.2	27 53	71.9
1	66 55.6	35 54	76.4	67 05.9	33 54	75.2	67 24.8	30 53	72.8	67 33.4	28 53	71.5
2	66 23.0	36 54	75.9	66 33.5	34 54	74.7	66 52.8	30 53	72.3	67 01.6	28 53	71.1
3	65 50.5	36 54	75.4	66 01.2	35 54	74.3	66 20.8	31 53	71.9	66 29.9	29 53	70.7
4	65 18.1	37 54	74.9	65 28.9	35 54	73.8	65 49.0	32 53	71.5	65 58.3	30 53	70.3
45	64 45.7	37 54	74.4	64 56.7	36 54	73.3	65 17.2	32 53	71.0	65 26.7	31 52	69.9
6	64 13.5	38 54	73.9	64 24.6	36 53	72.8	64 45.5	33 53	70.6	64 55.2	32 52	69.5
7	63 41.3	39 54	73.4	63 52.6	37 53	72.3	64 13.9	34 53	70.2	64 23.9	32 52	69.1
8	63 09.2	39 53	72.9	63 20.7	38 53	71.8	63 42.4	35 52	69.7	63 52.6	33 52	68.7
9	62 37.2	40 53	72.4	62 48.9	38 53	71.4	63 11.0	35 52	69.3	63 21.3	34 52	68.3
50	62 05.2	40 53	71.9	62 17.1	39 53	70.9	62 39.6	36 52	68.9	62 50.2	35 52	67.8
1	61 33.4	41 53	71.4	61 45.5	40 53	70.4	62 08.4	37 52	68.4	62 19.2	35 52	67.4
2	61 01.7	42 53	70.9	61 13.9	40 52	69.9	61 37.2	37 52	68.0	61 48.3	36 51	67.0
3	60 30.0	42 53	70.4	60 42.5	41 52	69.4	61 06.2	38 52	67.5	61 17.4	37 51	66.6
4	59 58.5	43 52	69.9	60 11.1	41 52	69.0	60 35.2	39 51	67.1	60 46.7	38 51	66.2
55	59 27.0	43 52	69.4	59 39.8	42 52	68.5	60 04.4	40 51	66.7	60 16.1	38 51	65.7
6	58 55.7	44 52	68.9	59 08.7	43 52	68.0	59 33.6	40 51	66.2	59 45.5	39 51	65.3
7	58 24.4	45 52	68.4	58 37.6	43 52	67.5	59 03.0	41 51	65.8	59 15.1	40 51	64.9
8	57 53.3	45 52	67.9	58 06.7	44 51	67.0	58 32.4	42 51	65.3	58 44.8	41 50	64.4
9	57 22.3	46 52	67.4	57 35.8	45 51	66.6	58 02.0	42 51	64.9	58 14.6	41 50	64.0
60	56 51.3	46 51	66.9	57 05.1	45 51	66.1	57 31.7	43 50	64.4	57 44.4	42 50	63.6
1	56 20.5	47 51	66.4	56 34.5	46 51	65.6	57 01.5	44 50	64.0	57 14.5	43 50	63.1
2	55 49.8	48 51	65.9	56 04.0	47 51	65.1	56 31.4	45 50	63.5	56 44.6	44 50	62.7
3	55 19.3	48 51	65.4	55 33.6	47 50	64.6	56 01.4	45 50	63.1	56 14.8	44 49	62.3
4	54 48.8	49 51	64.9	55 03.4	48 50	64.2	55 31.5	46 50	62.6	55 45.2	45 49	61.8
65	54 18.5	50 50	64.4	54 33.2	49 50	63.7	55 01.8	47 49	62.2	55 15.7	46 49	61.4
6	53 48.3	50 50	63.9	54 03.2	49 50	63.2	54 32.2	47 49	61.7	54 46.3	46 49	60.9
7	53 18.2	51 50	63.4	53 33.3	50 50	62.7	54 02.7	48 49	61.2	54 17.0	47 49	60.5
8	52 48.3	51 50	63.0	53 03.6	51 49	62.2	53 33.4	49 49	60.8	53 47.9	48 48	60.0
9	52 18.4	52 49	62.5	52 33.9	51 49	61.8	53 04.2	50 48	60.3	53 18.9	49 48	59.6
70	51 48.8	53 49	62.0	52 04.5	52 49	61.3	52 35.1	50 48	59.9	52 50.0	49 48	59.1
1	51 19.2	53 49	61.5	51 35.1	53 49	60.8	52 06.1	51 48	59.4	52 21.3	50 48	58.7
2	50 49.8	54 49	61.0	51 05.9	53 48	60.3	51 37.3	52 48	58.9	51 52.7	51 47	58.2
3	50 20.5	55 49	60.5	50 36.8	54 48	59.8	51 08.6	52 48	58.5	51 24.2	51 47	57.8
4	49 51.4	55 48	60.0	50 07.9	54 48	59.3	50 40.1	53 47	58.0	50 55.9	52 47	57.3
75	49 22.4	56 48	59.5	49 39.1	55 48	58.8	50 11.7	54 47	57.5	50 27.7	53 47	56.9
6	48 53.6	56 48	59.0	49 10.5	56 47	58.4	49 43.5	54 47	57.1	49 59.7	54 46	56.4
7	48 24.9	57 48	58.5	48 42.0	56 47	57.9	49 15.4	55 47	56.6	49 31.8	54 46	56.0
8	47 56.4	58 47	58.0	48 13.6	57 47	57.4	48 47.5	56 46	56.1	49 04.1	55 46	55.5
9	47 28.0	58 47	57.5	47 45.5	58 47	56.9	48 19.7	56 46	55.7	48 36.5	56 46	55.0
80	46 59.8	59 47	57.0	47 17.4	58 46	56.4	47 52.1	57 46	55.2	48 09.1	56 45	54.6
1	46 31.8	60 46	56.5	46 49.6	59 46	55.9	47 24.6	58 46	54.7	47 41.9	57 45	54.1
2	46 03.9	60 46	56.0	46 21.9	60 46	55.4	46 57.3	58 45	54.2	47 14.8	58 45	53.6
3	45 36.2	61 46	55.5	45 54.3	60 46	54.9	46 30.2	59 45	53.7	46 47.8	59 45	53.2
4	45 08.6	62 46	55.0	45 27.0	61 45	54.4	46 03.2	60 45	53.3	46 21.1	59 44	52.7
85	44 41.2	62 45	54.5	44 59.8	62 45	53.9	45 36.4	60 44	52.8	45 54.5	60 44	52.2
6	44 14.0	63 45	53.9	44 32.8	62 45	53.4	45 09.8	61 44	52.3	45 28.0	61 44	51.7
7	43 47.0	63 45	53.4	44 05.9	63 44	52.9	44 43.3	62 44	51.8	45 01.8	61 43	51.3
8	43 20.1	64 44	52.9	43 39.2	64 44	52.4	44 17.0	62 44	51.3	44 35.7	62 43	50.8
9	42 53.4	65 44	52.4	43 12.7	64 44	51.9	43 50.9	63 43	50.8	44 09.8	63 43	50.3
90	42 26.9	65 44	51.9	42 46.4	65 44	51.4	43 25.0	64 43	50.3	43 44.1	63 43	49.8

57° 00′ Alt.	Δd Δt	Az.	57° 30′ Alt.	Δd Δt	Az.	59° 00′ Alt.	Δd Δt	Az.	59° 30′ Alt.	Δd Δt	Az.	H.A.
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
89 00.0	1.0 14	00.0	88 30.0	1.0 10	00.0	87 00.0	1.0 05	00.0	86 30.0	1.0 04	00.0	00
88 51.5	87 35	28.5	88 24.2	94 26	19.7	86 57.2	98 14	09.7	86 27.6	99 12	08.2	1
88 30.7	66 45	47.0	88 08.5	80 37	35.3	86 48.8	94 22	18.9	86 20.5	95 19	16.1	2
88 04.0	50 49	57.6	87 46.4	66 43	46.4	86 35.7	87 28	27.0	86 09.1	90 25	23.3	3
87 34.6	39 51	64.0	87 20.6	54 47	54.0	86 18.6	80 34	33.9	85 54.1	84 30	29.7	4
87 03.9	31 52	68.0	86 52.6	45 49	59.2	85 58.5	72 38	39.8	85 36.1	77 34	35.2	05
86 32.5	25 53	70.7	86 23.2	37 50	63.0	85 36.0	65 41	44.6	85 15.6	71 37	39.9	6
86 00.7	20 54	72.6	85 52.9	32 51	65.7	85 11.6	58 43	48.5	84 53.2	64 40	43.9	7
85 28.5	16 54	73.9	85 22.0	27 52	67.8	84 45.8	52 45	51.8	84 29.2	59 42	47.3	8
84 56.2	13 54	74.9	84 50.8	23 52	69.4	84 19.0	47 46	54.4	84 03.9	53 44	50.2	9
84 23.8	11 54	75.6	84 19.3	[illegible] 53	70.6	83 51.3	42 47	56.7	83 37.7	48 45	52.6	10
83 51.2	08 54	76.1	83 47.6	16 53	71.5	83 23.0	38 48	58.5	83 10.7	44 46	54.6	1
83 18.6	06 54	76.4	83 15.7	14 53	72.2	82 54.1	34 49	60.1	82 43.0	40 47	56.3	2
82 46.0	04 54	76.7	82 43.7	11 53	72.7	82 24.8	30 49	61.4	82 14.9	36 48	57.8	3
82 13.4	03 54	76.8	82 11.6	09 54	73.1	81 55.2	27 50	62.4	81 46.3	33 48	59.1	4
81 40.7	01 54	76.9	81 39.5	07 54	73.4	81 25.4	24 50	63.4	81 17.3	29 49	60.1	15
81 08.0	00 54	76.9	81 07.3	05 54	73.7	80 55.3	21 50	64.1	80 48.1	27 49	61.1	6
80 35.3	02 54	76.9	80 35.1	03 54	73.8	80 25.0	19 51	64.8	80 18.6	24 49	61.8	7
80 02.6	03 54	76.8	80 02.9	02 54	73.9	79 54.6	16 51	65.3	79 48.9	21 50	62.5	8
79 30.0	04 54	76.7	79 30.6	00 54	73.9	79 24.1	14 51	65.7	79 19.1	19 50	63.1	9
78 57.4	06 54	76.5	78 58.4	01 54	73.9	78 53.4	12 51	66.1	78 49.1	16 50	63.5	20
78 24.8	07 54	76.3	78 26.2	03 54	73.8	78 22.7	10 51	66.4	78 19.0	14 50	63.9	1
77 52.2	08 54	76.1	77 53.9	04 54	73.8	77 52.0	08 51	66.6	77 48.9	12 50	64.3	2
77 19.6	09 54	75.9	77 21.7	05 54	73.7	77 21.1	06 51	66.8	77 18.6	10 51	64.5	3
76 47.1	10 54	75.7	76 49.6	06 54	73.5	76 50.3	05 51	66.9	76 48.3	08 51	64.7	4
76 14.6	11 54	75.4	76 17.4	08 54	73.3	76 19.4	03 51	67.0	76 17.9	07 51	64.9	25
75 42.1	12 54	75.2	75 45.3	09 54	73.2	75 48.5	02 52	67.1	75 47.5	05 51	65.0	6
75 09.7	13 54	74.9	75 13.2	10 53	73.0	75 17.6	00 52	67.1	75 17.1	03 51	65.1	7
74 37.3	14 54	74.6	74 41.1	11 53	72.8	74 46.7	01 51	67.1	74 46.7	02 51	65.2	8
74 05.0	15 54	74.3	74 09.1	12 53	72.5	74 15.8	03 51	67.0	74 16.2	00 51	65.2	9
73 32.7	16 54	74.0	73 37.1	13 53	72.3	73 44.9	04 51	67.0	73 45.8	01 51	65.2	30
73 00.5	17 54	73.7	73 05.2	14 53	72.0	73 14.1	06 51	66.9	73 15.3	03 51	65.1	1
72 28.3	18 54	73.4	72 33.3	15 53	71.8	72 43.2	07 51	66.8	72 44.9	04 51	65.1	2
71 56.2	19 53	73.1	72 01.4	16 53	71.5	72 12.4	08 51	66.6	72 14.5	05 51	65.0	3
71 24.1	20 53	72.7	71 29.6	17 53	71.2	71 41.6	09 51	66.5	71 44.1	07 51	64.9	4
70 52.1	21 53	72.4	70 57.9	18 53	70.9	71 10.9	11 51	66.3	71 13.7	08 51	64.8	35
70 20.2	21 53	72.1	70 26.2	19 53	70.6	70 40.2	12 51	66.1	70 43.4	09 50	64.6	6
69 48.3	22 53	71.7	69 54.6	20 53	70.3	70 09.5	13 51	66.0	70 13.1	11 50	64.5	7
69 16.4	23 53	71.3	69 23.1	21 52	70.0	69 38.9	14 51	65.7	69 42.8	12 50	64.3	8
68 44.7	24 53	71.0	68 51.6	22 52	69.6	69 08.3	15 51	65.5	69 12.6	13 50	64.1	9
68 13.0	25 53	70.6	68 20.2	23 52	69.3	68 37.8	16 51	65.3	68 42.4	14 50	63.9	40
67 41.4	26 53	70.3	67 48.8	24 52	69.0	68 07.4	18 51	65.1	68 12.3	15 50	63.7	1
67 09.8	27 52	69.9	67 17.5	25 52	68.6	67 37.0	19 51	64.8	67 42.2	17 50	63.5	2
66 38.4	27 52	69.5	66 46.3	25 52	68.3	67 06.6	20 50	64.6	67 12.2	18 50	63.3	3
66 07.0	28 52	69.1	66 15.2	26 52	67.9	66 36.4	21 50	64.3	66 42.3	19 50	63.1	4
65 35.7	29 52	68.8	65 44.1	27 52	67.6	66 06.2	22 50	64.0	66 12.4	20 50	62.8	45
65 04.4	30 52	68.4	65 13.1	28 52	67.2	65 36.0	23 50	63.7	65 42.6	21 50	62.6	6
64 33.3	31 52	68.0	64 42.2	29 51	66.9	65 06.0	24 50	63.5	65 12.9	22 49	62.3	7
64 02.2	31 52	67.6	64 11.4	30 51	66.5	64 36.0	25 50	63.2	64 43.2	23 49	62.0	8
63 31.3	32 51	67.2	63 40.7	31 51	66.1	64 06.1	26 50	62.9	64 13.6	24 49	61.8	9
63 00.4	33 51	66.8	63 10.1	32 51	65.8	63 36.3	27 50	62.6	63 44.1	25 49	61.5	50
62 29.6	34 51	66.4	62 39.5	32 51	65.4	63 06.6	28 49	62.2	63 14.6	26 49	61.2	1
61 58.9	35 51	66.0	62 09.1	33 51	65.0	62 36.9	29 49	61.9	62 45.3	27 49	60.9	2
61 28.3	35 51	65.6	61 38.7	34 50	64.6	62 07.4	30 49	61.6	62 16.0	28 49	60.6	3
60 57.8	36 51	65.2	61 08.4	35 50	64.2	61 37.9	31 49	61.3	61 46.8	29 48	60.3	4
60 27.4	37 50	64.8	60 38.3	36 50	63.8	61 08.5	32 49	60.9	61 17.7	30 48	60.0	55
59 57.1	38 50	64.4	60 08.2	36 50	63.5	60 39.2	32 49	60.6	60 48.8	31 48	59.6	6
59 26.8	39 50	64.0	59 38.2	37 50	63.1	60 10.0	33 48	60.3	60 19.8	32 48	59.3	7
58 56.8	39 50	63.6	59 08.4	38 50	62.7	59 41.0	34 48	59.9	59 51.0	33 48	59.0	8
58 26.8	40 50	63.1	58 38.6	39 49	62.3	59 12.0	35 48	59.6	59 22.3	34 48	58.6	9
57 56.9	41 50	62.7	58 09.0	40 49	61.9	58 43.1	36 48	59.2	58 53.7	35 48	58.3	60
57 27.1	42 49	62.3	57 39.5	41 49	61.5	58 14.3	37 48	58.8	58 25.3	36 47	58.0	1
56 57.5	42 49	61.9	57 10.0	41 49	61.0	57 45.7	38 48	58.5	57 56.9	37 47	57.6	2
56 27.9	43 49	61.5	56 40.7	42 49	60.6	57 17.1	39 47	58.1	57 28.6	38 47	57.3	3
55 58.5	44 49	61.0	56 11.6	43 48	60.2	56 48.7	40 47	57.7	57 00.4	38 47	56.9	4
55 29.2	45 49	60.6	55 42.5	44 48	59.8	56 20.4	40 47	57.4	56 32.4	39 47	56.5	65
55 00.1	45 48	60.2	55 13.6	44 48	59.4	55 52.2	41 47	57.0	56 04.4	40 46	56.2	6
54 31.0	46 48	59.7	54 44.8	45 48	59.0	55 24.1	42 47	56.6	55 36.6	41 46	55.8	7
54 02.1	47 48	59.3	54 16.1	46 48	58.5	54 56.2	43 46	56.2	55 08.9	42 46	55.4	8
53 33.3	48 48	58.9	53 47.5	47 47	58.1	54 28.3	44 46	55.8	54 41.4	43 46	55.1	9
53 04.7	48 48	58.4	53 19.1	48 47	57.7	54 00.6	45 46	55.4	54 13.9	44 46	54.7	70
52 36.2	49 47	58.0	52 50.8	48 47	57.3	53 33.1	46 46	55.1	53 46.6	45 45	54.3	1
52 07.8	50 47	57.5	52 22.6	49 47	56.8	53 05.6	46 46	54.7	53 19.4	46 45	53.9	2
51 39.5	51 47	57.1	51 54.6	50 46	56.4	52 38.3	47 45	54.3	52 52.4	46 45	53.5	3
51 11.4	51 47	56.7	51 26.8	51 46	56.0	52 11.2	48 45	53.9	52 25.5	47 45	53.1	4
50 43.5	52 46	56.2	50 59.0	51 46	55.5	51 44.2	49 45	53.4	51 58.7	48 44	52.7	75
50 15.7	53 46	55.8	50 31.4	52 46	55.1	51 17.3	50 45	53.0	51 32.1	49 44	52.3	6
49 48.0	54 46	55.3	50 04.0	53 46	54.6	50 50.5	51 44	52.6	51 05.6	50 44	51.9	7
49 20.5	54 46	54.8	49 36.7	54 45	54.2	50 23.9	51 44	52.2	50 39.2	51 44	51.5	8
48 53.2	55 45	54.4	49 09.6	54 45	53.8	49 57.5	52 44	51.8	50 13.0	51 43	51.1	9
48 26.0	56 45	53.9	48 42.6	55 45	53.3	49 31.2	53 44	51.4	49 47.0	52 43	50.7	80
47 58.9	56 45	53.5	48 15.8	56 44	52.9	49 05.1	54 43	51.0	49 21.1	53 43	50.3	1
47 32.0	57 45	53.0	47 49.1	57 44	52.4	48 39.1	55 43	50.5	48 55.4	54 43	49.9	2
47 05.3	58 44	52.6	47 22.6	57 44	52.0	48 13.3	55 43	50.1	48 29.8	55 42	49.5	3
46 38.8	59 44	52.1	46 56.2	58 44	51.5	47 47.6	56 42	49.7	48 04.3	55 42	49.1	4
46 12.4	59 44	51.6	46 30.1	59 43	51.0	47 22.1	57 42	49.2	47 39.1	56 42	48.6	85
45 46.1	60 43	51.2	46 04.1	59 43	50.6	46 56.8	58 42	48.8	47 14.0	57 42	48.2	6
45 20.1	61 43	50.7	45 38.2	60 43	50.1	46 31.6	58 42	48.4	46 49.0	58 41	47.8	7
44 54.2	61 43	50.2	45 12.6	61 42	49.7	46 06.6	59 41	47.9	46 24.3	59 41	47.4	8
44 28.5	62 43	49.7	44 47.1	62 42	49.2	45 41.8	60 41	47.5	45 59.7	59 41	46.9	9
44 03.0	63 42	49.3	44 21.8	62 42	48.7	45 17.1	61 41	47.1	45 35.3	60 40	46.5	90

Digitized by Google

16—1

Lat. 56°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	42 00.6	66 44	51.4	42 20.3	65 43	50.9	42 59.3	64 43	49.8	43 18.6	64 42	49.3	43 37.7	64 42	48.8	43 56.7	63 42	48.3	44 52.7	61 40	46.6	45 11.0	61 40	46.1	91
2	41 34.5	66 43	50.9	41 54.4	66 43	50.4	42 33.7	65 42	49.4	42 53.2	65 42	48.8	43 12.5	64 42	48.3	43 31.7	64 41	47.8	44 28.4	62 40	46.2	44 47.0	62 40	45.6	2
3	41 08.6	67 43	50.4	41 28.6	67 43	49.9	42 08.4	66 42	48.9	42 28.0	65 42	48.3	42 47.6	65 41	47.8	43 07.0	64 41	47.3	44 04.3	63 40	45.7	44 23.1	62 40	45.2	3
4	40 42.8	68 43	49.8	41 03.1	67 42	49.4	41 43.2	66 42	48.4	42 03.1	66 41	47.9	42 22.8	65 41	47.4	42 42.4	65 41	46.8	43 40.3	64 40	45.3	43 59.4	63 39	44.7	4
95	40 17.3	68 42	49.3	40 37.7	68 42	48.8	41 18.2	67 41	47.8	41 38.3	67 41	47.4	41 58.2	66 41	46.9	42 18.0	66 40	46.4	43 16.6	64 39	44.8	43 35.8	64 39	44.3	95
6	39 51.9	69 42	48.8	40 12.6	69 42	48.3	40 53.4	68 41	47.4	41 13.7	67 41	46.9	41 33.8	67 40	46.4	41 53.8	66 40	45.9	42 53.1	65 39	44.4	43 12.5	65 39	43.8	6
7	39 26.8	70 42	48.3	39 47.6	69 41	47.8	40 28.9	68 41	46.9	40 49.3	68 40	46.4	41 09.6	68 40	45.9	41 29.8	67 40	45.4	42 29.7	66 39	43.9	42 49.4	65 38	43.4	7
8	39 01.9	70 41	47.8	39 22.8	70 41	47.3	40 04.5	69 40	46.4	40 25.1	69 40	45.9	40 45.7	68 40	45.4	41 06.1	68 39	44.9	42 06.5	67 38	43.4	42 26.4	66 38	42.9	8
9	38 37.1	71 41	47.2	38 58.3	70 41	46.8	39 40.3	70 40	45.9	40 01.1	69 40	45.4	40 21.9	69 39	44.9	40 42.5	68 39	44.4	41 43.6	67 38	43.0	42 03.7	67 38	42.5	9
100	38 12.6	71 41	46.7	38 33.9	71 40	46.3	39 16.3	70 40	45.3	39 37.4	70 39	44.9	39 58.3	70 39	44.4	40 19.1	69 39	43.9	41 20.8	68 38	42.5	41 41.1	68 37	42.0	100
1	37 48.3	72 40	46.2	38 09.8	72 40	45.7	38 52.6	71 39	44.8	39 13.8	71 39	44.4	39 34.9	70 39	43.9	39 55.9	70 38	43.5	40 58.2	69 37	42.0	41 18.8	68 37	41.6	1
2	37 24.2	73 40	45.6	37 45.9	72 40	45.2	38 29.0	72 39	44.3	38 50.4	71 39	43.9	39 11.7	71 38	43.4	39 32.9	70 38	43.0	40 35.9	69 37	41.6	40 56.6	69 37	41.1	2
3	37 00.3	73 39	45.1	37 22.2	73 39	44.7	38 05.7	72 39	43.8	38 27.3	72 38	43.4	38 48.8	71 38	42.9	39 10.2	71 38	42.5	40 13.7	70 37	41.1	40 34.7	70 36	40.6	3
4	36 36.6	74 39	44.6	36 58.7	73 39	44.2	37 42.6	73 38	43.3	38 04.3	72 38	42.9	38 26.0	72 38	42.4	38 47.6	72 37	42.0	39 51.8	71 36	40.6	40 12.9	70 36	40.2	4
105	36 13.2	74 39	44.0	36 35.4	74 38	43.6	37 19.7	73 38	42.8	37 41.6	73 38	42.4	38 03.5	73 37	41.9	38 25.3	72 37	41.5	39 30.0	71 36	40.1	39 51.4	71 36	39.7	105
6	35 50.0	75 38	43.5	36 12.4	75 38	43.1	36 57.0	74 37	42.3	37 19.1	74 37	41.8	37 41.2	73 37	41.4	38 03.2	73 36	41.0	39 08.5	72 36	39.7	39 30.1	72 35	39.2	6
7	35 27.0	75 38	43.0	35 49.6	75 38	42.6	36 34.5	75 37	41.8	36 56.9	74 37	41.3	37 19.1	74 36	40.9	37 41.3	74 36	40.5	38 47.2	73 35	39.2	39 09.0	72 35	38.7	7
8	35 04.2	76 38	42.4	35 27.0	76 37	42.0	36 12.3	75 37	41.2	36 34.8	75 36	40.8	36 57.2	75 36	40.4	37 19.6	74 36	40.0	38 26.1	73 35	38.7	38 48.1	73 34	38.3	8
9	34 41.7	77 37	41.9	35 04.7	76 37	41.5	35 50.3	76 36	40.7	36 13.0	76 36	40.3	36 35.6	75 36	39.9	36 58.1	75 35	39.5	38 05.2	74 34	38.2	38 27.4	74 34	37.8	9
110	34 19.4	77 37	41.4	34 42.5	77 36	41.0	35 28.5	76 36	40.2	35 51.4	76 36	39.8	36 14.2	76 35	39.4	36 36.9	76 35	39.0	37 44.6	75 34	37.7	38 07.0	74 34	37.3	110
1	33 57.4	78 36	40.8	34 20.7	77 36	40.4	35 07.0	77 36	39.7	35 30.1	77 35	39.3	35 53.0	76 35	38.9	36 15.9	76 35	38.5	37 24.2	75 34	37.2	37 46.7	75 33	36.8	1
2	33 35.6	78 36	40.3	33 59.0	78 36	39.9	34 45.7	78 35	39.1	35 08.9	77 35	38.7	35 32.1	77 34	38.4	35 55.2	77 34	38.0	37 04.0	76 33	36.8	37 26.7	76 33	36.4	2
3	33 14.0	79 36	39.7	33 37.6	79 35	39.4	34 24.7	78 35	38.6	34 48.1	78 34	38.2	35 11.4	78 34	37.8	35 34.7	77 34	37.5	36 44.0	77 33	36.3	37 07.0	76 33	35.9	3
4	32 52.7	79 35	39.2	33 16.5	79 35	38.8	34 03.8	79 34	38.1	34 27.4	78 34	37.7	34 50.9	78 34	37.3	35 14.4	78 33	36.9	36 24.3	77 32	35.8	36 47.4	77 32	35.4	4
115	32 31.6	80 35	38.6	32 55.6	80 34	38.3	33 43.3	79 34	37.5	34 07.0	79 34	37.2	34 30.7	79 33	36.8	34 54.3	79 33	36.4	36 04.8	78 32	35.3	36 28.1	78 32	34.9	115
6	32 10.8	80 34	38.1	32 34.9	80 34	37.7	33 23.0	80 33	37.0	33 46.9	80 33	36.6	34 10.7	79 33	36.3	34 34.5	79 33	35.9	35 45.5	79 32	34.8	36 09.0	78 31	34.4	6
7	31 50.2	81 34	37.5	32 14.5	81 34	37.2	33 02.9	80 33	36.5	33 27.0	80 33	36.1	33 51.0	80 32	35.8	34 15.0	80 32	35.4	35 26.5	79 31	34.3	35 50.2	79 31	33.9	7
8	31 29.9	82 33	37.0	31 54.4	81 33	36.6	32 43.1	81 33	35.9	33 07.3	81 32	35.6	33 31.5	81 32	35.2	33 55.7	80 32	34.9	35 07.7	80 31	33.8	35 31.6	79 31	33.4	8
9	31 09.9	82 33	36.4	31 34.5	82 33	36.1	32 23.5	82 32	35.4	32 47.9	81 32	35.0	33 12.3	81 32	34.7	33 36.6	81 31	34.4	34 49.2	80 30	33.3	35 13.2	80 30	32.9	9
120	30 50.1	83 33	35.9	31 14.9	82 32	35.5	32 04.2	82 32	34.9	32 28.8	82 31	34.5	32 53.3	82 31	34.2	33 17.8	82 31	33.8	34 30.9	81 30	32.8	34 55.1	81 30	32.4	120
1	30 30.6	83 32	35.3	30 55.5	83 32	35.0	31 45.2	83 31	34.3	32 09.9	82 31	34.0	32 34.6	82 31	33.6	32 59.3	82 30	33.3	34 12.9	81 30	32.3	34 37.3	81 29	31.9	1
2	30 11.3	84 32	34.7	30 36.4	83 31	34.4	31 26.4	83 31	33.8	31 51.3	83 31	33.4	32 16.2	83 30	33.1	32 41.0	83 30	32.8	33 55.1	82 29	31.8	34 19.7	82 29	31.4	2
3	29 52.4	84 31	34.2	30 17.6	84 31	33.9	31 07.9	84 30	33.2	31 32.9	83 30	32.9	31 58.0	83 30	32.6	32 22.9	83 30	32.2	33 37.5	83 29	31.2	34 02.3	82 28	30.9	3
4	29 33.7	85 31	33.6	29 59.0	84 30	33.3	30 49.6	84 30	32.7	31 14.8	84 30	32.4	31 40.0	84 29	32.0	32 05.2	84 29	31.7	33 20.3	83 28	30.7	33 45.2	83 28	30.4	4
125	29 15.2	85 30	33.0	29 40.7	85 30	32.7	30 31.6	85 30	32.1	30 57.0	85 29	31.8	31 22.4	84 29	31.5	31 47.7	84 29	31.2	33 03.2	84 28	30.2	33 28.3	84 28	29.9	125
6	28 57.1	86 30	32.5	29 22.7	85 30	32.2	30 13.9	85 29	31.6	30 39.5	85 29	31.3	31 05.0	85 29	31.0	31 30.4	85 28	30.7	32 46.5	84 27	29.7	33 11.8	84 27	29.4	6
7	28 39.2	86 29	31.9	29 05.0	86 29	31.6	29 56.5	86 29	31.0	30 22.2	86 28	30.7	30 47.8	85 28	30.4	31 13.4	85 28	30.1	32 30.0	85 27	29.2	32 55.4	85 27	28.9	7
8	28 21.6	87 29	31.3	28 47.6	86 29	31.0	29 39.3	86 28	30.5	30 05.2	86 28	30.2	30 31.0	86 28	29.9	30 56.7	86 27	29.6	32 13.8	85 27	28.7	32 39.3	85 26	28.4	8
9	28 04.3	87 28	30.8	28 30.4	87 28	30.5	29 22.5	87 28	29.9	29 48.5	87 27	29.6	30 14.4	86 27	29.3	30 40.3	86 27	29.0	31 57.8	86 26	28.2	32 23.5	86 26	27.8	9
130	27 47.3	87 28	30.2	28 13.5	87 28	29.9	29 05.9	87 27	29.4	29 32.0	87 27	29.1	29 58.1	87 27	28.8	30 24.2	87 26	28.5	31 42.1	86 26	27.6	32 08.0	86 25	27.3	130
1	27 30.6	88 27	29.6	27 56.9	88 27	29.3	28 49.6	88 27	28.8	29 15.9	88 26	28.5	29 42.1	87 26	28.2	30 08.3	87 26	28.0	31 26.7	87 25	27.1	31 52.7	87 25	26.8	1
2	27 14.1	88 27	29.0	27 40.6	88 27	28.8	28 33.6	88 26	28.2	29 00.0	88 26	28.0	29 26.4	88 26	27.7	29 52.7	88 26	27.4	31 11.5	87 25	26.6	31 37.7	87 25	26.3	2
3	26 58.0	89 26	28.5	27 24.6	89 26	28.2	28 17.8	89 26	27.7	28 44.4	88 26	27.4	29 10.9	88 25	27.1	29 37.4	88 25	26.9	30 56.7	88 24	26.1	31 23.0	88 24	25.8	3
4	26 42.2	89 26	27.9	27 08.9	89 26	27.6	28 02.4	89 25	27.1	28 29.1	89 25	26.9	28 55.7	89 25	26.6	29 22.4	89 25	26.3	30 42.1	88 24	25.5	31 08.6	88 24	25.2	4
135	26 26.6	90 25	27.3	26 53.5	90 25	27.0	27 47.2	89 25	26.5	28 14.1	89 25	26.3	28 40.9	89 24	26.0	29 07.6	89 24	25.8	30 27.7	89 23	25.0	30 54.4	89 23	24.7	135
6	26 11.4	90 25	26.7	26 38.4	90 25	26.5	27 32.4	90 24	26.0	27 59.4	90 24	25.7	28 26.3	90 24	25.5	28 53.2	90 24	25.2	30 13.7	89 23	24.5	30 40.5	89 23	24.2	6
7	25 56.5	91 24	26.1	26 23.6	90 24	25.9	27 17.9	90 24	25.4	27 44.9	90 24	25.2	28 12.0	90 23	24.9	28 39.0	90 23	24.7	30 00.0	90 22	23.9	30 26.9	90 22	23.7	7
8	25 41.8	91 24	25.5	26 09.1	91 24	25.3	27 03.6	91 23	24.8	27 30.8	91 23	24.6	27 58.0	91 23	24.4	28 25.2	90 23	24.1	29 46.5	90 22	23.4	30 13.5	90 22	23.1	8
9	25 27.5	91 23	25.0	25 54.9	91 23	24.7	26 49.7	91 23	24.3	27 17.0	91 23	24.0	27 44.3	91 22	23.8	28 11.6	91 22	23.6	29 33.3	91 21	22.9	30 00.5	91 21	22.6	9
140	25 13.5	92 23	24.4	25 41.0	92 23	24.1	26 36.0	92 22	23.7	27 03.5	91 22	23.5	27 30.9	91 22	23.2	27 58.3	91 22	23.0	29 20.4	91 21	22.3	29 47.7	91 21	22.1	140
1	24 59.8	92 22	23.8	25 27.5	92 22	23.6	26 22.7	92 22	23.1	26 50.3	92 22	22.9	27 17.8	92 21	22.7	27 45.4	92 21	22.5	29 07.8	92 20	21.8	29 35.3	91 20	21.5	1
2	24 46.5	93 22	23.2	25 14.2	92 22	23.0	26 09.7	92 21	22.6	26 37.4	92 21	22.3	27 05.0	92 21	22.1	27 32.7	92 21	21.9	28 55.5	92 20	21.2	29 23.1	92 20	21.0	2
3	24 33.4	93 21	22.6	25 01.3	93 21	22.4	25 56.9	93 21	22.0	26 24.8	93 20	21.8	26 52.5	93 20	21.6	27 20.3	93 20	21.3	28 43.5	92 20	20.7	29 11.2	92 19	20.5	3
4	24 20.7	93 21	22.0	24 48.7	93 20	21.8	25 44.5	93 20	21.4	26 12.5	93 20	21.2	26 40.4	93 20	21.0	27 08.3	93 20	20.8	28 31.8	93 19	20.2	28 59.6	93 19	19.9	4
145	24 08.3	94 20	21.4	24 36.3	94 20	21.2	25 32.5	93 20	20.8	26 00.5	93 19	20.6	26 28.5	93 19	20.4	26 56.5	93 19	20.2	28 20.4	93 18	19.6	28 48.3	93 18	19.4	145
6	23 56.2	94 20	20.8	24 24.4	94 19	20.6	25 20.7	94 19	20.2	25 48.8	94 19	20.1	26 17.0	94 19	19.9	26 45.1	94 19	19.7	28 09.3	93 18	19.1	28 37.3	93 18	18.9	6
7	23 44.4	94 19	20.2	24 12.7	94 19	20.0	25 09.2	94 19	19.7	25 37.5	94 18	19.5	26 05.7	94 18	19.3	26 33.9	94 18	19.1	27 58.5	94 18	18.5	28 26.6	94 17	18.3	7
8	23 33.0	95 18	19.6	24 01.4	95 18	19.4	24 58.1	95 18	19.1	25 26.5	94 18	18.9	25 54.8	94 18	18.7	26 23.1	94 18	18.5	27 48.0	94 17	18.0	28 16.2	94 17	17.8	8
9	23 21.9	95 18	19.0	23 50.4	95 18	18.8	24 47.3	95 17	18.5	25 15.8	95 17	18.3	25 44.2	95 17	18.1	26 12.6	95 17	18.0	27 37.8	95 16	17.4	28 06.1	95 16	17.2	9
150	23 11.1	95 17	18.4	23 39.7	95 17	18.2	24 36.8	95 17	17.9	25 05.4	95 17	17.7	25 33.9	95 17	17.6	26 02.4	95 16	17.4	27 27.9	95 16	16.9	27 56.4	95 16	16.7	150
1	23 00.7	96 17	17.8	23 29.4	96 17	17.6	24 26.7	95 16	17.3	24 55.3	95 16	17.2	25 23.9	95 16	17.0	25 52.5	95 16	16.8	27 18.3	93 15	16.3	27 46.9	93 15	16.1	1
2	22 50.6	96 16	17.2	23 19.4	96 16	17.1	24 16.8	96 16	16.7	24 45.6	96 16	16.6	25 14.3	96 16	16.4	25 43.0	96 15	16.3	27 09.0	96 15	15.8	27 37.7	96 15	15.6	2
3	22 40.9	96 16	16.6	23 09.7	96 16	16.5	24 07.3	96 15	16.2	24 36.2	96 15	16.0	25 05.0	96 15	15.8	25 33.8	96 15	15.7	27 00.1	96 14	15.2	27 28.8	96 14	15.1	3
4	22 31.4	96 15	16.0	23 00.4	96 15	15.9	23 58.2	96 15	15.6	24 27.1	96 15	15.4	24 56.0	96 14	15.3	25 24.8	96 14	15.1	26 51.4	96 14	14.7	27 20.3	96 14	14.5	4
155	22 22.4	97 15	15.4	22 51.4	97 14	15.3	23 49.3	97 14	15.0	24 18.3	97 14	14.8	24 47.3	97 14	14.7	25 16.3	97 14	14.5	26 43.1	96 13	14.1	27 12.0	96 13	14.0	155
6	22 13.6	97 14	14.8	22 42.7	97 14	14.6	23 40.8	97 14	14.4	24 09.9	97 13	14.2	24 39.0	97 13	14.1	25 08.0	97 13	14.0	26 35.1	97 13	13.5	27 04.1	97 13	13.4	6
7	22 05.2	97 13	14.2	22 34.4	97 13	14.0	23 32.7	97 13	13.8	24 01.8	97 13	13.7	24 30.9	97 13	13.5	25 00.1	97 13	13.4	26 27.4	97 12	13.0	26 56.5	97 12	12.9	7
8	21 57.2	97 13	13.6	22 26.4	97 13	13.4	23 24.9	97 12	13.2	23 54.1	97 12	13.1	24 23.3	97 12	12.9	24 52.5	97 12	12.8	26 20.0	97 12	12.4	26 49.2	97 12	12.3	8
9	21 49.5	98 12	13.0	22 18.8	98 12	12.8	23 17.4	98 12	12.6	23 46.6	98 12	12.5	24 15.9	98 12	12.4	24 45.2	98 12	12.2	26 12.9	97 11	11.9	26 42.2	97 11	11.7	9
160	21 42.2	98 12	12.3	22 11.5	98 12	12.2	23 10.2	98 11	12.0	23 39.6	98 11	11.9	24 08.9	98 11	11.8	24 38.2	98 11	11.7	26 06.2	98 11	11.3	26 35.5	98 11	11.2	160
1	21 35.2	98 11	11.7	22 04.6	98 11	11.6	23 03.4	98 11	11.4	23 32.8	98 11	11.3	24 02.2	98 11	11.2	24 31.6	98 10	11.1	25 59.8	98 10	10.8	26 29.1	98 10	10.6	1
2	21 28.5	98 10	11.1	21 58.0	98 10	11.0	22 56.9	98 10	10.8	23 26.4	98 10	10.7	23 55.9	98 10	10.6	24 25.3	98 10	10.5	25 53.7	98 10	10.2	26 23.1	98 10	10.1	2
3	21 22.2	98 10	10.5	21 51.8	98 10	10.4	22 50.8	98 10	10.2	23 20.3	98 10	10.1	23 49.9	98 09	10.0	24 19.4	98 09	09.9	25 47.9	98 09	09.6	26 17.4	98 09	09.5	3
4	21 16.3	99 09	09.9	21 45.9	99 09	09.8	22 45.0	99 09	09.6	23 14.6	99 09	09.5	23 44.2	99 09	09.4	24 13.8	99 09	09.3	25 42.4	99 09	09.1	26 12.0	99 08	09.0	4
165	21 10.7	99 09	09.3	21 40.3	99 09	09.2	22 39.6	99 08	09.0	23 09.2	99 08	08.9	23 38.9	99 08	08.9	24 08.5	99 08	08.8	25 37.3	99 08	08.5	26 06.9	99 08	08.4	165
6	21 05.5	99 08	08.7	21 35.2	99 08	08.6	22 34.5	99 08	08.4	23 04.2	99 08	08.3	23 33.9	99 08	08.3	24 03.5	99 08	08.2	25 32.5	99 07	07.9	26 02.2	99 07	07.9	6
7	21 00.6	99 08	08.0	21 30.3	99 07	08.0	22 29.8	99 07	07.8	22 59.5	99 07	07.8	23 29.2	99 07	07.7	23 58.9	99 07	07.6	25 28.1	99 07	07.4	25 57.8	99 07	07.3	7
8	20 56.1	99 07	07.4	21 25.8	99 07	07.4	22 25.4	99 07	07.2	22 55.1	99 07	07.2	23 24.9	99 07	07.1	23 54.7	99 07	07.0	25 23.9	99 06	06.8	25 53.7	99 06	06.7	8
9	20 51.9	99 06	06.8	21 21.7	99 06	06.7	22 21.3	99 06	06.6	22 51.1	99 06	06.6	23 20.9	99 06	06.5	23 50.7	99 06	06.4	25 20.1	99 06	06.2	25 49.9	99 06	06.2	9
170	20 48.1	99 06	06.2	21 18.0	99 06	06.1	22 17.6	99 06	06.0	22 47.5	99 06	06.0	23 17.3	99 05	05.9	23 47.1	99 05	05.9	25 16.6	99 05	05.7	25 46.4	99 05	05.6	170
1	20 44.7	1.0 05	05.6	21 14.6	1.0 05	05.5	22 14.3	1.0 05	05.4	22 44.2	1.0 05	05.4	23 14.0	1.0 05	05.3	23 43.9	1.0 05	05.3	25 13.5	1.0 05	05.1	25 43.3	1.0 05	05.1	1
2	20 41.6	1.0 05	05.0	21 11.5	1.0 04	04.9	22 11.3	1.0 04	04.8	22 41.2	1.0 04	04.8	23 11.1	1.0 04	04.7	23 41.0	1.0 04	04.7	25 10.6	1.0 04	04.5	25 40.5	1.0 04	04.5	2
3	20 38.9	1.0 04	04.3	21 08.8	1.0 04	04.3	22 08.6	1.0 04	04.2	22 38.6	1.0 04	04.2	23 08.5	1.0 04	04.1	23 38.4	1.0 04	04.1	25 08.1	1.0 04	04.0	25 38.1	1.0 04	03.9	3
4	20 36.5	1.0 03	03.7	21 06.5	1.0 03	03.7	22 06.4	1.0 03	03.6	22 36.3	1.0 03	03.6	23 06.2	1.0 03	03.5	23 36.2	1.0 03	03.5	25 06.0	1.0 03	03.4	25 35.9	1.0 03	03.4	4
175	20 34.5	1.0 03	03.1	21 04.5	1.0 03	03.1	22 04.4	1.0 03	03.0	22 34.4	1.0 03	03.0	23 04.3	1.0 03	03.0	23 34.3	1.0 03	02.9	25 04.2	1.0 02	02.8	25 34.1	1.0 02	02.8	175
6	20 32.9	1.0 02	02.5	21 02.9	1.0 02	02.5	22 02.8	1.0 02	02.4	22 32.8	1.0 02	02.4	23 02.8	1.0 02	02.4	23 32.7	1.0 02	02.3	25 02.7	1.0 02	02.3	25 32.6	1.0 02	02.2	6
7	20 31.6	1.0 02	01.9	21 01.6	1.0 02	01.8	22 01.6	1.0 01	01.8	22 31.6	1.0 01	01.8	23 01.6	1.0 01	01.8	23 31.5	1.0 01	01.8	25 01.5	1.0 01	01.7	25 31.5	1.0 01	01.7	7
8	20 30.7	1.0 01	01.2	21 00.7	1.0 01	01.2	22 00.7	1.0 01	01.2	22 30.7	1.0 01	01.2	23 00.7	1.0 01	01.2	23 30.7	1.0 01	01.2	25 00.7	1.0 01	01.1	25 30.7	1.0 01	01.1	8
9	20 30.2	1.0 00	00.6	21 00.2	1.0 00	00.6	22 00.2	1.0 00	00.6	22 30.2	1.0 00	00.6	23 00.2	1.0 00	00.6	23 30.2	1.0 00	00.6	25 00.2	1.0 00	00.6	25 30.2	1.0 00	00.6	9
180	20 30.0	1.0 00	00.0	21 00.0	1.0 00	00.0	22 00.0	1.0 00	00.0	22 30.0	1.0 00	00.0	23 00.0	1.0 00	00.0	23 30.0	1.0 00	00.0	25 00.0	1.0 00	00.0	25 30.0	1.0 00	00.0	180

Lat. 57°

Lat. 58°

Lat. 56°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	86 00.0	1.0 03	00.0	85 30.0	1.0 03	00.0	84 00.0	1.0 02	00.0	83 30.0	1.0 02	00.0	83 00.0	1.0 02	00.0	77 00.0	1.0 01	00.0	76 30.0	1.0 01	00.0	71 30.0	1.0 00	00.0	00
1	85 57.9	99 10	07.1	85 28.2	99 09	06.2	83 58.7	1.0 06	04.5	83 28.8	1.0 06	04.1	82 58.9	1.0 05	03.7	76 59.5	1.0 02	01.6	76 29.6	1.0 02	01.5	71 29.8	1.0 01	00.8	1
2	85 51.8	96 17	14.0	85 22.8	97 15	12.3	83 54.8	98 11	08.9	83 25.3	99 10	08.1	82 55.7	99 09	07.4	76 58.1	1.0 04	03.2	76 28.2	1.0 04	03.0	71 29.0	1.0 02	01.7	2
3	85 41.8	92 22	20.4	85 13.9	94 20	18.1	83 48.4	96 15	13.2	83 19.4	97 13	12.0	82 50.3	97 12	11.0	76 55.8	99 05	04.8	76 26.1	99 05	04.5	71 27.8	1.0 03	02.5	3
4	85 28.5	87 27	26.2	85 02.0	89 24	23.4	83 39.5	94 18	17.2	83 11.3	94 17	15.8	82 42.9	95 16	14.5	76 52.6	99 07	06.3	76 23.0	99 06	06.0	71 26.1	99 04	03.4	4
05	85 12.3	81 31	31.4	84 47.4	84 28	28.2	83 28.5	90 22	21.1	83 01.2	92 20	19.3	82 33.6	93 19	17.8	76 48.4	98 08	07.9	76 19.1	98 08	07.4	71 23.9	99 04	04.2	05
6	84 53.7	75 34	36.0	84 30.5	79 32	32.5	83 15.4	87 25	24.7	82 49.2	88 23	22.7	82 22.4	90 21	21.0	76 43.4	97 10	09.4	76 14.3	97 09	08.9	71 21.2	98 05	05.0	6
7	84 33.0	70 37	39.9	84 11.5	74 34	36.4	83 00.5	83 28	28.0	82 35.4	85 26	25.9	82 09.6	87 24	23.9	76 37.5	96 11	10.9	76 08.8	96 11	10.3	71 18.0	98 06	05.8	7
8	84 10.7	64 39	43.3	83 50.8	69 37	39.7	82 44.0	79 30	31.1	82 20.0	81 28	28.8	81 55.3	83 26	26.7	76 30.7	94 13	12.3	76 02.4	95 12	11.7	71 14.3	97 07	06.6	8
9	83 47.1	59 41	46.3	83 28.6	64 39	42.7	82 25.9	75 32	33.9	82 03.1	77 30	31.5	81 39.5	80 28	29.3	76 23.2	93 14	13.8	75 55.2	93 13	13.0	71 10.2	96 08	07.4	9
10	83 22.3	54 43	48.8	83 05.3	59 41	45.3	82 06.6	71 34	36.4	81 44.9	74 32	34.0	81 22.5	76 30	31.7	76 14.8	91 15	15.2	75 47.3	92 14	14.3	71 05.7	95 08	08.2	10
1	82 56.7	50 44	51.0	82 41.0	55 42	47.5	81 46.1	67 36	38.7	81 25.6	70 34	36.2	81 04.3	73 32	33.9	76 05.6	90 17	16.5	75 38.6	90 16	15.6	71 00.6	94 09	09.0	1
2	82 30.2	45 45	52.8	82 15.9	50 43	49.5	81 24.7	63 37	40.8	81 05.3	66 35	38.3	80 45.0	69 34	36.0	75 55.7	88 18	17.8	75 29.2	89 17	16.9	70 55.1	93 10	09.8	2
3	82 03.2	41 46	54.4	81 50.0	46 44	51.2	81 02.3	59 39	42.7	80 44.1	62 37	40.2	80 24.9	66 35	37.8	75 45.0	86 19	19.1	75 19.1	87 18	18.1	70 49.2	92 11	10.5	3
4	81 35.7	38 47	55.8	81 23.6	43 45	52.8	80 39.2	55 40	44.4	80 22.1	59 38	41.9	80 03.9	62 36	39.5	75 33.7	84 20	20.3	75 08.4	85 19	19.3	70 42.9	91 11	11.3	4
15	81 07.7	35 47	57.0	80 56.6	39 46	54.1	80 15.4	52 41	45.9	79 59.3	55 39	43.4	79 42.2	59 37	41.1	75 21.7	82 21	21.5	74 57.0	83 20	20.4	70 36.1	90 12	12.0	15
6	80 39.4	31 48	58.1	80 29.3	36 46	55.2	79 51.0	48 41	47.3	79 36.0	52 40	44.8	79 19.8	55 38	42.5	75 09.1	80 22	22.7	74 45.0	81 21	21.5	70 28.9	89 13	12.7	6
7	80 10.8	28 48	59.0	80 01.5	33 47	56.2	79 26.2	45 42	48.5	79 12.0	49 41	46.1	78 56.9	52 39	43.8	74 55.9	78 23	23.8	74 32.4	79 22	22.6	70 21.3	87 13	13.4	7
8	79 41.9	26 48	59.8	79 33.5	30 47	57.1	79 00.8	42 43	49.6	78 47.6	46 41	47.2	78 33.4	49 40	45.0	74 42.1	76 24	24.8	74 19.2	77 23	23.6	70 13.3	86 14	14.1	8
9	79 12.8	23 49	60.4	79 05.2	27 48	57.9	78 35.1	39 43	50.6	78 22.8	43 42	48.3	78 09.4	46 41	46.1	74 27.7	73 25	25.8	74 05.5	75 24	24.6	70 04.9	85 15	14.8	9
20	78 43.5	21 49	61.0	78 36.7	25 48	58.5	78 09.0	36 44	51.4	77 57.6	40 43	49.2	77 45.1	43 41	47.0	74 12.8	71 26	26.8	73 51.3	73 24	25.5	69 56.2	83 15	15.5	20
1	78 14.1	18 49	61.5	78 08.0	22 48	59.1	77 42.6	34 44	52.2	77 32.0	37 43	50.0	77 20.3	41 42	47.9	73 57.5	69 26	27.7	73 36.6	70 25	26.4	69 47.1	81 16	16.1	1
2	77 44.6	16 49	61.9	77 39.1	20 48	59.6	77 16.0	31 45	52.9	77 06.1	35 44	50.8	76 55.3	38 42	48.7	73 41.7	67 27	28.6	73 21.4	68 26	27.3	69 37.6	80 16	16.7	2
3	77 14.9	14 50	62.3	77 10.1	18 49	60.0	76 49.1	29 45	53.6	76 40.0	32 44	51.5	76 29.9	35 43	49.4	73 25.4	64 28	29.4	73 05.9	66 27	28.1	69 27.8	78 17	17.3	3
4	76 45.2	12 50	62.6	76 41.0	16 49	60.4	76 22.0	26 45	54.1	76 13.7	30 44	52.1	76 04.3	33 43	50.1	73 08.7	62 28	30.2	72 49.9	64 27	28.9	69 17.6	77 17	17.9	4
25	76 15.4	10 50	62.8	76 11.8	14 49	60.7	75 54.8	24 46	54.6	75 47.1	27 45	52.6	75 38.5	30 43	50.7	72 51.7	60 29	30.9	72 33.5	62 28	29.6	69 07.1	75 18	18.5	25
6	75 45.5	08 50	63.0	75 42.5	12 49	61.0	75 27.3	22 46	55.0	75 20.3	25 45	53.1	75 12.4	28 44	51.2	72 34.3	57 30	31.6	72 16.7	59 28	30.3	68 56.4	73 18	19.0	6
7	75 15.6	07 50	63.1	75 13.1	10 49	61.2	74 59.8	20 46	55.4	74 53.4	23 45	53.5	74 46.2	26 44	51.7	72 16.5	55 30	32.3	71 59.7	57 29	31.0	68 45.3	71 19	19.6	7
8	74 45.6	05 50	63.3	74 43.7	08 49	61.4	74 32.1	18 46	55.7	74 26.4	21 45	53.9	74 19.8	24 44	52.1	71 58.4	53 31	32.9	71 42.2	55 30	31.6	68 33.9	70 19	20.1	8
9	74 15.7	03 50	63.3	74 14.2	06 49	61.5	74 04.3	16 46	56.0	73 59.2	18 45	54.2	73 53.2	21 44	52.5	71 40.0	51 31	33.5	71 24.5	53 30	32.2	68 22.2	68 20	20.6	9
30	73 45.7	02 50	63.4	73 44.7	05 49	61.6	73 36.4	14 47	56.3	73 31.9	16 46	54.5	73 26.6	19 45	52.8	71 21.3	48 32	34.1	71 06.5	50 30	32.7	68 10.3	66 20	21.1	30
1	73 15.7	00 50	63.4	73 15.2	03 49	61.7	73 08.5	12 47	56.5	73 04.6	15 46	54.8	72 59.8	17 45	53.1	71 02.4	46 32	34.6	70 48.2	48 31	33.3	67 58.1	64 21	21.5	1
2	72 45.7	01 50	63.4	72 45.6	02 49	61.7	72 40.5	10 47	56.7	72 37.1	13 46	55.0	72 32.9	15 45	53.3	70 43.2	44 32	35.1	70 29.7	46 31	33.8	67 45.7	62 21	22.0	2
3	72 15.7	03 50	63.4	72 16.1	00 49	61.7	72 12.4	08 47	56.8	72 09.6	11 46	55.2	72 05.9	13 45	53.6	70 23.8	42 33	35.6	70 10.9	44 32	34.2	67 33.0	60 22	22.4	3
4	71 45.7	04 50	63.3	71 46.6	02 49	61.7	71 44.4	06 47	56.9	71 42.0	09 46	55.3	71 38.9	12 45	53.7	70 04.2	40 33	36.0	69 52.0	42 32	34.7	67 20.1	58 22	22.8	4
35	71 15.7	06 50	63.2	71 17.0	03 49	61.7	71 16.2	05 47	57.0	71 14.4	07 46	55.4	71 11.8	10 45	53.9	69 44.4	38 33	36.4	69 32.8	40 32	35.1	67 07.0	57 22	23.2	35
6	70 45.8	07 50	63.1	70 47.5	04 49	61.6	70 48.1	03 47	57.0	70 46.8	06 46	55.5	70 44.7	08 45	54.0	69 24.4	36 34	36.8	69 13.4	38 33	35.5	66 53.7	55 23	23.6	6
7	70 15.9	08 50	63.0	70 18.0	06 49	61.5	70 19.9	02 47	57.1	70 19.1	04 46	55.6	70 17.5	06 45	54.1	69 04.2	34 34	37.1	68 53.8	36 33	35.8	66 40.1	53 23	24.0	7
8	69 46.0	10 50	62.9	69 48.5	07 49	61.4	69 51.8	00 47	57.1	69 51.4	02 46	55.6	69 50.4	05 45	54.2	68 43.9	32 34	37.5	68 34.1	34 33	36.2	66 26.4	51 23	24.3	8
9	69 16.2	11 50	62.7	69 19.1	08 49	61.3	69 23.6	02 47	57.1	69 23.7	01 46	55.7	69 23.1	03 45	54.2	68 23.4	29 34	37.8	68 14.2	31 33	36.5	66 12.5	49 23	24.6	9
40	68 46.4	12 50	62.6	68 49.6	10 49	61.2	68 55.4	03 47	57.1	68 56.0	01 46	55.7	68 55.9	01 45	54.3	68 02.8	28 35	38.0	67 54.2	29 34	36.8	65 58.4	47 24	25.0	40
1	68 16.6	13 50	62.4	68 20.2	11 49	61.1	68 27.3	05 47	57.0	68 28.3	02 46	55.6	68 28.7	00 45	54.3	67 42.0	26 35	38.3	67 34.1	28 34	37.0	65 44.2	45 24	25.3	1
2	67 46.9	14 49	62.2	67 50.9	12 49	60.9	67 59.1	06 47	56.9	68 00.6	04 46	55.6	68 01.4	02 45	54.3	67 21.2	24 35	38.5	67 13.8	26 34	37.3	65 29.8	43 24	25.5	2
3	67 17.2	16 49	62.0	67 21.6	14 49	60.7	67 31.0	07 47	56.9	67 32.9	05 46	55.5	67 34.2	03 45	54.2	67 00.3	22 35	38.7	66 53.5	24 34	37.5	65 15.3	41 24	25.8	3
4	66 47.6	17 49	61.8	66 52.4	15 49	60.6	67 03.0	09 47	56.8	67 05.3	07 46	55.5	67 07.0	05 45	54.2	66 39.2	20 35	38.9	66 33.0	22 34	37.7	65 00.6	39 25	26.1	4
45	66 18.1	18 49	61.6	66 23.2	16 49	60.4	66 34.9	10 47	56.6	66 37.6	08 46	55.4	66 39.8	06 45	54.1	66 18.1	18 35	39.1	66 12.4	20 34	37.9	64 45.8	37 25	26.3	45
6	65 48.6	19 49	61.4	65 54.0	17 48	60.2	66 06.9	11 47	56.5	66 10.0	09 46	55.3	66 12.6	08 45	54.1	65 56.9	16 35	39.2	65 51.8	18 35	38.0	64 30.9	36 25	26.5	6
7	65 19.2	20 49	61.1	65 25.0	18 48	60.0	65 39.0	13 47	56.4	65 42.5	11 46	55.2	65 45.4	09 45	54.0	65 35.7	14 36	39.4	65 31.1	16 35	38.2	64 15.8	34 25	26.8	7
8	64 49.8	21 49	60.9	64 55.9	19 48	59.7	65 11.0	14 46	56.2	65 15.0	12 46	55.0	65 18.3	10 45	53.9	65 14.4	12 36	39.5	65 10.3	14 35	38.3	64 00.7	32 25	27.0	8
9	64 20.6	22 49	60.6	64 27.0	21 48	59.5	64 43.2	15 46	56.1	64 47.5	13 46	54.9	64 51.3	12 45	53.7	64 53.0	11 36	39.6	64 49.5	13 35	38.4	63 45.4	30 26	27.1	9
50	63 51.4	23 49	60.4	63 58.1	22 48	59.3	64 15.4	17 46	55.9	64 20.1	15 46	54.8	64 24.2	13 45	53.6	64 31.6	09 36	39.7	64 28.6	11 35	38.5	63 30.1	28 26	27.3	50
1	63 22.2	24 48	60.1	63 29.3	23 48	59.0	63 47.6	18 46	55.7	63 52.7	16 46	54.6	63 57.2	14 45	53.5	64 10.2	07 36	39.7	64 07.7	09 35	38.6	63 14.6	26 26	27.5	1
2	62 53.2	26 48	59.8	63 00.6	24 48	58.8	63 19.9	19 46	55.5	63 25.4	17 45	54.4	63 30.3	16 45	53.3	63 48.7	06 36	39.8	63 46.8	07 35	38.7	62 59.1	24 26	27.6	2
3	62 24.2	27 48	59.5	62 32.0	25 48	58.5	62 52.3	20 46	55.3	62 58.1	19 45	54.2	63 03.4	17 45	53.1	63 27.2	04 36	39.8	63 25.8	06 35	38.7	62 43.5	22 26	27.8	3
4	61 55.3	28 48	59.3	62 03.4	26 47	58.2	62 24.8	21 46	55.1	62 30.9	20 45	54.0	62 36.6	18 45	53.0	63 05.7	02 36	39.8	63 04.8	04 35	38.7	62 27.9	21 26	27.9	4
55	61 26.5	29 48	59.0	61 34.9	27 47	58.0	61 57.3	23 46	54.9	62 03.8	21 45	53.8	62 09.9	19 44	52.8	62 44.2	01 36	39.9	62 43.8	02 35	38.8	62 12.1	19 26	28.0	55
6	60 57.8	30 48	58.7	61 06.5	28 47	57.7	61 29.9	24 46	54.6	61 36.8	22 45	53.6	61 43.2	21 44	52.6	62 22.7	01 36	39.9	62 22.8	01 35	38.8	61 56.4	17 26	28.1	6
7	60 29.2	31 48	58.3	60 38.2	29 47	57.4	61 02.5	25 45	54.4	61 09.8	23 45	53.4	61 16.6	22 44	52.4	62 01.2	03 36	39.8	62 01.8	01 35	38.8	61 40.5	15 26	28.2	7
8	60 00.7	32 47	58.0	60 10.0	30 47	57.1	60 35.3	26 45	54.2	60 42.9	25 45	53.2	60 50.0	23 44	52.2	61 39.8	04 36	39.8	61 40.8	03 35	38.8	61 24.7	13 27	28.3	8
9	59 32.3	33 47	57.7	59 41.9	31 47	56.8	60 08.1	27 45	53.9	60 16.1	26 45	52.9	60 23.5	24 44	52.0	61 18.3	06 36	39.8	61 19.8	04 35	38.7	61 08.8	12 27	28.3	9
60	59 04.0	34 47	57.4	59 13.9	32 47	56.5	59 41.1	28 45	53.7	59 49.3	27 44	52.7	59 57.2	25 44	51.7	60 56.8	07 36	39.7	60 58.8	06 35	38.7	60 52.8	10 27	28.4	60
1	58 35.8	34 47	57.1	58 45.9	33 46	56.2	59 14.1	29 45	53.4	59 22.7	28 44	52.5	59 30.9	27 44	51.5	60 35.4	09 36	39.7	60 37.9	07 35	38.6	60 36.8	08 27	28.4	1
2	58 07.7	35 47	56.7	58 18.1	34 46	55.8	58 47.2	30 45	53.1	58 56.1	29 44	52.2	59 04.6	28 44	51.3	60 14.0	10 36	39.6	60 16.9	09 35	38.6	60 20.9	06 27	28.5	2
3	57 39.7	36 46	56.4	57 50.4	35 46	55.5	58 20.4	31 44	52.8	58 29.7	30 44	51.9	58 38.5	29 43	51.0	59 52.6	12 36	39.5	59 56.0	10 35	38.5	60 04.8	05 27	28.5	3
4	57 11.8	37 46	56.0	57 22.8	36 46	55.2	57 53.7	33 44	52.6	58 03.3	31 44	51.7	58 12.5	30 43	50.8	59 31.3	13 35	39.4	59 35.1	12 35	38.4	59 48.8	03 27	28.5	4
65	56 44.0	38 46	55.7	56 55.3	37 46	54.9	57 27.1	34 44	52.3	57 37.0	32 44	51.4	57 46.5	31 43	50.5	59 10.0	15 35	39.3	59 14.3	13 35	38.4	59 32.8	01 27	28.5	65
6	56 16.4	39 46	55.4	56 28.0	38 45	54.5	57 00.7	35 44	52.0	57 10.9	33 43	51.1	57 20.7	32 43	50.2	58 48.8	16 35	39.2	58 53.5	15 35	38.3	59 16.8	00 27	28.5	6
7	55 48.8	40 46	55.0	56 00.7	39 45	54.2	56 34.3	36 44	51.7	56 44.8	34 43	50.8	56 55.0	33 43	50.0	58 27.6	18 35	39.1	58 32.7	16 34	38.2	59 00.7	02 27	28.5	7
8	55 21.4	41 46	54.6	55 33.5	40 45	53.8	56 08.0	37 44	51.4	56 18.8	36 43	50.5	56 29.3	34 43	49.7	58 06.5	19 35	39.0	58 12.0	18 34	38.0	58 44.7	04 27	28.5	8
9	54 54.1	42 45	54.3	55 06.5	41 45	53.5	55 41.9	38 43	51.1	55 53.0	37 43	50.2	56 03.8	35 42	49.4	57 45.4	21 35	38.8	57 51.4	19 34	37.9	58 28.7	05 27	28.5	9
70	54 26.9	43 45	53.9	54 39.6	42 45	53.1	55 15.8	39 43	50.7	55 27.3	38 43	49.9	55 38.4	36 42	49.1	57 24.4	22 35	38.7	57 30.8	21 34	37.8	58 12.7	07 27	28.5	70
1	53 59.9	44 45	53.5	54 12.8	43 44	52.8	54 49.9	40 43	50.4	55 01.7	39 42	49.6	55 13.1	38 42	48.8	57 03.4	23 35	38.5	57 10.3	22 34	37.6	57 56.7	09 27	28.4	1
2	53 33.0	45 45	53.2	53 46.2	44 44	52.4	54 24.1	41 43	50.1	54 36.2	40 42	49.3	54 47.9	39 42	48.5	56 42.6	25 35	38.4	56 49.8	23 34	37.5	57 40.7	10 27	28.4	2
3	53 06.2	45 44	52.8	53 19.7	45 44	52.0	53 58.4	42 43	49.8	54 10.8	41 42	49.0	54 22.8	40 42	48.2	56 21.8	26 35	38.2	56 29.4	25 34	37.3	57 24.8	12 26	28.3	3
4	52 39.5	46 44	52.4	52 53.3	45 44	51.7	53 32.9	43 42	49.4	53 45.5	42 42	48.7	53 57.9	41 41	47.9	56 01.1	27 34	38.0	56 09.1	26 34	37.2	57 08.9	13 26	28.3	4
75	52 13.0	47 44	52.0	52 27.0	46 44	51.3	53 07.5	44 42	49.1	53 20.4	43 42	48.3	53 33.0	42 41	47.6	55 40.4	29 34	37.9	55 48.9	28 34	37.0	56 53.0	15 26	28.2	75
6	51 46.6	48 44	51.6	52 00.9	47 43	50.9	52 42.2	45 42	48.7	52 55.4	44 41	48.0	53 08.3	43 41	47.3	55 19.9	30 34	37.7	55 28.7	29 33	36.8	56 37.2	17 26	28.1	6
7	51 20.4	49 44	51.2	51 34.9	48 43	50.5	52 17.0	45 42	48.4	52 30.5	45 41	47.7	52 43.8	44 41	46.9	54 59.4	31 34	37.5	55 08.6	30 33	36.7	56 21.4	18 26	28.0	7
8	50 54.3	50 43	50.9	51 09.1	49 43	50.2	51 52.0	46 41	48.0	52 05.8	46 41	47.3	52 19.3	45 41	46.6	54 39.0	33 34	37.3	54 48.6	31 33	36.5	56 05.7	20 26	27.9	8
9	50 28.3	51 43	50.5	50 43.4	50 43	49.8	51 27.1	47 41	47.7	51 41.2	46 41	47.0	51 55.0	46 40	46.3	54 18.7	34 34	37.1	54 28.7	33 33	36.3	55 50.0	21 26	27.8	9
80	50 02.5	51 43	50.1	50 17.9	51 42	49.4	51 02.4	48 41	47.3	51 16.7	47 41	46.6	51 30.8	47 40	45.9	53 58.6	35 33	36.9	54 08.9	34 33	36.1	55 34.3	23 26	27.7	80
1	49 36.9	52 42	49.7	49 52.5	52 42	49.0	50 37.8	49 41	47.0	50 52.4	48 40	46.3	51 06.8	48 40	45.6	53 38.5	36 33	36.7	53 49.2	35 33	35.9	55 18.7	24 26	27.6	1
2	49 11.4	53 42	49.3	49 27.2	52 42	48.6	50 13.3	50 40	46.6	50 28.3	49 40	45.9	50 42.9	48 40	45.2	53 18.5	38 33	36.4	53 29.6	37 32	35.7	55 03.2	26 26	27.5	2
3	48 46.1	54 42	48.8	49 02.1	53 42	48.2	49 49.0	51 40	46.2	50 04.2	50 40	45.6	50 19.2	49 39	44.9	52 58.6	39 33	36.2	53 10.1	38 32	35.4	54 47.7	27 26	27.4	3
4	48 20.9	55 42	48.4	48 37.2	54 41	47.8	49 24.9	52 40	45.9	49 40.3	51 40	45.2	49 55.6	50 39	44.5	52 38.9	40 33	36.0	52 50.7	39 32	35.2	54 32.3	28 26	27.3	4
85	47 55.8	56 41	48.0	48 12.4	55 41	47.4	49 00.9	53 40	45.5	49 16.6	52 39	44.8	49 32.1	51 39	44.2	52 19.2	41 33	35.7	52 31.4	40 32	35.0	54 17.0	30 25	27.1	85
6	47 31.0	56 41	47.6	47 47.8	56 41	47.0	48 37.0	54 40	45.1	48 53.0	53 39	44.5	49 08.8	52 39	43.8	51 59.7	42 32	35.5	52 12.2	41 32	34.8	54 01.7	31 25	27.0	6
7	47 06.3	57 41	47.2	47 23.3	57 40	46.6	48 13.3	55 39	44.7	48 29.6	54 39	44.1	48 45.6	53 38	43.5	51 40.3	44 32	35.2	51 53.2	43 32	34.5	53 46.5	33 25	26.8	7
8	46 41.8	58 41	46.8	46 59.1	57 40	46.2	47 49.8	55 39	44.3	48 06.3	55 38	43.7	48 22.7	54 38	43.1	51 21.0	45 32	35.0	51 34.2	44 31	34.3	53 31.4	34 25	26.7	8
9	46 17.4	59 40	46.3	46 34.9	58 40	45.8	47 26.4	56 39	43.9	47 43.2	56 38	43.3	47 59.8	55 38	42.7	51 01.8	46 32	34.7	51 15.4	45 31	34.0	53 16.4	35 25	26.5	9
90	45 53.2	60 40	45.9	46 11.0	59 40	45.3	47 03.2	57 38	43.6	47 20.3	56 38	43.0	47 37.1	56 38	42.3	50 42.7	47 32	34.5	50 56.7	46 31	33.8	53 01.4	37 25	26.4	90

Lat. 56°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	45 29.2	60 40	45.5	45 47.2	60 39	44.9	46 40.2	58 38	43.2	46 57.5	57 38	42.6	47 14.6	57 37	42.0	50 23.8	48 31	34.2	50 38.1	47 31	33.5	52 46.6	38 25	26.2	91
2	45 05.4	61 39	45.1	45 23.6	61 39	44.5	46 17.3	59 38	42.8	46 34.9	58 37	42.2	46 52.3	58 37	41.6	50 05.0	49 31	33.9	50 19.6	48 31	33.2	52 31.8	40 24	26.0	2
3	44 41.7	62 39	44.6	45 00.2	61 39	44.1	45 54.6	60 38	42.4	46 12.5	59 37	41.8	46 30.1	58 37	41.2	49 46.3	50 31	33.7	50 01.3	49 30	33.0	52 17.1	41 24	25.9	3
4	44 18.2	63 39	44.2	44 36.9	62 38	43.6	45 32.1	60 37	42.0	45 50.2	60 37	41.4	46 08.1	59 36	40.8	49 27.8	51 31	33.4	49 43.1	51 30	32.7	52 02.5	42 24	25.7	4
95	43 54.9	63 38	43.7	44 13.9	63 38	43.2	45 09.8	61 37	41.6	45 28.1	61 37	41.0	45 46.2	60 36	40.4	49 09.4	52 30	33.1	49 25.0	52 30	32.4	51 48.0	43 24	25.5	95
6	43 31.8	64 38	43.3	43 51.0	64 38	42.8	44 47.6	62 37	41.1	45 06.2	62 36	40.6	45 24.6	61 36	40.0	48 51.2	53 30	32.8	49 07.1	53 30	32.2	51 33.6	45 24	25.3	6
7	43 08.9	65 38	42.9	43 28.3	64 38	42.3	44 25.6	63 36	40.7	44 44.4	62 36	40.2	45 03.1	62 36	39.6	48 33.1	54 30	32.5	48 49.3	54 29	31.9	51 19.3	46 24	25.1	7
8	42 46.2	66 38	42.4	43 05.8	65 37	41.9	44 03.8	64 36	40.3	44 22.9	63 36	39.8	44 41.8	63 35	39.2	48 15.1	56 30	32.2	48 31.7	55 29	31.6	51 05.2	47 23	24.9	8
9	42 23.7	66 37	42.0	42 43.5	66 37	41.5	43 42.2	65 36	39.9	44 01.5	64 35	39.4	44 20.6	64 35	38.8	47 57.3	57 29	31.9	48 14.2	56 29	31.3	50 51.1	48 23	24.7	9
100	42 01.3	67 37	41.5	42 21.4	67 37	41.0	43 20.8	65 35	39.5	43 40.3	65 35	39.0	43 59.7	64 35	38.4	47 39.7	58 29	31.6	47 56.8	57 29	31.0	50 37.1	50 23	24.5	100
1	41 39.2	68 37	41.1	41 59.5	67 36	40.6	42 59.6	66 35	39.1	43 19.3	66 35	38.5	43 38.9	65 34	38.0	47 22.2	59 29	31.3	47 39.6	58 28	30.7	50 23.2	51 23	24.3	1
2	41 17.2	69 36	40.6	41 37.8	68 36	40.1	42 38.5	67 35	38.6	42 58.5	66 34	38.1	43 18.4	66 34	37.6	47 04.8	60 29	31.0	47 22.6	59 28	30.4	50 09.5	52 23	24.1	2
3	40 55.5	69 36	40.2	41 16.2	69 36	39.7	42 17.7	68 34	38.2	42 37.9	67 34	37.7	42 58.0	67 34	37.2	46 47.6	61 28	30.7	47 05.7	60 28	30.1	49 55.9	53 23	23.9	3
4	40 34.0	70 36	39.7	40 54.9	70 35	39.2	41 57.0	68 34	37.8	42 17.5	68 34	37.3	42 37.8	68 33	36.8	46 30.6	62 28	30.3	46 49.0	61 28	29.8	49 42.3	54 22	23.6	4
105	40 12.7	71 35	39.2	40 33.8	70 35	38.8	41 36.6	69 34	37.3	41 57.3	69 33	36.9	42 17.8	68 33	36.4	46 13.7	62 28	30.0	46 32.4	62 27	29.5	49 29.0	56 22	23.4	105
6	39 51.5	71 35	38.8	40 12.9	71 34	38.3	41 16.3	70 33	36.9	41 37.2	69 33	36.4	41 58.0	69 33	35.9	45 57.0	63 28	29.7	46 16.0	63 27	29.1	49 15.7	57 22	23.2	6
7	39 30.6	72 34	38.3	39 52.2	72 34	37.8	40 56.3	71 33	36.5	41 17.4	70 33	36.0	41 38.4	70 32	35.5	45 40.5	64 27	29.4	45 59.7	64 27	28.8	49 02.5	58 22	22.9	7
8	39 10.0	73 34	37.8	39 31.7	72 34	37.4	40 36.4	71 33	36.0	40 57.8	71 32	35.6	41 19.0	71 32	35.1	45 24.1	65 27	29.0	45 43.6	65 27	28.5	48 49.5	59 21	22.7	8
9	38 49.5	73 34	37.4	39 11.5	73 33	36.9	40 16.8	72 32	35.6	40 38.4	72 32	35.1	40 59.9	71 32	34.7	45 07.9	66 27	28.7	45 27.7	66 26	28.2	48 36.6	60 21	22.5	9
110	38 29.2	74 33	36.9	38 51.4	74 33	36.5	39 57.4	73 32	35.1	40 19.2	72 32	34.7	40 40.9	72 31	34.2	44 51.9	67 26	28.4	45 11.9	67 26	27.8	48 23.9	61 21	22.2	110
1	38 09.2	75 33	36.4	38 31.6	74 33	36.0	39 38.2	74 32	34.7	40 00.2	73 31	34.2	40 22.1	73 31	33.8	44 36.0	68 26	28.0	44 56.4	68 26	27.5	48 11.3	62 21	22.0	1
2	37 49.4	75 33	35.9	38 12.0	75 32	35.5	39 19.2	74 31	34.2	39 41.4	74 31	33.8	40 03.5	74 31	33.4	44 20.3	69 26	27.7	44 40.9	68 25	27.2	47 58.8	63 21	21.7	2
3	37 29.8	76 32	35.5	37 52.6	76 32	35.0	39 00.4	75 31	33.8	39 22.9	75 31	33.4	39 45.2	74 30	32.9	44 04.8	70 26	27.3	44 25.7	69 25	26.8	47 46.4	64 20	21.5	3
4	37 10.5	77 32	35.0	37 33.5	76 32	34.6	38 41.9	76 31	33.3	39 04.5	75 30	32.9	39 27.1	75 30	32.5	43 49.5	71 25	27.0	44 10.7	70 25	26.5	47 34.2	65 20	21.2	4
115	36 51.4	77 31	34.5	37 14.5	77 31	34.1	38 23.6	76 30	32.9	38 46.4	76 30	32.5	39 09.2	76 29	32.0	43 34.4	71 25	26.6	43 55.8	71 24	26.1	47 22.1	66 20	21.0	115
6	36 32.5	78 31	34.0	36 55.8	78 31	33.6	38 05.5	77 30	32.4	38 28.5	77 29	32.0	38 51.5	76 29	31.6	43 19.4	72 25	26.3	43 41.1	72 24	25.8	47 10.2	67 20	20.7	6
7	36 13.8	79 31	33.5	36 37.4	78 30	33.1	37 47.6	78 29	32.0	38 10.8	77 29	31.6	38 34.0	77 29	31.2	43 04.7	73 24	25.9	43 26.6	73 24	25.5	46 58.4	68 19	20.4	7
8	35 55.4	79 30	33.0	36 19.2	79 30	32.7	37 29.9	78 29	31.5	37 53.4	78 29	31.1	38 16.8	78 28	30.7	42 50.1	74 24	25.6	43 12.2	74 24	25.1	46 46.8	69 19	20.2	8
9	35 37.2	80 30	32.5	36 01.2	80 30	32.2	37 12.5	79 29	31.0	37 36.2	79 28	30.6	37 59.7	78 28	30.3	42 35.7	75 24	25.2	42 58.1	74 23	24.7	46 35.3	70 19	19.9	9
120	35 19.3	80 29	32.1	35 43.4	80 29	31.7	36 55.4	80 28	30.6	37 19.2	79 28	30.2	37 42.9	79 28	29.8	42 21.5	76 23	24.8	42 44.2	75 23	24.4	46 24.0	71 19	19.6	120
1	35 01.6	81 29	31.6	35 25.9	81 29	31.2	36 38.4	80 28	30.1	37 02.4	80 28	29.7	37 26.4	80 27	29.3	42 07.6	76 23	24.5	42 30.4	76 23	24.0	46 12.8	72 18	19.3	1
2	34 44.2	82 29	31.1	35 08.7	81 28	30.7	36 21.7	81 27	29.6	36 45.9	81 27	29.3	37 10.1	80 27	28.9	41 53.8	77 23	24.1	42 16.8	77 22	23.7	46 01.8	73 18	19.1	2
3	34 27.0	82 28	30.6	34 51.7	82 28	30.2	36 05.2	81 27	29.2	36 29.6	81 27	28.8	36 54.0	81 26	28.4	41 40.2	78 22	23.7	42 03.5	78 22	23.3	45 50.9	74 18	18.8	3
4	34 10.1	83 28	30.1	34 34.9	83 28	29.7	35 49.0	82 27	28.7	36 13.6	82 26	28.3	36 38.1	82 26	28.0	41 26.8	79 22	23.4	41 50.3	78 22	22.9	45 40.2	75 18	18.5	4
125	33 53.4	83 27	29.6	34 18.4	83 27	29.2	35 33.0	83 26	28.2	35 57.8	82 26	27.9	36 22.5	82 26	27.5	41 13.6	79 22	23.0	41 37.3	79 21	22.6	45 29.6	76 17	18.2	125
6	33 37.0	84 27	29.1	34 02.1	84 27	28.7	35 17.3	83 26	27.7	35 42.2	83 26	27.4	36 07.1	83 25	27.0	41 00.6	80 21	22.6	41 24.5	80 21	22.2	45 19.2	77 17	17.9	6
7	33 20.8	85 27	28.6	33 46.1	84 26	28.2	35 01.8	84 25	27.3	35 26.9	84 25	26.9	35 52.0	83 25	26.6	40 47.8	81 21	22.2	41 12.0	80 21	21.8	45 09.0	77 17	17.6	7
8	33 04.9	85 26	28.0	33 30.4	85 26	27.7	34 46.6	84 25	26.8	35 11.9	84 25	26.4	35 37.1	84 24	26.1	40 35.2	81 21	21.8	40 59.6	81 20	21.4	44 58.9	78 17	17.3	8
9	32 49.2	86 26	27.5	33 14.9	85 25	27.2	34 31.6	85 25	26.3	34 57.0	85 24	26.0	35 22.4	85 24	25.6	40 22.8	82 20	21.4	40 47.4	82 20	21.1	44 49.0	79 16	17.0	9
130	32 33.9	86 25	27.0	32 59.7	86 25	26.7	34 16.8	86 24	25.8	34 42.5	85 24	25.5	35 08.1	85 24	25.2	40 10.7	83 20	21.1	40 35.5	83 20	20.7	44 39.3	80 16	16.7	130
1	32 18.7	87 25	26.5	32 44.7	87 24	26.2	34 02.4	86 24	25.3	34 28.2	86 23	25.0	34 53.9	86 23	24.7	39 58.7	83 20	20.7	40 23.7	83 19	20.3	44 29.7	81 16	16.4	1
2	32 03.9	87 24	26.0	32 30.0	87 24	25.7	33 48.2	87 23	24.8	34 14.1	86 23	24.5	34 40.0	86 23	24.2	39 47.0	84 19	20.3	40 12.2	84 19	19.9	44 20.3	81 15	16.1	2
3	31 49.3	88 24	25.5	32 15.6	88 24	25.2	33 34.2	87 23	24.3	34 00.3	87 23	24.0	34 26.4	87 22	23.7	39 35.5	85 19	19.9	40 00.9	85 18	19.5	44 11.1	82 15	15.8	3
4	31 35.0	88 23	25.0	32 01.4	88 23	24.7	33 20.5	88 22	23.8	33 46.8	88 22	23.6	34 13.0	87 22	23.3	39 24.2	85 18	19.5	39 49.7	85 18	19.1	44 02.0	83 15	15.5	4
135	31 21.6	89 23	24.5	31 47.6	89 23	24.2	33 07.1	88 22	23.3	33 33.5	88 22	23.1	33 59.9	88 21	22.8	39 13.1	86 18	19.1	39 38.8	86 18	18.8	43 53.1	84 14	15.2	135
6	31 07.2	89 22	23.9	31 34.0	89 22	23.7	32 53.9	89 21	22.9	33 20.5	89 21	22.6	33 47.0	88 21	22.3	39 02.2	87 18	18.7	39 28.2	86 17	18.4	43 44.4	84 14	14.9	6
7	30 53.8	90 22	23.4	31 20.6	89 22	23.2	32 41.0	89 21	22.4	33 07.7	89 21	22.1	33 34.4	89 21	21.8	38 51.6	87 17	18.3	39 17.7	87 17	18.0	43 35.9	85 14	14.6	7
8	30 40.6	90 22	22.9	31 07.6	90 21	22.6	32 28.4	90 21	21.9	32 55.3	90 20	21.6	33 22.1	89 20	21.3	38 41.1	88 17	17.9	39 07.5	88 17	17.6	43 27.5	86 14	14.3	8
9	30 27.7	90 21	22.4	30 54.8	90 21	22.1	32 16.0	90 20	21.4	32 43.0	90 20	21.1	33 10.0	90 20	20.8	38 31.0	88 17	17.5	38 57.4	88 16	17.2	43 19.3	86 13	13.9	9
140	30 15.0	91 21	21.8	30 42.3	91 20	21.6	32 03.9	91 20	20.9	32 31.1	90 19	20.6	32 58.2	90 19	20.4	38 21.0	89 16	17.1	38 47.6	89 16	16.8	43 11.4	87 13	13.6	140
1	30 02.7	91 20	21.3	30 30.1	91 20	21.1	31 52.1	91 19	20.4	32 19.4	91 19	20.1	32 46.7	91 19	19.9	38 11.2	89 16	16.7	38 38.0	89 16	16.4	43 03.5	88 13	13.3	1
2	29 50.6	92 20	20.8	30 18.2	92 19	20.6	31 40.6	91 19	19.9	32 08.0	91 19	19.6	32 35.4	91 18	19.4	38 01.7	90 15	16.3	38 28.7	90 15	16.0	42 55.9	88 12	13.0	2
3	29 38.9	92 19	20.3	30 06.5	92 19	20.0	31 29.3	92 18	19.3	31 56.9	92 18	19.1	32 24.4	92 18	18.9	37 52.4	90 15	15.9	38 19.6	90 15	15.6	42 48.5	89 12	12.7	3
4	29 27.4	93 19	19.7	29 55.2	93 18	19.5	31 18.4	92 18	18.8	31 46.0	92 18	18.6	32 13.7	92 17	18.4	37 43.4	91 15	15.4	38 10.7	91 14	15.2	42 41.2	89 12	12.3	4
145	29 16.2	93 18	19.2	29 44.1	93 18	19.0	31 07.7	93 17	18.3	31 35.5	93 17	18.1	32 03.3	93 17	17.9	37 34.6	91 14	15.0	38 02.0	91 14	14.8	42 34.1	90 11	12.0	145
6	29 05.4	93 18	18.7	29 33.4	93 17	18.5	30 57.3	93 17	17.8	31 25.2	93 17	17.6	31 53.1	93 16	17.4	37 26.0	92 14	14.6	37 53.6	92 14	14.4	42 27.2	91 11	11.7	6
7	28 54.8	94 17	18.1	29 22.9	94 17	17.9	30 47.1	94 16	17.3	31 15.2	93 16	17.1	31 43.2	93 16	16.9	37 17.6	92 14	14.2	37 45.3	92 13	14.0	42 20.5	91 11	11.4	7
8	28 44.5	94 17	17.6	29 12.7	94 16	17.4	30 37.3	94 16	16.8	31 05.4	94 16	16.6	31 33.6	94 16	16.4	37 09.5	93 13	13.8	37 37.4	93 13	13.6	42 14.0	92 11	11.0	8
9	28 34.5	94 16	17.1	29 02.8	94 16	16.9	30 27.7	94 15	16.3	30 56.0	94 15	16.1	31 24.2	94 15	15.9	37 01.7	93 13	13.4	37 29.6	93 12	13.1	42 07.7	92 10	10.7	9
150	28 24.8	95 16	16.5	28 53.2	95 15	16.3	30 18.5	95 15	15.8	30 46.8	95 15	15.6	31 15.2	95 15	15.4	36 54.0	94 12	12.9	37 22.1	94 12	12.7	42 01.6	93 10	10.4	150
1	28 15.4	95 15	16.0	28 44.0	95 15	15.8	30 09.5	95 14	15.3	30 38.0	95 14	15.1	31 06.4	95 14	14.9	36 46.6	94 12	12.5	37 14.8	94 12	12.3	41 55.6	93 10	10.0	1
2	28 06.3	95 15	15.4	28 35.0	95 14	15.3	30 00.8	95 14	14.7	30 29.4	95 14	14.6	30 57.9	95 14	14.4	36 39.5	94 12	12.1	37 07.8	94 11	11.9	41 49.9	94 09	09.7	2
3	27 57.6	96 14	14.9	28 26.3	96 14	14.7	29 52.4	96 14	14.2	30 21.1	96 13	14.1	30 49.7	96 13	13.9	36 32.5	95 11	11.7	37 01.0	95 11	11.5	41 44.3	94 09	09.4	3
4	27 49.1	96 14	14.3	28 17.9	96 13	14.2	29 44.3	96 13	13.7	30 13.1	96 13	13.5	30 41.8	96 13	13.4	36 25.9	95 11	11.3	36 54.4	95 11	11.1	41 39.0	94 09	09.0	4
155	27 40.9	96 13	13.8	28 09.8	96 13	13.7	29 36.5	96 13	13.2	30 05.4	96 12	13.0	30 34.2	96 12	12.9	36 19.4	96 10	10.8	36 48.1	96 10	10.7	41 33.8	95 08	08.7	155
6	27 33.1	97 13	13.3	28 02.1	97 12	13.1	29 29.0	97 12	12.7	29 57.9	96 12	12.5	30 26.9	96 12	12.4	36 13.3	96 10	10.4	36 42.0	96 10	10.2	41 28.8	95 08	08.3	6
7	27 25.5	97 12	12.7	27 54.6	97 12	12.6	29 21.8	97 12	12.2	29 50.8	97 11	12.0	30 19.8	97 11	11.9	36 07.3	96 09	10.0	36 36.2	96 09	09.8	41 24.1	96 08	08.0	7
8	27 18.3	97 12	12.2	27 47.5	97 11	12.0	29 14.9	97 11	11.6	29 44.0	97 11	11.5	30 13.1	97 11	11.4	36 01.6	97 09	09.6	36 30.6	97 09	09.4	41 19.5	96 07	07.7	8
9	27 11.4	97 11	11.6	27 40.6	97 11	11.5	29 08.3	97 10	11.1	29 37.5	97 10	11.0	30 06.6	97 10	10.8	35 56.2	97 09	09.1	36 25.2	97 09	09.0	41 15.1	96 07	07.3	9
160	27 04.8	98 10	11.1	27 34.1	98 10	11.0	29 01.9	98 10	10.6	29 31.2	98 10	10.5	30 00.5	98 10	10.3	35 51.0	97 08	08.7	36 20.1	97 08	08.6	41 11.0	97 07	07.0	160
1	26 58.5	98 10	10.5	27 27.9	98 10	10.4	28 55.9	98 10	10.1	29 25.3	98 09	09.9	29 54.6	98 09	09.8	35 46.0	97 08	08.3	36 15.3	97 08	08.1	41 07.0	97 06	06.6	1
2	26 52.5	98 09	10.0	27 22.0	98 09	09.9	28 50.2	98 09	09.5	29 19.6	98 09	09.4	29 49.0	98 09	09.3	35 41.3	98 07	07.8	36 10.6	98 07	07.7	41 03.2	97 06	06.3	2
3	26 46.9	98 09	09.4	27 16.4	98 09	09.3	28 44.8	98 08	09.0	29 14.3	98 08	08.9	29 43.8	98 08	08.8	35 36.9	98 07	07.4	36 06.3	98 07	07.3	40 59.6	98 06	05.9	3
4	26 41.6	99 08	08.9	27 11.1	98 08	08.8	28 39.7	98 08	08.5	29 09.3	98 08	08.4	29 38.8	98 08	08.3	35 32.7	98 07	07.0	36 02.1	98 06	06.9	40 56.3	98 05	05.6	4
165	26 36.5	99 08	08.3	27 06.1	99 08	08.2	28 34.9	99 07	08.0	29 04.5	99 07	07.9	29 34.1	99 07	07.8	35 28.7	98 06	06.5	35 58.3	98 06	06.4	40 53.1	98 05	05.2	165
6	26 31.8	99 07	07.8	27 01.5	99 07	07.7	28 30.4	99 07	07.4	29 00.1	99 07	07.3	29 29.7	99 07	07.2	35 25.0	99 06	06.1	35 54.6	99 06	06.0	40 50.1	98 05	04.9	6
7	26 27.5	99 07	07.2	26 57.2	99 07	07.1	28 26.3	99 06	06.9	28 55.9	99 06	06.8	29 25.6	99 06	06.7	35 21.6	99 05	05.7	35 51.2	99 05	05.6	40 47.4	99 04	04.6	7
8	26 23.4	99 06	06.7	26 53.2	99 06	06.6	28 22.4	99 06	06.4	28 52.1	99 06	06.3	29 21.8	99 06	06.2	35 18.4	99 05	05.2	35 48.1	99 05	05.2	40 44.8	99 04	04.2	8
9	26 19.7	99 06	06.1	26 49.5	99 06	06.0	28 18.8	99 05	05.8	28 48.6	99 05	05.8	29 18.4	99 05	05.7	35 15.5	99 04	04.8	35 45.2	99 04	04.7	40 42.4	99 04	03.9	9
170	26 16.3	99 05	05.6	26 46.1	99 05	05.5	28 15.5	99 05	05.3	28 45.4	99 05	05.2	29 15.2	99 05	05.2	35 12.8	99 04	04.4	35 42.6	99 04	04.3	40 40.3	99 03	03.5	170
1	26 13.2	1.0 05	05.0	26 43.0	1.0 05	04.9	28 12.6	1.0 04	04.8	28 42.4	1.0 04	04.7	29 12.3	99 04	04.7	35 10.4	99 04	03.9	35 40.2	99 04	03.9	40 38.3	99 03	03.2	1
2	26 10.4	1.0 04	04.4	26 40.3	1.0 04	04.4	28 10.0	1.0 04	04.2	28 39.8	1.0 04	04.2	29 09.7	1.0 04	04.1	35 08.2	1.0 03	03.5	35 38.1	1.0 03	03.4	40 36.6	99 03	02.8	2
3	26 08.0	1.0 04	03.9	26 37.9	1.0 03	03.8	28 07.6	1.0 03	03.7	28 37.5	1.0 03	03.7	29 07.4	1.0 03	03.6	35 06.3	1.0 03	03.1	35 36.2	1.0 03	03.0	40 35.0	1.0 02	02.5	3
4	26 05.9	1.0 03	03.3	26 35.8	1.0 03	03.3	28 05.6	1.0 03	03.2	28 35.5	1.0 03	03.2	29 05.5	1.0 03	03.1	35 04.6	1.0 02	02.6	35 34.5	1.0 02	02.6	40 33.7	1.0 02	02.1	4
175	26 04.1	1.0 02	02.8	26 34.0	1.0 02	02.8	28 03.9	1.0 02	02.7	28 33.8	1.0 02	02.6	29 03.8	1.0 02	02.6	35 03.2	1.0 02	02.2	35 33.1	1.0 02	02.2	40 32.6	1.0 02	01.8	175
6	26 02.6	1.0 02	02.2	26 32.6	1.0 02	02.2	28 02.5	1.0 02	02.1	28 32.5	1.0 02	02.1	29 02.4	1.0 02	02.1	35 02.0	1.0 02	01.7	35 32.0	1.0 01	01.7	40 31.6	1.0 01	01.4	6
7	26 01.5	1.0 01	01.7	26 31.4	1.0 01	01.7	28 01.4	1.0 01	01.6	28 31.4	1.0 01	01.6	29 01.4	1.0 01	01.6	35 01.1	1.0 01	01.3	35 31.1	1.0 01	01.3	40 30.9	1.0 01	01.1	7
8	26 00.7	1.0 01	01.1	26 30.6	1.0 01	01.1	28 00.6	1.0 01	01.1	28 30.6	1.0 01	01.1	29 00.6	1.0 01	01.0	35 00.5	1.0 01	00.9	35 30.5	1.0 01	00.9	40 30.4	1.0 01	00.7	8
9	26 00.2	1.0 00	00.6	26 30.2	1.0 00	00.6	28 00.2	1.0 00	00.5	28 30.2	1.0 00	00.5	29 00.2	1.0 00	00.5	35 00.1	1.0 00	00.4	35 30.1	1.0 00	00.4	40 30.1	1.0 00	00.4	9
180	26 00.0	1.0 00	00.0	26 30.0	1.0 00	00.0	28 00.0	1.0 00	00.0	28 30.0	1.0 00	00.0	29 00.0	1.0 00	00.0	35 00.0	1.0 00	00.0	35 30.0	1.0 00	00.0	40 30.0	1.0 00	00.0	180

Lat. 57°

Lat. 58°

Lat. 59°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 56°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	38	180	42	180	46	180	50	180	54	180	58	180	62	180	66	180	70	180	74	180	78	180	00
4	38	175	42	175	46	174	50	174	54	174	58	173	62	172	66	172	70	171	74	169	78	166	4
8	38	170	42	169	46	169	50	168	54	167	57	166	61	165	65	164	69	161	73	158	77	154	8
12	37	165	41	164	45	163	49	162	53	161	57	160	61	158	65	156	68	153	72	149	76	142	12
16	36	160	40	159	44	158	48	157	52	155	56	153	60	151	64	148	67	145	71	140	74	133	16
20	36	155	39	154	43	153	47	151	51	149	55	147	59	145	62	141	66	137	69	132	73	125	20
24	35	150	38	149	42	148	46	146	50	144	54	141	57	139	61	135	64	131	68	125	71	118	24
28	33	146	37	144	41	143	45	141	48	138	52	136	56	133	59	129	62	125	66	119	69	112	28
32	32	141	36	140	40	138	43	136	47	133	50	131	54	127	57	124	61	119	64	114	66	107	32
36	31	137	34	135	38	133	42	131	45	128	49	126	52	122	55	119	59	114	62	109	64	103	36
40	29	133	33	131	36	129	40	126	43	124	47	121	50	118	53	114	56	110	59	104	62	98	40
44	27	129	31	127	34	125	38	122	41	119	45	117	48	113	51	110	54	105	57	100	60	95	44
48	26	125	29	123	33	120	36	118	39	115	43	112	46	109	49	105	52	101	55	97	58	91	48
52	24	121	27	119	31	116	34	114	37	111	41	108	44	105	47	102	50	98	53	93	55	88	52
56	22	117	25	115	29	113	32	110	35	107	39	105	42	101	45	98	48	94	51	90	53	85	56
60	20	113	23	111	26	109	30	106	33	104	36	101	40	98	43	94	46	91	48	86	51	82	60
64	18	110	21	108	24	105	28	103	31	100	34	97	37	94	40	91	43	87	46	83	49	79	64
68	15	106	19	104	22	102	25	99	29	97	32	94	35	91	38	88	41	84	44	80	47	76	68
72	13	103	17	101	20	98	23	96	26	93	30	90	33	88	36	84	39	81	42	77	44	73	72
76	11	99	14	97	18	95	21	92	24	90	27	87	31	84	34	81	37	78	40	75	42	71	76
80	09	96	12	94	16	91	19	89	22	87	25	84	28	81	31	78	34	75	37	72	40	68	80
84	07	93	10	90	13	88	17	86	20	83	23	81	26	78	29	75	32	72	35	69	38	65	84
88	04	89	08	87	11	85	14	83	18	80	21	78	24	75	27	72	30	69	33	66	36	63	88
92	02	86	06	84	09	82	12	79	15	77	19	74	22	72	25	69	28	66	31	64	34	60	92
96	*00*	83	03	81	07	78	10	76	13	74	16	71	20	69	23	66	26	64	29	61	32	58	96
100	*02*	79	01	77	04	75	08	73	11	71	14	68	18	66	21	63	24	61	27	58	30	55	100
104	*04*	76	*01*	74	02	72	06	70	09	67	12	65	16	63	19	60	22	58	25	55	29	53	104
108	*07*	73	*03*	71	00	68	04	66	07	64	10	62	14	60	17	58	20	55	24	53	27	50	108
112	*09*	69	*05*	67	*02*	65	02	63	05	61	08	59	12	57	15	55	19	52	22	50	25	47	112
116	*11*	66	*07*	64	*04*	62	*00*	60	03	58	07	56	10	54	13	52	17	49	20	47	24	45	116
120	*13*	62	*09*	60	*06*	58	*02*	56	01	54	05	53	08	51	12	49	15	47	19	44	22	42	120
124	*15*	59	*11*	57	*08*	55	*04*	53	*01*	51	03	49	06	47	10	46	14	44	17	42	21	40	124
128	*17*	55	*13*	53	*09*	51	*06*	50	*02*	48	01	46	05	44	08	43	12	41	16	39	19	37	128
132	*18*	51	*15*	50	*11*	48	*08*	46	*04*	44	*00*	43	03	41	07	39	11	38	14	36	18	34	132
136	*20*	48	*16*	46	*13*	44	*09*	43	*05*	41	*02*	39	02	38	06	36	09	35	13	33	17	31	136
140	*22*	44	*18*	42	*14*	40	*11*	39	*07*	37	*03*	36	01	35	04	33	08	32	12	30	16	29	140
144	*23*	40	*19*	38	*16*	37	*12*	35	*08*	34	*04*	33	*01*	31	03	30	07	29	11	27	15	26	144
148	*25*	36	*21*	34	*17*	33	*13*	32	*09*	30	*06*	29	*02*	28	02	27	06	26	10	24	14	23	148
152	*26*	31	*22*	30	*18*	29	*14*	28	*10*	27	*07*	26	*03*	25	01	24	05	22	09	21	13	20	152
156	*27*	27	*23*	26	*19*	25	*15*	24	*11*	23	*07*	22	*04*	21	00	20	04	19	08	18	12	17	156
160	*28*	23	*24*	22	*20*	21	*16*	20	*12*	19	*08*	18	*04*	18	*00*	17	04	16	07	15	11	15	160
164	*29*	18	*25*	17	*21*	17	*17*	16	*13*	15	*09*	15	*05*	14	*01*	14	03	13	07	12	11	12	164
168	*29*	14	*25*	13	*21*	13	*17*	12	*13*	12	*09*	11	*05*	11	*01*	10	03	10	07	09	11	09	168
172	*30*	09	*26*	09	*22*	08	*18*	08	*14*	08	*10*	07	*06*	07	*02*	07	02	06	06	06	10	06	172
176	*30*	05	*26*	04	*22*	04	*18*	04	*14*	04	*10*	04	*06*	04	*02*	03	02	03	06	03	10	03	176
180	*30*	00	*26*	00	*22*	00	*18*	00	*14*	00	*10*	00	*06*	00	*02*	00	02	00	06	00	10	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

Lat. 56°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	82	180	86	180	90	....	86	00	82	00	78	00	74	00	70	00	66	00	62	00	58	00	00
4	82	161	85	148	88	88	85	26	82	12	78	07	74	04	70	03	66	02	62	01	58	00	4
8	81	145	84	127	86	87	84	43	81	23	77	13	74	09	70	06	66	03	62	02	58	01	8
12	79	132	82	115	83	85	83	53	80	32	77	20	73	13	70	08	66	05	62	03	58	01	12
16	77	123	80	106	81	83	81	58	79	38	76	25	73	17	69	11	65	07	62	03	58	01	16
20	75	115	78	100	79	82	79	61	77	43	75	29	72	20	69	13	65	08	62	04	58	01	20
24	73	109	75	96	77	80	77	63	76	46	74	33	71	23	68	15	65	10	61	05	58	02	24
28	71	103	73	92	74	78	75	63	74	49	72	36	70	25	67	17	64	11	61	06	58	02	28
32	69	99	71	89	72	77	73	63	72	50	71	38	69	28	67	19	64	12	61	07	58	02	32
36	67	95	69	86	70	75	71	63	71	51	70	39	68	29	66	21	64	13	61	07	58	02	36
40	65	91	66	83	68	73	69	63	69	51	68	41	67	31	65	22	63	14	60	08	58	02	40
44	62	88	64	80	66	71	67	62	67	52	67	41	66	32	64	23	62	15	60	08	57	03	44
48	60	85	62	78	64	70	65	61	65	51	65	42	65	33	64	24	62	16	60	09	57	03	48
52	58	82	60	75	62	68	63	60	64	51	64	42	63	33	63	24	61	16	59	09	57	03	52
56	56	79	58	73	60	66	61	59	62	51	62	42	62	33	62	25	61	17	59	10	57	03	56
60	53	77	56	71	58	64	59	57	60	50	61	42	61	34	61	25	60	17	59	10	57	03	60
64	51	74	54	69	56	63	57	56	58	49	59	41	60	34	60	26	59	18	58	10	57	03	64
68	49	71	51	66	54	61	55	55	57	48	58	41	59	33	59	26	59	18	58	10	57	03	68
72	47	69	49	64	52	59	54	53	55	47	56	40	57	33	58	26	58	18	57	11	57	03	72
76	45	67	47	62	50	57	52	52	54	46	55	39	56	33	57	25	57	18	57	11	56	04	76
80	43	64	45	60	48	55	50	50	52	44	54	38	55	32	56	25	56	18	57	11	56	04	80
84	41	62	44	58	46	53	48	48	50	43	52	37	54	31	55	25	56	18	56	11	56	04	84
88	39	59	42	56	44	51	47	47	49	42	51	36	53	31	54	24	55	18	56	11	56	04	88
92	37	57	40	53	43	49	45	45	47	40	50	35	51	30	53	24	54	17	55	11	56	04	92
96	35	55	38	51	41	47	44	43	46	39	48	34	50	29	52	23	54	17	55	10	56	04	96
100	33	52	36	49	39	45	42	42	45	37	47	33	49	28	51	22	53	17	55	10	56	03	100
104	32	50	35	47	38	43	41	40	43	36	46	31	48	27	51	22	52	16	54	10	55	03	104
108	30	47	33	44	36	41	39	38	42	34	45	30	47	26	50	21	52	16	54	10	55	03	108
112	28	45	32	42	35	39	38	36	41	32	44	29	46	25	49	20	51	15	53	09	55	03	112
116	27	42	30	40	33	37	37	34	40	31	43	27	45	23	48	19	51	14	53	09	55	03	116
120	25	40	29	37	32	35	35	32	39	29	42	26	45	22	47	18	50	14	53	09	55	03	120
124	24	37	27	35	31	33	34	30	37	27	41	24	44	21	47	17	50	13	52	08	55	03	124
128	23	35	26	33	30	30	33	28	36	25	40	23	43	19	46	16	49	12	52	08	55	03	128
132	21	32	25	30	29	28	32	26	36	24	39	21	42	18	46	15	49	11	52	07	55	03	132
136	20	30	24	28	28	26	31	24	35	22	38	19	42	17	45	14	48	10	51	07	55	02	136
140	19	27	23	25	27	24	30	22	34	20	37	18	41	15	44	13	48	10	51	06	54	02	140
144	18	24	22	23	26	21	29	20	33	18	37	16	40	14	44	11	48	09	51	06	54	02	144
148	17	22	21	20	25	19	29	18	32	16	36	14	40	12	44	10	47	08	51	05	54	02	148
152	17	19	20	18	24	17	28	15	32	14	36	13	39	11	43	09	47	07	51	04	54	02	152
156	16	16	20	15	24	14	28	13	31	12	35	11	39	09	43	08	47	06	50	04	54	01	156
160	15	14	19	13	23	12	27	11	31	10	35	09	39	08	43	06	46	05	50	03	54	01	160
164	15	11	19	10	23	10	27	09	31	08	35	07	38	06	42	05	46	04	50	03	54	01	164
168	14	08	18	08	22	07	26	07	30	06	34	05	38	05	42	04	46	03	50	02	54	01	168
172	14	06	18	05	22	05	26	04	30	04	34	04	38	03	42	03	46	02	50	01	54	00	172
176	14	03	18	03	22	02	26	02	30	02	34	02	38	02	42	01	46	01	50	01	54	00	176
180	14	00	18	00	22	00	26	00	30	00	34	00	38	00	42	00	46	00	50	00	54	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 57°

Lat. 58°

Lat. 59°

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

Lat. 57°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	33 00.0	1.0 01	180.0	33 30.0	1.0 01	180.0	34 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	35 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	36 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	00
1	32 59.7	1.0 02	178.8	33 29.7	1.0 02	178.8	33 59.7	1.0 02	178.8	34 29.7	1.0 02	178.8	34 59.7	1.0 02	178.8	35 29.6	1.0 02	178.8	35 59.6	1.0 02	178.8	36 29.6	1.0 02	178.8	1
2	32 58.6	1.0 03	177.6	33 28.6	1.0 03	177.6	33 58.6	1.0 03	177.6	34 28.6	1.0 03	177.6	34 58.6	1.0 03	177.6	35 28.6	1.0 03	177.5	35 58.6	1.0 03	177.5	36 28.6	1.0 03	177.5	2
3	32 56.9	1.0 04	176.4	33 26.9	1.0 04	176.4	33 56.9	1.0 04	176.4	34 26.9	1.0 04	176.4	34 56.9	1.0 04	176.3	35 26.9	1.0 04	176.3	35 56.8	1.0 04	176.3	36 26.8	1.0 04	176.3	3
4	32 54.6	1.0 05	175.2	33 24.5	1.0 05	175.2	33 54.5	1.0 05	175.2	34 24.5	1.0 05	175.2	34 54.4	1.0 05	175.1	35 24.4	1.0 05	175.1	35 54.4	1.0 06	175.1	36 24.3	1.0 05	175.0	4
05	32 51.5	1.0 06	174.0	33 21.5	1.0 06	174.0	33 51.4	1.0 06	174.0	34 21.4	1.0 06	173.9	34 51.3	1.0 06	173.9	35 21.3	1.0 06	173.9	35 51.2	1.0 06	173.8	36 21.2	1.0 06	173.8	05
6	32 47.8	1.0 07	172.9	33 17.7	1.0 07	172.8	33 47.6	1.0 07	172.8	34 17.6	1.0 07	172.7	34 47.5	1.0 08	172.7	35 17.4	1.0 08	172.6	35 47.4	1.0 08	172.6	36 17.3	1.0 08	172.6	6
7	32 43.4	1.0 08	171.7	33 13.3	1.0 08	171.6	33 43.2	1.0 09	171.6	34 13.1	1.0 09	171.5	34 43.0	1.0 09	171.5	35 12.9	1.0 09	171.4	35 42.8	1.0 09	171.4	36 12.7	1.0 09	171.3	7
8	32 38.3	1.0 10	170.5	33 08.2	1.0 10	170.4	33 38.1	1.0 10	170.4	34 07.9	1.0 10	170.3	34 37.8	1.0 10	170.3	35 07.7	1.0 10	170.2	35 37.6	1.0 10	170.2	36 07.4	1.0 10	170.1	8
9	32 32.6	99 11	169.3	33 02.4	99 11	169.2	33 32.3	99 11	169.2	34 02.1	99 11	169.1	34 32.0	99 11	169.1	35 01.8	99 11	169.0	35 31.6	99 11	168.9	36 01.5	99 11	168.9	9
10	32 26.2	99 12	168.1	32 56.0	99 12	168.1	33 25.8	99 12	168.0	33 55.6	99 12	167.9	34 25.4	99 12	167.9	34 55.2	99 12	167.8	35 25.0	99 12	167.7	35 54.8	99 12	167.6	10
1	32 19.1	99 13	167.0	32 48.9	99 13	166.9	33 18.7	99 13	166.8	33 48.4	99 13	166.7	34 18.2	99 13	166.7	34 48.0	99 13	166.6	35 17.7	99 13	166.5	35 47.5	99 13	166.4	1
2	32 11.4	99 14	165.8	32 41.2	99 14	165.7	33 10.9	99 14	165.6	33 40.6	99 14	165.5	34 10.3	99 14	165.5	34 40.0	99 14	165.4	35 09.8	99 14	165.3	35 39.5	99 14	165.2	2
3	32 03.1	99 15	164.6	32 32.8	99 15	164.5	33 02.4	99 15	164.4	33 32.1	99 15	164.3	34 01.8	99 15	164.3	34 31.5	99 15	164.2	35 01.1	99 16	164.1	35 30.8	99 16	164.0	3
4	31 54.1	99 16	163.4	32 23.7	99 16	163.4	32 53.4	99 16	163.3	33 23.0	99 16	163.2	33 52.6	99 16	163.1	34 22.2	99 16	163.0	34 51.8	99 17	162.9	35 21.4	99 17	162.8	4
15	31 44.5	99 17	162.3	32 14.0	99 17	162.2	32 43.6	99 17	162.1	33 13.2	99 17	162.0	33 42.8	99 17	161.9	34 12.3	99 18	161.8	34 41.9	99 18	161.7	35 11.4	99 18	161.6	15
6	31 34.2	98 18	161.1	32 03.7	98 18	161.0	32 33.3	98 18	160.9	33 02.8	98 18	160.8	33 32.3	98 19	160.7	34 01.8	98 19	160.6	34 31.3	98 19	160.5	35 00.8	98 19	160.4	6
7	31 23.3	98 19	160.0	31 52.8	98 19	159.9	32 22.3	98 19	159.8	32 51.7	98 19	159.6	33 21.2	98 20	159.5	33 50.6	98 20	159.4	34 20.1	98 20	159.3	34 49.5	98 20	159.2	7
8	31 11.8	98 20	158.8	31 41.2	98 20	158.7	32 10.6	98 20	158.6	32 40.0	98 20	158.5	33 09.4	98 21	158.4	33 38.8	98 21	158.2	34 08.2	98 21	158.1	34 37.6	98 21	158.0	8
9	30 59.7	98 21	157.7	31 29.1	98 21	157.6	31 58.4	98 21	157.4	32 27.7	98 22	157.3	32 57.1	98 22	157.2	33 26.4	98 22	157.1	33 55.7	98 22	156.9	34 25.0	98 22	156.8	9
20	30 47.0	98 22	156.5	31 16.3	98 22	156.4	31 45.6	98 22	156.3	32 14.8	98 23	156.2	32 44.1	98 23	156.0	33 13.3	97 23	155.9	33 42.6	97 23	155.8	34 11.8	97 23	155.6	20
1	30 33.7	97 23	155.4	31 02.9	97 23	155.3	31 32.1	97 23	155.1	32 01.3	97 24	155.0	32 30.5	97 24	154.9	32 59.7	97 24	154.7	33 28.9	97 24	154.6	33 58.0	97 24	154.4	1
2	30 19.8	97 24	154.3	30 48.9	97 24	154.1	31 18.1	97 24	154.0	31 47.2	97 24	153.9	32 16.3	97 25	153.7	32 45.4	97 25	153.6	33 14.5	97 25	153.4	33 43.6	97 25	153.3	2
3	30 05.3	97 25	153.2	30 34.4	97 25	153.0	31 03.5	97 25	152.9	31 32.5	97 25	152.7	32 01.6	97 26	152.6	32 30.6	97 26	152.4	32 59.6	97 26	152.3	33 28.6	97 26	152.1	3
4	29 50.3	97 26	152.0	30 19.3	97 26	151.9	30 48.3	97 26	151.7	31 17.3	97 26	151.6	31 46.2	97 27	151.4	32 15.2	97 27	151.3	32 44.1	96 27	151.1	33 13.1	96 27	151.0	4
25	29 34.7	96 27	150.9	30 03.6	96 27	150.8	30 32.5	96 27	150.6	31 01.4	96 27	150.5	31 30.3	96 27	150.3	31 59.2	96 28	150.1	32 28.1	96 28	150.0	32 56.9	96 28	149.8	25
6	29 18.5	96 28	149.8	29 47.4	96 28	149.7	30 16.2	96 28	149.5	30 45.0	96 28	149.3	31 13.9	96 28	149.2	31 42.7	96 28	149.0	32 11.4	96 29	148.8	32 40.2	96 29	148.7	6
7	29 01.8	96 29	148.7	29 30.6	96 29	148.6	29 59.4	96 29	148.4	30 28.1	96 29	148.2	30 56.8	96 29	148.1	31 25.6	96 29	147.9	31 54.3	96 30	147.7	32 23.0	96 30	147.5	7
8	28 44.6	96 30	147.6	29 13.3	96 30	147.5	29 42.0	96 30	147.3	30 10.6	96 30	147.1	30 39.3	95 30	146.9	31 07.9	95 30	146.8	31 36.5	95 30	146.6	32 05.2	95 31	146.4	8
9	28 26.8	95 30	146.5	28 55.5	95 31	146.4	29 24.0	95 31	146.2	29 52.6	95 31	146.0	30 21.2	95 31	145.8	30 49.8	95 31	145.7	31 18.3	95 31	145.5	31 46.8	95 31	145.3	9
30	28 08.6	95 31	145.5	28 37.1	95 31	145.3	29 05.6	95 32	145.1	29 34.1	95 32	144.9	30 02.6	95 32	144.7	30 31.1	95 32	144.6	30 59.5	95 32	144.4	31 28.0	95 32	144.2	30
1	27 49.8	95 32	144.4	28 18.2	95 32	144.2	28 46.7	95 32	144.0	29 15.1	95 33	143.8	29 43.5	95 33	143.7	30 11.9	95 33	143.5	30 40.2	95 33	143.3	31 08.6	94 33	143.1	1
2	27 30.5	95 33	143.3	27 58.9	95 33	143.1	28 27.2	94 33	142.9	28 55.5	94 33	142.8	29 23.9	94 34	142.6	29 52.2	94 34	142.4	30 20.4	94 34	142.2	30 48.7	94 34	142.0	2
3	27 10.7	94 34	142.2	27 39.0	94 34	142.1	28 07.3	94 34	141.9	28 35.5	94 34	141.7	29 03.8	94 34	141.5	29 32.0	94 34	141.3	30 00.2	94 35	141.1	30 28.3	94 35	140.9	3
4	26 50.5	94 35	141.2	27 18.7	94 35	141.0	27 46.9	94 35	140.8	28 15.0	94 35	140.6	28 43.2	94 35	140.4	29 11.3	94 35	140.2	29 39.4	94 35	140.0	30 07.5	94 36	139.8	4
35	26 29.8	94 35	140.1	26 57.9	94 35	139.9	27 26.0	94 36	139.7	27 54.1	94 36	139.5	28 22.1	93 36	139.3	28 50.1	93 36	139.1	29 18.2	93 36	138.9	29 46.2	93 36	138.7	35
6	26 08.6	93 36	139.1	26 36.6	93 36	138.9	27 04.6	93 36	138.7	27 32.6	93 36	138.5	28 00.6	93 37	138.3	28 28.5	93 37	138.1	28 56.5	93 37	137.9	29 24.4	93 37	137.7	6
7	25 47.0	93 37	138.1	26 14.9	93 37	137.9	26 42.8	93 37	137.7	27 10.7	93 37	137.4	27 38.6	93 37	137.2	28 06.5	93 37	137.0	28 34.3	93 38	136.8	29 02.1	93 38	136.6	7
8	25 24.9	93 37	137.0	25 52.8	93 38	136.8	26 20.6	93 38	136.6	26 48.4	93 38	136.4	27 16.2	93 38	136.2	27 44.0	93 38	136.0	28 11.7	92 38	135.8	28 39.5	92 38	135.5	8
9	25 02.4	93 38	136.0	25 30.2	93 38	135.8	25 58.0	92 38	135.6	26 25.7	92 39	135.4	26 53.4	92 39	135.2	27 21.1	92 39	134.9	27 48.7	92 39	134.7	28 16.4	92 39	134.5	9
40	24 39.5	92 39	135.0	25 07.2	92 39	134.8	25 34.9	92 39	134.6	26 02.5	92 39	134.3	26 30.1	92 39	134.1	26 57.7	92 40	133.9	27 25.3	92 40	133.7	27 52.9	92 40	133.5	40
1	24 16.2	92 40	134.0	24 43.8	92 40	133.8	25 11.4	92 40	133.5	25 38.9	92 40	133.3	26 06.5	92 40	133.1	26 34.0	92 40	132.9	27 01.5	92 40	132.7	27 28.9	92 41	132.4	1
2	23 52.5	92 40	133.0	24 20.0	92 40	132.7	24 47.5	92 40	132.5	25 15.0	92 41	132.3	25 42.4	91 41	132.1	26 09.8	91 41	131.9	26 37.2	91 41	131.6	27 04.6	91 41	131.4	2
3	23 28.4	91 41	132.0	23 55.8	91 41	131.7	24 23.2	91 41	131.5	24 50.6	91 41	131.3	25 18.0	91 41	131.1	25 45.3	91 42	130.8	26 12.6	91 42	130.6	26 39.9	91 42	130.4	3
4	23 03.9	91 41	131.0	23 31.3	91 42	130.7	23 58.6	91 42	130.5	24 25.9	91 42	130.3	24 53.1	91 42	130.1	25 20.4	91 42	129.8	25 47.6	91 42	129.6	26 14.8	91 42	129.4	4
45	22 39.1	91 42	130.0	23 06.3	91 42	129.8	23 33.6	91 42	129.5	24 00.8	91 42	129.3	24 28.0	91 43	129.1	24 55.1	91 43	128.8	25 22.3	90 43	128.6	25 49.4	90 43	128.4	45
6	22 13.8	91 43	129.0	22 41.0	91 43	128.8	23 08.2	90 43	128.5	23 35.3	90 43	128.3	24 02.4	90 43	128.1	24 29.5	90 43	127.8	24 56.6	90 43	127.6	25 23.6	90 44	127.4	6
7	21 48.3	90 43	128.0	22 15.4	90 43	127.8	22 42.4	90 43	127.6	23 09.5	90 44	127.3	23 36.5	90 44	127.1	24 03.5	90 44	126.9	24 30.5	90 44	126.6	24 57.5	90 44	126.4	7
8	21 22.4	90 44	127.1	21 49.4	90 44	126.8	22 16.4	90 44	126.6	22 43.3	90 44	126.4	23 10.3	90 44	126.1	23 37.2	90 44	125.9	24 04.1	90 45	125.6	24 31.0	90 45	125.4	8
9	20 56.1	90 44	126.1	21 23.1	90 44	125.9	21 50.0	90 45	125.6	22 16.9	90 45	125.4	22 43.7	90 45	125.1	23 10.6	89 45	124.9	23 37.4	89 45	124.7	24 04.2	89 45	124.4	9
50	20 29.6	90 45	125.1	20 56.4	89 45	124.9	21 23.2	89 45	124.7	21 50.0	89 45	124.4	22 16.8	89 45	124.2	22 43.6	89 45	123.9	23 10.3	89 46	123.7	23 37.1	89 46	123.4	50
1	20 02.7	89 45	124.2	20 29.5	89 45	123.9	20 56.2	89 46	123.7	21 22.9	89 46	123.5	21 49.6	89 46	123.2	22 16.3	89 46	123.0	22 43.0	89 46	122.7	23 09.6	89 46	122.5	1
2	19 35.5	89 46	123.2	20 02.2	89 46	123.0	20 28.9	89 46	122.7	20 55.5	89 46	122.5	21 22.2	89 46	122.3	21 48.8	89 46	122.0	22 15.4	89 47	121.8	22 41.9	89 47	121.5	2
3	19 08.0	89 46	122.3	19 34.6	89 46	122.0	20 01.2	89 46	121.8	20 27.8	89 47	121.6	20 54.4	88 47	121.3	21 20.9	88 47	121.1	21 47.4	88 47	120.8	22 13.9	88 47	120.6	3
4	18 40.3	89 47	121.4	19 06.8	88 47	121.1	19 33.3	88 47	120.9	19 59.8	88 47	120.6	20 26.3	88 47	120.4	20 52.8	88 47	120.1	21 19.2	88 47	119.9	21 45.7	88 48	119.6	4
55	18 12.2	88 47	120.4	18 38.7	88 47	120.2	19 05.1	88 47	119.9	19 31.6	88 48	119.7	19 58.0	88 48	119.4	20 24.4	88 48	119.2	20 50.8	88 48	118.9	21 17.1	88 48	118.7	55
6	17 43.9	88 48	119.5	18 10.3	88 48	119.2	18 36.7	88 48	119.0	19 03.1	88 48	118.7	19 29.4	88 48	118.5	19 55.7	88 48	118.2	20 22.0	88 48	118.0	20 48.3	88 48	117.7	6
7	17 15.3	88 48	118.6	17 41.7	88 48	118.3	18 08.0	88 48	118.1	18 34.3	88 48	117.8	19 00.6	88 48	117.6	19 26.8	87 49	117.3	19 53.0	87 49	117.0	20 19.3	87 49	116.8	7
8	16 46.5	88 48	117.7	17 12.8	88 49	117.4	17 39.0	87 49	117.2	18 05.3	87 49	116.9	18 31.5	87 49	116.6	18 57.7	87 49	116.4	19 23.8	87 49	116.1	19 50.0	87 49	115.9	8
9	16 17.4	87 49	116.7	16 43.6	87 49	116.5	17 09.8	87 49	116.2	17 36.0	87 49	116.0	18 02.1	87 49	115.7	18 28.3	87 49	115.5	18 54.4	87 49	115.2	19 20.4	87 50	114.9	9
60	15 48.1	87 49	115.8	16 14.3	87 49	115.6	16 40.4	87 49	115.3	17 06.5	87 50	115.1	17 32.6	87 50	114.8	17 58.6	87 50	114.5	18 24.7	87 50	114.3	18 50.7	87 50	114.0	60
1	15 18.6	87 50	114.9	15 44.7	87 50	114.7	16 10.8	87 50	114.4	16 36.8	87 50	114.2	17 02.8	87 50	113.9	17 28.8	87 50	113.6	17 54.8	87 50	113.4	18 20.8	86 50	113.1	1
2	14 48.9	87 50	114.0	15 14.9	87 50	113.8	15 40.9	87 50	113.5	16 06.9	87 50	113.3	16 32.8	87 50	113.0	16 58.8	86 50	112.7	17 24.7	86 50	112.5	17 50.6	86 51	112.2	2
3	14 18.9	87 50	113.1	14 44.9	86 50	112.9	15 10.8	86 50	112.6	15 36.8	86 51	112.4	16 02.7	86 51	112.1	16 28.5	86 51	111.8	16 54.4	86 51	111.6	17 20.2	86 51	111.3	3
4	13 48.8	86 51	112.2	14 14.7	86 51	112.0	14 40.6	86 51	111.7	15 06.4	86 51	111.5	15 32.3	86 51	111.2	15 58.1	86 51	110.9	16 23.9	86 51	110.7	16 49.7	86 51	110.4	4
65	13 18.4	86 51	111.4	13 44.3	86 51	111.1	14 10.1	86 51	110.8	14 35.9	86 51	110.6	15 01.7	86 51	110.3	15 27.5	86 51	110.0	15 53.3	86 51	109.8	16 19.0	86 51	109.5	65
6	12 47.9	86 51	110.5	13 13.7	86 51	110.2	13 39.5	86 51	110.0	14 05.2	86 51	109.7	14 31.0	86 52	109.4	14 56.7	86 52	109.2	15 22.4	86 52	108.9	15 48.1	86 52	108.6	6
7	12 17.2	86 51	109.6	12 43.0	86 52	109.3	13 08.7	86 52	109.1	13 34.4	86 52	108.8	14 00.1	86 52	108.5	14 25.8	86 52	108.3	14 51.4	85 52	108.0	15 17.1	85 52	107.7	7
8	11 46.3	86 52	108.7	12 12.0	86 52	108.5	12 37.7	86 52	108.2	13 03.4	86 52	107.9	13 29.0	85 52	107.7	13 54.7	85 52	107.4	14 20.3	85 52	107.1	14 45.9	85 52	106.9	8
9	11 15.3	86 52	107.8	11 41.0	85 52	107.6	12 06.6	85 52	107.3	12 32.2	85 52	107.0	12 57.8	85 52	106.8	13 23.4	85 52	106.5	13 49.0	85 52	106.2	14 14.5	85 52	106.0	9
70	10 44.1	85 52	107.0	11 09.7	85 52	106.7	11 35.3	85 52	106.4	12 00.9	85 52	106.2	12 26.5	85 52	105.9	12 52.0	85 53	105.6	13 17.5	85 53	105.4	13 43.0	85 53	105.1	70
1	10 12.8	85 52	106.1	10 38.4	85 52	105.8	11 03.9	85 53	105.6	11 29.4	85 53	105.3	11 55.0	85 53	105.0	12 20.5	85 53	104.8	12 45.9	85 53	104.5	13 11.4	85 53	104.2	1
2	9 41.3	85 53	105.2	10 06.9	85 53	105.0	10 32.4	85 53	104.7	10 57.9	85 53	104.4	11 23.3	85 53	104.2	11 48.8	85 53	103.9	12 14.3	85 53	103.6	12 39.7	85 53	103.4	2
3	9 09.8	85 53	104.4	9 35.2	85 53	104.1	10 00.7	85 53	103.8	10 26.2	85 53	103.6	10 51.6	85 53	103.3	11 17.0	85 53	103.0	11 42.4	85 53	102.8	12 07.8	85 53	102.5	3
4	8 38.0	85 53	103.5	9 03.5	85 53	103.3	9 28.9	85 53	103.0	9 54.3	85 53	102.7	10 19.7	85 53	102.4	10 45.1	85 53	102.2	11 10.5	85 53	101.9	11 35.9	85 53	101.6	4
75	8 06.2	85 53	102.7	8 31.6	85 53	102.4	8 57.0	85 53	102.1	9 22.4	85 53	101.9	9 47.8	85 53	101.6	10 13.1	85 53	101.3	10 38.5	84 54	101.0	11 03.8	84 54	100.8	75
6	7 34.3	85 53	101.8	7 59.7	85 53	101.5	8 25.0	85 53	101.3	8 50.4	84 54	101.0	9 15.7	84 54	100.7	9 41.1	84 54	100.5	10 06.4	84 54	100.2	10 31.7	84 54	99.9	6
7	7 02.2	85 54	101.0	7 27.6	84 54	100.7	7 52.9	84 54	100.4	8 18.3	84 54	100.1	8 43.6	84 54	99.9	9 08.9	84 54	99.6	9 34.2	84 54	99.3	9 59.4	84 54	99.1	7
8	6 30.1	84 54	100.1	6 55.4	84 54	99.8	7 20.7	84 54	99.6	7 46.0	84 54	99.3	8 11.3	84 54	99.0	8 36.6	84 54	98.8	9 01.9	84 54	98.5	9 27.1	84 54	98.2	8
9	5 57.9	84 54	99.3	6 23.2	84 54	99.0	6 48.5	84 54	98.7	7 13.8	84 54	98.4	7 39.0	84 54	98.2	8 04.3	84 54	97.9	8 29.5	84 54	97.6	8 54.8	84 54	97.4	9
80	5 25.6	84 54	98.4	5 50.9	84 54	98.1	6 16.1	84 54	97.9	6 41.4	84 54	97.6	7 06.6	84 54	97.3	7 31.9	84 54	97.1	7 57.1	84 54	96.8	8 22.3	84 54	96.5	80
1				5 18.5	84 54	97.3	5 43.7	84 54	97.0	6 09.0	84 54	96.8	6 34.2	84 54	96.5	6 59.4	84 54	96.2	7 24.6	84 54	95.9	7 49.8	84 54	95.7	1
2							5 11.3	84 54	96.2	5 36.5	84 54	95.9	6 01.7	84 54	95.6	6 26.9	84 54	95.4	6 52.1	84 54	95.1	7 17.3	84 54	94.8	2
3										5 04.0	84 54	95.1	5 29.2	84 54	94.8	5 54.3	84 54	94.5	6 19.5	84 54	94.2	6 44.7	84 54	94.0	3
4																5 21.8	84 54	93.7	5 46.9	84 54	93.4	6 12.1	84 54	93.1	4
85																			5 14.3	84 54	92.6	5 39.4	84 54	92.3	85
6																						5 06.8	84 54	91.4	6

Digitized by Google

Lat. 57°

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	33 00.0 1.0 01	180.0	32 30.0 1.0 01	180.0	32 00.0 1.0 01	180.0	31 30.0 1.0 01	180.0	31 00.0 1.0 01	180.0	30 30.0 1.0 01	180.0	30 00.0 1.0 01	180.0	29 30.0 1.0 01	180.0	00
1	32 59.7 1.0 02	178.8	32 29.7 1.0 02	178.8	31 59.7 1.0 02	178.8	31 29.7 1.0 02	178.8	30 59.7 1.0 02	178.8	30 29.7 1.0 02	178.8	29 59.7 1.0 02	178.8	29 29.7 1.0 02	178.9	1
2	32 58.6 1.0 03	177.6	32 28.6 1.0 03	177.6	31 58.7 1.0 03	177.6	31 28.7 1.0 03	177.7	30 58.7 1.0 03	177.7	30 28.7 1.0 03	177.7	29 58.7 1.0 03	177.7	29 28.7 1.0 03	177.7	2
3	32 56.9 1.0 04	176.4	32 27.0 1.0 04	176.4	31 57.0 1.0 04	176.5	31 27.0 1.0 04	176.5	30 57.0 1.0 04	176.5	30 27.0 1.0 04	176.5	29 57.0 1.0 04	176.5	29 27.1 1.0 04	176.6	3
4	32 54.6 1.0 05	175.2	32 24.6 1.0 05	175.3	31 54.6 1.0 05	175.3	31 24.7 1.0 05	175.3	30 54.7 1.0 05	175.3	30 24.7 1.0 05	175.4	29 54.7 1.0 05	175.4	29 24.8 1.0 05	175.4	4
05	32 51.5 1.0 06	174.0	32 21.6 1.0 06	174.1	31 51.6 1.0 06	174.1	31 21.7 1.0 06	174.1	30 51.7 1.0 06	174.2	30 21.7 1.0 06	174.2	29 51.8 1.0 06	174.2	29 21.8 1.0 06	174.3	05
6	32 47.8 1.0 07	172.9	32 17.9 1.0 07	172.9	31 47.9 1.0 07	172.9	31 18.0 1.0 07	173.0	30 48.1 1.0 07	173.0	30 18.1 1.0 07	173.1	29 48.2 1.0 07	173.1	29 18.2 1.0 07	173.1	6
7	32 43.4 1.0 08	171.7	32 13.5 1.0 08	171.7	31 43.6 1.0 08	171.8	31 13.7 1.0 08	171.8	30 43.8 1.0 08	171.9	30 13.8 1.0 08	171.9	29 43.9 1.0 08	171.9	29 14.0 1.0 08	172.0	7
8	32 38.3 1.0 10	170.5	32 08.4 1.0 10	170.5	31 38.6 1.0 09	170.6	31 08.7 1.0 09	170.6	30 38.8 1.0 09	170.7	30 08.9 1.0 09	170.7	29 39.0 1.0 09	170.8	29 09.1 1.0 09	170.8	8
9	32 32.6 99 11	169.3	32 02.7 99 11	169.4	31 32.9 99 11	169.4	31 03.0 1.0 10	169.5	30 33.2 1.0 10	169.5	30 03.3 1.0 10	169.6	29 33.5 1.0 10	169.7	29 03.6 1.0 10	169.7	9
10	32 26.2 99 12	168.1	31 56.4 99 12	168.2	31 26.6 99 12	168.3	30 56.7 99 12	168.3	30 26.9 99 12	168.4	29 57.1 99 11	168.4	29 27.3 99 11	168.5	28 57.5 99 11	168.6	10
1	32 19.1 99 13	167.0	31 49.4 99 13	167.0	31 19.6 99 13	167.1	30 49.8 99 13	167.2	30 20.0 99 13	167.2	29 50.2 99 12	167.3	29 20.5 99 12	167.4	28 50.7 99 12	167.4	1
2	32 11.4 99 14	165.8	31 41.7 99 14	165.9	31 12.0 99 14	165.9	30 42.2 99 14	166.0	30 12.5 99 14	166.1	29 42.7 99 14	166.2	29 13.0 99 13	166.2	28 43.3 99 13	166.3	2
3	32 03.1 99 15	164.6	31 33.4 99 15	164.7	31 03.7 99 15	164.8	30 34.0 99 15	164.9	30 04.3 99 15	164.9	29 34.6 99 15	165.0	29 04.9 99 15	165.1	28 35.2 99 14	165.2	3
4	31 54.1 99 16	163.4	31 24.5 99 16	163.5	30 54.8 99 16	163.6	30 25.2 99 16	163.7	29 55.5 99 16	163.8	29 25.9 99 16	163.9	28 56.2 99 16	164.0	28 26.5 99 15	164.1	4
15	31 44.5 99 17	162.3	31 14.9 99 17	162.4	30 45.3 99 17	162.5	30 15.7 99 17	162.6	29 46.1 99 17	162.7	29 16.5 99 17	162.8	28 46.9 99 17	162.8	28 17.3 99 16	162.9	15
6	31 34.2 98 18	161.1	31 04.7 98 18	161.2	30 35.1 98 18	161.3	30 05.6 98 18	161.4	29 36.0 98 18	161.5	29 06.5 99 18	161.6	28 36.9 99 18	161.7	28 07.4 99 17	161.8	6
7	31 23.3 98 19	160.0	30 53.8 98 19	160.1	30 24.4 98 19	160.2	29 54.9 98 19	160.3	29 25.4 98 19	160.4	28 55.9 98 19	160.5	28 26.4 98 19	160.6	27 56.9 98 18	160.7	7
8	31 11.8 98 20	158.8	30 42.4 98 20	158.9	30 13.0 98 20	159.1	29 43.6 98 20	159.2	29 14.1 98 20	159.3	28 44.7 98 20	159.4	28 15.2 98 20	159.5	27 45.8 98 19	159.6	8
9	30 59.7 98 21	157.7	30 30.4 98 21	157.8	30 01.0 98 21	157.9	29 31.6 98 21	158.0	29 02.3 98 21	158.2	28 32.9 98 21	158.3	28 03.5 98 21	158.4	27 34.1 98 20	158.5	9
20	30 47.0 98 22	156.5	30 17.7 98 22	156.7	29 48.4 98 22	156.8	29 19.1 98 22	156.9	28 49.8 98 22	157.0	28 20.5 98 22	157.2	27 51.2 98 22	157.3	27 21.8 98 21	157.4	20
1	30 33.7 97 23	155.4	30 04.5 97 23	155.5	29 35.2 97 23	155.7	29 06.0 97 23	155.8	28 36.8 97 23	155.9	28 07.5 98 23	156.0	27 38.2 98 22	156.2	27 09.0 98 22	156.3	1
2	30 19.8 97 24	154.3	29 50.6 97 24	154.4	29 21.5 97 24	154.5	28 52.3 97 24	154.7	28 23.1 97 24	154.8	27 54.0 97 24	154.9	27 24.8 97 23	155.1	26 55.6 97 23	155.2	2
3	30 05.3 97 25	153.2	29 36.2 97 25	153.3	29 07.2 97 25	153.4	28 38.1 97 25	153.6	28 08.9 97 25	153.7	27 39.8 97 24	153.8	27 10.7 97 24	154.0	26 41.6 97 24	154.1	3
4	29 50.3 97 26	152.0	29 21.3 97 26	152.2	28 52.3 97 26	152.3	28 23.2 97 26	152.5	27 54.2 97 26	152.6	27 25.2 97 25	152.8	26 56.1 97 25	152.9	26 27.0 97 25	153.0	4
25	29 34.7 96 27	150.9	29 05.8 96 27	151.1	28 36.8 97 27	151.2	28 07.9 97 27	151.4	27 38.9 97 26	151.5	27 09.9 97 26	151.7	26 40.9 97 26	151.8	26 11.9 97 26	152.0	25
6	29 18.5 96 28	149.8	28 49.7 96 28	150.0	28 20.8 96 28	150.1	27 51.9 96 27	150.3	27 23.0 96 27	150.4	26 54.1 96 27	150.6	26 25.2 96 27	150.7	25 56.3 96 27	150.9	6
7	29 01.8 96 29	148.7	28 33.1 96 29	148.9	28 04.3 96 28	149.0	27 35.5 96 28	149.2	27 06.6 96 28	149.4	26 37.8 96 28	149.5	26 09.0 96 28	149.7	25 40.1 96 28	149.8	7
8	28 44.6 96 30	147.6	28 15.9 96 29	147.8	27 47.2 96 29	148.0	27 18.5 96 29	148.1	26 49.7 96 29	148.3	26 21.0 96 29	148.4	25 52.2 96 29	148.6	25 23.5 96 29	148.8	8
9	28 26.8 95 30	146.5	27 58.2 95 30	146.7	27 29.6 95 30	146.9	27 00.9 96 30	147.0	26 32.3 96 30	147.2	26 03.6 96 30	147.4	25 34.9 96 30	147.5	25 06.2 96 30	147.7	9
30	28 08.6 95 31	145.5	27 40.0 95 31	145.6	27 11.5 95 31	145.8	26 42.9 95 31	146.0	26 14.3 95 31	146.1	25 45.7 95 31	146.3	25 17.1 95 30	146.5	24 48.5 95 30	146.6	30
1	27 49.8 95 32	144.4	27 21.3 95 32	144.6	26 52.9 95 32	144.7	26 24.4 95 32	144.9	25 55.9 95 32	145.1	25 27.4 95 31	145.3	24 58.8 96 31	145.4	24 30.3 95 31	145.6	1
2	27 30.5 95 33	143.3	27 02.1 95 33	143.5	26 33.7 95 33	143.7	26 05.3 95 33	143.9	25 36.9 95 32	144.0	25 08.5 95 32	144.2	24 40.1 95 32	144.4	24 11.6 95 32	144.6	2
3	27 10.7 94 34	142.2	26 42.5 94 34	142.4	26 14.1 94 33	142.6	25 45.8 94 33	142.8	25 17.5 94 33	143.0	24 49.2 95 33	143.2	24 20.8 95 33	143.3	23 52.4 95 33	143.5	3
4	26 50.5 94 35	141.2	26 22.3 94 34	141.4	25 54.1 94 34	141.6	25 25.8 94 34	141.8	24 57.6 94 34	141.9	24 29.3 94 34	142.1	24 01.0 94 34	142.3	23 32.8 94 34	142.5	4
35	26 29.8 94 35	140.1	26 01.7 94 35	140.3	25 33.5 94 35	140.5	25 05.4 94 35	140.7	24 37.2 94 35	140.9	24 09.0 94 35	141.1	23 40.8 94 34	141.3	23 12.6 94 34	141.5	35
6	26 08.6 93 36	139.1	25 40.6 93 36	139.3	25 12.5 94 36	139.5	24 44.5 94 36	139.7	24 16.4 94 35	139.9	23 48.3 94 35	140.1	23 20.2 94 35	140.3	22 52.0 94 35	140.5	6
7	25 47.0 93 37	138.1	25 19.0 93 37	138.3	24 51.1 93 36	138.5	24 23.1 93 36	138.7	23 55.1 93 36	138.9	23 27.1 93 36	139.1	22 59.1 93 36	139.2	22 31.0 93 36	139.4	7
8	25 24.9 93 37	137.0	24 57.1 93 37	137.2	24 29.2 93 37	137.4	24 01.3 93 37	137.6	23 33.4 93 37	137.8	23 05.5 93 37	138.0	22 37.5 93 37	138.2	22 09.6 93 36	138.4	8
9	25 02.4 93 38	136.0	24 34.7 93 38	136.2	24 06.9 93 38	136.4	23 39.1 93 38	136.6	23 11.2 93 38	136.8	22 43.4 93 37	137.0	22 15.5 93 37	137.2	21 47.7 93 37	137.4	9
40	24 39.5 92 39	135.0	24 11.8 92 39	135.2	23 44.1 92 39	135.4	23 16.4 92 38	135.6	22 48.7 93 38	135.8	22 20.9 93 38	136.0	21 53.1 93 38	136.2	21 25.3 93 38	136.4	40
1	24 16.2 92 40	134.0	23 48.6 92 39	134.2	23 21.0 92 39	134.4	22 53.4 92 39	134.6	22 25.7 92 39	134.8	21 58.0 92 39	135.0	21 30.3 92 39	135.2	21 02.6 92 39	135.4	1
2	23 52.5 92 40	133.0	23 25.0 92 40	133.2	22 57.4 92 40	133.4	22 29.9 92 40	133.6	22 02.3 92 40	133.8	21 34.7 92 39	134.0	21 07.1 92 39	134.2	20 39.5 92 39	134.5	2
3	23 28.4 91 41	132.0	23 01.0 91 41	132.2	22 33.5 92 41	132.4	22 06.0 92 40	132.6	21 38.5 92 40	132.8	21 11.0 92 40	133.1	20 43.5 92 40	133.3	20 16.0 92 40	133.5	3
4	23 03.9 91 41	131.0	22 36.6 91 41	131.2	22 09.2 91 41	131.4	21 41.8 91 41	131.6	21 14.4 91 41	131.9	20 47.0 91 41	132.1	20 19.5 91 41	132.3	19 52.1 92 40	132.5	4
45	22 39.1 91 42	130.0	22 11.8 91 42	130.2	21 44.5 91 42	130.4	21 17.2 91 42	130.7	20 49.9 91 41	130.9	20 22.5 91 41	131.1	19 55.2 91 41	131.3	19 27.8 91 41	131.5	45
6	22 13.8 91 43	129.0	21 46.7 91 42	129.2	21 19.4 91 42	129.5	20 52.2 91 42	129.7	20 25.0 91 42	129.9	19 57.7 91 42	130.1	19 30.4 91 42	130.4	19 03.1 91 42	130.6	6
7	21 48.3 90 43	128.0	21 21.2 90 43	128.3	20 54.0 90 43	128.5	20 26.9 91 43	128.7	19 59.7 91 43	128.9	19 32.6 91 42	129.2	19 05.4 91 42	129.4	18 38.1 91 42	129.6	7
8	21 22.4 90 44	127.1	20 55.3 90 44	127.3	20 28.3 90 43	127.5	20 01.2 90 43	127.8	19 34.1 90 43	128.0	19 07.0 90 43	128.2	18 39.9 90 43	128.4	18 12.8 90 43	128.7	8
9	20 56.1 90 44	126.1	20 29.2 90 44	126.3	20 02.2 90 44	126.6	19 35.2 90 44	126.8	19 08.2 90 44	127.0	18 41.2 90 44	127.3	18 14.2 90 44	127.5	17 47.1 90 43	127.7	9
50	20 29.6 90 45	125.1	20 02.7 90 45	125.4	19 35.8 90 45	125.6	19 08.9 90 44	125.8	18 42.0 90 44	126.1	18 15.0 90 44	126.3	17 48.1 90 44	126.5	17 21.1 90 44	126.8	50
1	20 02.7 89 45	124.2	19 35.9 89 45	124.4	19 09.1 89 45	124.7	18 42.2 89 45	124.9	18 15.4 90 45	125.1	17 48.5 90 45	125.4	17 21.7 90 45	125.6	16 54.8 90 44	125.8	1
2	19 35.5 89 46	123.2	19 08.8 89 46	123.5	18 42.0 89 46	123.7	18 15.3 89 45	124.0	17 48.5 89 45	124.2	17 21.7 89 45	124.4	16 54.9 89 45	124.7	16 28.1 89 45	124.9	2
3	19 08.0 89 46	122.3	18 41.4 89 46	122.5	18 14.7 89 46	122.8	17 48.0 89 46	123.0	17 21.3 89 46	123.3	16 54.6 89 46	123.5	16 27.9 89 46	123.7	16 01.2 89 45	124.0	3
4	18 40.3 89 47	121.4	18 13.7 89 47	121.6	17 47.1 89 46	121.8	17 20.5 89 46	122.1	16 53.9 89 46	122.3	16 27.2 89 46	122.6	16 00.6 89 46	122.8	15 33.9 89 46	123.0	4
55	18 12.2 88 47	120.4	17 45.7 88 47	120.7	17 19.2 88 47	120.9	16 52.7 88 47	121.2	16 26.1 89 47	121.4	15 59.6 89 47	121.6	15 33.0 89 46	121.9	15 06.4 89 46	122.1	55
6	17 43.9 88 48	119.5	17 17.5 88 48	119.7	16 51.0 88 47	120.0	16 24.6 88 47	120.2	15 58.1 88 47	120.5	15 31.6 88 47	120.7	15 05.1 88 47	121.0	14 38.6 88 47	121.2	6
7	17 15.3 88 48	118.6	16 49.0 88 48	118.8	16 22.6 88 48	119.1	15 56.2 88 48	119.3	15 29.8 88 48	119.6	15 03.4 88 47	119.8	14 36.9 88 47	120.1	14 10.5 88 47	120.3	7
8	16 46.5 88 48	117.7	16 20.2 88 48	117.9	15 53.9 88 48	118.2	15 27.6 88 48	118.4	15 01.2 88 48	118.7	14 34.9 88 48	118.9	14 08.5 88 48	119.2	13 42.1 88 48	119.4	8
9	16 17.4 87 49	116.7	15 51.2 87 49	117.0	15 25.0 87 49	117.2	14 58.7 88 48	117.5	14 32.4 88 48	117.7	14 06.2 88 48	118.0	13 39.9 88 48	118.2	13 13.5 88 48	118.5	9
60	15 48.1 87 49	115.8	15 22.0 87 49	116.1	14 55.8 87 49	116.3	14 29.6 87 49	116.6	14 03.4 87 49	116.8	13 37.2 87 49	117.1	13 11.0 87 49	117.3	12 44.7 88 48	117.6	60
1	15 18.6 87 50	114.9	14 52.5 87 49	115.2	14 26.4 87 49	115.4	14 00.3 87 49	115.7	13 34.1 87 49	115.9	13 08.0 87 49	116.2	12 41.8 87 49	116.5	12 15.6 87 49	116.7	1
2	14 48.9 87 50	114.0	14 22.8 87 50	114.3	13 56.8 87 50	114.5	13 30.7 87 50	114.8	13 04.6 87 50	115.1	12 38.5 87 49	115.3	12 12.4 87 49	115.6	11 46.3 87 49	115.8	2
3	14 18.9 87 50	113.1	13 53.0 87 50	113.4	13 27.0 87 50	113.7	13 01.0 87 50	113.9	12 34.9 87 50	114.2	12 08.9 87 50	114.4	11 42.9 87 50	114.7	11 16.8 87 50	114.9	3
4	13 48.8 86 51	112.2	13 22.9 86 50	112.5	12 56.9 86 50	112.8	12 31.0 87 50	113.0	12 05.0 87 50	113.3	11 39.0 87 50	113.5	11 13.1 87 50	113.8	10 47.0 87 50	114.0	4
65	13 18.4 86 51	111.4	12 52.6 86 51	111.6	12 26.7 86 51	111.9	12 00.8 86 51	112.1	11 34.9 86 50	112.4	11 09.0 86 50	112.7	10 43.0 86 50	112.9	10 17.1 87 50	113.2	65
6	12 47.9 86 51	110.5	12 22.1 86 51	110.7	11 56.3 86 51	111.0	11 30.4 86 51	111.3	11 04.6 86 51	111.5	10 38.7 86 51	111.8	10 12.9 86 51	112.0	9 47.0 86 51	112.3	6
7	12 17.2 86 51	109.6	11 51.5 86 51	109.9	11 25.7 86 51	110.1	10 59.9 86 51	110.4	10 34.1 86 51	110.6	10 08.3 86 51	110.9	9 42.5 86 51	111.2	9 16.6 86 51	111.4	7
8	11 46.3 86 52	108.7	11 20.6 86 52	109.0	10 54.9 86 52	109.2	10 29.2 86 51	109.5	10 03.4 86 51	109.8	9 37.7 86 51	110.0	9 11.9 86 51	110.3	8 46.1 86 51	110.5	8
9	11 15.3 86 52	107.8	10 49.7 86 52	108.1	10 24.0 86 52	108.4	9 58.3 86 52	108.6	9 32.6 86 52	108.9	9 06.9 86 52	109.2	8 41.2 86 52	109.4	8 15.4 86 51	109.7	9
70	10 44.1 85 52	107.0	10 18.5 85 52	107.2	9 52.9 85 52	107.5	9 27.3 85 52	107.8	9 01.6 86 52	108.0	8 35.9 86 52	108.3	8 10.3 86 52	108.6	7 44.6 86 52	108.8	70
1	10 12.8 85 52	106.1	9 47.2 85 52	106.4	9 21.7 85 52	106.6	8 56.1 85 52	106.9	8 30.5 85 52	107.2	8 04.8 85 52	107.4	7 39.2 85 52	107.7	7 13.6 85 52	108.0	1
2	9 41.3 85 53	105.2	9 15.8 85 53	105.5	8 50.3 85 53	105.8	8 24.7 85 52	106.0	7 59.2 85 52	106.3	7 33.6 85 52	106.6	7 08.0 85 52	106.8	6 42.4 85 52	107.1	2
3	9 09.8 85 53	104.4	8 44.3 85 53	104.6	8 18.8 85 53	104.9	7 53.3 85 53	105.2	7 27.7 85 53	105.4	7 02.2 85 53	105.7	6 36.7 85 52	106.0	6 11.1 85 52	106.2	3
4	8 38.0 85 53	103.5	8 12.6 85 53	103.8	7 47.1 85 53	104.1	7 21.6 85 53	104.3	6 56.2 85 53	104.6	6 30.7 85 53	104.9	6 05.2 85 53	105.1	5 39.7 85 53	105.4	4
75	8 06.2 85 53	102.7	7 40.8 85 53	102.9	7 15.4 85 53	103.2	6 49.9 85 53	103.5	6 24.5 85 53	103.7	5 59.0 85 53	104.0	5 33.6 85 53	104.3	5 08.1 85 53	104.5	75
6	7 34.3 85 53	101.8	7 08.9 85 53	102.1	6 43.5 85 53	102.3	6 18.1 85 53	102.6	5 52.7 85 53	102.9	5 27.3 85 53	103.1	5 01.8 85 53	103.4			6
7	7 02.2 85 54	101.0	6 36.9 85 54	101.2	6 11.5 85 53	101.5	5 46.2 85 53	101.8	5 20.8 85 53	102.0							7
8	6 30.1 84 54	100.1	6 04.8 84 54	100.4	5 39.5 84 54	100.6	5 14.1 84 54	100.9									8
9	5 57.9 84 54	99.3	5 32.6 84 54	99.5	5 07.3 84 54	99.8											9
80	5 25.6 84 54	98.4	5 00.3 84 54	98.7													80

Lat. 57°

Lat. 58°

Lat. 59°

Digitized by Google

Lat. 57°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	37 00.0	1.0	01	180.0	37 30.0	1.0	01	180.0	38 00.0	1.0	01	180.0	38 30.0	1.0	01	180.0	39 00.0	1.0	01	180.0	39 30.0	1.0	01	180.0	40 00.0	1.0	01	180.0	00
1	36 59.6	1.0	02	178.8	37 29.6	1.0	02	178.7	37 59.6	1.0	02	178.7	38 29.6	1.0	02	178.7	38 59.6	1.0	02	178.7	39 29.6	1.0	02	178.7	39 59.6	1.0	02	178.7	1
2	36 58.6	1.0	03	177.5	37 28.6	1.0	03	177.5	37 58.6	1.0	03	177.5	38 28.5	1.0	03	177.5	38 58.5	1.0	03	177.4	39 28.5	1.0	03	177.4	39 58.5	1.0	03	177.4	2
3	36 56.8	1.0	04	176.3	37 26.8	1.0	04	176.2	37 56.8	1.0	04	176.2	38 26.7	1.0	04	176.2	38 56.7	1.0	04	176.2	39 26.7	1.0	04	176.1	39 56.7	1.0	04	176.1	3
4	36 54.3	1.0	05	175.0	37 24.3	1.0	05	175.0	37 54.2	1.0	05	174.9	38 24.2	1.0	05	174.9	38 54.2	1.0	05	174.9	39 24.1	1.0	06	174.9	39 54.1	1.0	06	174.8	4
05	36 51.1	1.0	07	173.8	37 21.1	1.0	07	173.7	37 51.0	1.0	07	173.7	38 20.9	1.0	07	173.6	38 50.9	1.0	07	173.6	39 20.8	1.0	07	173.6	39 50.8	1.0	07	173.5	05
6	36 47.2	1.0	08	172.5	37 17.1	1.0	08	172.5	37 47.1	1.0	08	172.4	38 17.0	1.0	08	172.4	38 46.9	1.0	08	172.3	39 16.8	1.0	08	172.3	39 46.7	1.0	08	172.2	6
7	36 42.6	1.0	09	171.3	37 12.5	1.0	09	171.2	37 42.4	1.0	09	171.2	38 12.3	1.0	09	171.1	38 42.2	1.0	09	171.1	39 12.1	1.0	09	171.0	39 42.0	1.0	09	171.0	7
8	36 37.3	1.0	10	170.0	37 07.2	1.0	10	170.0	37 37.0	1.0	10	169.9	38 06.9	1.0	10	169.9	38 36.7	1.0	10	169.8	39 06.6	1.0	10	169.7	39 36.5	1.0	10	169.7	8
9	36 31.3	99	11	168.8	37 01.1	99	11	168.7	37 31.0	99	11	168.7	38 00.8	99	11	168.6	38 30.6	99	11	168.5	39 00.4	99	11	168.5	39 30.2	99	12	168.4	9
10	36 24.6	99	12	167.6	36 54.4	99	12	167.5	37 24.2	99	12	167.4	37 54.0	99	12	167.3	38 23.8	99	13	167.3	38 53.5	99	13	167.2	39 23.3	99	13	167.1	10
1	36 17.2	99	13	166.3	36 47.0	99	14	166.3	37 16.7	99	14	166.2	37 46.5	99	14	166.1	38 16.2	99	14	166.0	38 45.9	99	14	165.9	39 15.7	99	14	165.8	1
2	36 09.2	99	15	165.1	36 38.9	99	15	165.0	37 08.6	99	15	164.9	37 38.3	99	15	164.9	38 08.0	99	15	164.8	38 37.6	99	15	164.7	39 07.3	99	15	164.6	2
3	36 00.4	99	16	163.9	36 30.1	99	16	163.8	36 59.7	99	16	163.7	37 29.4	99	16	163.6	37 59.0	99	16	163.5	38 28.7	99	16	163.4	38 58.3	99	16	163.3	3
4	35 51.0	99	17	162.7	36 20.6	99	17	162.6	36 50.2	99	17	162.5	37 19.8	99	17	162.4	37 49.4	99	17	162.3	38 19.0	99	17	162.2	38 48.6	99	17	162.1	4
15	35 41.0	98	18	161.5	36 10.5	98	18	161.4	36 40.1	98	18	161.2	37 09.6	98	18	161.1	37 39.1	98	18	161.0	38 08.6	98	18	160.9	38 38.1	98	18	160.8	15
6	35 30.3	98	19	160.3	35 59.8	98	19	160.1	36 29.2	98	19	160.0	36 58.7	98	19	159.9	37 28.2	98	19	159.8	37 57.6	98	19	159.7	38 27.1	98	20	159.6	6
7	35 18.9	98	20	159.1	35 48.3	98	20	158.9	36 17.7	98	20	158.8	36 47.2	98	20	158.7	37 16.5	98	20	158.6	37 45.9	98	21	158.4	38 15.3	98	21	158.3	7
8	35 06.9	98	21	157.9	35 36.3	98	21	157.7	36 05.6	98	21	157.6	36 35.0	98	21	157.5	37 04.3	98	22	157.3	37 33.6	98	22	157.2	38 02.9	98	22	157.1	8
9	34 54.3	98	22	156.7	35 23.6	98	22	156.5	35 52.9	98	22	156.4	36 22.1	98	22	156.3	36 51.4	98	23	156.1	37 20.6	97	23	156.0	37 49.9	97	23	155.8	9
20	34 41.0	97	23	155.5	35 10.3	97	23	155.3	35 39.5	97	23	155.2	36 08.7	97	23	155.1	36 37.8	97	24	154.9	37 07.0	97	24	154.8	37 36.2	97	24	154.6	20
1	34 27.2	97	24	154.3	34 56.3	97	24	154.2	35 25.4	97	24	154.0	35 54.6	97	24	153.9	36 23.7	97	25	153.7	36 52.8	97	25	153.6	37 21.9	97	25	153.4	1
2	34 12.7	97	25	153.1	34 41.8	97	25	153.0	35 10.8	97	25	152.8	35 39.9	97	25	152.7	36 08.9	97	26	152.5	36 37.9	97	26	152.4	37 06.9	97	26	152.2	2
3	33 57.6	97	26	152.0	34 26.6	97	26	151.8	34 55.6	97	26	151.7	35 24.6	97	26	151.5	35 53.5	96	27	151.3	36 22.5	96	27	151.2	36 51.4	96	27	151.0	3
4	33 42.0	96	27	150.8	34 10.9	96	27	150.6	34 39.8	96	27	150.5	35 08.7	96	27	150.3	35 37.6	96	28	150.2	36 06.4	96	28	150.0	36 35.3	96	28	149.8	4
25	33 25.8	96	28	149.7	33 54.6	96	28	149.5	34 23.4	96	28	149.3	34 52.2	96	28	149.2	35 21.0	96	29	149.0	35 49.8	96	29	148.8	36 18.5	96	29	148.6	25
6	33 09.0	96	29	148.5	33 37.7	96	29	148.3	34 06.5	96	29	148.2	34 35.2	96	29	148.0	35 03.9	96	29	147.8	35 32.6	96	30	147.6	36 01.2	96	30	147.5	6
7	32 51.6	96	30	147.4	33 20.3	96	30	147.2	33 49.0	95	30	147.0	34 17.6	95	30	146.8	34 46.2	95	30	146.7	35 14.8	95	31	146.5	35 43.4	95	31	146.3	7
8	32 33.7	95	31	146.2	33 02.3	95	31	146.1	33 30.9	95	31	145.9	33 59.4	95	31	145.7	34 28.0	95	31	145.5	34 56.5	95	31	145.3	35 25.0	95	32	145.1	8
9	32 15.3	95	32	145.1	32 43.8	95	32	144.9	33 12.3	95	32	144.7	33 40.8	95	32	144.6	34 09.2	95	32	144.4	34 37.6	95	32	144.2	35 06.0	95	32	144.0	9
30	31 56.4	95	32	144.0	32 24.8	95	33	143.8	32 53.2	95	33	143.6	33 21.5	95	33	143.4	33 49.9	94	33	143.2	34 18.2	94	33	143.0	34 46.5	94	33	142.8	30
1	31 36.9	94	33	142.9	32 05.2	94	33	142.7	32 33.5	94	34	142.5	33 01.8	94	34	142.3	33 30.1	94	34	142.1	33 58.3	94	34	141.9	34 26.5	94	34	141.7	1
2	31 16.9	94	34	141.8	31 45.2	94	34	141.6	32 13.4	94	34	141.4	32 41.6	94	35	141.2	33 09.7	94	35	141.0	33 37.9	94	35	140.8	34 06.0	94	35	140.6	2
3	30 56.5	94	35	140.7	31 24.6	94	35	140.5	31 52.7	94	35	140.3	32 20.9	94	35	140.1	32 48.9	94	36	139.9	33 17.0	93	36	139.7	33 45.0	93	36	139.4	3
4	30 35.6	94	36	139.6	31 03.6	93	36	139.4	31 31.6	93	36	139.2	31 59.6	93	36	139.0	32 27.6	93	36	138.8	32 55.6	93	36	138.6	33 23.5	93	37	138.3	4
35	30 14.1	93	36	138.5	30 42.1	93	37	138.3	31 10.0	93	37	138.1	31 38.0	93	37	137.9	32 05.9	93	37	137.7	32 33.7	93	37	137.5	33 01.6	93	37	137.2	35
6	29 52.3	93	37	137.5	30 20.1	93	37	137.2	30 48.0	93	37	137.0	31 15.8	93	38	136.8	31 43.6	93	38	136.6	32 11.4	93	38	136.4	32 39.2	92	38	136.1	6
7	29 30.0	93	38	136.4	29 57.7	93	38	136.2	30 25.5	92	38	136.0	30 53.2	92	38	135.7	31 20.9	92	39	135.5	31 48.6	92	39	135.3	32 16.3	92	39	135.1	7
8	29 07.2	92	39	135.3	29 34.9	92	39	135.1	30 02.6	92	39	134.9	30 30.2	92	39	134.7	30 57.8	92	39	134.4	31 25.4	92	39	134.2	31 53.0	92	40	134.0	8
9	28 44.0	92	39	134.3	29 11.6	92	40	134.1	29 39.2	92	40	133.8	30 06.7	92	40	133.6	30 34.3	92	40	133.4	31 01.8	92	40	133.1	31 29.3	92	40	132.9	9
40	28 20.4	92	40	133.2	28 47.9	92	40	133.0	29 15.4	92	40	132.8	29 42.9	92	40	132.5	30 10.3	91	41	132.3	30 37.7	91	41	132.1	31 05.1	91	41	131.8	40
1	27 56.4	91	41	132.2	28 23.8	91	41	132.0	28 51.2	91	41	131.7	29 18.6	91	41	131.5	29 46.0	91	41	131.3	30 13.3	91	41	131.0	30 40.6	91	42	130.8	1
2	27 32.0	91	41	131.2	27 59.3	91	41	130.9	28 26.6	91	42	130.7	28 53.9	91	42	130.5	29 21.2	91	42	130.2	29 48.4	91	42	130.0	30 15.6	91	42	129.7	2
3	27 07.2	91	42	130.1	27 34.5	91	42	129.9	28 01.7	91	42	129.7	28 28.9	91	42	129.4	28 56.1	91	43	129.2	29 23.2	90	43	129.0	29 50.3	90	43	128.7	3
4	26 42.0	91	43	129.1	27 09.2	91	43	128.9	27 36.3	90	43	128.7	28 03.5	90	43	128.4	28 30.6	90	43	128.2	28 57.6	90	43	127.9	29 24.6	90	43	127.7	4
45	26 16.5	90	43	128.1	26 43.6	90	43	127.9	27 10.6	90	43	127.6	27 37.7	90	44	127.4	28 04.7	90	44	127.2	28 31.7	90	44	126.9	28 58.6	90	44	126.7	45
6	25 50.6	90	44	127.1	26 17.6	90	44	126.9	26 44.6	90	44	126.6	27 11.5	90	44	126.4	27 38.5	90	44	126.1	28 05.4	90	44	125.9	28 32.2	90	45	125.6	6
7	25 24.4	90	44	126.1	25 51.3	90	44	125.9	26 18.2	90	45	125.6	26 45.1	90	45	125.4	27 11.9	89	45	125.1	27 38.7	89	45	124.9	28 05.5	89	45	124.6	7
8	24 57.8	89	45	125.1	25 24.7	89	45	124.9	25 51.5	89	45	124.6	26 18.3	89	45	124.4	26 45.0	89	45	124.1	27 11.7	89	45	123.9	27 38.4	89	46	123.6	8
9	24 31.0	89	45	124.2	24 57.7	89	45	123.9	25 24.4	89	46	123.7	25 51.1	89	46	123.4	26 17.8	89	46	123.2	26 44.5	89	46	122.9	27 11.1	89	46	122.6	9
50	24 03.8	89	46	123.2	24 30.4	89	46	122.9	24 57.1	89	46	122.7	25 23.7	89	46	122.4	25 50.3	89	46	122.2	26 16.9	89	46	121.9	26 43.4	88	47	121.7	50
1	23 36.3	89	46	122.2	24 02.9	89	46	122.0	24 29.4	89	47	121.7	24 56.0	88	47	121.5	25 22.5	88	47	121.2	25 49.0	88	47	120.9	26 15.4	88	47	120.7	1
2	23 08.5	88	47	121.3	23 35.0	88	47	121.0	24 01.5	88	47	120.7	24 28.0	88	47	120.5	24 54.4	88	47	120.2	25 20.8	88	47	120.0	25 47.2	88	48	119.7	2
3	22 40.4	88	47	120.3	23 06.8	88	47	120.0	23 33.3	88	48	119.8	23 59.7	88	48	119.5	24 26.0	88	48	119.3	24 52.4	88	48	119.0	25 18.7	88	48	118.7	3
4	22 12.0	88	48	119.3	22 38.4	88	48	119.1	23 04.8	88	48	118.8	23 31.1	88	48	118.6	23 57.4	88	48	118.3	24 23.7	88	48	118.0	24 49.9	87	48	117.8	4
55	21 43.4	88	48	118.4	22 09.7	88	48	118.1	22 36.0	88	48	117.9	23 02.3	87	48	117.6	23 28.5	87	49	117.4	23 54.7	87	49	117.1	24 20.9	87	49	116.8	55
6	21 14.6	87	49	117.5	21 40.8	87	49	117.2	22 07.0	87	49	116.9	22 33.2	87	49	116.7	22 59.3	87	49	116.4	23 25.5	87	49	116.1	23 51.6	87	49	115.9	6
7	20 45.4	87	49	116.5	21 11.6	87	49	116.3	21 37.8	87	49	116.0	22 03.9	87	49	115.7	22 30.0	87	49	115.5	22 56.0	87	49	115.2	23 22.1	87	50	114.9	7
8	20 16.1	87	49	115.6	20 42.2	87	49	115.3	21 08.3	87	50	115.1	21 34.3	87	50	114.8	22 00.3	87	50	114.5	22 26.3	87	50	114.3	22 52.3	87	50	114.0	8
9	19 46.5	87	50	114.7	20 12.5	87	50	114.4	20 38.6	87	50	114.1	21 04.5	87	50	113.9	21 30.5	86	50	113.6	21 56.4	86	50	113.3	22 22.4	86	50	113.1	9
60	19 16.7	87	50	113.8	19 42.7	87	50	113.5	20 08.6	86	50	113.2	20 34.6	86	50	113.0	21 00.5	86	50	112.7	21 26.3	86	50	112.4	21 52.2	86	51	112.1	60
1	18 46.7	86	50	112.8	19 12.6	86	50	112.6	19 38.5	86	51	112.3	20 04.4	86	51	112.0	20 30.2	86	51	111.8	20 56.0	86	51	111.5	21 21.8	86	51	111.2	1
2	18 16.5	86	51	111.9	18 42.3	86	51	111.7	19 08.2	86	51	111.4	19 34.0	86	51	111.1	19 59.8	86	51	110.9	20 25.5	86	51	110.6	20 51.3	86	51	110.3	2
3	17 46.1	86	51	111.0	18 11.9	86	51	110.8	18 37.7	86	51	110.5	19 03.4	86	51	110.2	19 29.1	86	51	110.0	19 54.8	86	51	109.7	20 20.5	86	52	109.4	3
4	17 15.5	86	51	110.1	17 41.2	86	51	109.9	18 07.0	86	51	109.6	18 32.7	86	52	109.3	18 58.3	86	52	109.1	19 24.0	85	52	108.8	19 49.6	85	52	108.5	4
65	16 44.7	86	52	109.2	17 10.4	86	52	109.0	17 36.1	86	52	108.7	18 01.7	85	52	108.4	18 27.4	85	52	108.2	18 53.0	85	52	107.9	19 18.6	85	52	107.6	65
6	16 13.8	86	52	108.4	16 39.4	85	52	108.1	17 05.1	85	52	107.8	17 30.7	85	52	107.5	17 56.2	85	52	107.3	18 21.8	85	52	107.0	18 47.3	85	52	106.7	6
7	15 42.7	85	52	107.5	16 08.3	85	52	107.2	16 33.9	85	52	106.9	16 59.4	85	52	106.6	17 25.0	85	52	106.4	17 50.5	85	52	106.1	18 16.0	85	53	105.8	7
8	15 11.4	85	52	106.6	15 37.0	85	52	106.3	16 02.5	85	52	106.0	16 28.0	85	53	105.8	16 53.5	85	53	105.5	17 19.0	85	53	105.2	17 44.5	85	53	104.9	8
9	14 40.0	85	53	105.7	15 05.6	85	53	105.4	15 31.1	85	53	105.2	15 56.5	85	53	104.9	16 22.0	85	53	104.6	16 47.4	85	53	104.3	17 12.8	85	53	104.1	9
70	14 08.5	85	53	104.8	14 34.0	85	53	104.6	14 59.4	85	53	104.3	15 24.9	85	53	104.0	15 50.3	85	53	103.7	16 15.7	85	53	103.5	16 41.1	85	53	103.2	70
1	13 36.9	85	53	104.0	14 02.3	85	53	103.7	14 27.7	85	53	103.4	14 53.1	85	53	103.1	15 18.5	85	53	102.9	15 43.8	84	53	102.6	16 09.2	84	53	102.3	1
2	13 05.1	85	53	103.1	13 30.5	85	53	102.8	13 55.9	85	53	102.5	14 21.2	85	53	102.3	14 46.6	84	53	102.0	15 11.9	84	53	101.7	15 37.2	84	53	101.4	2
3	12 33.2	85	53	102.2	12 58.6	85	53	101.9	13 23.9	84	53	101.7	13 49.3	84	53	101.4	14 14.6	84	54	101.1	14 39.9	84	54	100.8	15 05.1	84	54	100.6	3
4	12 01.2	84	53	101.4	12 26.6	84	54	101.1	12 51.9	84	54	100.8	13 17.2	84	54	100.5	13 42.5	84	54	100.3	14 07.7	84	54	100.0	14 33.0	84	54	99.7	4
75	11 29.1	84	54	100.5	11 54.4	84	54	100.2	12 19.7	84	54	99.9	12 45.0	84	54	99.7	13 10.3	84	54	99.4	13 35.5	84	54	99.1	14 00.7	84	54	98.8	75
6	10 57.0	84	54	99.6	11 22.2	84	54	99.4	11 47.5	84	54	99.1	12 12.7	84	54	98.8	12 38.0	84	54	98.5	13 03.2	84	54	98.3	13 28.4	84	54	98.0	6
7	10 24.7	84	54	98.8	10 50.0	84	54	98.5	11 15.2	84	54	98.2	11 40.4	84	54	98.0	12 05.6	84	54	97.7	12 30.8	84	54	97.4	12 56.0	84	54	97.1	7
8	9 52.4	84	54	97.9	10 17.6	84	54	97.7	10 42.8	84	54	97.4	11 08.0	84	54	97.1	11 33.2	84	54	96.8	11 58.4	84	54	96.6	12 23.5	84	54	96.3	8
9	9 20.0	84	54	97.1	9 45.2	84	54	96.8	10 10.4	84	54	96.5	10 35.6	84	54	96.3	11 00.7	84	54	96.0	11 25.9	84	54	95.7	11 51.0	84	54	95.4	9
80	8 47.5	84	54	96.2	9 12.7	84	54	96.0	9 37.9	84	54	95.7	10 03.1	84	54	95.4	10 28.2	84	54	95.1	10 53.3	84	54	94.9	11 18.5	84	54	94.6	80
1	8 15.0	84	54	95.4	8 40.2	84	54	95.1	9 05.3	84	54	94.8	9 30.5	84	54	94.6	9 55.6	84	54	94.3	10 20.8	84	54	94.0	10 45.9	84	54	93.7	1
2	7 42.5	84	54	94.5	8 07.6	84	54	94.3	8 32.8	84	54	94.0	8 57.9	84	54	93.7	9 23.0	84	54	93.4	9 48.1	84	54	93.2	10 13.2	84	54	92.9	2
3	7 09.9	84	54	93.7	7 35.0	84	54	93.4	8 00.2	84	54	93.1	8 25.3	84	54	92.9	8 50.4	84	54	92.6	9 15.5	84	54	92.3	9 40.6	84	54	92.0	3
4	6 37.2	84	54	92.9	7 02.4	84	54	92.6	7 27.5	84	54	92.3	7 52.6	84	54	92.0	8 17.7	84	54	91.8	8 42.8	84	54	91.5	9 07.9	84	54	91.2	4
85	6 04.6	84	54	92.0	6 29.7	84	54	91.7	6 54.9	84	54	91.5	7 20.0	84	54	91.2	7 45.1	84	54	90.9	8 10.2	84	54	90.6	8 35.3	84	54	90.4	85
6	5 31.9	84	54	91.2	5 57.1	84	54	90.9	6 22.2	84	54	90.6	6 47.3	84	54	90.3	7 12.4	84	54	90.1	7 37.5	84	54	89.8	8 02.6	84	54	89.5	6
7					5 24.4	84	54	90.1	5 49.5	84	54	89.8	6 14.6	84	54	89.5	6 39.7	84	54	89.2	7 04.8	84	54	89.0	7 29.9	84	54	88.7	7
8									5 16.8	84	54	88.9	5 41.9	84	54	88.7	6 07.1	84	54	88.4	6 32.2	84	54	88.1	6 57.2	84	54	87.8	8
9													5 09.3	84	54	87.8	5 34.4	84	54	87.6	5 59.5	84	54	87.3	6 24.6	84	54	87.0	9
90																	5 01.8	84	54	86.7	5 26.9	84	54	86.4	5 52.0	84	54	86.2	90

Digitized by Google

Lat. 57°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	°
00	29 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	28 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	27 00.0	1.0 01	180.0	26 30.0	1.0 01	180.0	26 00.0	1.0 01	180.0	25 30.0	1.0 01	180.0	00
1	28 59.7	1.0 02	178.9	28 29.7	1.0 02	178.9	27 59.7	1.0 02	178.9	27 29.7	1.0 02	178.9	26 59.7	1.0 02	178.9	26 29.7	1.0 02	178.9	25 59.7	1.0 02	178.9	25 29.7	1.0 02	178.9	1
2	28 58.7	1.0 03	177.7	28 28.7	1.0 03	177.7	27 58.7	1.0 03	177.7	27 28.7	1.0 03	177.8	26 58.7	1.0 03	177.8	26 28.7	1.0 03	177.8	25 58.7	1.0 03	177.8	25 28.7	1.0 03	177.8	2
3	28 57.1	1.0 04	176.6	28 27.1	1.0 04	176.6	27 57.1	1.0 04	176.6	27 27.1	1.0 04	176.6	26 57.1	1.0 04	176.7	26 27.2	1.0 04	176.7	25 57.2	1.0 04	176.7	25 27.2	1.0 04	176.7	3
4	28 54.8	1.0 05	175.4	28 24.8	1.0 05	175.5	27 54.9	1.0 05	175.5	27 24.9	1.0 05	175.5	26 54.9	1.0 05	175.5	26 24.9	1.0 05	175.6	25 55.0	1.0 05	175.6	25 25.0	1.0 05	175.6	4
05	28 51.9	1.0 06	174.3	28 21.9	1.0 06	174.3	27 52.0	1.0 06	174.4	27 22.0	1.0 06	174.4	26 52.1	1.0 06	174.4	26 22.1	1.0 06	174.5	25 52.1	1.0 06	174.5	25 22.2	1.0 06	174.5	05
6	28 48.3	1.0 07	173.2	28 18.4	1.0 07	173.2	27 48.4	1.0 07	173.2	27 18.5	1.0 07	173.3	26 48.6	1.0 07	173.3	26 18.6	1.0 07	173.3	25 48.7	1.0 07	173.4	25 18.7	1.0 07	173.4	6
7	28 44.1	1.0 08	172.0	28 14.2	1.0 08	172.1	27 44.3	1.0 08	172.1	27 14.4	1.0 08	172.2	26 44.4	1.0 08	172.2	26 14.5	1.0 08	172.2	25 44.6	1.0 08	172.3	25 14.7	1.0 08	172.3	7
8	28 39.3	1.0 09	170.9	28 09.4	1.0 09	170.9	27 39.5	1.0 09	171.0	27 09.6	1.0 09	171.0	26 39.7	1.0 09	171.1	26 09.8	1.0 09	171.1	25 39.9	1.0 09	171.2	25 10.0	1.0 09	171.2	8
9	28 33.8	1.0 10	169.8	28 03.9	1.0 10	169.8	27 34.0	1.0 10	169.9	27 04.2	1.0 10	169.9	26 34.3	1.0 10	170.0	26 04.5	1.0 10	170.0	25 34.6	1.0 10	170.1	25 04.7	1.0 10	170.1	9
10	28 27.6	99 11	168.6	27 57.8	99 11	168.7	27 28.0	99 11	168.8	26 58.2	99 11	168.8	26 28.3	99 11	168.9	25 58.5	99 11	168.9	25 28.7	99 11	169.0	24 58.8	99 11	169.1	10
1	28 20.9	99 12	167.5	27 51.1	99 12	167.6	27 21.3	99 12	167.6	26 51.5	99 12	167.7	26 21.7	99 12	167.8	25 51.9	99 12	167.8	25 22.1	99 12	167.9	24 52.3	99 12	168.0	1
2	28 13.5	99 13	166.4	27 43.8	99 13	166.5	27 14.0	99 13	166.5	26 44.2	99 13	166.6	26 14.5	99 13	166.7	25 44.7	99 13	166.7	25 15.0	99 13	166.8	24 45.2	99 13	166.9	2
3	28 05.5	99 14	165.3	27 35.8	99 14	165.3	27 06.1	99 14	165.4	26 36.4	99 14	165.5	26 06.6	99 14	165.6	25 36.9	99 14	165.6	25 07.2	99 14	165.7	24 37.5	99 14	165.8	3
4	27 56.9	99 15	164.1	27 27.2	99 15	164.2	26 57.5	99 15	164.3	26 27.9	99 15	164.4	25 58.2	99 15	164.5	25 28.5	99 15	164.6	24 58.8	99 15	164.6	24 29.2	99 15	164.7	4
15	27 47.7	99 16	163.0	27 18.0	99 16	163.1	26 48.4	99 16	163.2	26 18.8	99 16	163.3	25 49.2	99 16	163.4	25 19.5	99 16	163.5	24 49.9	99 16	163.6	24 20.3	99 16	163.6	15
6	27 37.8	99 17	161.9	27 08.2	99 17	162.0	26 38.7	99 17	162.1	26 09.1	99 17	162.2	25 39.5	99 17	162.3	25 09.9	99 17	162.4	24 40.3	99 17	162.5	24 10.8	99 17	162.6	6
7	27 27.4	98 18	160.8	26 57.9	98 18	160.9	26 28.3	98 18	161.0	25 58.8	98 18	161.1	25 29.3	98 18	161.2	24 59.8	98 18	161.3	24 30.2	98 18	161.4	24 00.7	98 18	161.5	7
8	27 16.3	98 19	159.7	26 46.9	98 19	159.8	26 17.4	98 19	159.9	25 47.9	98 19	160.0	25 18.5	98 19	160.1	24 49.0	98 19	160.2	24 19.5	98 19	160.3	23 50.0	98 19	160.4	8
9	27 04.7	98 20	158.6	26 35.3	98 20	158.7	26 05.9	98 20	158.8	25 36.5	98 20	158.9	25 07.1	98 20	159.0	24 37.6	98 20	159.2	24 08.2	98 20	159.3	23 38.8	98 20	159.4	9
20	26 52.5	98 21	157.5	26 23.2	98 21	157.6	25 53.8	98 21	157.7	25 24.5	98 21	157.9	24 55.1	98 21	158.0	24 25.7	98 21	158.1	23 56.4	98 21	158.2	23 27.0	98 21	158.3	20
1	26 39.7	98 22	156.4	26 10.4	98 22	156.5	25 41.1	98 22	156.7	25 11.9	98 22	156.8	24 42.6	98 22	156.9	24 13.3	98 22	157.0	23 43.9	98 22	157.1	23 14.6	98 22	157.3	1
2	26 26.4	97 23	155.3	25 57.1	97 23	155.5	25 27.9	97 23	155.6	24 58.7	97 23	155.7	24 29.5	97 23	155.8	24 00.2	97 23	156.0	23 31.0	97 23	156.1	23 01.7	98 22	156.2	2
3	26 12.4	97 24	154.3	25 43.3	97 24	154.4	25 14.1	97 24	154.5	24 45.0	97 24	154.6	24 15.8	97 24	154.8	23 46.6	97 24	154.9	23 17.4	97 23	155.0	22 48.3	97 23	155.2	3
4	25 58.0	97 25	153.2	25 28.9	97 25	153.3	24 59.8	97 25	153.4	24 30.7	97 25	153.6	24 01.6	97 25	153.7	23 32.5	97 24	153.8	23 03.4	97 24	154.0	22 34.3	97 24	154.1	4
25	25 42.9	97 26	152.1	25 13.9	97 26	152.2	24 44.9	97 26	152.4	24 15.9	97 26	152.5	23 46.9	97 25	152.7	23 17.8	97 25	152.8	22 48.8	97 25	152.9	22 19.7	97 25	153.1	25
6	25 27.4	96 27	151.0	24 58.4	96 27	151.2	24 29.5	96 27	151.3	24 00.5	97 26	151.5	23 31.6	97 26	151.6	23 02.6	97 26	151.8	22 33.6	97 26	151.9	22 04.7	97 26	152.0	6
7	25 11.3	96 28	150.0	24 42.4	96 28	150.1	24 13.6	96 27	150.3	23 44.7	96 27	150.4	23 15.8	96 27	150.6	22 46.9	96 27	150.7	22 18.0	96 27	150.9	21 49.1	96 27	151.0	7
8	24 54.7	96 29	148.9	24 25.9	96 28	149.1	23 57.1	96 28	149.2	23 28.3	96 28	149.4	22 59.5	96 28	149.5	22 30.6	96 28	149.7	22 01.8	96 28	149.8	21 33.0	96 28	150.0	8
9	24 37.5	96 29	147.9	24 08.8	96 29	148.0	23 40.1	96 29	148.2	23 11.4	96 29	148.3	22 42.6	96 29	148.5	22 13.9	96 29	148.6	21 45.1	96 29	148.8	21 16.4	96 28	148.9	9
30	24 19.9	95 30	146.8	23 51.3	95 30	147.0	23 22.6	95 30	147.1	22 54.0	96 30	147.3	22 25.3	96 30	147.5	21 56.6	96 30	147.6	21 28.0	96 29	147.8	20 59.3	96 29	147.9	30
1	24 01.8	95 31	145.8	23 33.2	95 31	145.9	23 04.6	95 31	146.1	22 36.1	95 31	146.3	22 07.5	95 31	146.4	21 38.9	95 30	146.6	21 10.3	95 30	146.8	20 41.7	96 30	146.9	1
2	23 43.1	95 32	144.7	23 14.7	95 32	144.9	22 46.2	95 32	145.1	22 17.7	95 31	145.2	21 49.2	95 31	145.4	21 20.7	95 31	145.6	20 52.1	95 31	145.7	20 23.6	95 31	145.9	2
3	23 24.0	95 33	143.7	22 55.6	95 32	143.9	22 27.2	95 32	144.1	21 58.8	95 32	144.2	21 30.4	95 32	144.4	21 01.9	95 32	144.6	20 33.5	95 32	144.7	20 05.0	95 32	144.9	3
4	23 04.5	94 33	142.7	22 36.1	94 33	142.9	22 07.8	94 33	143.0	21 39.5	94 33	143.2	21 11.1	95 33	143.4	20 42.8	95 33	143.6	20 14.4	95 33	143.7	19 46.0	95 32	143.9	4
35	22 44.4	94 34	141.7	22 16.2	94 34	141.8	21 47.9	94 34	142.0	21 19.7	94 34	142.2	20 51.4	94 34	142.4	20 23.1	94 34	142.6	19 54.8	94 33	142.7	19 26.5	94 33	142.9	35
6	22 23.9	94 35	140.6	21 55.8	94 35	140.8	21 27.6	94 35	141.0	20 59.4	94 34	141.2	20 31.2	94 34	141.4	20 03.0	94 34	141.6	19 34.8	94 34	141.7	19 06.6	94 34	141.9	6
7	22 03.0	94 36	139.6	21 34.9	94 36	139.8	21 06.8	94 35	140.0	20 38.7	94 35	140.2	20 10.6	94 35	140.4	19 42.5	94 35	140.6	19 14.4	94 35	140.8	18 46.2	94 35	140.9	7
8	21 41.6	93 36	138.6	21 13.6	93 36	138.8	20 45.6	93 36	139.0	20 17.6	93 36	139.2	19 49.6	93 36	139.4	19 21.5	93 36	139.6	18 53.5	94 36	139.8	18 25.4	94 35	140.0	8
9	21 19.8	93 37	137.6	20 51.9	93 37	137.8	20 23.9	93 37	138.0	19 56.0	93 37	138.2	19 28.1	93 36	138.4	19 00.1	93 36	138.6	18 32.2	93 36	138.8	18 04.2	93 36	139.0	9
40	20 57.5	93 38	136.6	20 29.7	93 38	136.8	20 01.9	93 37	137.0	19 34.0	93 37	137.2	19 06.2	93 37	137.4	18 38.3	93 37	137.6	18 10.4	93 37	137.8	17 42.5	93 37	138.0	40
1	20 34.9	92 38	135.6	20 07.2	92 38	135.8	19 39.4	93 38	136.1	19 11.6	93 38	136.3	18 43.9	93 38	136.5	18 16.1	93 38	136.7	17 48.3	93 38	136.8	17 20.5	93 37	137.0	1
2	20 11.8	92 39	134.7	19 44.2	92 39	134.9	19 16.5	92 39	135.1	18 48.8	92 39	135.3	18 21.2	92 38	135.5	17 53.4	92 38	135.7	17 25.7	92 38	135.9	16 58.0	92 38	136.1	2
3	19 48.4	92 40	133.7	19 20.8	92 40	133.9	18 53.3	92 39	134.1	18 25.7	92 39	134.3	17 58.0	92 39	134.5	17 30.4	92 39	134.7	17 02.8	92 39	134.9	16 35.1	92 39	135.1	3
4	19 24.6	92 40	132.7	18 57.1	92 40	132.9	18 29.6	92 40	133.1	18 02.1	92 40	133.3	17 34.6	92 40	133.6	17 07.0	92 40	133.8	16 39.5	92 40	134.0	16 11.9	92 39	134.2	4
45	19 00.4	91 41	131.8	18 33.0	91 41	132.0	18 05.6	91 41	132.2	17 38.1	91 41	132.4	17 10.7	92 40	132.6	16 43.2	92 40	132.8	16 15.8	92 40	133.0	15 48.3	92 40	133.2	45
6	18 35.8	91 42	130.8	18 08.5	91 41	131.0	17 41.2	91 41	131.2	17 13.8	91 41	131.4	16 46.5	91 41	131.7	16 19.1	91 41	131.9	15 51.7	91 41	132.1	15 24.3	91 41	132.3	6
7	18 10.9	91 42	129.8	17 43.7	91 42	130.1	17 16.4	91 42	130.3	16 49.1	91 42	130.5	16 21.9	91 42	130.7	15 54.6	91 41	130.9	15 27.2	91 41	131.1	14 59.9	91 41	131.4	7
8	17 45.6	91 43	128.9	17 18.5	91 43	129.1	16 51.3	91 42	129.3	16 24.1	91 42	129.5	15 56.9	91 42	129.8	15 29.7	91 42	130.0	15 02.5	91 42	130.2	14 35.2	91 42	130.4	8
9	17 20.0	90 43	127.9	16 53.0	90 43	128.2	16 25.9	90 43	128.4	15 58.7	90 43	128.6	15 31.6	90 43	128.8	15 04.5	90 43	129.1	14 37.3	91 42	129.3	14 10.2	91 42	129.5	9
50	16 54.1	90 44	127.0	16 27.1	90 44	127.2	16 00.1	90 44	127.4	15 33.0	90 43	127.7	15 06.0	90 43	127.9	14 38.9	90 43	128.1	14 11.9	90 43	128.3	13 44.8	90 43	128.6	50
1	16 27.8	90 44	126.1	16 00.9	90 44	126.3	15 34.0	90 44	126.5	15 07.0	90 44	126.7	14 40.1	90 44	127.0	14 13.1	90 44	127.2	13 46.1	90 44	127.4	13 19.1	90 43	127.6	1
2	16 01.3	89 45	125.1	15 34.4	90 45	125.4	15 07.6	90 45	125.6	14 40.7	90 44	125.8	14 13.8	90 44	126.1	13 46.9	90 44	126.3	13 20.0	90 44	126.5	12 53.0	90 44	126.7	2
3	15 34.4	89 45	124.2	15 07.6	89 45	124.4	14 40.8	89 45	124.7	14 14.0	89 45	124.9	13 47.2	89 45	125.1	13 20.4	89 45	125.4	12 53.5	89 45	125.6	12 26.7	90 44	125.8	3
4	15 07.2	89 46	123.3	14 40.5	89 46	123.5	14 13.8	89 46	123.8	13 47.1	89 45	124.0	13 20.3	89 45	124.2	12 53.6	89 45	124.5	12 26.8	89 45	124.7	12 00.0	89 45	124.9	4
55	14 39.8	89 46	122.4	14 13.1	89 46	122.6	13 46.5	89 46	122.8	13 19.8	89 46	123.1	12 53.2	89 46	123.3	12 26.5	89 46	123.5	11 59.8	89 46	123.8	11 33.1	89 45	124.0	55
6	14 12.0	88 47	121.5	13 45.5	89 47	121.7	13 18.9	89 46	121.9	12 52.3	89 46	122.2	12 25.7	89 46	122.4	11 59.1	89 46	122.6	11 32.5	89 46	122.9	11 05.9	89 46	123.1	6
7	13 44.0	88 47	120.5	13 17.5	88 47	120.8	12 51.0	88 47	121.0	12 24.5	88 47	121.3	11 58.0	88 47	121.5	11 31.5	88 47	121.7	11 04.9	89 46	122.0	10 38.4	89 46	122.2	7
8	13 15.7	88 48	119.6	12 49.3	88 47	119.9	12 22.9	88 47	120.1	11 56.5	88 47	120.4	11 30.0	88 47	120.6	11 03.5	88 47	120.8	10 37.1	88 47	121.1	10 10.6	88 47	121.3	8
9	12 47.2	88 48	118.7	12 20.9	88 48	119.0	11 54.5	88 48	119.2	11 28.1	88 48	119.5	11 01.7	88 48	119.7	10 35.4	88 47	120.0	10 08.9	88 47	120.2	9 42.5	88 47	120.4	9
60	12 18.4	88 48	117.8	11 52.2	88 48	118.1	11 25.9	88 48	118.3	10 59.6	88 48	118.6	10 33.2	88 48	118.8	10 06.9	88 48	119.1	9 40.6	88 48	119.3	9 14.2	88 48	119.6	60
1	11 49.4	87 49	117.0	11 23.2	87 49	117.2	10 57.0	87 49	117.4	10 30.7	87 48	117.7	10 04.5	88 48	117.9	9 38.2	88 48	118.2	9 12.0	88 48	118.4	8 45.7	88 48	118.7	1
2	11 20.2	87 49	116.1	10 54.0	87 49	116.3	10 27.9	87 49	116.6	10 01.7	87 49	116.8	9 35.5	87 49	117.1	9 09.3	87 49	117.3	8 43.1	87 48	117.5	8 16.9	87 48	117.8	2
3	10 50.7	87 49	115.2	10 24.6	87 49	115.4	9 58.5	87 49	115.7	9 32.4	87 49	115.9	9 06.3	87 49	116.2	8 40.2	87 49	116.4	8 14.0	87 49	116.7	7 47.9	87 49	116.9	3
4	10 21.0	87 50	114.3	9 55.0	87 50	114.5	9 29.0	87 50	114.8	9 02.9	87 50	115.1	8 36.9	87 49	115.3	8 10.8	87 49	115.6	7 44.7	87 49	115.8	7 18.6	87 49	116.1	4
65	9 51.1	87 50	113.4	9 25.2	87 50	113.7	8 59.2	87 50	113.9	8 33.2	87 50	114.2	8 07.2	87 50	114.4	7 41.2	87 50	114.7	7 15.2	87 50	114.9	6 49.2	87 49	115.2	65
6	9 21.1	86 50	112.5	8 55.1	86 50	112.8	8 29.2	86 50	113.1	8 03.3	86 50	113.3	7 37.4	86 50	113.6	7 11.4	87 50	113.8	6 45.4	87 50	114.1	6 19.5	87 50	114.3	6
7	8 50.8	86 51	111.7	8 24.9	86 51	111.9	7 59.1	86 51	112.2	7 33.2	86 50	112.4	7 07.3	86 50	112.7	6 41.4	86 50	112.9	6 15.5	86 50	113.2	5 49.6	86 50	113.5	7
8	8 20.3	86 51	110.8	7 54.5	86 51	111.1	7 28.7	86 51	111.3	7 02.9	86 51	111.6	6 37.1	86 51	111.8	6 11.2	86 51	112.1	5 45.4	86 51	112.3	5 19.5	86 50	112.6	8
9	7 49.7	86 51	109.9	7 23.9	86 51	110.2	6 58.2	86 51	110.5	6 32.4	86 51	110.7	6 06.6	86 51	111.0	5 40.8	86 51	111.2	5 15.1	86 51	111.5				9
70	7 18.9	86 52	109.1	6 53.2	86 52	109.3	6 27.5	86 51	109.6	6 01.8	86 51	109.9	5 36.0	86 51	110.1	5 10.3	86 51	110.4							70
1	6 47.9	86 52	108.2	6 22.3	86 52	108.5	5 56.6	86 52	108.7	5 30.9	86 52	109.0	5 05.3	86 52	109.3										1
2	6 16.8	85 52	107.4	5 51.2	85 52	107.6	5 25.6	85 52	107.9	5 00.0	85 52	108.1													2
3	5 45.5	85 52	106.5	5 20.0	85 52	106.8																			3
4	5 14.1	85 52	105.6																						4

DECLINATION SAME NAME AS LATITUDE

Lat 58°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	°
91																			5 19.4	84 54	85.3	5 44.5	84 54	85.1	91
2																						5 12.0	84 54	84.2	2

Digitized by Google

Lat. 57°

H.A.	8° 00′ Alt.	Δd Δt	Az.	8° 30′ Alt.	Δd Δt	Az.	9° 00′ Alt.	Δd Δt	Az.	9° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	41 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	42 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0
1	40 59.6	1.0 02	178.7	41 29.6	1.0 02	178.7	41 59.6	1.0 02	178.7	42 29.6	1.0 02	178.7
2	40 58.5	1.0 03	177.4	41 28.5	1.0 03	177.4	41 58.5	1.0 03	177.3	42 28.5	1.0 03	177.3
3	40 56.6	1.0 04	176.1	41 26.6	1.0 04	176.0	41 56.6	1.0 04	176.0	42 26.6	1.0 04	176.0
4	40 54.0	1.0 06	174.8	41 24.0	1.0 06	174.7	41 53.9	1.0 06	174.7	42 23.9	1.0 06	174.7
05	40 50.7	1.0 07	173.4	41 20.6	1.0 07	173.4	41 50.5	1.0 07	173.4	42 20.5	1.0 07	173.3
6	40 46.6	1.0 08	172.1	41 16.5	1.0 08	172.1	41 46.4	1.0 08	172.0	42 16.3	1.0 08	172.0
7	40 41.7	1.0 09	170.8	41 11.6	1.0 09	170.8	41 41.5	1.0 09	170.7	42 11.4	1.0 09	170.7
8	40 36.2	1.0 10	169.5	41 06.0	99 11	169.5	41 35.9	99 11	169.4	42 05.7	99 11	169.3
9	40 29.9	99 12	168.2	40 59.7	99 12	168.2	41 29.5	99 12	168.1	41 59.3	99 12	168.0
10	40 22.9	99 13	167.0	40 52.6	99 13	166.9	41 22.4	99 13	166.8	41 52.1	99 13	166.7
1	40 15.1	99 14	165.7	40 44.8	99 14	165.6	41 14.6	99 14	165.5	41 44.3	99 14	165.4
2	40 06.7	99 15	164.4	40 36.3	99 15	164.3	41 06.0	99 15	164.2	41 35.7	99 16	164.1
3	39 57.5	99 16	163.1	40 27.1	99 16	163.0	40 56.7	99 17	162.9	41 26.3	99 17	162.8
4	39 47.7	99 18	161.8	40 17.2	98 18	161.7	40 46.8	98 18	161.6	41 16.3	98 18	161.5
15	39 37.1	98 19	160.6	40 06.6	98 19	160.4	40 36.1	98 19	160.3	41 05.6	98 19	160.2
6	39 25.9	98 20	159.3	39 55.4	98 20	159.2	40 24.8	98 20	159.0	40 54.2	98 20	158.9
7	39 14.1	98 21	158.1	39 43.4	98 21	157.9	40 12.8	98 21	157.8	40 42.1	98 21	157.6
8	39 01.5	98 22	156.8	39 30.8	98 22	156.7	40 00.1	98 22	156.5	40 29.3	98 22	156.4
9	38 48.3	97 23	155.6	39 17.5	97 23	155.4	39 46.7	97 23	155.3	40 15.9	97 23	155.1
20	38 34.5	97 24	154.3	39 03.6	97 24	154.2	39 32.7	97 24	154.0	40 01.8	97 25	153.9
1	38 20.0	97 25	153.1	38 49.1	97 25	152.9	39 18.1	97 25	152.8	39 47.1	97 26	152.6
2	38 04.9	97 26	151.9	38 33.9	97 26	151.7	39 02.8	96 26	151.5	39 31.8	96 27	151.4
3	37 49.2	96 27	150.7	38 18.1	96 27	150.5	38 47.0	96 27	150.3	39 15.8	96 28	150.1
4	37 32.9	96 28	149.5	38 01.7	96 28	149.3	38 30.5	96 28	149.1	38 59.2	96 29	148.9
25	37 16.0	96 29	148.3	37 44.7	96 29	148.1	38 13.4	96 29	147.9	38 42.1	96 30	147.7
6	36 58.5	96 30	147.1	37 27.2	95 30	146.9	37 55.8	95 30	146.7	38 24.3	95 30	146.5
7	36 40.5	95 31	145.9	37 09.0	95 31	145.7	37 37.5	95 31	145.5	38 06.0	95 31	145.3
8	36 21.9	95 32	144.7	36 50.3	95 32	144.5	37 18.8	95 32	144.3	37 47.2	95 32	144.1
9	36 02.8	95 33	143.6	36 31.1	94 33	143.4	36 59.4	94 33	143.2	37 27.7	94 33	143.0
30	35 43.1	94 34	142.4	36 11.4	94 34	142.2	36 39.6	94 34	142.0	37 07.8	94 34	141.8
1	35 22.9	94 34	141.3	35 51.1	94 35	141.1	36 19.2	94 35	140.8	36 47.3	94 35	140.6
2	35 02.2	94 35	140.1	35 30.3	94 35	139.9	35 58.3	93 36	139.7	36 26.3	93 36	139.5
3	34 41.0	93 36	139.0	35 09.0	93 36	138.8	35 36.9	93 36	138.6	36 04.9	93 37	138.3
4	34 19.4	93 37	137.9	34 47.2	93 37	137.7	35 15.1	93 37	137.4	35 42.9	93 37	137.2
35	33 57.2	93 38	136.8	34 25.0	93 38	136.6	34 52.7	92 38	136.3	35 20.5	92 38	136.1
6	33 34.6	92 38	135.7	34 02.3	92 39	135.4	34 30.0	92 39	135.2	34 57.6	92 39	135.0
7	33 11.6	92 39	134.6	33 39.1	92 39	134.4	34 06.7	92 39	134.1	34 34.2	92 40	133.9
8	32 48.1	92 40	133.5	33 15.6	92 40	133.3	33 43.0	92 40	133.0	34 10.5	91 40	132.8
9	32 24.2	91 41	132.4	32 51.6	91 41	132.2	33 18.9	91 41	131.9	33 46.3	91 41	131.7
40	31 59.8	91 41	131.4	32 27.1	91 41	131.1	32 54.4	91 42	130.9	33 21.7	91 42	130.6
1	31 35.1	91 42	130.3	32 02.3	91 42	130.1	32 29.5	91 42	129.8	32 56.7	90 42	129.6
2	31 10.0	90 42	129.3	31 37.1	90 43	129.0	32 04.2	90 43	128.7	32 31.3	90 43	128.5
3	30 44.5	90 43	128.2	31 11.5	90 43	128.0	31 38.5	90 43	127.7	32 05.5	90 44	127.4
4	30 18.6	90 44	127.2	30 45.6	90 44	126.9	31 12.5	90 44	126.7	31 39.4	90 44	126.4
45	29 52.4	90 44	126.1	30 19.3	89 44	125.9	30 46.1	89 45	125.6	31 12.9	89 45	125.4
6	29 25.9	89 45	125.1	29 52.6	89 45	124.9	30 19.4	89 45	124.6	30 46.1	89 45	124.3
7	28 59.0	89 45	124.1	29 25.7	89 46	123.9	29 52.3	89 46	123.6	30 19.0	89 46	123.3
8	28 31.8	89 46	123.1	28 58.4	89 46	122.8	29 25.0	89 46	122.6	29 51.5	88 46	122.3
9	28 04.2	88 46	122.1	28 30.8	88 47	121.8	28 57.3	88 47	121.6	29 23.7	88 47	121.3
50	27 36.4	88 47	121.1	28 02.9	88 47	120.9	28 29.3	88 47	120.6	28 55.7	88 47	120.3
1	27 08.3	88 47	120.1	27 34.7	88 47	119.9	28 01.0	88 48	119.6	28 27.3	88 48	119.3
2	26 39.9	88 48	119.2	27 06.2	88 48	118.9	27 32.5	88 48	118.6	27 58.7	87 48	118.4
3	26 11.2	87 48	118.2	26 37.4	87 48	117.9	27 03.6	87 48	117.7	27 29.8	87 49	117.4
4	25 42.3	87 49	117.2	26 08.4	87 49	117.0	26 34.6	87 49	116.7	27 00.7	87 49	116.4
55	25 13.1	87 49	116.3	25 39.2	87 49	116.0	26 05.2	87 49	115.7	26 31.3	87 49	115.5
6	24 43.7	87 49	115.3	25 09.7	87 50	115.1	25 35.7	87 50	114.8	26 01.6	86 50	114.5
7	24 14.0	87 50	114.4	24 40.0	86 50	114.1	25 05.9	86 50	113.8	25 31.8	86 50	113.6
8	23 44.2	86 50	113.5	24 10.1	86 50	113.2	24 35.9	86 50	112.9	25 01.7	86 50	112.6
9	23 14.1	86 50	112.5	23 39.9	86 51	112.2	24 05.7	86 51	112.0	24 31.5	86 51	111.7
60	22 43.8	86 51	111.6	23 09.6	86 51	111.3	23 35.3	86 51	111.0	24 01.0	86 51	110.8
1	22 13.3	86 51	110.7	22 39.0	86 51	110.4	23 04.7	86 51	110.1	23 30.4	85 51	109.8
2	21 42.7	86 51	109.8	22 08.3	85 52	109.5	22 33.9	85 52	109.2	22 59.5	85 52	108.9
3	21 11.8	85 52	108.9	21 37.4	85 52	108.6	22 03.0	85 52	108.3	22 28.5	85 52	108.0
4	20 40.8	85 52	107.9	21 06.4	85 52	107.7	21 31.9	85 52	107.4	21 57.4	85 52	107.1
65	20 09.6	85 52	107.0	20 35.1	85 52	106.8	21 00.6	85 52	106.5	21 26.1	85 52	106.2
6	19 38.3	85 52	106.2	20 03.8	85 52	105.9	20 29.2	85 53	105.6	20 54.6	85 53	105.3
7	19 06.9	85 53	105.3	19 32.3	85 53	105.0	19 57.7	85 53	104.7	20 23.0	84 53	104.4
8	18 35.3	85 53	104.4	19 00.7	85 53	104.1	19 26.0	84 53	103.8	19 51.3	84 53	103.5
9	18 03.6	84 53	103.5	18 28.9	84 53	103.2	18 54.2	84 53	102.9	19 19.5	84 53	102.6
70	17 31.7	84 53	102.6	17 57.0	84 53	102.3	18 22.3	84 53	102.0	18 47.6	84 53	101.8
1	16 59.8	84 53	101.7	17 25.1	84 53	101.5	17 50.3	84 54	101.2	18 15.5	84 54	100.9
2	16 27.7	84 54	100.9	16 53.0	84 54	100.6	17 18.2	84 54	100.3	17 43.4	84 54	100.0
3	15 55.6	84 54	100.0	16 20.8	84 54	99.7	16 46.0	84 54	99.4	17 11.2	84 54	99.2
4	15 23.4	84 54	99.1	15 48.6	84 54	98.9	16 13.7	84 54	98.6	16 38.9	84 54	98.3
75	14 51.1	84 54	98.3	15 16.2	84 54	98.0	15 41.4	84 54	97.7	16 06.5	84 54	97.4
6	14 18.7	84 54	97.4	14 43.8	84 54	97.1	15 09.0	84 54	96.9	15 34.1	84 54	96.6
7	13 46.3	84 54	96.6	14 11.4	84 54	96.3	14 36.5	84 54	96.0	15 01.6	84 54	95.7
8	13 13.8	84 54	95.7	13 38.9	84 54	95.4	14 04.0	84 54	95.1	14 29.0	84 54	94.9
9	12 41.2	84 54	94.9	13 06.3	84 54	94.6	13 31.4	84 54	94.3	13 56.4	83 54	94.0
80	12 08.7	84 54	94.0	12 33.7	84 54	93.7	12 58.8	83 54	93.5	13 23.8	83 54	93.2
1	11 36.0	84 54	93.2	12 01.1	84 54	92.9	12 26.2	83 54	92.6	12 51.2	83 54	92.3
2	11 03.4	84 54	92.3	11 28.5	83 54	92.0	11 53.5	83 54	91.8	12 18.5	83 54	91.5
3	10 30.7	84 54	91.5	10 55.8	83 54	91.2	11 20.8	83 54	90.9	11 45.9	83 54	90.6
4	9 58.1	84 54	90.6	10 23.1	83 54	90.4	10 48.2	83 54	90.1	11 13.2	83 54	89.8
85	9 25.4	84 54	89.8	9 50.4	83 54	89.5	10 15.5	83 54	89.2	10 40.5	83 54	89.0
6	8 52.7	84 54	89.0	9 17.8	83 54	88.7	9 42.8	83 54	88.4	10 07.8	83 54	88.1
7	8 20.1	84 54	88.1	8 45.1	83 54	87.8	9 10.2	83 54	87.6	9 35.2	83 54	87.3
8	7 47.4	84 54	87.3	8 12.5	84 54	87.0	8 37.5	83 54	86.7	9 02.6	83 54	86.5
9	7 14.8	84 54	86.5	7 39.8	84 54	86.2	8 04.9	84 54	85.9	8 30.0	83 54	85.6
90	6 42.2	84 54	85.6	7 07.3	84 54	85.3	7 32.3	84 54	85.1	7 57.4	84 54	84.8

10° 00′ Alt.	Δd Δt	Az.	10° 30′ Alt.	Δd Δt	Az.	11° 00′ Alt.	Δd Δt	Az.	11° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
43 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	44 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	00
42 59.6	1.0 02	178.7	43 29.6	1.0 02	178.6	43 59.6	1.0 02	178.6	44 29.6	1.0 02	178.6	1
42 58.5	1.0 03	177.3	43 28.5	1.0 03	177.3	43 58.4	1.0 03	177.3	44 28.4	1.0 03	177.3	2
42 56.5	1.0 04	176.0	43 26.5	1.0 04	175.9	43 56.5	1.0 05	175.9	44 26.5	1.0 05	175.9	3
42 53.9	1.0 06	174.6	43 23.8	1.0 06	174.6	43 53.8	1.0 06	174.5	44 23.7	1.0 06	174.5	4
42 50.4	1.0 07	173.3	43 20.4	1.0 07	173.2	43 50.3	1.0 07	173.2	44 20.2	1.0 07	173.1	05
42 46.2	1.0 08	171.9	43 16.1	1.0 08	171.9	43 46.0	1.0 08	171.8	44 15.9	1.0 08	171.8	6
42 41.3	1.0 10	170.6	43 11.1	1.0 10	170.5	43 41.0	1.0 10	170.5	44 10.9	1.0 10	170.4	7
42 35.5	99 11	169.3	43 05.4	99 11	169.2	43 35.2	99 11	169.1	44 05.1	99 11	169.1	8
42 29.1	99 12	167.9	42 58.9	99 12	167.9	43 28.7	99 12	167.8	43 58.5	99 12	167.7	9
42 21.9	99 13	166.6	42 51.6	99 13	166.5	43 21.4	99 13	166.4	43 51.1	99 13	166.4	10
42 14.0	99 14	165.3	42 43.7	99 15	165.2	43 13.4	99 15	165.1	43 43.1	99 15	165.0	1
42 05.3	99 16	164.0	42 35.0	99 16	163.9	43 04.6	99 16	163.8	43 34.2	99 16	163.7	2
41 55.9	99 17	162.7	42 25.5	99 17	162.6	42 55.1	99 17	162.5	43 24.7	99 17	162.3	3
41 45.8	98 18	161.4	42 15.4	98 18	161.3	42 44.9	98 18	161.1	43 14.4	98 18	161.0	4
41 35.1	98 19	160.1	42 04.5	98 19	159.9	42 34.0	98 19	159.8	43 03.4	98 20	159.7	15
41 23.6	98 20	158.8	41 53.0	98 20	158.7	42 22.3	98 21	158.5	42 51.7	98 21	158.4	6
41 11.4	98 21	157.5	41 40.7	98 22	157.4	42 10.0	98 22	157.2	42 39.3	98 22	157.1	7
40 58.6	97 22	156.2	41 27.8	97 23	156.1	41 57.0	97 23	155.9	42 26.3	97 23	155.8	8
40 45.1	97 24	155.0	41 14.2	97 24	154.8	41 43.4	97 24	154.6	42 12.5	97 24	154.5	9
40 30.9	97 25	153.7	41 00.0	97 25	153.5	41 29.1	97 25	153.4	41 58.1	97 25	153.2	20
40 16.1	97 26	152.4	40 45.1	97 26	152.3	41 14.1	97 26	152.1	41 43.1	97 26	151.9	1
40 00.7	96 27	151.2	40 29.6	96 27	151.0	40 58.5	96 27	150.9	41 27.4	96 27	150.7	2
39 44.6	96 28	150.0	40 13.5	96 28	149.8	40 42.3	96 28	149.6	41 11.1	96 28	149.4	3
39 28.0	96 29	148.7	39 56.7	96 29	148.6	40 25.4	96 29	148.4	40 54.1	96 29	148.2	4
39 10.7	95 30	147.5	39 39.4	95 30	147.3	40 08.0	95 30	147.1	40 36.6	95 30	146.9	25
38 52.9	95 31	146.3	39 21.4	95 31	146.1	39 50.0	95 31	145.9	40 18.5	95 31	145.7	6
38 34.5	95 32	145.1	39 02.9	95 32	144.9	39 31.4	95 32	144.7	39 59.8	95 32	144.5	7
38 15.5	95 33	143.9	38 43.9	94 33	143.7	39 12.2	94 33	143.5	39 40.5	94 33	143.3	8
37 56.0	94 33	142.7	38 24.3	94 34	142.5	38 52.5	94 34	142.3	39 20.7	94 34	142.1	9
37 36.0	94 34	141.6	38 04.1	94 34	141.4	38 32.3	94 35	141.1	39 00.4	94 35	140.9	30
37 15.4	94 35	140.4	37 43.5	94 35	140.2	38 11.5	93 35	140.0	38 39.5	93 36	139.7	1
36 54.3	93 36	139.3	37 22.3	93 36	139.0	37 50.2	93 36	138.8	38 18.1	93 36	138.6	2
36 32.8	93 37	138.1	37 00.6	93 37	137.9	37 28.5	93 37	137.7	37 56.3	93 37	137.4	3
36 10.7	93 38	137.0	36 38.5	93 38	136.7	37 06.2	92 38	136.5	37 33.9	92 38	136.3	4
35 48.2	92 38	135.9	36 15.8	92 38	135.6	36 43.5	92 39	135.4	37 11.1	92 39	135.1	35
35 25.2	92 39	134.7	35 52.8	92 39	134.5	36 20.3	92 39	134.3	36 47.8	92 40	134.0	6
35 01.8	92 40	133.6	35 29.2	92 40	133.4	35 56.7	91 40	133.1	36 24.1	91 40	132.9	7
34 37.9	91 40	132.5	35 05.3	91 41	132.3	35 32.6	91 41	132.0	35 59.9	91 41	131.8	8
34 13.6	91 41	131.4	34 40.9	91 41	131.2	35 08.1	91 41	130.9	35 35.4	91 42	130.7	9
33 48.9	91 42	130.4	34 16.1	91 42	130.1	34 43.2	90 42	129.9	35 10.4	90 42	129.6	40
33 23.8	90 42	129.3	33 50.9	90 43	129.0	34 18.0	90 43	128.8	34 45.0	90 43	128.5	1
32 58.3	90 43	128.2	33 25.3	90 43	128.0	33 52.3	90 43	127.7	34 19.2	90 44	127.4	2
32 32.5	90 44	127.2	32 59.4	90 44	126.9	33 26.3	90 44	126.7	33 53.1	89 44	126.4	3
32 06.3	89 44	126.1	32 33.1	89 44	125.9	32 59.9	89 45	125.6	33 26.6	89 45	125.3	4
31 39.7	89 45	125.1	32 06.4	89 45	124.8	32 33.1	89 45	124.6	32 59.8	89 45	124.3	45
31 12.8	89 45	124.1	31 39.4	89 46	123.8	32 06.1	89 46	123.5	32 32.6	89 46	123.3	6
30 45.6	89 46	123.1	31 12.1	88 46	122.8	31 38.7	88 46	122.5	32 05.2	88 46	122.2	7
30 18.0	88 46	122.0	30 44.5	88 47	121.8	31 10.9	88 47	121.5	31 37.4	88 47	121.2	8
29 50.2	88 47	121.0	30 16.6	88 47	120.8	30 42.9	88 47	120.5	31 09.3	88 47	120.2	9
29 22.0	88 47	120.0	29 48.3	88 48	119.8	30 14.6	88 48	119.5	30 40.9	87 48	119.2	50
28 53.6	88 48	119.1	29 19.8	87 48	118.8	29 46.0	87 48	118.5	30 12.2	87 48	118.2	1
28 24.9	87 48	118.1	28 51.1	87 48	117.8	29 17.2	87 49	117.5	29 43.3	87 49	117.2	2
27 55.9	87 49	117.1	28 22.0	87 49	116.8	28 48.1	87 49	116.5	29 14.1	87 49	116.3	3
27 26.7	87 49	116.1	27 52.7	87 49	115.9	28 18.7	87 49	115.6	28 44.7	86 49	115.3	4
26 57.3	87 49	115.2	27 23.2	86 50	114.9	27 49.1	86 50	114.6	28 15.0	86 50	114.3	55
26 27.6	86 50	114.2	26 53.5	86 50	113.9	27 19.3	86 50	113.7	27 45.1	86 50	113.4	6
25 57.7	86 50	113.3	26 23.5	86 50	113.0	26 49.3	86 50	112.7	27 15.0	86 51	112.4	7
25 27.5	86 51	112.3	25 53.3	86 51	112.0	26 19.0	86 51	111.8	26 44.7	86 51	111.5	8
24 57.2	86 51	111.4	25 22.9	86 51	111.1	25 48.6	86 51	110.8	26 14.2	85 51	110.5	9
24 26.7	86 51	110.5	24 52.3	85 51	110.2	25 17.9	85 51	109.9	25 43.5	85 51	109.6	60
23 56.0	85 51	109.5	24 21.6	85 52	109.3	24 47.1	85 52	109.0	25 12.6	85 52	108.7	1
23 25.1	85 52	108.6	23 50.6	85 52	108.3	24 16.1	85 52	108.1	24 41.6	85 52	107.8	2
22 54.1	85 52	107.7	23 19.5	85 52	107.4	23 45.0	85 52	107.1	24 10.4	85 52	106.9	3
22 22.8	85 52	106.8	22 48.3	85 52	106.5	23 13.7	85 52	106.2	23 39.1	85 52	105.9	4
21 51.5	85 52	105.9	22 16.9	85 53	105.6	22 42.2	84 53	105.3	23 07.6	84 53	105.0	65
21 20.0	85 53	105.0	21 45.3	84 53	104.7	22 10.7	84 53	104.4	22 35.9	84 53	104.2	6
20 48.4	84 53	104.1	21 13.7	84 53	103.8	21 39.0	84 53	103.5	22 04.2	84 53	103.3	7
20 16.6	84 53	103.2	20 41.9	84 53	103.0	21 07.1	84 53	102.7	21 32.3	84 53	102.4	8
19 44.8	84 53	102.4	20 10.0	84 53	102.1	20 35.2	84 53	101.8	21 00.4	84 53	101.5	9
19 12.8	84 53	101.5	19 38.0	84 54	101.2	20 03.1	84 54	100.9	20 28.3	84 54	100.6	70
18 40.7	84 54	100.6	19 05.9	84 54	100.3	19 31.0	84 54	100.0	19 56.1	84 54	99.7	1
18 08.5	84 54	99.7	18 33.7	84 54	99.4	18 58.8	84 54	99.2	19 23.9	84 54	98.9	2
17 36.3	84 54	98.9	18 01.4	84 54	98.6	18 26.5	84 54	98.3	18 51.6	83 54	98.0	3
17 04.0	84 54	98.0	17 29.1	84 54	97.7	17 54.1	84 54	97.4	18 19.2	83 54	97.1	4
16 31.6	84 54	97.1	16 56.6	84 54	96.9	17 21.7	83 54	96.6	17 46.7	83 54	96.3	75
15 59.1	84 54	96.3	16 24.2	83 54	96.0	16 49.2	83 54	95.7	17 14.2	83 54	95.4	6
15 26.6	83 54	95.4	15 51.6	83 54	95.1	16 16.7	83 54	94.9	16 41.6	83 54	94.6	7
14 54.1	83 54	94.6	15 19.1	83 54	94.3	15 44.1	83 54	94.0	16 09.1	83 54	93.7	8
14 21.5	83 54	93.7	14 46.5	83 54	93.4	15 11.5	83 54	93.2	15 36.4	83 54	92.9	9
13 48.8	83 54	92.9	14 13.8	83 54	92.6	14 38.8	83 54	92.3	15 03.8	83 54	92.0	80
13 16.2	83 54	92.0	13 41.2	83 54	91.8	14 06.2	83 54	91.5	14 31.1	83 54	91.2	1
12 43.5	83 54	91.2	13 08.5	83 54	90.9	13 33.5	83 54	90.6	13 58.4	83 54	90.3	2
12 10.9	83 54	90.4	12 35.8	83 54	90.1	13 00.8	83 54	89.8	13 25.8	83 54	89.5	3
11 38.2	83 54	89.5	12 03.2	83 54	89.2	12 28.1	83 54	89.0	12 53.1	83 54	88.7	4
11 05.5	83 54	88.7	11 30.5	83 54	88.4	11 55.5	83 54	88.1	12 20.4	83 54	87.8	85
10 32.8	83 54	87.8	10 57.8	83 54	87.6	11 22.8	83 54	87.3	11 47.8	83 54	87.0	6
10 00.2	83 54	87.0	10 25.2	83 54	86.7	10 50.2	83 54	86.4	11 15.2	83 54	86.2	7
9 27.6	83 54	86.2	9 52.6	83 54	85.9	10 17.6	83 54	85.6	10 42.6	83 54	85.3	8
8 55.0	83 54	85.3	9 20.0	83 54	85.1	9 45.0	83 54	84.8	10 10.0	83 54	84.5	9
8 22.4	83 54	84.5	8 47.5	83 54	84.2	9 12.5	83 54	84.0	9 37.5	83 54	83.7	90

Digitized by Google

10—18000

Lat. 57°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	25 00.0	1.0 01	180.0	24 30.0	1.0 01	180.0	24 00.0	1.0 01	180.0	23 30.0	1.0 00	180.0	23 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	00
1	24 59.7	1.0 02	178.9	24 29.7	1.0 02	178.9	23 59.7	1.0 02	178.9	23 29.7	1.0 02	178.9	22 59.7	1.0 02	178.9	22 29.7	1.0 02	178.9	21 59.7	1.0 02	178.9	21 29.7	1.0 02	178.9	1
2	24 58.8	1.0 03	177.8	24 28.8	1.0 03	177.8	23 58.8	1.0 03	177.8	23 28.8	1.0 03	177.8	22 58.8	1.0 03	177.9	22 28.8	1.0 03	177.9	21 58.8	1.0 03	177.9	21 28.8	1.0 02	177.9	2
3	24 57.2	1.0 04	176.7	24 27.2	1.0 04	176.7	23 57.2	1.0 04	176.8	23 27.2	1.0 04	176.8	22 57.3	1.0 04	176.8	22 27.3	1.0 04	176.8	21 57.3	1.0 04	176.8	21 27.3	1.0 04	176.8	3
4	24 55.0	1.0 05	175.6	24 25.0	1.0 05	175.7	23 55.1	1.0 05	175.7	23 25.1	1.0 05	175.7	22 55.1	1.0 05	175.7	22 25.1	1.0 05	175.7	21 55.2	1.0 04	175.8	21 25.2	1.0 04	175.8	4
05	24 52.2	1.0 06	174.5	24 22.3	1.0 06	174.6	23 52.3	1.0 06	174.6	23 22.3	1.0 06	174.6	22 52.4	1.0 06	174.7	22 22.4	1.0 06	174.7	21 52.5	1.0 06	174.7	21 22.5	1.0 06	174.7	05
6	24 48.8	1.0 07	173.5	24 18.9	1.0 07	173.5	23 48.9	1.0 07	173.5	23 19.0	1.0 07	173.6	22 49.0	1.0 07	173.6	22 19.1	1.0 07	173.6	21 49.1	1.0 07	173.7	21 19.2	1.0 06	173.7	6
7	24 44.8	1.0 08	172.4	24 14.8	1.0 08	172.4	23 44.9	1.0 08	172.4	23 15.0	1.0 08	172.5	22 45.1	1.0 08	172.5	22 15.2	1.0 08	172.6	21 45.2	1.0 08	172.6	21 15.3	1.0 07	172.6	7
8	24 40.1	1.0 09	171.3	24 10.2	1.0 09	171.3	23 40.3	1.0 09	171.4	23 10.4	1.0 09	171.4	22 40.5	1.0 09	171.5	22 10.6	1.0 09	171.5	21 40.7	1.0 08	171.5	21 10.8	1.0 08	171.6	8
9	24 34.9	1.0 10	170.2	24 05.0	1.0 10	170.2	23 35.1	1.0 10	170.3	23 05.2	1.0 10	170.3	22 35.4	1.0 10	170.4	22 05.5	1.0 10	170.4	21 35.6	1.0 10	170.5	21 05.8	1.0 09	170.5	9
10	24 29.9	99 11	169.1	23 59.1	99 11	169.2	23 29.3	99 11	169.2	22 59.5	99 11	169.3	22 29.6	99 11	169.3	21 59.8	99 11	169.4	21 29.9	99 10	169.4	21 00.1	99 10	169.5	10
1	24 22.5	99 12	168.0	23 52.7	99 12	168.1	23 22.9	99 12	168.2	22 53.1	99 12	168.2	22 23.3	99 12	168.3	21 53.5	99 12	168.3	21 23.7	99 11	168.4	20 53.8	99 11	168.5	1
2	24 15.4	99 13	166.9	23 45.7	99 13	167.0	23 15.9	99 13	167.1	22 46.1	99 13	167.2	22 16.3	99 13	167.2	21 46.6	99 12	167.3	21 16.8	99 12	167.3	20 47.0	99 12	167.4	2
3	24 07.7	99 14	165.9	23 38.0	99 14	165.9	23 08.3	99 14	166.0	22 38.6	99 14	166.1	22 08.8	99 14	166.2	21 39.1	99 13	166.2	21 09.3	99 13	166.3	20 39.6	99 13	166.4	3
4	23 59.5	99 15	164.8	23 29.8	99 15	164.9	23 00.1	99 15	165.0	22 30.4	99 15	165.0	22 00.7	99 14	165.1	21 31.0	99 14	165.2	21 01.3	99 14	165.3	20 31.6	99 14	165.3	4
15	23 50.6	99 16	163.7	23 21.0	99 16	163.8	22 51.3	99 16	163.9	22 21.7	99 16	164.0	21 52.0	99 15	164.1	21 22.4	99 15	164.1	20 52.7	99 15	164.2	20 23.1	99 15	164.3	15
6	23 41.2	99 17	162.7	23 11.6	99 17	162.7	22 42.0	99 17	162.8	22 12.4	99 16	162.9	21 42.8	99 16	163.0	21 13.2	99 16	163.1	20 43.5	99 16	163.2	20 13.9	99 16	163.3	6
7	23 31.1	98 18	161.6	23 01.6	98 18	161.7	22 32.0	99 18	161.8	22 02.5	99 17	161.9	21 32.9	99 17	162.0	21 03.4	99 17	162.1	20 33.8	99 17	162.1	20 04.2	99 17	162.2	7
8	23 20.5	98 19	160.5	22 51.0	98 19	160.6	22 21.5	98 18	160.7	21 52.0	98 18	160.8	21 22.5	98 18	160.9	20 53.0	98 18	161.0	20 23.5	98 18	161.1	19 54.0	98 18	161.2	8
9	23 09.4	98 20	159.5	22 39.9	98 19	159.6	22 10.5	98 19	159.7	21 41.0	98 19	159.8	21 11.6	98 19	159.9	20 42.1	98 19	160.0	20 12.7	98 19	160.1	19 43.2	98 19	160.2	9
20	22 57.6	98 20	158.4	22 28.2	98 20	158.5	21 58.8	98 20	158.6	21 29.5	98 20	158.7	21 00.1	98 20	158.9	20 30.7	98 20	159.0	20 01.3	98 20	159.1	19 31.9	98 20	159.2	20
1	22 45.3	98 21	157.4	22 16.0	98 21	157.5	21 46.7	98 21	157.6	21 17.3	98 21	157.7	20 48.0	98 21	157.8	20 18.7	98 21	157.9	19 49.3	98 21	158.0	19 20.0	98 21	158.2	1
2	22 32.5	98 22	156.3	22 03.2	98 22	156.4	21 33.9	98 22	156.6	21 04.7	98 22	156.7	20 35.4	98 22	156.8	20 06.1	98 22	156.9	19 36.8	98 22	157.0	19 07.5	98 22	157.1	2
3	22 19.1	97 23	155.3	21 49.9	97 23	155.4	21 20.7	97 23	155.5	20 51.5	97 23	155.6	20 22.2	97 23	155.8	19 53.0	97 23	155.9	19 23.8	97 23	156.0	18 54.6	97 22	156.1	3
4	22 05.1	97 24	154.2	21 36.0	97 24	154.4	21 06.9	97 24	154.5	20 37.7	97 24	154.6	20 08.6	97 24	154.7	19 39.4	97 24	154.9	19 10.2	97 23	155.0	18 41.1	97 23	155.1	4
25	21 50.7	97 25	153.2	21 21.6	97 25	153.3	20 52.5	97 25	153.5	20 23.4	97 25	153.6	19 54.4	97 25	153.7	19 25.3	97 24	153.9	18 56.2	97 24	154.0	18 27.1	97 24	154.1	25
6	21 35.7	97 26	152.2	21 06.7	97 26	152.3	20 37.7	97 26	152.4	20 08.7	97 26	152.6	19 39.6	97 25	152.7	19 10.6	97 25	152.8	18 41.6	97 25	153.0	18 12.6	97 25	153.1	6
7	21 20.2	96 27	151.1	20 51.2	96 27	151.3	20 22.3	96 26	151.4	19 53.3	96 26	151.6	19 24.4	97 26	151.7	18 55.4	97 26	151.8	18 26.5	97 26	152.0	17 57.5	97 26	152.1	7
8	21 04.1	96 28	150.1	20 35.3	96 27	150.3	20 06.4	96 27	150.4	19 37.5	96 27	150.6	19 08.7	96 27	150.7	18 39.8	96 27	150.8	18 10.9	96 27	151.0	17 42.0	96 27	151.1	8
9	20 47.6	96 28	149.1	20 18.8	96 28	149.3	19 50.0	96 28	149.4	19 21.2	96 28	149.5	18 52.4	96 28	149.7	18 23.6	96 28	149.8	17 54.8	96 28	150.0	17 26.0	96 28	150.1	9
30	20 30.6	96 29	148.1	20 01.9	96 29	148.2	19 33.1	96 29	148.4	19 04.4	96 29	148.5	18 35.7	96 29	148.7	18 06.9	96 29	148.9	17 38.2	96 28	149.0	17 09.4	96 28	149.2	30
1	20 13.0	95 30	147.1	19 44.4	95 30	147.2	19 15.8	95 30	147.4	18 47.1	96 30	147.6	18 18.5	96 30	147.7	17 49.8	96 29	147.9	17 21.1	96 29	148.0	16 52.4	96 29	148.2	1
2	19 55.0	95 31	146.1	19 26.5	95 31	146.2	18 57.9	95 31	146.4	18 29.3	95 30	146.6	18 00.8	95 30	146.7	17 32.2	95 30	146.9	17 03.6	95 30	147.0	16 35.0	95 30	147.2	2
3	19 36.6	95 32	145.1	19 08.1	95 31	145.2	18 39.6	95 31	145.4	18 11.1	95 31	145.6	17 42.6	95 31	145.7	17 14.1	95 31	145.9	16 45.6	95 31	146.1	16 17.0	95 31	146.2	3
4	19 17.6	95 32	144.1	18 49.2	95 32	144.2	18 20.8	95 32	144.4	17 52.4	95 32	144.6	17 24.0	95 32	144.8	16 55.5	95 32	144.9	16 27.1	95 32	145.1	15 58.6	95 31	145.3	4
35	18 58.2	94 33	143.1	18 29.9	94 33	143.3	18 01.6	94 33	143.4	17 33.2	94 33	143.6	17 04.9	95 33	143.8	16 36.5	95 32	143.9	16 08.2	95 32	144.1	15 39.8	95 32	144.3	35
6	18 38.4	94 34	142.1	18 10.1	94 34	142.3	17 41.9	94 34	142.5	17 13.6	94 33	142.6	16 45.4	94 33	142.8	16 17.1	94 33	143.0	15 48.8	94 33	143.2	15 20.5	94 33	143.3	6
7	18 18.1	94 35	141.1	17 49.9	94 34	141.3	17 21.7	94 34	141.5	16 53.6	94 34	141.7	16 25.4	94 34	141.8	15 57.2	94 34	142.0	15 29.0	94 34	142.2	15 00.8	94 34	142.4	7
8	17 57.4	94 35	140.1	17 29.3	94 35	140.3	17 01.2	94 35	140.5	16 33.1	94 35	140.7	16 05.0	94 35	140.9	15 36.9	94 35	141.1	15 08.7	94 34	141.2	14 40.6	94 34	141.4	8
9	17 36.2	93 36	139.2	17 08.2	93 36	139.4	16 40.2	93 36	139.5	16 12.2	93 36	139.7	15 44.1	93 35	139.9	15 16.1	93 35	140.1	14 48.1	94 35	140.3	14 20.0	94 35	140.5	9
40	17 14.6	93 37	138.2	16 46.7	93 36	138.4	16 18.8	93 36	138.6	15 50.8	93 36	138.8	15 22.9	93 36	139.0	14 54.9	93 36	139.2	14 27.0	93 36	139.3	13 59.0	93 36	139.5	40
1	16 52.6	93 37	137.2	16 24.8	93 37	137.4	15 57.0	93 37	137.6	15 29.1	93 37	137.8	15 01.2	93 37	138.0	14 33.4	93 37	138.2	14 05,5	93 36	138.4	13 37.6	93 36	138.6	1
2	16 30.3	92 38	136.3	16 02.5	93 38	136.5	15 34.7	93 38	136.7	15 07.0	93 38	136.9	14 39.2	93 37	137.1	14 11.4	93 37	137.3	13 43.6	93 37	137.5	13 15.8	93 37	137.6	2
3	16 07.5	92 39	135.3	15 39.8	92 38	135.5	15 12.1	92 38	135.7	14 44.4	92 38	135.9	14 16.7	92 38	136.1	13 49.0	92 38	136.3	13 21.3	92 38	136.5	12 53.6	92 38	136.7	3
4	15 44.3	92 39	134.4	15 16.7	92 39	134.6	14 49.1	92 39	134.8	14 21.5	92 39	135.0	13 53.9	92 39	135.2	13 26.3	92 39	135.4	12 58.6	92 38	135.6	12 31.0	92 38	135.8	4
45	15 20.8	92 40	133.4	14 53.3	92 40	133.6	14 25.7	92 40	133.9	13 58.2	92 39	134.1	13 30.7	92 39	134.3	13 03.1	92 39	134.5	12 35.6	92 39	134.7	12 08.0	92 39	134.9	45
6	14 56.9	91 40	132.5	14 29.4	91 40	132.7	14 02.0	91 40	132.9	13 34.5	92 40	133.1	13 07.1	92 40	133.3	12 39.6	92 40	133.5	12 12.1	92 40	133.7	11 44.6	92 40	133.9	6
7	14 32.6	91 41	131.6	14 05.2	91 41	131.8	13 37.9	91 41	132.0	13 10.5	91 41	132.2	12 43.1	91 41	132.4	12 15.7	91 40	132.6	11 48.3	91 40	132.8	11 20.9	91 40	133.0	7
8	14 08.0	91 42	130.6	13 40.7	91 41	130.8	13 13.4	91 41	131.1	12 46.1	91 41	131.3	12 18.8	91 41	131.5	11 51.5	91 41	131.7	11 24.2	91 41	131.9	10 56.9	91 41	132.1	8
9	13 43.0	91 42	129.7	13 15.8	91 42	129.9	12 48.6	91 42	130.1	12 21.4	91 42	130.4	11 54.2	91 42	130.6	11 26.9	91 42	130.8	10 59.7	91 41	131.0	10 32.5	91 41	131.2	9
50	13 17.7	90 43	128.8	12 50.6	90 43	129.0	12 23.5	90 42	129.2	11 56.3	90 42	129.4	11 29.2	90 42	129.7	11 02.0	91 42	129.9	10 34.9	91 42	130.1	10 07.7	91 42	130.3	50
1	12 52.0	90 43	127.9	12 25.0	90 43	128.1	11 58.0	90 43	128.3	11 30.9	90 43	128.5	11 03.9	90 43	128.8	10 36.8	90 43	129.0	10 09.7	90 42	129.2	9 42.6	90 42	129.4	1
2	12 26.1	90 44	127.0	11 59.1	90 44	127.2	11 32.2	90 44	127.4	11 05.2	90 43	127.6	10 38.2	90 43	127.9	10 11.2	90 43	128.1	9 44.2	90 43	128.3	9 17.2	90 43	128.5	2
3	11 59.8	90 44	126.0	11 32.9	90 44	126.3	11 06.1	90 44	126.5	10 39.2	90 44	126.7	10 12.3	90 44	127.0	9 45.3	90 44	127.2	9 18.4	90 44	127.4	8 51.5	90 43	127.6	3
4	11 33.3	89 45	125.1	11 06.5	89 45	125.4	10 39.6	89 45	125.6	10 12.8	89 44	125.8	9 46.0	89 44	126.1	9 19.2	89 44	126.3	8 52.3	90 44	126.5	8 25.4	90 44	126.7	4
55	11 06.4	89 45	124.2	10 39.7	89 45	124.5	10 12.9	89 45	124.7	9 46.2	89 45	124.9	9 19.4	89 45	125.2	8 52.7	89 45	125.4	8 25.9	89 44	125.6	7 59.1	89 44	125.8	55
6	10 39.2	89 46	123.3	10 12.6	89 46	123.6	9 45.9	89 46	123.8	9 19.2	89 45	124.0	8 52.6	89 45	124.3	8 25.9	89 45	124.5	7 59.2	89 45	124.7	7 32.5	89 45	125.0	6
7	10 11.8	89 46	122.5	9 45.2	89 46	122.7	9 18.6	89 46	122.9	8 52.0	89 46	123.2	8 25.4	89 46	123.4	7 58.8	89 46	123.6	7 32.2	89 45	123.9	7 05.6	89 45	124.1	7
8	9 44.1	88 47	121.6	9 17.6	88 46	121.8	8 51.1	88 46	122.0	8 24.5	88 46	122.3	7 58.0	88 46	122.5	7 31.5	88 46	122.7	7 04.9	89 46	123.0	6 38.4	89 46	123.2	8
9	9 16.1	88 47	120.7	8 49.7	88 47	120.9	8 23.2	88 47	121.2	7 56.8	88 47	121.4	7 30.3	88 47	121.6	7 03.8	88 46	121.9	6 37.4	88 46	122.1	6 10.9	88 46	122.3	9
60	8 47.9	88 47	119.8	8 21.5	88 47	120.0	7 55.1	88 47	120.3	7 28.7	88 47	120.5	7 02.4	88 47	120.8	6 36.0	88 47	121.0	6 09.5	88 47	121.2	5 43.1	88 47	121.5	60
1	8 19.4	88 48	118.9	7 53.1	88 48	119.2	7 26.8	88 48	119.4	7 00.5	88 48	119.6	6 34.1	88 47	119.9	6 07.8	88 47	120.1	5 41.5	88 47	120.4	5 15.1	88 47	120.6	1
2	7 50.7	87 48	118.0	7 24.4	87 48	118.3	6 58.2	87 48	118.5	6 31.9	88 48	118.8	6 05.7	88 48	119.0	5 39.4	88 48	119.3	5 13.2	88 48	119.5				2
3	7 21.7	87 49	117.2	6 55.5	87 49	117.4	6 29.4	87 48	117.7	6 03.2	87 48	117.9	5 37.0	87 48	118.2	5 10.8	87 48	118.4							3
4	6 52.5	87 49	116.3	6 26.4	87 49	116.5	6 00.3	87 49	116.8	5 34.2	87 49	117.0	5 08.1	87 48	117.3										4
65	6 23.1	87 49	115.4	5 57.1	87 49	115.7	5 31.0	87 49	115.9	5 05.0	87 49	116.2													65
6	5 53.5	87 50	114.6	5 27.5	87 50	114.8	5 01.5	87 50	115.1																6
7	5 23.7	86 50	113.7																						7

DECLINATION SAME NAME AS LATITUDE

Lat 58°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	6 09.6	84 54	84.8	6 34.7	84 54	84.5	6 59.8	84 54	84.2	7 24.9	84 54	84.0	7 49.9	84 54	83.7	8 15.0	84 54	83.4	8 40.0	83 54	83.1	9 05.1	83 54	82.8	91
2	5 37.1	84 54	84.0	6 02.2	84 54	83.7	6 27.3	84 54	83.4	6 52.4	84 54	83.1	7 17.5	84 54	82.9	7 42.6	84 54	82.6	8 07.6	84 54	82.3	8 32.7	83 54	82.0	2
3	5 04.6	84 54	83.1	5 29.7	84 54	82.8	5 54.9	84 54	82.6	6 20.0	84 54	82.3	6 45.1	84 54	82.0	7 10.2	84 54	81.7	7 35.3	84 54	81.5	8 00.3	84 54	81.2	3
4							5 22.5	84 54	81.7	5 47.6	84 54	81.5	6 12.8	84 54	81.2	6 37.9	84 54	80.9	7 03.0	84 54	80.6	7 28.1	84 54	80.4	4
95										5 15.4	84 54	80.6	5 40.5	84 54	80.4	6 05.6	84 54	80.1	6 30.8	84 54	79.8	6 55.9	84 54	79.5	95
6													5 08.3	84 54	79.5	5 33.5	84 53	79.3	5 58.7	84 53	79.0	6 23.8	84 53	78.7	6
7																5 01.4	84 53	78.4	5 26.6	84 53	78.2	5 51.8	84 53	77.9	7
8																						5 19.9	84 53	77.1	8

Digitized by Google

La 59

Lat. 57°

H.A.	12° 00′		12° 30′		13° 00′		13° 30′		14° 00′		14° 30′		15° 00′		15° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	45 00.0 1.0 01	180.0	45 30.0 1.0 01	180.0	46 00.0 1.0 01	180.0	46 30.0 1.0 01	180.0	47 00.0 1.0 01	180.0	47 30.0 1.0 01	180.0	48 00.0 1.0 01	180.0	48 30.0 1.0 01	180.0	00
1	44 59.6 1.0 02	178.6	45 29.6 1.0 02	178.6	45 59.6 1.0 02	178.6	46 29.6 1.0 02	178.6	46 59.6 1.0 02	178.6	47 29.6 1.0 02	178.6	47 59.6 1.0 02	178.6	48 29.6 1.0 02	178.5	1
2	44 58.4 1.0 03	177.2	45 28.4 1.0 03	177.2	45 58.4 1.0 03	177.2	46 28.4 1.0 03	177.2	46 58.4 1.0 03	177.2	47 28.4 1.0 03	177.1	47 58.4 1.0 03	177.1	48 28.3 1.0 03	177.1	2
3	44 56.5 1.0 05	175.9	45 26.4 1.0 05	175.8	45 56.4 1.0 05	175.8	46 26.4 1.0 05	175.8	46 56.4 1.0 05	175.7	47 26.3 1.0 05	175.7	47 56.3 1.0 05	175.7	48 26.3 1.0 05	175.6	3
4	44 53.7 1.0 06	174.5	45 23.7 1.0 06	174.4	45 53.6 1.0 06	174.4	46 23.6 1.0 06	174.4	46 53.5 1.0 06	174.3	47 23.5 1.0 06	174.3	47 53.4 1.0 06	174.2	48 23.4 1.0 06	174.2	4
05	44 50.2 1.0 07	173.1	45 20.1 1.0 07	173.0	45 50.0 1.0 07	173.0	46 20.0 1.0 07	172.9	46 49.9 1.0 07	172.9	47 19.8 1.0 07	172.8	47 49.7 1.0 08	172.8	48 19.7 1.0 08	172.7	05
6	44 45.8 1.0 08	171.7	45 15.7 1.0 09	171.7	45 45.6 1.0 09	171.6	46 15.5 1.0 09	171.5	46 45.4 1.0 09	171.5	47 15.3 1.0 09	171.4	47 45.2 1.0 09	171.4	48 15.1 1.0 09	171.3	6
7	44 40.7 1.0 10	170.3	45 10.6 1.0 10	170.3	45 40.5 1.0 10	170.2	46 10.3 1.0 10	170.1	46 40.2 1.0 10	170.1	47 10.1 1.0 10	170.0	47 39.9 1.0 10	169.9	48 09.8 1.0 10	169.9	7
8	44 34.9 99 11	169.0	45 04.7 99 11	168.9	45 34.5 99 11	168.8	46 04.4 99 11	168.8	46 34.2 99 11	168.7	47 04.0 99 11	168.6	47 33.8 99 12	168.5	48 03.6 99 12	168.4	8
9	44 28.3 99 12	167.6	44 58.0 99 12	167.5	45 27.8 99 12	167.4	45 57.6 99 13	167.4	46 27.4 99 13	167.3	46 57.1 99 13	167.2	47 26.9 99 13	167.1	47 56.7 99 13	167.0	9
10	44 20.9 99 14	166.3	44 50.6 99 14	166.2	45 20.3 99 14	166.1	45 50.1 99 14	166.0	46 19.8 99 14	165.9	46 49.5 99 14	165.8	47 19.2 99 14	165.7	47 48.9 99 14	165.6	10
1	44 12.7 99 15	164.9	44 42.4 99 15	164.8	45 12.1 99 15	164.7	45 41.8 99 15	164.6	46 11.4 99 15	164.5	46 41.1 99 15	164.4	47 10.7 99 15	164.3	47 40.4 99 16	164.2	1
2	44 03.9 99 16	163.6	44 33.5 99 16	163.4	45 03.1 99 16	163.3	45 32.7 99 16	163.2	46 02.3 99 16	163.1	46 31.9 99 17	163.0	47 01.5 99 17	162.9	47 31.1 99 17	162.7	2
3	43 54.2 99 17	162.2	44 23.8 99 17	162.1	44 53.4 98 17	162.0	45 22.9 98 18	161.9	45 52.4 98 18	161.7	46 22.0 98 18	161.6	46 51.5 98 18	161.5	47 21.0 98 18	161.3	3
4	43 43.9 98 18	160.9	44 13.4 98 19	160.8	44 42.9 98 19	160.6	45 12.4 98 19	160.5	45 41.8 98 19	160.4	46 11.3 98 19	160.2	46 40.7 98 19	160.1	47 10.2 98 19	159.9	4
15	43 32.8 98 20	159.6	44 02.3 98 20	159.4	44 31.7 98 20	159.3	45 01.1 98 20	159.1	45 30.5 98 20	159.0	45 59.9 98 20	158.9	46 29.2 98 20	158.7	46 58.6 98 21	158.6	15
6	43 21.1 98 21	158.2	43 50.4 98 21	158.1	44 19.8 98 21	157.9	44 49.1 98 21	157.8	45 18.4 98 21	157.6	45 47.7 98 21	157.5	46 17.0 98 22	157.3	46 46.3 98 22	157.2	6
7	43 08.6 98 22	156.9	43 37.9 98 22	156.8	44 07.1 98 22	156.6	44 36.4 97 22	156.5	45 05.6 97 22	156.3	45 34.8 97 23	156.1	46 04.0 97 23	156.0	46 33.2 97 23	155.8	7
8	42 55.5 97 23	155.6	43 24.7 97 23	155.5	43 53.8 97 23	155.3	44 23.0 97 23	155.1	44 52.1 97 24	155.0	45 21.3 97 24	154.8	45 50.4 97 24	154.6	46 19.5 97 24	154.5	8
9	42 41.6 97 24	154.3	43 10.7 97 24	154.2	43 39.8 97 24	154.0	44 08.9 97 25	153.8	44 38.0 97 25	153.6	45 07.0 97 25	153.5	45 36.1 97 25	153.3	46 05.1 97 25	153.1	9
20	42 27.2 97 25	153.0	42 56.2 97 25	152.9	43 25.2 97 26	152.7	43 54.2 97 26	152.5	44 23.1 97 26	152.3	44 52.1 96 26	152.1	45 21.0 96 26	152.0	45 49.9 96 26	151.8	20
1	42 12.0 96 26	151.8	42 40.9 96 26	151.6	43 09.9 96 27	151.4	43 38.8 96 27	151.2	44 07.6 96 27	151.0	44 36.5 96 27	150.8	45 05.3 96 27	150.6	45 34.2 96 27	150.4	1
2	41 56.2 96 27	150.5	42 25.1 96 28	150.3	42 53.9 96 28	150.1	43 22.7 96 28	149.9	43 51.5 96 28	149.7	44 20.2 96 28	149.5	44 49.0 96 28	149.3	45 17.7 96 28	149.1	2
3	41 39.8 96 28	149.2	42 08.6 96 29	149.0	42 37.3 96 29	148.8	43 06.0 96 29	148.6	43 34.7 96 29	148.4	44 03.4 96 29	148.2	44 32.0 96 29	148.0	45 00.6 96 30	147.8	3
4	41 22.8 96 29	148.0	41 51.4 95 30	147.8	42 20.1 95 30	147.6	42 48.7 95 30	147.4	43 17.3 95 30	147.2	43 45.8 95 30	147.0	44 14.4 95 30	146.7	44 42.9 95 31	146.5	4
25	41 05.2 95 30	146.7	41 33.7 95 31	146.5	42 02.3 95 31	146.3	42 30.8 95 31	146.1	42 59.3 95 31	145.9	43 27.7 95 31	145.7	43 56.2 95 31	145.5	44 24.6 95 32	145.2	25
6	40 47.0 95 31	145.5	41 15.4 95 32	145.3	41 43.8 95 32	145.1	42 12.3 95 32	144.9	42 40.6 95 32	144.7	43 09.0 94 32	144.4	43 37.3 94 32	144.2	44 05.6 94 33	144.0	6
7	40 28.2 95 32	144.3	40 56.5 94 32	144.1	41 24.9 94 33	143.9	41 53.2 94 33	143.6	42 21.5 94 33	143.4	42 49.7 94 33	143.2	43 17.9 94 33	142.9	43 46.1 94 33	142.7	7
8	40 08.8 94 33	143.1	40 37.1 94 33	142.9	41 05.3 94 34	142.6	41 33.5 94 34	142.4	42 01.7 94 34	142.2	42 29.8 94 34	141.9	42 58.0 94 34	141.7	43 26.1 94 34	141.5	8
9	39 48.9 94 34	141.9	40 17.1 94 34	141.6	40 45.2 94 34	141.4	41 13.3 94 35	141.2	41 41.4 94 35	141.0	42 09.4 93 35	140.7	42 37.4 93 35	140.5	43 05.4 93 35	140.2	9
30	39 28.5 94 35	140.7	39 56.5 93 35	140.5	40 24.6 93 35	140.2	40 52.6 93 35	140.0	41 20.5 93 36	139.7	41 48.5 93 36	139.5	42 16.4 93 36	139.3	42 44.3 93 36	139.0	30
1	39 07.5 93 36	139.5	39 35.5 93 36	139.3	40 03.4 93 36	139.0	40 31.3 93 36	138.8	40 59.1 93 36	138.5	41 27.0 93 37	138.3	41 54.8 93 37	138.0	42 22.6 93 37	137.8	1
2	38 46.0 93 37	138.3	39 13.9 93 37	138.1	39 41.7 93 37	137.9	40 09.5 93 37	137.6	40 37.3 92 37	137.4	41 05.0 92 38	137.1	41 32.7 92 38	136.8	42 00.4 92 38	136.6	2
3	38 24.1 93 37	137.2	38 51.8 92 38	136.9	39 19.5 92 38	136.7	39 47.2 92 38	136.4	40 14.9 92 38	136.2	40 42.5 92 38	135.9	41 10.1 92 38	135.7	41 37.6 92 39	135.4	3
4	38 01.6 92 38	136.0	38 29.3 92 38	135.8	38 56.9 92 39	135.5	39 24.5 92 39	135.3	39 52.0 92 39	135.0	40 19.5 92 39	134.8	40 47.0 92 39	134.5	41 14.5 91 39	134.2	4
35	37 38.7 92 39	134.9	38 06.2 92 39	134.6	38 33.7 92 39	134.4	39 01.2 92 39	134.1	39 28.7 91 40	133.9	39 56.1 91 40	133.6	40 23.5 91 40	133.3	40 50.8 91 40	133.1	35
6	37 15.3 92 40	133.8	37 42.7 91 40	133.5	38 10.2 91 40	133.2	38 37.5 91 40	133.0	39 04.9 91 40	132.7	39 32.2 91 41	132.4	39 59.5 91 41	132.2	40 26.7 91 41	131.9	6
7	36 51.5 91 40	132.6	37 18.8 91 41	132.4	37 46.1 91 41	132.1	38 13.4 91 41	131.9	38 40.7 91 41	131.6	39 07.9 91 41	131.3	39 35.0 91 41	131.0	40 02.2 90 42	130.8	7
8	36 27.2 91 41	131.5	36 54.5 91 41	131.3	37 21.7 91 41	131.0	37 48.9 91 42	130.7	38 16.0 90 42	130.5	38 43.1 90 42	130.2	39 10.2 90 42	129.9	39 37.2 90 42	129.6	8
9	36 02.5 91 42	130.4	36 29.7 90 42	130.2	36 56.8 90 42	129.9	37 23.9 90 42	129.6	37 50.9 90 42	129.3	38 18.0 90 43	129.1	38 44.9 90 43	128.8	39 11.8 90 43	128.5	9
40	35 37.5 90 42	129.3	36 04.5 90 43	129.1	36 31.5 90 43	128.8	36 58.5 90 43	128.5	37 25.5 90 43	128.2	37 52.4 90 43	128.0	38 19.3 89 43	127.7	38 46.1 89 44	127.4	40
1	35 12.0 90 43	128.2	35 39.0 90 43	128.0	36 05.9 90 43	127.7	36 32.8 90 44	127.4	36 59.6 89 44	127.2	37 26.4 89 44	126.9	37 53.2 89 44	126.6	38 19.9 89 44	126.3	1
2	34 46.1 90 44	127.2	35 13.0 89 44	126.9	35 39.8 89 44	126.6	36 06.6 89 44	126.4	36 33.4 89 44	126.1	37 00.1 89 44	125.8	37 26.8 89 45	125.5	37 53.4 89 45	125.2	2
3	34 19.9 89 44	126.1	34 46.7 89 44	125.8	35 13.4 89 45	125.6	35 40.1 89 45	125.3	36 06.8 89 45	125.0	36 33.4 89 45	124.7	37 00.0 89 45	124.4	37 26.5 88 45	124.1	3
4	33 53.4 89 45	125.1	34 20.0 89 45	124.8	34 46.7 89 45	124.5	35 13.3 89 45	124.2	35 39.9 88 45	123.9	36 06.4 88 46	123.7	36 32.9 88 46	123.4	36 59.3 88 46	123.1	4
45	33 26.4 89 45	124.0	33 53.0 89 46	123.7	34 19.6 88 46	123.5	34 46.1 88 46	123.2	35 12.6 88 46	122.9	35 39.0 88 46	122.6	36 05.4 88 46	122.3	36 31.8 88 46	122.0	45
6	32 59.2 88 46	123.0	33 25.7 88 46	122.7	33 52.2 88 46	122.4	34 18.6 88 46	122.1	34 45.0 88 47	121.8	35 11.3 88 47	121.6	35 37.6 88 47	121.3	36 03.9 87 47	121.0	6
7	32 31.6 88 46	122.0	32 58.0 88 47	121.7	33 24.4 88 47	121.4	33 50.8 88 47	121.1	34 17.1 88 47	120.8	34 43.3 87 47	120.5	35 09.6 87 47	120.2	35 35.7 87 47	119.9	7
8	32 03.7 88 47	120.9	32 30.1 88 47	120.7	32 56.4 88 47	120.4	33 22.6 87 47	120.1	33 48.9 87 48	119.8	34 15.0 87 48	119.5	34 41.2 87 48	119.2	35 07.3 87 48	118.9	8
9	31 35.6 88 47	119.9	32 01.8 87 48	119.6	32 28.0 87 48	119.4	32 54.2 87 48	119.1	33 20.4 87 48	118.8	33 46.4 87 48	118.5	34 12.5 87 48	118.2	34 38.5 87 48	117.9	9
50	31 07.1 87 48	118.9	31 33.3 87 48	118.6	31 59.4 87 48	118.4	32 25.5 87 48	118.1	32 51.6 87 48	117.8	33 17.6 87 49	117.5	33 43.6 87 49	117.2	34 09.5 86 49	116.9	50
1	30 38.4 87 48	117.9	31 04.5 87 48	117.6	31 30.5 87 49	117.4	31 56.5 87 49	117.1	32 22.5 87 49	116.8	32 48.5 86 49	116.5	33 14.4 86 49	116.2	33 40.2 86 49	115.9	1
2	30 09.4 87 49	116.9	30 35.4 87 49	116.7	31 01.4 87 49	116.4	31 27.3 86 49	116.1	31 53.2 86 49	115.8	32 19.1 86 49	115.5	32 44.9 86 49	115.2	33 10.7 86 50	114.9	2
3	29 40.1 87 49	116.0	30 06.1 86 49	115.7	30 32.0 86 49	115.4	30 57.8 86 50	115.1	31 23.7 86 50	114.8	31 49.5 86 50	114.5	32 15.2 86 50	114.2	32 40.9 86 50	113.9	3
4	29 10.6 86 50	115.0	29 36.5 86 50	114.7	30 02.3 86 50	114.4	30 28.1 86 50	114.1	30 53.9 86 50	113.8	31 19.6 86 50	113.5	31 45.3 86 50	113.2	32 10.9 85 50	112.9	4
55	28 40.9 86 50	114.0	29 06.7 86 50	113.7	29 32.5 86 50	113.4	29 58.2 86 50	113.2	30 23.9 86 50	112.9	30 49.5 85 50	112.6	31 15.2 85 51	112.2	31 40.7 85 51	111.9	55
6	28 10.9 86 50	113.1	28 36.7 86 50	112.8	29 02.4 86 50	112.5	29 28.0 86 51	112.2	29 53.7 85 51	111.9	30 19.3 85 51	111.6	30 44.8 85 51	111.3	31 10.3 85 51	111.0	6
7	27 40.7 86 51	112.1	28 06.4 86 51	111.8	28 32.1 85 51	111.5	28 57.7 85 51	111.2	29 23.2 85 51	110.9	29 48.8 85 51	110.6	30 14.3 85 51	110.3	30 39.7 85 51	110.0	7
8	27 10.4 85 51	111.2	27 36.0 85 51	110.9	28 01.6 85 51	110.6	28 27.1 85 51	110.3	28 52.6 85 51	110.0	29 18.1 85 51	109.7	29 43.5 85 52	109.4	30 08.9 85 52	109.1	8
9	26 39.8 85 51	110.2	27 05.4 85 51	110.0	27 30.9 85 51	109.7	27 56.4 85 52	109.4	28 21.8 85 52	109.1	28 47.2 85 52	108.8	29 12.6 84 52	108.5	29 37.9 84 52	108.1	9
60	26 09.1 85 52	109.3	26 34.6 85 52	109.0	27 00.0 85 52	108.7	27 25.5 85 52	108.4	27 50.9 85 52	108.1	28 16.2 84 52	107.8	28 41.5 84 52	107.5	29 06.8 84 52	107.2	60
1	25 38.1 85 52	108.4	26 03.6 85 52	108.1	26 29.0 85 52	107.8	26 54.4 85 52	107.5	27 19.7 84 52	107.2	27 45.0 84 52	106.9	28 10.3 84 52	106.6	28 35.5 84 52	106.3	1
2	25 07.0 85 52	107.5	25 32.4 85 52	107.2	25 57.8 84 53	106.9	26 23.1 84 52	106.6	26 48.4 84 52	106.3	27 13.7 84 52	106.0	27 38.9 84 53	105.7	28 04.1 84 53	105.4	2
3	24 35.8 85 52	106.6	25 01.2 84 52	106.3	25 26.5 84 52	106.0	25 51.8 84 53	105.7	26 17.0 84 53	105.4	26 42.2 84 53	105.1	27 07.4 84 53	104.8	27 32.5 84 53	104.5	3
4	24 04.4 84 53	105.7	24 29.7 84 53	105.4	24 55.0 84 53	105.1	25 20.2 84 53	104.8	25 45.4 84 53	104.5	26 10.6 84 53	104.2	26 35.7 84 53	103.9	27 00.8 84 53	103.6	4
65	23 32.9 84 53	104.8	23 58.1 84 53	104.5	24 23.4 84 53	104.2	24 48.6 84 53	103.9	25 13.7 84 53	103.6	25 38.8 84 53	103.3	26 03.9 84 53	103.0	26 29.0 83 53	102.6	65
6	23 01.2 84 53	103.9	23 26.4 84 53	103.6	23 51.6 84 53	103.3	24 16.8 84 53	103.0	24 41.9 84 53	102.7	25 07.0 84 53	102.4	25 32.0 83 53	102.1	25 57.0 83 53	101.8	6
7	22 29.4 84 53	103.0	22 54.6 84 53	102.7	23 19.8 84 53	102.4	23 44.9 84 53	102.1	24 09.9 84 53	101.8	24 35.0 83 53	101.5	25 00.0 83 54	101.2	25 25.0 83 54	100.9	7
8	21 57.5 84 53	102.1	22 22.7 84 53	101.8	22 47.8 84 53	101.5	23 12.9 84 54	101.2	23 37.9 83 54	100.9	24 02.9 83 54	100.6	24 27.9 83 54	100.3	24 52.8 83 54	100.0	8
9	21 25.5 84 54	101.2	21 50.6 84 54	100.9	22 15.7 84 54	100.6	22 40.8 83 54	100.3	23 05.8 83 54	100.0	23 30.8 83 54	99.7	23 55.7 83 54	99.4	24 20.6 83 54	99.1	9
70	20 53.4 84 54	100.3	21 18.5 84 54	100.0	21 43.5 83 54	99.7	22 08.6 83 54	99.4	22 33.5 83 54	99.1	22 58.5 83 54	98.8	23 23.4 83 54	98.5	23 48.3 83 54	98.2	70
1	20 21.2 84 54	99.4	20 46.3 83 54	99.2	21 11.3 83 54	98.9	21 36.3 83 54	98.6	22 01.2 83 54	98.3	22 26.2 83 54	98.0	22 51.1 83 54	97.7	23 15.9 83 54	97.4	1
2	19 48.9 83 54	98.6	20 14.0 83 54	98.3	20 39.0 83 54	98.0	21 03.9 83 54	97.7	21 28.9 83 54	97.4	21 53.8 83 54	97.1	22 18.7 83 54	96.8	22 43.5 83 54	96.5	2
3	19 16.6 83 54	97.7	19 41.6 83 54	97.4	20 06.6 83 54	97.1	20 31.5 83 54	96.8	20 56.4 83 54	96.5	21 21.3 83 54	96.2	21 46.2 83 54	95.9	22 11.0 83 54	95.6	3
4	18 44.2 83 54	96.8	19 09.2 83 54	96.6	19 34.1 83 54	96.3	19 59.0 83 54	96.0	20 23.9 83 54	95.7	20 48.8 83 54	95.4	21 13.6 83 54	95.1	21 38.5 83 54	94.8	4
75	18 11.7 83 54	96.0	18 36.7 83 54	95.7	19 01.6 83 54	95.4	19 26.5 83 54	95.1	19 51.4 83 54	94.8	20 16.3 83 54	94.5	20 41.1 83 54	94.2	21 05.9 83 54	93.9	75
6	17 39.2 83 54	95.1	18 04.1 83 54	94.8	18 29.1 83 54	94.5	18 53.9 83 54	94.3	19 18.8 83 54	94.0	19 43.7 83 54	93.7	20 08.5 83 54	93.4	20 33.3 83 54	93.1	6
7	17 06.6 83 54	94.3	17 31.5 83 54	94.0	17 56.5 83 54	93.7	18 21.3 83 54	93.4	18 46.2 83 54	93.1	19 11.0 83 54	92.8	19 35.8 83 54	92.5	20 00.6 83 54	92.2	7
8	16 34.0 83 54	93.4	16 58.9 83 54	93.1	17 23.8 83 54	92.8	17 48.7 83 54	92.6	18 13.6 83 54	92.3	18 38.4 83 54	92.0	19 03.2 83 54	91.7	19 27.9 83 54	91.4	8
9	16 01.4 83 54	92.6	16 26.3 83 54	92.3	16 51.2 83 54	92.0	17 16.1 83 54	91.7	17 40.9 83 54	91.4	18 05.7 83 54	91.1	18 30.5 83 54	90.8	18 55.3 82 54	90.5	9
80	15 28.7 83 54	91.7	15 53.6 83 54	91.4	16 18.5 83 54	91.2	16 43.4 83 54	90.9	17 08.2 83 54	90.6	17 33.0 83 54	90.3	17 57.8 83 54	90.0	18 22.6 82 54	89.7	80
1	14 56.0 83 54	90.9	15 21.0 83 54	90.6	15 45.8 83 54	90.3	16 10.7 83 54	90.0	16 35.5 83 54	89.7	17 00.4 83 54	89.4	17 25.2 83 54	89.1	17 49.9 83 54	88.8	1
2	14 23.4 83 54	90.1	14 48.3 83 54	89.8	15 13.2 83 54	89.5	15 38.0 83 54	89.2	16 02.9 83 54	88.9	16 27.7 83 54	88.6	16 52.5 83 54	88.3	17 17.3 83 54	88.0	2
3	13 50.7 83 54	89.2	14 15.6 83 54	88.9	14 40.5 83 54	88.6	15 05.4 83 54	88.4	15 30.2 83 54	88.1	15 55.0 83 54	87.8	16 19.8 83 54	87.5	16 44.6 83 54	87.2	3
4	13 18.0 83 54	88.4	13 42.9 83 54	88.1	14 07.8 83 54	87.8	14 32.7 83 54	87.5	14 57.6 83 54	87.2	15 22.4 83 54	86.9	15 47.2 83 54	86.6	16 12.0 83 54	86.4	4
85	12 45.4 83 54	87.5	13 10.3 83 54	87.3	13 35.2 83 54	87.0	14 00.1 83 54	86.7	14 24.9 83 54	86.4	14 49.8 83 54	86.1	15 14.6 83 54	85.8	15 39.4 83 54	85.5	85
6	12 12.7 83 54	86.7	12 37.7 83 54	86.4	13 02.6 83 54	86.1	13 27.5 83 54	85.9	13 52.3 83 54	85.6	14 17.2 83 54	85.3	14 42.0 83 54	85.0	15 06.8 83 54	84.7	6
7	11 40.1 83 54	85.9	12 05.1 83 54	85.6	12 30.0 83 54	85.3	12 54.9 83 54	85.0	13 19.8 83 54	84.7	13 44.6 83 54	84.5	14 09.5 83 54	84.2	14 34.3 83 54	83.9	7
8	11 07.5 83 54	85.1	11 32.5 83 54	84.8	11 57.4 83 54	84.5	12 22.3 83 54	84.2	12 47.2 83 54	83.9	13 12.1 83 54	83.6	13 37.0 83 54	83.3	14 01.8 83 54	83.1	8
9	10 35.0 83 54	84.2	11 00.0 83 54	83.9	11 24.9 83 54	83.7	11 49.9 83 54	83.4	12 14.8 83 54	83.1	12 39.7 83 54	82.8	13 04.6 83 54	82.5	13 29.4 83 54	82.2	9
90	10 02.5 83 54	83.4	10 27.5 83 54	83.1	10 52.5 83 54	82.8	11 17.4 83 54	82.6	11 42.4 83 54	82.3	12 07.3 83 54	82.0	12 32.2 83 54	81.7	12 57.1 83 54	81.4	90

Digitized by Google

Lat. 57°

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	21 00.0	1.0	00	180.0	20 30.0	1.0	00	180.0	20 00.0	1.0	00	180.0	19 30.0	1.0	00	180.0	19 00.0	1.0	00	180.0	18 30.0	1.0	00	180.0	18 00.0	1.0	00	180.0	17 30.0	1.0	00	180.0	00
1	20 59.7	1.0	02	179.0	20 29.7	1.0	01	179.0	19 59.7	1.0	01	179.0	19 29.7	1.0	01	179.0	18 59.7	1.0	01	179.0	18 29.7	1.0	01	179.0	17 59.7	1.0	01	179.0	17 29.7	1.0	01	179.0	1
2	20 58.8	1.0	02	177.9	20 28.8	1.0	02	177.9	19 58.8	1.0	02	177.9	19 28.8	1.0	02	177.9	18 58.8	1.0	02	177.9	18 28.8	1.0	02	178.0	17 58.8	1.0	02	178.0	17 28.8	1.0	02	178.0	2
3	20 57.3	1.0	04	176.9	20 27.3	1.0	03	176.9	19 57.3	1.0	03	176.9	19 27.4	1.0	03	176.9	18 57.4	1.0	03	176.9	18 27.4	1.0	03	176.9	17 57.4	1.0	03	177.0	17 27.4	1.0	03	177.0	3
4	20 55.2	1.0	04	175.8	20 25.2	1.0	04	175.8	19 55.3	1.0	04	175.9	19 25.3	1.0	04	175.9	18 55.3	1.0	04	175.9	18 25.3	1.0	04	175.9	17 55.4	1.0	04	175.9	17 25.4	1.0	04	176.0	4
05	20 52.5	1.0	05	174.8	20 22.6	1.0	05	174.8	19 52.6	1.0	05	174.8	19 22.7	1.0	05	174.8	18 52.7	1.0	05	174.9	18 22.7	1.0	05	174.9	17 52.8	1.0	05	174.9	17 22.8	1.0	05	175.0	05
6	20 49.3	1.0	06	173.7	20 19.3	1.0	06	173.8	19 49.4	1.0	06	173.8	19 19.4	1.0	06	173.8	18 49.5	1.0	06	173.8	18 19.5	1.0	06	173.9	17 49.6	1.0	06	173.9	17 19.6	1.0	06	173.9	6
7	20 45.4	1.0	07	172.7	20 15.5	1.0	07	172.7	19 45.5	1.0	07	172.8	19 15.6	1.0	07	172.8	18 45.7	1.0	07	172.8	18 15.8	1.0	07	172.9	17 45.8	1.0	07	172.9	17 15.9	1.0	07	172.9	7
8	20 40.9	1.0	08	171.6	20 11.0	1.0	08	171.7	19 41.1	1.0	08	171.7	19 11.2	1.0	08	171.8	18 41.3	1.0	08	171.8	18 11.4	1.0	08	171.8	17 41.5	1.0	08	171.9	17 11.6	1.0	08	171.9	8
9	20 35.9	1.0	09	170.6	20 06.0	1.0	09	170.6	19 36.1	1.0	09	170.7	19 06.3	1.0	09	170.7	18 36.4	1.0	09	170.8	18 06.5	1.0	09	170.8	17 36.6	1.0	09	170.9	17 06.7	1.0	09	170.9	9
10	20 30.2	99	10	169.6	20 00.4	99	10	169.6	19 30.6	99	10	169.7	19 00.7	99	10	169.7	18 30.9	1.0	10	169.8	18 01.0	1.0	10	169.8	17 31.1	1.0	10	169.9	17 01.3	1.0	10	169.9	10
1	20 24.0	99	11	168.5	19 54.2	99	11	168.6	19 24.4	99	11	168.6	18 54.6	99	11	168.7	18 24.8	99	11	168.7	17 54.9	99	11	168.8	17 25.1	99	11	168.9	16 55.3	99	11	168.9	1
2	20 17.2	99	12	167.5	19 47.5	99	12	167.5	19 17.7	99	12	167.6	18 47.9	99	12	167.7	18 18.1	99	12	167.7	17 48.3	99	12	167.8	17 18.5	99	12	167.9	16 48.7	99	12	167.9	2
3	20 09.9	99	13	166.4	19 40.1	99	13	166.5	19 10.4	99	13	166.6	18 40.6	99	13	166.7	18 10.9	99	13	166.7	17 41.1	99	13	166.8	17 11.4	99	13	166.9	16 41.6	99	13	166.9	3
4	20 01.9	99	14	165.4	19 32.2	99	14	165.5	19 02.5	99	14	165.6	18 32.8	99	14	165.6	18 03.1	99	14	165.7	17 33.4	99	14	165.8	17 03.7	99	14	165.9	16 33.9	99	14	165.9	4
15	19 53.4	99	15	164.4	19 23.7	99	15	164.5	18 54.1	99	15	164.5	18 24.4	99	15	164.6	17 54.7	99	15	164.7	17 25.1	99	15	164.8	16 55.4	99	15	164.9	16 25.7	99	15	164.9	15
6	19 44.3	99	16	163.4	19 14.7	99	16	163.4	18 45.1	99	16	163.5	18 15.5	99	16	163.6	17 45.8	99	16	163.7	17 16.2	99	16	163.8	16 46.6	99	16	163.9	16 17.0	99	16	163.9	6
7	19 34.7	99	17	162.3	19 05.1	99	17	162.4	18 35.5	99	17	162.5	18 06.0	99	17	162.6	17 36.4	99	17	162.7	17 06.8	99	17	162.8	16 37.2	99	16	162.9	16 07.6	99	16	162.9	7
8	19 24.5	98	18	161.3	18 55.0	98	18	161.4	18 25.4	98	18	161.5	17 55.9	98	18	161.6	17 26.4	98	18	161.7	16 56.9	98	17	161.8	16 27.3	98	17	161.9	15 57.8	98	17	162.0	8
9	19 13.7	98	19	160.3	18 44.3	98	19	160.4	18 14.8	98	19	160.5	17 45.3	98	19	160.6	17 15.8	98	18	160.7	16 46.4	98	18	160.8	16 16.9	98	18	160.9	15 47.4	98	18	161.0	9
20	19 02.4	98	20	159.3	18 33.0	98	20	159.4	18 03.6	98	20	159.5	17 34.2	98	19	159.6	17 04.8	98	19	159.7	16 35.3	98	19	159.8	16 05.9	98	19	159.9	15 36.5	98	19	160.0	20
1	18 50.6	98	21	158.3	18 21.3	98	21	158.4	17 51.9	98	20	158.5	17 22.5	98	20	158.6	16 53.2	98	20	158.7	16 23.8	98	20	158.8	15 54.4	98	20	158.9	15 25.0	98	20	159.0	1
2	18 38.2	98	22	157.3	18 08.9	98	21	157.4	17 39.6	98	21	157.5	17 10.3	98	21	157.6	16 41.0	98	21	157.7	16 11.7	98	21	157.8	15 42.4	98	21	157.9	15 13.1	98	21	158.0	2
3	18 25.3	97	22	156.2	17 56.1	97	22	156.4	17 26.9	97	22	156.5	16 57.6	97	22	156.6	16 28.4	98	22	156.7	15 59.1	98	22	156.8	15 29.8	98	22	156.9	15 00.6	98	22	157.1	3
4	18 11.9	97	23	155.2	17 42.7	97	23	155.4	17 13.6	97	23	155.5	16 44.4	97	23	155.6	16 15.2	97	23	155.7	15 46.0	97	23	155.8	15 16.8	97	23	156.0	14 47.6	97	22	156.1	4
25	17 58.0	97	24	154.2	17 28.9	97	24	154.4	16 59.7	97	24	154.5	16 30.6	97	24	154.6	16 01.5	97	24	154.7	15 32.4	97	24	154.9	15 03.2	97	23	155.0	14 34.1	97	23	155.1	25
6	17 43.5	97	25	153.2	17 14.5	97	25	153.4	16 45.4	97	25	153.5	16 16.4	97	25	153.6	15 47.3	97	24	153.8	15 18.2	97	24	153.9	14 49.2	97	24	154.0	14 20.1	97	24	154.2	6
7	17 28.5	97	26	152.3	16 59.6	97	26	152.4	16 30.6	97	26	152.5	16 01.6	97	25	152.7	15 32.6	97	25	152.8	15 03.6	97	25	152.9	14 34.6	97	25	153.1	14 05.6	97	25	153.2	7
8	17 13.1	96	27	151.3	16 44.2	96	26	151.4	16 15.3	96	26	151.5	15 46.3	96	26	151.7	15 17.4	96	26	151.8	14 48.5	96	26	152.0	14 19.6	96	26	152.1	13 50.6	96	26	152.2	8
9	16 57.1	96	27	150.3	16 28.3	96	27	150.4	15 59.4	96	27	150.6	15 30.6	96	27	150.7	15 01.7	96	27	150.9	14 32.9	96	27	151.0	14 04.0	96	27	151.1	13 35.2	96	27	151.3	9
30	16 40.7	96	28	149.3	16 11.9	96	28	149.4	15 43.2	96	28	149.6	15 14.4	96	28	149.7	14 45.6	96	28	149.9	14 16.8	96	28	150.0	13 48.0	96	27	150.2	13 19.2	96	27	150.3	30
1	16 23.8	96	29	148.3	15 55.1	96	29	148.5	15 26.4	96	29	148.6	14 57.7	96	29	148.8	14 29.0	96	28	148.9	14 00.2	96	28	149.1	13 31.5	96	28	149.2	13 02.8	96	28	149.4	1
2	16 06.4	95	30	147.3	15 37.7	95	30	147.5	15 09.1	95	30	147.7	14 40.5	95	29	147.8	14 11.9	95	29	148.0	13 43.2	95	29	148.1	13 14.6	96	29	148.3	12 45.9	96	29	148.4	2
3	15 48.5	95	31	146.4	15 20.0	95	30	146.5	14 51.4	95	30	146.7	14 22.9	95	30	146.9	13 54.3	95	30	147.0	13 25.7	95	30	147.2	12 57.2	95	30	147.3	12 28.6	95	30	147.5	3
4	15 30.2	95	31	145.4	15 01.7	95	31	145.6	14 33.2	95	31	145.7	14 04.8	95	31	145.9	13 36.3	95	31	146.1	13 07.8	95	31	146.2	12 39.3	95	30	146.4	12 10.8	95	30	146.5	4
35	15 11.4	95	32	144.5	14 43.0	95	32	144.6	14 14.6	95	32	144.8	13 46.2	95	32	145.0	13 17.8	95	32	145.1	12 49.4	95	31	145.3	12 21.0	95	31	145.4	11 52.6	95	31	145.6	35
6	14 52.2	94	33	143.5	14 23.9	94	33	143.7	13 55.6	94	32	143.8	13 27.2	94	32	144.0	12 58.9	94	32	144.2	12 30.6	94	32	144.3	12 02.2	94	32	144.5	11 33.9	95	32	144.7	6
7	14 32.5	94	33	142.5	14 04.3	94	33	142.7	13 36.1	94	33	142.9	13 07.8	94	33	143.1	12 39.6	94	33	143.2	12 11.3	94	33	143.4	11 43.0	94	33	143.6	11 14.8	94	33	143.8	7
8	14 12.4	94	34	141.6	13 44.3	94	34	141.8	13 16.1	94	34	142.0	12 48.0	94	34	142.1	12 19.8	94	34	142.3	11 51.6	94	34	142.5	11 23.4	94	33	142.7	10 55.2	94	33	142.8	8
9	13 51.9	94	35	140.7	13 23.9	94	35	140.8	12 55.8	94	35	141.0	12 27.7	94	34	141.2	11 59.6	94	34	141.4	11 31.5	94	34	141.6	11 03.4	94	34	141.7	10 35.3	94	34	141.9	9
40	13 31.0	93	36	139.7	13 03.0	93	35	139.9	12 35.0	93	35	140.1	12 07.0	93	35	140.3	11 39.0	93	35	140.4	11 11.0	93	35	140.6	10 42.9	93	35	140.8	10 14.9	93	35	141.0	40
1	13 09.7	93	36	138.8	12 41.8	93	36	139.0	12 13.8	93	36	139.1	11 45.9	93	36	139.3	11 18.0	93	36	139.5	10 50.0	93	36	139.7	10 22.1	93	35	139.9	9 54.1	93	35	140.1	1
2	12 47.9	93	37	137.8	12 20.1	93	37	138.0	11 52.3	93	37	138.2	11 24.4	93	36	138.4	10 56.6	93	36	138.6	10 28.7	93	36	138.8	10 00.8	93	36	139.0	9 33.0	93	36	139.2	2
3	12 25.8	92	38	136.9	11 58.1	93	37	137.1	11 30.3	93	37	137.3	11 02.5	93	37	137.5	10 34.8	93	37	137.7	10 07.0	93	37	137.9	9 39.2	93	37	138.1	9 11.4	93	37	138.3	3
4	12 03.3	92	38	136.0	11 35.6	92	38	136.2	11 08.0	92	38	136.4	10 40.3	92	38	136.6	10 12.6	92	38	136.8	9 44.9	92	37	137.0	9 17.2	92	37	137.2	8 49.5	92	37	137.4	4
45	11 40.4	92	39	135.1	11 12.8	92	39	135.3	10 45.2	92	38	135.5	10 17.6	92	38	135.7	9 50.0	92	38	135.9	9 22.4	92	38	136.1	8 54.8	92	38	136.3	8 27.1	92	38	136.5	45
6	11 17.1	92	39	134.2	10 49.6	92	39	134.4	10 22.1	92	39	134.6	9 54.6	92	39	134.8	9 27.1	92	39	135.0	8 59.5	92	39	135.2	8 32.0	92	39	135.4	8 04.4	92	38	135.6	6
7	10 53.5	91	40	133.2	10 26.1	91	40	133.4	9 58.7	91	40	133.7	9 31.2	91	40	133.9	9 03.8	92	39	134.1	8 36.3	92	39	134.3	8 08.9	92	39	134.5	7 41.4	92	39	134.7	7
8	10 29.5	91	41	132.3	10 02.2	91	40	132.5	9 34.8	91	40	132.7	9 07.5	91	40	133.0	8 40.1	91	40	133.2	8 12.7	91	40	133.4	7 45.4	91	40	133.6	7 18.0	91	40	133.8	8
9	10 05.2	91	41	131.4	9 37.9	91	41	131.6	9 10.7	91	41	131.8	8 43.4	91	41	132.1	8 16.1	91	41	132.3	7 48.8	91	40	132.5	7 21.5	91	40	132.7	6 54.2	91	40	132.9	9
50	9 40.5	91	42	130.5	9 13.3	91	42	130.7	8 46.2	91	41	131.0	8 19.0	91	41	131.2	7 51.7	91	41	131.4	7 24.5	91	41	131.6	6 57.3	91	41	131.8	6 30.1	91	41	132.0	50
1	9 15.5	90	42	129.6	8 48.4	90	42	129.8	8 21.3	90	42	130.1	7 54.2	90	42	130.3	7 27.1	90	42	130.5	6 59.9	90	42	130.7	6 32.8	90	41	130.9	6 05.6	90	41	131.1	1
2	8 50.2	90	43	128.7	8 23.2	90	43	129.0	7 56.1	90	42	129.2	7 29.1	90	42	129.4	7 02.0	90	42	129.6	6 35.0	90	42	129.8	6 07.9	90	42	130.0	5 40.9	90	42	130.3	2
3	8 24.5	90	43	127.8	7 57.6	90	43	128.1	7 30.6	90	43	128.3	7 03.7	90	43	128.5	6 36.7	90	43	128.7	6 09.7	90	43	129.0	5 42.8	90	42	129.2	5 15.8	90	42	129.4	3
4	7 58.6	90	44	127.0	7 31.7	90	44	127.2	7 04.8	90	44	127.4	6 38.0	90	43	127.6	6 11.1	90	43	127.9	5 44.2	90	43	128.1	5 17.3	90	43	128.3					4
55	7 32.3	89	44	126.1	7 05.5	89	44	126.3	6 38.7	89	44	126.5	6 11.9	89	44	126.8	5 45.1	89	44	127.0	5 18.3	89	44	127.2									55
6	7 05.8	89	45	125.2	6 39.0	89	45	125.4	6 12.3	89	44	125.7	5 45.6	89	44	125.9	5 18.9	89	44	126.1													6
7	6 38.9	89	45	124.3	6 12.3	89	45	124.6	5 45.6	89	45	124.8	5 19.0	89	45	125.0																	7
8	6 11.8	89	46	123.4	5 45.2	89	46	123.7	5 18.6	89	45	123.9																					8
9	5 44.4	88	46	122.6	5 17.9	88	46	122.8																									9
60	5 16.7	88	47	121.7																													60

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	9 30.1	83	54	82.6	9 55.1	83	54	82.3	10 20.1	83	54	82.0	10 45.1	83	54	81.7	11 10.0	83	54	81.4	11 35.0	83	54	81.2	11 59.9	83	54	80.9	12 24.8	83	54	80.6	91
2	8 57.7	83	54	81.7	9 22.7	83	54	81.5	9 47.8	83	54	81.2	10 12.8	83	54	80.9	10 37.7	83	54	80.6	11 02.7	83	54	80.3	11 27.7	83	54	80.1	11 52.6	83	54	79.8	2
3	8 25.4	84	54	80.9	8 50.5	83	54	80.6	9 15.5	83	54	80.4	9 40.5	83	54	80.1	10 05.5	83	54	79.8	10 30.5	83	53	79.5	10 55.5	83	53	79.2	11 20.5	83	53	79.0	3
4	7 53.2	84	54	80.1	8 18.3	84	54	79.8	8 43.3	84	53	79.5	9 08.4	83	53	79.3	9 33.4	83	53	79.0	9 58.5	83	53	78.7	10 23.5	83	53	78.4	10 48.5	83	53	78.1	4
95	7 21.0	84	53	79.3	7 46.1	84	53	79.0	8 11.2	84	53	78.7	8 36.3	84	53	78.4	9 01.4	84	53	78.2	9 26.5	84	53	77.9	9 51.5	83	53	77.6	10 16.5	83	53	77.3	95
6	6 49.0	84	53	78.4	7 14.1	84	53	78.2	7 39.2	84	53	77.9	8 04.4	84	53	77.6	8 29.5	84	53	77.3	8 54.6	84	53	77.1	9 19.6	84	53	76.8	9 44.7	84	53	76.5	6
7	6 17.0	84	53	77.6	6 42.2	84	53	77.3	7 07.3	84	53	77.1	7 32.5	84	53	76.8	7 57.6	84	53	76.5	8 22.8	84	53	76.2	8 47.9	84	53	76.0	9 13.0	84	53	75.7	7
8	5 45.1	84	53	76.8	6 10.3	84	53	76.5	6 35.5	84	53	76.2	7 00.7	84	53	76.0	7 25.9	84	53	75.7	7 51.1	84	53	75.4	8 16.2	84	53	75.1	8 41.4	84	52	74.9	8
9	5 13.4	84	53	76.0	5 38.6	84	53	75.7	6 03.9	84	53	75.4	6 29.1	84	53	75.1	6 54.3	84	52	74.9	7 19.5	84	52	74.6	7 44.7	84	52	74.3	8 09.9	84	52	74.1	9
100					5 07.0	84	52	74.9	5 32.3	84	52	74.6	5 57.6	84	52	74.3	6 22.8	84	52	74.1	6 48.1	84	52	73.8	7 13.3	84	52	73.5	7 38.5	84	52	73.2	100
1									5 00.8	84	52	73.8	5 26.2	84	52	73.5	5 51.5	84	52	73.2	6 16.8	84	52	73.0	6 42.0	84	52	72.7	7 07.3	84	52	72.4	1
2																	5 20.2	84	52	72.4	5 45.6	84	52	72.1	6 10.9	84	52	71.9	6 36.2	84	52	71.6	2
3																					5 14.6	85	52	71.3	5 39.9	85	51	71.0	6 05.3	85	51	70.8	3
4																									5 09.1	85	51	70.2	5 34.5	85	51	70.0	4
105																													5 03.9	85	51	69.1	105

Lat. 58°

Lat. 59°

Digitized by Google

Lat. 57°

H.A. (°)	16° 00′ Alt. (° ′)	Δd Δt	Az. (°)	16° 30′ Alt. (° ′)	Δd Δt	Az. (°)	17° 00′ Alt. (° ′)	Δd Δt	Az. (°)	17° 30′ Alt. (° ′)	Δd Δt	Az. (°)
00	49 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0
1	48 59.6	1.0 02	178.5	49 29.6	1.0 02	178.5	49 59.6	1.0 02	178.5	50 29.6	1.0 02	178.5
2	48 58.3	1.0 03	177.1	49 28.3	1.0 04	177.0	49 58.3	1.0 04	177.0	50 28.3	1.0 04	177.0
3	48 56.2	1.0 05	175.6	49 26.2	1.0 05	175.6	49 56.2	1.0 05	175.5	50 26.2	1.0 05	175.5
4	48 53.3	1.0 06	174.1	49 23.3	1.0 06	174.1	49 53.2	1.0 06	174.1	50 23.2	1.0 06	174.0
05	48 49.6	1.0 08	172.7	49 19.5	1.0 08	172.6	49 49.4	1.0 08	172.6	50 19.3	1.0 08	172.5
6	48 45.0	1.0 09	171.2	49 14.9	1.0 09	171.2	49 44.8	1.0 09	171.1	50 14.7	1.0 09	171.0
7	48 39.6	99 10	169.8	49 09.5	99 10	169.7	49 39.3	99 10	169.6	50 09.2	99 11	169.5
8	48 33.4	99 12	168.3	49 03.2	99 12	168.3	49 33.0	99 12	168.2	50 02.8	99 12	168.1
9	48 26.4	99 13	166.9	48 56.2	99 13	166.8	49 25.9	99 13	166.7	49 55.6	99 13	166.6
10	48 18.6	99 14	165.5	48 48.3	99 14	165.4	49 18.0	99 15	165.2	49 47.7	99 15	165.1
1	48 10.0	99 16	164.0	48 39.6	99 16	163.9	49 09.3	99 16	163.8	49 38.9	99 16	163.7
2	48 00.6	99 17	162.6	48 30.2	99 17	162.5	48 59.8	98 17	162.4	49 29.3	98 17	162.2
3	47 50.5	98 18	161.2	48 20.0	98 18	161.1	48 49.5	98 18	160.9	49 18.9	98 19	160.8
4	47 39.6	98 19	159.8	48 09.0	98 20	159.7	48 38.4	98 20	159.5	49 07.8	98 20	159.4
15	47 27.9	98 21	158.4	47 57.3	98 21	158.3	48 26.6	98 21	158.1	48 55.9	98 21	157.9
6	47 15.5	98 22	157.0	47 44.8	97 22	156.9	48 14.0	97 22	156.7	48 43.2	97 22	156.5
7	47 02.4	97 23	155.6	47 31.6	97 23	155.5	48 00.7	97 23	155.3	48 29.9	97 24	155.1
8	46 48.6	97 24	154.3	47 17.7	97 24	154.1	47 46.7	97 25	153.9	48 15.7	97 25	153.7
9	46 34.1	97 25	152.9	47 03.0	97 26	152.7	47 32.0	96 26	152.5	48 00.9	96 26	152.3
20	46 18.8	96 26	151.6	46 47.7	96 27	151.4	47 16.6	96 27	151.2	47 45.4	96 27	151.0
1	46 03.0	96 28	150.2	46 31.7	96 28	150.0	47 00.5	96 28	149.8	47 29.2	96 28	149.6
2	45 46.4	96 29	148.9	46 15.1	96 29	148.7	46 43.7	95 29	148.5	47 12.4	95 29	148.3
3	45 29.2	95 30	147.6	45 57.8	95 30	147.4	46 26.3	95 30	147.2	46 54.9	95 30	146.9
4	45 11.4	95 31	146.3	45 39.9	95 31	146.1	46 08.3	95 31	145.9	46 36.7	95 31	145.6
25	44 53.0	95 32	145.0	45 21.3	94 32	144.8	45 49.7	94 32	144.6	46 18.0	94 32	144.3
6	44 33.9	94 33	143.7	45 02.2	94 33	143.5	45 30.4	94 33	143.3	45 58.6	94 33	143.0
7	44 14.3	94 34	142.5	44 42.5	94 34	142.2	45 10.6	94 34	142.0	45 38.6	94 34	141.7
8	43 54.1	93 35	141.2	44 22.2	93 35	141.0	44 50.2	93 35	140.7	45 18.1	93 35	140.5
9	43 33.4	93 35	140.0	44 01.3	93 36	139.7	44 29.2	93 36	139.5	44 57.0	93 36	139.2
30	43 12.1	93 36	138.8	43 39.9	93 37	138.5	44 07.7	93 37	138.2	44 35.4	92 37	138.0
1	42 50.3	92 37	137.5	43 18.0	92 37	137.3	43 45.7	92 38	137.0	44 13.3	92 38	136.7
2	42 28.0	92 38	136.3	42 55.6	92 38	136.1	43 23.1	92 38	135.8	43 50.6	92 39	135.5
3	42 05.2	92 39	135.1	42 32.6	92 39	134.9	43 00.1	91 39	134.6	43 27.5	91 39	134.3
4	41 41.9	91 40	134.0	42 09.2	91 40	133.7	42 36.6	91 40	133.4	43 03.9	91 40	133.1
35	41 18.1	91 40	132.8	41 45.4	91 41	132.5	42 12.6	91 41	132.2	42 39.8	91 41	131.9
6	40 53.9	91 41	131.6	41 21.1	90 41	131.3	41 48.2	90 41	131.1	42 15.3	90 42	130.8
7	40 29.3	90 42	130.5	40 56.3	90 42	130.2	41 23.3	90 42	129.9	41 50.3	90 42	129.6
8	40 04.2	90 42	129.3	40 31.2	90 43	129.1	40 58.1	90 43	128.8	41 24.9	89 43	128.5
9	39 38.7	90 43	128.2	40 05.6	89 43	127.9	40 32.4	89 43	127.6	40 59.1	89 44	127.3
40	39 12.9	89 44	127.1	39 39.6	89 44	126.8	40 06.3	89 44	126.5	40 33.0	89 44	126.2
1	38 46.6	89 44	126.0	39 13.3	89 44	125.7	39 39.9	89 45	125.4	40 06.4	88 45	125.1
2	38 20.0	89 45	124.9	38 46.5	88 45	124.6	39 13.0	88 45	124.3	39 39.5	88 45	124.0
3	37 53.0	88 46	123.8	38 19.5	88 46	123.5	38 45.9	88 46	123.2	39 12.2	88 46	122.9
4	37 25.7	88 46	122.8	37 52.1	88 46	122.5	38 18.4	88 46	122.2	38 44.6	87 47	121.9
45	36 58.1	88 47	121.7	37 24.3	87 47	121.4	37 50.6	87 47	121.1	38 16.7	87 47	120.8
6	36 30.1	87 47	120.7	36 56.3	87 47	120.4	37 22.4	87 47	120.0	37 48.5	87 48	119.7
7	36 01.9	87 48	119.6	36 27.9	87 48	119.3	36 54.0	87 48	119.0	37 20.0	87 48	118.7
8	35 33.3	87 48	118.6	35 59.3	87 48	118.3	36 25.3	86 48	118.0	36 51.2	86 48	117.7
9	35 04.5	86 48	117.6	35 30.4	86 49	117.3	35 56.3	86 49	116.9	36 22.1	86 49	116.6
50	34 35.4	86 49	116.6	35 01.2	86 49	116.2	35 27.0	86 49	115.9	35 52.7	86 49	115.6
1	34 06.0	86 49	115.6	34 31.8	86 49	115.2	34 57.5	86 50	114.9	35 23.2	85 50	114.6
2	33 36.4	86 50	114.6	34 02.1	86 50	114.3	34 27.7	85 50	113.9	34 53.3	85 50	113.6
3	33 06.6	85 50	113.6	33 32.2	86 50	113.3	33 57.8	85 50	113.0	34 23.3	85 50	112.6
4	32 36.5	85 50	112.6	33 02.1	86 51	112.3	33 27.6	85 51	112.0	33 53.0	85 51	111.7
55	32 06.2	85 51	111.6	32 31.7	85 51	111.3	32 57.2	85 51	111.0	33 22.5	85 51	110.7
6	31 35.8	85 51	110.7	32 01.2	85 51	110.4	32 26.6	84 51	110.0	32 51.9	84 51	109.7
7	31 05.1	85 51	109.7	31 30.5	84 52	109.4	31 55.8	84 52	109.1	32 21.0	84 52	108.8
8	30 34.2	84 52	108.8	30 59.5	84 52	108.5	31 24.8	84 52	108.1	31 50.0	84 52	107.8
9	30 03.2	84 52	107.8	30 28.5	84 52	107.5	30 53.7	84 52	107.2	31 18.8	84 52	106.9
60	29 32.0	84 52	106.9	29 57.2	84 52	106.6	30 22.4	84 52	106.3	30 47.5	84 52	106.0
1	29 00.7	84 52	106.0	29 25.8	84 53	105.7	29 50.9	84 53	105.3	30 16.0	83 53	105.0
2	28 29.2	84 53	106.1	28 54.3	84 53	104.7	29 19.3	83 53	104.4	29 44.3	83 53	104.1
3	27 57.6	84 53	104.1	28 22.6	83 53	103.8	28 47.6	83 53	103.5	29 12.6	83 53	103.2
4	27 25.8	83 53	103.2	27 50.8	83 53	102.9	28 15.8	83 53	102.6	28 40.7	83 53	102.3
65	26 54.0	83 53	102.3	27 18.9	83 53	102.0	27 43.9	83 53	101.7	28 08.7	83 53	101.4
6	26 22.0	83 53	101.4	26 46.9	83 54	101.1	27 11.8	83 54	100.8	27 36.7	83 54	100.5
7	25 49.9	83 54	100.6	26 14.8	83 54	100.2	26 39.7	83 54	99.9	27 04.5	83 54	99.6
8	25 17.7	83 54	99.7	25 42.6	83 54	99.4	26 07.4	83 54	99.0	26 32.2	83 54	98.7
9	24 45.5	83 54	98.8	25 10.3	83 54	98.5	25 35.1	83 54	98.2	25 59.9	82 54	97.9
70	24 13.2	83 54	97.9	24 38.0	83 54	97.6	25 02.7	83 54	97.3	25 27.5	82 54	97.0
1	23 40.8	83 54	97.0	24 05.5	83 54	96.7	24 30.3	82 54	96.4	24 55.0	82 54	96.1
2	23 08.3	83 54	96.2	23 33.1	83 54	95.9	23 57.8	82 54	95.6	24 22.5	82 54	95.3
3	22 35.8	83 54	95.3	23 00.5	82 54	95.0	23 25.3	82 54	94.7	23 49.9	82 54	94.4
4	22 03.2	83 54	94.5	22 28.0	82 54	94.2	22 52.7	82 54	93.8	23 17.3	82 54	93.5
75	21 30.6	82 54	93.6	21 55.4	82 54	93.3	22 20.0	82 54	93.0	22 44.7	82 54	92.7
6	20 50.0	82 54	92.8	21 22.7	82 54	92.5	21 47.4	82 54	92.1	22 12.1	82 54	91.8
7	20 25.3	82 54	91.9	20 50.1	82 54	91.6	21 14.7	82 54	91.3	21 39.4	82 54	91.0
8	19 52.7	82 54	91.1	20 17.4	82 54	90.8	20 42.1	82 54	90.5	21 06.7	82 54	90.2
9	19 20.0	82 54	90.2	19 44.7	82 54	89.9	20 09.4	82 54	89.6	20 34.0	82 54	89.3
80	18 47.3	82 54	89.4	19 12.0	82 54	89.1	19 36.7	82 54	88.8	20 01.4	82 54	88.5
1	18 14.7	82 54	88.6	18 39.4	82 54	88.3	19 04.0	82 54	88.0	19 28.7	82 54	87.7
2	17 42.0	82 54	87.7	18 06.7	82 54	87.4	18 31.4	82 54	87.1	18 56.1	82 54	86.8
3	17 09.4	82 54	86.9	17 34.1	82 54	86.6	17 58.8	82 54	86.3	18 23.4	82 54	86.0
4	16 36.7	82 54	86.1	17 01.5	82 54	85.8	17 26.2	82 54	85.5	17 50.9	82 54	85.2
85	16 04.2	83 54	85.2	16 28.9	82 54	84.9	16 53.6	82 54	84.6	17 18.3	82 54	84.3
6	15 31.6	83 54	84.4	15 56.4	83 54	84.1	16 21.1	82 54	83.8	16 45.8	82 54	83.5
7	14 59.1	83 54	83.6	15 23.9	83 54	83.3	15 48.6	82 54	83.0	16 13.4	82 54	82.7
8	14 26.7	83 54	82.8	14 51.5	83 54	82.5	15 16.2	83 54	82.2	15 41.0	82 54	81.9
9	13 54.3	83 54	81.9	14 19.1	83 54	81.7	14 43.9	83 54	81.4	15 08.7	83 54	81.1
90	13 22.0	83 54	81.1	13 46.8	83 54	80.8	14 11.6	83 54	80.5	14 36.4	83 54	80.3

H.A. (°)	18° 00′ Alt. (° ′)	Δd Δt	Az. (°)	18° 30′ Alt. (° ′)	Δd Δt	Az. (°)	19° 00′ Alt. (° ′)	Δd Δt	Az. (°)	19° 30′ Alt. (° ′)	Δd Δt	Az. (°)
00	51 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0
1	50 59.6	1.0 02	178.5	51 29.6	1.0 02	178.5	51 59.6	1.0 02	178.5	52 29.6	1.0 02	178.5
2	50 58.3	1.0 04	177.0	51 28.3	1.0 04	177.0	51 58.2	1.0 04	176.9	52 28.2	1.0 04	176.9
3	50 56.1	1.0 05	175.5	51 26.1	1.0 05	175.4	51 56.1	1.0 05	175.4	52 26.0	1.0 05	175.4
4	50 53.1	1.0 06	174.0	51 23.1	1.0 06	173.9	51 53.0	1.0 07	173.9	52 22.9	1.0 07	173.8
05	50 49.3	1.0 08	172.5	51 19.2	1.0 08	172.4	51 49.1	1.0 08	172.3	52 19.0	1.0 08	172.3
6	50 44.5	1.0 09	171.0	51 14.4	1.0 09	170.9	51 44.3	1.0 09	170.8	52 14.2	1.0 09	170.7
7	50 39.0	99 11	169.5	51 08.8	99 11	169.4	51 38.7	99 11	169.3	52 08.5	99 11	169.2
8	50 32.6	99 12	168.0	51 02.4	99 12	167.9	51 32.2	99 12	167.8	52 01.9	99 12	167.7
9	50 25.4	99 13	166.5	50 55.1	99 14	166.4	51 24.8	99 14	166.3	51 54.5	99 14	166.2
10	50 17.3	99 15	165.0	50 47.0	99 15	164.9	51 16.7	99 15	164.8	51 46.3	99 15	164.7
1	50 08.5	99 16	163.6	50 38.1	99 16	163.4	51 07.7	99 16	163.3	51 37.3	99 16	163.2
2	49 58.8	98 17	162.1	50 28.4	98 18	162.0	50 57.9	98 18	161.8	51 27.4	98 18	161.7
3	49 48.4	98 19	160.6	50 17.8	98 19	160.5	50 47.3	98 19	160.3	51 16.7	98 19	160.2
4	49 37.2	98 20	159.2	50 06.5	98 20	159.0	50 35.9	98 20	158.9	51 05.2	98 20	158.7
15	49 25.2	98 21	157.8	49 54.5	98 21	157.6	50 23.7	98 22	157.4	50 53.0	97 22	157.3
6	49 12.4	97 22	156.3	49 41.6	97 23	156.2	50 10.8	97 23	156.0	50 40.0	97 23	155.8
7	48 59.0	97 24	154.9	49 28.1	97 24	154.7	49 57.1	97 24	154.6	50 26.2	97 24	154.4
8	48 44.8	97 25	153.5	49 13.8	97 25	153.3	49 42.7	97 25	153.1	50 11.7	96 25	152.9
9	48 29.8	96 26	152.1	48 58.7	96 26	151.9	49 27.6	96 26	151.7	49 56.5	96 27	151.5
20	48 14.2	96 27	150.8	48 43.0	96 27	150.6	49 11.8	96 28	150.3	49 40.5	96 28	150.1
1	47 57.9	96 28	149.4	48 26.6	96 28	149.2	48 55.3	95 29	149.0	49 23.9	95 29	148.7
2	47 41.0	95 29	148.0	48 09.5	95 30	147.8	48 38.1	95 30	147.6	49 06.6	95 30	147.4
3	47 23.3	95 30	146.7	47 51.8	95 31	146.5	48 20.2	95 31	146.2	48 48.7	95 31	146.0
4	47 05.1	95 31	145.4	47 33.4	94 32	145.1	48 01.8	94 32	144.9	48 30.1	94 32	144.6
25	46 46.2	94 32	144.1	47 14.5	94 33	143.8	47 42.7	94 33	143.6	48 10.8	94 33	143.3
6	46 26.7	94 33	142.8	46 54.9	94 34	142.5	47 23.0	94 34	142.3	47 51.0	93 34	142.0
7	46 06.7	93 34	141.5	46 34.7	93 35	141.2	47 02.7	93 35	141.0	47 30.6	93 35	140.7
8	45 46.0	93 35	140.2	46 13.9	93 36	139.9	46 41.8	93 36	139.7	47 09.6	93 36	139.4
9	45 24.9	93 36	138.9	45 52.6	93 36	138.7	46 20.4	92 37	138.4	46 48.1	92 37	138.1
30	45 03.1	92 37	137.7	45 30.8	92 37	137.4	45 58.4	92 38	137.1	46 26.0	92 38	136.9
1	44 40.9	92 38	136.5	45 08.4	92 38	136.2	45 35.9	92 38	135.9	46 03.4	91 39	135.6
2	44 18.1	92 39	135.2	44 45.5	91 39	134.9	45 12.9	91 39	134.7	45 40.3	91 39	134.4
3	43 54.9	91 40	134.0	44 22.2	91 40	133.7	44 49.4	91 40	133.4	45 16.7	91 40	133.1
4	43 31.1	91 40	132.8	43 58.3	91 40	132.5	44 25.5	90 41	132.2	44 52.6	90 41	131.9
35	43 06.9	90 41	131.6	43 34.0	90 41	131.3	44 01.1	90 41	131.0	44 28.1	90 42	130.7
6	42 42.3	90 42	130.5	43 09.3	90 42	130.2	43 36.2	90 42	129.9	44 03.1	90 42	129.6
7	42 17.2	90 42	129.3	42 44.1	89 43	129.0	43 10.9	89 43	128.7	43 37.7	89 43	128.4
8	41 51.7	89 43	128.2	42 18.5	89 43	127.9	42 45.2	89 44	127.6	43 11.9	89 44	127.2
9	41 25.8	89 44	127.0	41 52.5	89 44	126.7	42 19.1	89 44	126.4	42 45.7	88 44	126.1
40	40 59.6	89 44	125.9	41 26.1	88 45	125.6	41 52.6	88 45	125.3	42 19.1	88 45	125.0
1	40 32.9	88 45	124.8	40 59.4	88 45	124.5	41 25.8	88 45	124.2	41 52.1	88 46	123.9
2	40 05.9	88 46	123.7	40 32.2	88 46	123.4	40 58.5	88 46	123.1	41 24.8	87 46	122.7
3	39 38.5	88 46	122.6	40 04.8	87 46	122.3	40 31.0	87 46	122.0	40 57.1	87 47	121.7
4	39 10.8	87 47	121.5	39 37.0	87 47	121.2	40 03.1	87 47	120.9	40 29.2	87 47	120.6
45	38 42.8	87 47	120.5	39 08.9	87 47	120.2	39 34.9	87 48	119.8	40 00.9	86 48	119.5
6	38 14.5	87 48	119.4	38 40.5	86 48	119.1	39 06.4	86 48	118.8	39 32.3	86 48	118.4
7	37 45.9	86 48	118.4	38 11.8	86 48	118.1	38 37.6	86 48	117.7	39 03.4	86 49	117.4
8	37 17.0	86 49	117.3	37 42.8	86 49	117.0	38 08.6	86 49	116.7	38 34.3	86 49	116.4
9	36 47.9	86 49	116.3	37 13.6	86 49	116.0	37 39.2	85 49	115.7	38 04.9	85 49	115.3
50	36 18.4	86 49	115.3	36 44.1	85 50	115.0	37 09.7	85 50	114.7	37 35.2	85 50	114.3
1	35 48.8	85 50	114.3	36 14.3	85 50	114.0	36 39.8	85 50	113.6	37 05.3	85 50	113.3
2	35 18.9	85 50	113.3	35 44.4	85 50	113.0	36 09.8	85 50	112.6	36 35.2	85 51	112.3
3	34 48.8	85 51	112.3	35 14.2	85 51	112.0	35 39.5	84 51	111.7	36 04.8	84 51	111.3
4	34 18.4	85 51	111.3	34 43.8	84 51	111.0	35 09.1	84 51	110.7	35 34.3	84 51	110.4
55	33 47.9	84 51	110.4	34 13.2	84 51	110.0	34 38.4	84 51	109.7	35 03.6	84 52	109.4
6	33 17.1	84 52	109.4	33 42.4	84 52	109.1	34 07.5	84 52	108.8	34 32.7	84 52	108.4
7	32 46.2	84 52	108.5	33 11.4	84 52	108.1	33 36.5	84 52	107.8	34 01.6	83 52	107.5
8	32 15.2	84 52	107.5	32 40.3	84 52	107.2	33 05.3	83 52	106.9	33 30.3	83 52	106.5
9	31 43.9	84 52	106.6	32 09.0	83 52	106.2	32 34.0	83 52	105.9	32 58.9	83 53	105.6
60	31 12.5	83 53	105.6	31 37.5	83 53	105.3	32 02.5	83 53	105.0	32 27.4	83 53	104.7
1	30 41.0	83 53	104.7	31 05.9	83 53	104.4	31 30.8	83 53	104.1	31 55.7	83 53	103.7
2	30 09.3	83 53	103.8	30 34.2	83 53	103.5	30 59.1	83 53	103.1	31 23.9	83 53	102.8
3	29 37.5	83 53	102.9	30 02.4	83 53	102.6	30 27.2	83 53	102.2	30 52.0	82 53	101.9
4	29 05.6	83 53	102.0	29 30.4	83 53	101.7	29 55.2	83 53	101.3	30 19.9	82 54	101.0
65	28 33.6	83 54	101.1	28 58.4	83 54	100.8	29 23.1	82 54	100.4	29 47.8	82 54	100.1
6	28 01.5	83 54	100.2	28 26.2	82 54	99.9	28 50.9	82 54	99.5	29 15.6	82 54	99.2
7	27 29.3	82 54	99.3	27 54.0	82 54	99.0	28 18.7	82 54	98.7	28 43.3	82 54	98.3
8	26 57.0	82 54	98.4	27 21.7	82 54	98.1	27 46.3	82 54	97.8	28 10.9	82 54	97.5
9	26 24.6	82 54	97.5	26 49.3	82 54	97.2	27 13.9	82 54	96.9	27 38.5	82 54	96.6
70	25 52.2	82 54	96.7	26 16.8	82 54	96.4	26 41.4	82 54	96.0	27 06.0	82 54	95.7
1	25 19.7	82 54	95.8	25 44.3	82 54	95.5	26 08.9	82 54	95.2	26 33.5	82 54	94.8
2	24 47.2	82 54	94.9	25 11.8	82 54	94.6	25 36.4	82 54	94.3	26 00.9	82 54	94.0
3	24 14.6	82 54	94.1	24 39.2	82 54	93.8	25 03.7	82 54	93.5	25 28.3	82 54	93.1
4	23 42.0	82 54	93.2	24 06.6	82 54	92.9	24 31.1	82 54	92.6	24 55.6	82 54	92.3
75	23 09.3	82 54	92.4	23 33.9	82 54	92.1	23 58.5	82 54	91.8	24 23.0	82 54	91.4
6	22 36.7	82 54	91.5	23 01.2	82 54	91.2	23 25.8	82 54	90.9	23 50.3	82 54	90.6
7	22 04.0	82 54	90.7	22 28.6	82 54	90.4	22 53.1	82 54	90.1	23 17.6	82 54	89.8
8	21 31.3	82 54	89.8	21 55.9	82 54	89.5	22 20.4	82 54	89.2	22 44.9	82 54	88.9
9	20 58.6	82 54	89.0	21 23.2	82 54	88.7	21 47.8	82 54	88.4	22 12.3	82 54	88.1
80	20 26.0	82 54	88.2	20 50.6	82 54	87.9	21 15.1	82 54	87.6	21 39.6	82 54	87.3
1	19 53.3	82 54	87.3	20 17.9	82 54	87.0	20 42.5	82 54	86.7	21 07.0	82 54	86.4
2	19 20.7	82 54	86.5	19 45.3	82 54	86.2	20 09.9	82 54	85.9	20 34.4	82 54	85.6
3	18 48.1	82 54	85.7	19 12.7	82 54	85.4	19 37.3	82 54	85.1	20 01.8	82 54	84.8
4	18 15.5	82 54	84.9	18 40.1	82 54	84.6	19 04.7	82 54	84.3	19 29.3	82 54	84.0
85	17 43.0	82 54	84.0	18 07.6	82 54	83.7	18 32.3	82 54	83.4	18 56.8	82 54	83.1
6	17 10.5	82 54	83.2	17 35.2	82 54	82.9	17 59.8	82 54	82.6	18 24.4	82 54	82.3
7	16 38.1	82 54	82.4	17 02.8	82 54	82.1	17 27.4	82 54	81.8	17 52.1	82 54	81.5
8	16 05.7	82 54	81.6	16 30.4	82 54	81.3	16 55.1	82 54	81.0	17 19.8	82 54	80.7
9	15 33.4	82 54	80.8	15 58.2	82 54	80.5	16 22.9	82 54	80.2	16 47.6	82 54	79.9
90	15 01.2	83 54	80.0	15 26.0	83 54	79.7	15 50.7	82 53	79.4	16 15.4	82 53	79.1

Lat. 57°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	17 00.0	1.0 00	180.0	16 30.0	1.0 00	180.0	16 00.0	1.0 00	180.0	15 30.0	1.0 00	180.0	15 00.0	1.0 00	180.0	14 30.0	1.0 00	180.0	14 00.0	1.0 00	180.0	13 30.0	1.0 00	180.0	00
1	16 59.7	1.0 01	179.0	16 29.7	1.0 01	179.0	15 59.7	1.0 01	179.0	15 29.7	1.0 01	179.0	14 59.7	1.0 01	179.0	14 29.7	1.0 01	179.0	13 59.7	1.0 01	179.0	13 29.7	1.0 01	179.0	1
2	16 58.9	1.0 02	178.0	16 28.9	1.0 02	178.0	15 58.9	1.0 02	178.0	15 28.9	1.0 02	178.0	14 58.9	1.0 02	178.0	14 28.9	1.0 02	178.0	13 58.9	1.0 02	178.1	13 28.9	1.0 02	178.1	2
3	16 57.4	1.0 03	177.0	16 27.4	1.0 03	177.0	15 57.4	1.0 03	177.0	15 27.5	1.0 03	177.0	14 57.5	1.0 03	177.0	14 27.5	1.0 03	177.1	13 57.5	1.0 03	177.1	13 27.5	1.0 03	177.1	3
4	16 55.4	1.0 04	176.0	16 25.4	1.0 04	176.0	15 55.5	1.0 04	176.0	15 25.5	1.0 04	176.0	14 55.5	1.0 04	176.1	14 25.5	1.0 04	176.1	13 55.6	1.0 04	176.1	13 25.6	1.0 04	176.1	4
05	16 52.8	1.0 05	175.0	16 22.9	1.0 05	175.0	15 52.9	1.0 05	175.0	15 23.0	1.0 05	175.1	14 53.0	1.0 05	175.1	14 23.0	1.0 05	175.1	13 53.1	1.0 05	175.1	13 23.1	1.0 05	175.2	05
6	16 49.7	1.0 06	174.0	16 19.7	1.0 06	174.0	15 49.8	1.0 06	174.0	15 19.9	1.0 06	174.1	14 49.9	1.0 06	174.1	14 20.0	1.0 06	174.1	13 50.0	1.0 06	174.2	13 20.1	1.0 06	174.2	6
7	16 46.0	1.0 07	173.0	16 16.1	1.0 07	173.0	15 46.1	1.0 07	173.0	15 16.2	1.0 07	173.1	14 46.3	1.0 07	173.1	14 16.3	1.0 07	173.2	13 46.4	1.0 07	173.2	13 16.5	1.0 07	173.2	7
8	16 41.7	1.0 08	172.0	16 11.8	1.0 08	172.0	15 41.9	1.0 08	172.1	15 12.0	1.0 08	172.1	14 42.1	1.0 08	172.1	14 12.2	1.0 08	172.2	13 42.3	1.0 08	172.2	13 12.3	1.0 08	172.3	8
9	16 36.9	1.0 09	171.0	16 07.0	1.0 09	171.0	15 37.1	1.0 09	171.1	15 07.2	1.0 09	171.1	14 37.3	1.0 09	171.2	14 07.4	1.0 09	171.2	13 37.6	1.0 09	171.2	13 07.7	1.0 09	171.3	9
10	16 31.4	1.0 10	170.0	16 01.6	1.0 10	170.0	15 31.7	1.0 10	170.1	15 01.9	1.0 10	170.1	14 32.0	1.0 10	170.2	14 02.2	1.0 10	170.2	13 32.3	1.0 10	170.3	13 02.5	1.0 10	170.3	10
1	16 25.5	99 11	169.0	15 55.6	99 11	169.0	15 25.8	99 11	169.1	14 56.0	99 11	169.1	14 26.2	99 11	169.2	13 56.3	99 11	169.3	13 26.5	99 11	169.3	12 56.7	99 10	169.4	1
2	16 18.9	99 12	168.0	15 49.2	99 12	168.0	15 19.4	99 12	168.1	14 49.6	99 12	168.2	14 19.8	99 12	168.2	13 50.0	99 12	168.3	13 20.2	99 11	168.3	12 50.4	99 11	168.4	2
3	16 11.9	99 13	167.0	15 42.1	99 13	167.1	15 12.4	99 13	167.1	14 42.6	99 13	167.2	14 12.8	99 12	167.2	13 43.1	99 12	167.3	13 13.3	99 12	167.4	12 43.6	99 12	167.4	3
4	16 04.2	99 14	166.0	15 34.5	99 14	166.1	15 04.8	99 14	166.1	14 35.1	99 13	166.2	14 05.4	99 13	166.3	13 35.6	99 13	166.3	13 05.9	99 13	166.4	12 36.2	99 13	166.5	4
15	15 56.0	99 15	165.0	15 26.4	99 14	165.1	14 56.7	99 14	165.2	14 27.0	99 14	165.2	13 57.3	99 14	165.3	13 27.7	99 14	165.4	12 58.0	99 14	165.5	12 28.3	99 14	165.5	15
6	15 47.3	99 15	164.0	15 17.7	99 15	164.1	14 48.1	99 15	164.2	14 18.4	99 15	164.3	13 48.8	99 15	164.3	13 19.1	99 15	164.4	12 49.5	99 15	164.5	12 19.9	99 15	164.6	6
7	15 38.1	99 16	163.0	15 08.5	99 16	163.1	14 38.9	99 16	163.2	14 09.3	99 16	163.3	13 39.7	99 16	163.4	13 10.1	99 16	163.5	12 40.5	99 16	163.5	12 10.9	99 16	163.6	7
8	15 28.2	98 17	162.0	14 58.7	98 17	162.1	14 29.2	98 17	162.2	13 59.6	98 17	162.3	13 30.1	98 17	162.4	13 00.5	98 17	162.5	12 31.0	99 17	162.6	12 01.4	99 17	162.7	8
9	15 17.9	98 18	161.1	14 48.4	98 18	161.2	14 18.9	98 18	161.3	13 49.4	98 18	161.4	13 19.9	98 18	161.4	12 50.4	98 18	161.5	12 20.9	98 18	161.6	11 51.4	98 18	161.7	9
20	15 07.0	98 19	160.1	14 37.6	98 19	160.2	14 08.2	98 19	160.3	13 38.7	98 19	160.4	13 09.3	98 19	160.5	12 39.8	98 19	160.6	12 10.4	98 18	160.7	11 40.9	98 18	160.8	20
1	14 55.7	98 20	159.1	14 26.3	98 20	159.2	13 56.9	98 20	159.3	13 27.5	98 20	159.4	12 58.1	98 19	159.5	12 28.7	98 19	159.6	11 59.3	98 19	159.7	11 29.9	98 19	159.8	1
2	14 43.7	98 21	158.1	14 14.4	98 21	158.2	13 45.1	98 20	158.4	13 15.8	98 20	158.5	12 46.4	98 20	158.6	12 17.1	98 20	158.7	11 47.7	98 20	158.8	11 18.4	98 20	158.9	2
3	14 31.3	98 22	157.2	14 02.1	98 21	157.3	13 32.8	98 21	157.4	13 03.5	98 21	157.5	12 34.2	98 21	157.6	12 05.0	98 21	157.7	11 35.7	98 21	157.8	11 06.4	98 21	158.0	3
4	14 18.4	97 22	156.2	13 49.2	97 22	156.3	13 20.0	97 22	156.4	12 50.8	97 22	156.6	12 21.5	97 22	156.7	11 52.3	97 22	156.8	11 23.1	97 22	156.9	10 53.9	97 22	157.0	4
25	14 05.0	97 23	155.2	13 35.8	97 23	155.4	13 06.7	97 23	155.5	12 37.5	97 23	155.6	12 08.4	97 23	155.7	11 39.2	97 23	155.8	11 10.0	97 23	156.0	10 40.9	97 22	156.1	25
6	13 51.0	97 24	154.3	13 21.9	97 24	154.4	12 52.9	97 24	154.5	12 23.8	97 24	154.7	11 54.7	97 24	154.8	11 25.6	97 24	154.9	10 56.5	97 23	155.0	10 27.4	97 23	155.2	6
7	13 36.6	97 25	153.3	13 07.6	97 25	153.5	12 38.6	97 25	153.6	12 09.5	97 25	153.7	11 40.5	97 24	153.8	11 11.5	97 24	154.0	10 42.4	97 24	154.1	10 13.4	97 24	154.2	7
8	13 21.7	96 26	152.4	12 52.7	96 26	152.5	12 23.8	97 25	152.6	11 54.8	97 25	152.8	11 25.9	97 25	152.9	10 56.9	97 25	153.0	10 27.9	97 25	153.2	9 59.0	97 25	153.3	8
9	13 06.3	96 26	151.4	12 37.4	96 26	151.6	12 08.5	96 26	151.7	11 39.6	96 26	151.8	11 10.7	96 26	152.0	10 41.8	96 26	152.1	10 12.9	96 26	152.2	9 44.0	96 26	152.4	9
30	12 50.4	96 27	150.5	12 21.6	96 27	150.6	11 52.8	96 27	150.8	11 24.0	96 27	150.9	10 55.1	96 27	151.0	10 26.3	96 27	151.2	9 57.5	96 27	151.3	9 28.7	96 26	151.5	30
1	12 34.1	96 28	149.5	12 05.3	96 28	149.7	11 36.6	96 28	149.8	11 07.8	96 28	150.0	10 39.1	96 28	150.1	10 10.3	96 27	150.2	9 41.6	96 27	150.4	9 12.8	96 27	150.5	1
2	12 17.3	96 29	148.6	11 48.6	96 29	148.7	11 19.9	96 29	148.9	10 51.2	96 28	149.0	10 22.6	96 28	149.2	9 53.9	96 28	149.3	9 25.2	96 28	149.5	8 56.5	96 28	149.6	2
3	12 00.0	95 30	147.6	11 31.4	95 29	147.8	11 02.8	95 29	147.9	10 34.2	95 29	148.1	10 05.6	95 29	148.3	9 37.0	95 29	148.4	9 08.4	95 29	148.6	8 39.8	95 29	148.7	3
4	11 42.3	95 30	146.7	11 13.8	95 30	146.9	10 45.2	95 30	147.0	10 16.7	95 30	147.2	9 48.2	95 30	147.3	9 19.7	95 30	147.5	8 51.1	95 30	147.6	8 22.6	95 29	147.8	4
35	11 24.1	95 31	145.8	10 55.7	95 31	145.9	10 27.2	95 31	146.1	9 58.8	95 31	146.3	9 30.3	95 30	146.4	9 01.9	95 30	146.6	8 33.4	95 30	146.7	8 04.9	95 30	146.9	35
6	11 05.5	95 32	144.8	10 37.2	95 32	145.0	10 08.8	95 31	145.2	9 40.4	95 31	145.3	9 12.0	95 31	145.5	8 43.7	95 31	145.7	8 15.3	95 31	145.8	7 46.9	95 31	146.0	6
7	10 46.5	94 32	143.9	10 18.2	94 32	144.1	9 49.9	94 32	144.3	9 21.6	94 32	144.4	8 53.3	94 32	144.6	8 25.0	94 32	144.8	7 56.7	94 32	144.9	7 28.4	94 32	145.1	7
8	10 27.0	94 33	143.0	9 58.8	94 33	143.2	9 30.6	94 33	143.3	9 02.4	94 33	143.5	8 34.2	94 33	143.7	8 06.0	94 32	143.9	7 37.7	94 32	144.0	7 09.5	94 32	144.2	8
9	10 07.2	94 34	142.1	9 39.0	94 34	142.3	9 10.9	94 34	142.4	8 42.8	94 33	142.6	8 14.6	94 33	142.8	7 46.5	94 33	143.0	7 18.3	94 33	143.1	6 50.2	94 33	143.3	9
40	9 46.9	93 34	141.2	9 18.8	93 34	141.4	8 50.8	94 34	141.5	8 22.7	94 34	141.7	7 54.7	94 34	141.9	7 26.6	94 34	142.1	6 58.5	94 34	142.2	6 30.4	94 24	142.4	40
1	9 26.2	93 35	140.3	8 58.2	93 35	140.4	8 30.2	93 35	140.6	8 02.3	93 35	140.8	7 34.3	93 35	141.0	7 06.3	93 34	141.2	6 38.3	93 34	141.4	6 10.3	93 34	141.5	1
2	9 05.1	93 36	139.4	8 37.2	93 36	139.5	8 09.3	93 36	139.7	7 41.4	93 35	139.9	7 13.5	93 35	140.1	6 45.6	93 35	140.3	6 17.7	93 35	140.5	5 49.8	93 35	140.7	2
3	8 43.6	93 36	138.5	8 15.8	93 36	138.6	7 48.0	93 36	138.8	7 20.2	93 36	139.0	6 52.4	93 36	139.2	6 24.5	93 36	139.4	5 56.7	93 36	139.6	5 28.9	93 36	139.8	3
4	8 21.7	92 37	137.6	7 54.0	92 37	137.7	7 26.3	92 37	137.9	6 58.6	92 37	138.1	6 30.8	92 37	138.3	6 03.1	92 36	138.5	5 35.3	92 36	138.7	5 07.6	93 36	138.9	4
45	7 59.5	92 38	136.7	7 31.9	92 38	136.9	7 04.2	92 37	137.0	6 36.6	92 37	137.2	6 08.9	92 37	137.4	5 41.2	92 37	137.6	5 13.6	92 37	137.8				45
6	7 36.9	92 38	135.8	7 09.3	92 38	136.0	6 41.8	92 38	136.2	6 14.2	92 38	136.4	5 46.6	92 38	136.6	5 19.0	92 38	136.8							6
7	7 13.9	92 39	134.9	6 46.4	92 39	135.1	6 19.0	92 39	135.3	5 51.5	92 38	135.5	5 24.0	92 38	135.7										7
8	6 50.6	91 40	134.0	6 23.2	91 39	134.2	5 55.8	91 39	134.4	5 28.4	91 39	134.6	5 01.0	91 39	134.8										8
9	6 26.9	91 40	133.1	5 59.6	91 40	133.3	5 32.3	91 40	133.5	5 04.9	91 40	133.7													9
50	6 02.9	91 41	132.2	5 35.6	91 40	132.4	5 08.4	91 40	132.6																50
1	5 38.5	91 41	131.4	5 11.3	91 41	131.6																			1
2	5 13.8	90 42	130.5																						2

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	12 49.7	83 54	80.3	13 14.6	83 54	80.0	13 39.4	83 54	79.7	14 04.3	83 53	79.4	14 29.1	83 53	79.2	14 53.9	83 53	78.9	15 18.7	83 53	78.6	15 43.4	82 53	78.3	91
2	12 17.5	83 53	79.5	12 42.4	83 53	79.2	13 07.3	83 53	78.9	13 32.2	83 53	78.6	13 57.0	83 53	78.3	14 21.9	83 53	78.1	14 46.7	83 53	77.8	15 11.5	83 53	77.5	2
3	11 45.4	83 53	78.7	12 10.4	83 53	78.4	12 35.3	83 53	78.1	13 00.2	83 53	77.8	13 25.1	83 53	77.5	13 49.9	83 53	77.2	14 14.8	83 53	77.0	14 39 6	83 53	76.7	3
4	11 13.5	83 53	77.9	11 38.4	83 53	77.6	12 03.4	83 53	77.3	12 28.3	83 53	77.0	12 53.2	83 53	76.7	13 18.1	83 53	76.4	13 43.0	83 53	76.1	14 07 9	83 53	75.9	4
95	10 41.6	83 53	77.0	11 06.6	83 53	76.8	11 31.5	83 53	76.5	11 56.5	83 53	76.2	12 21.5	83 53	75.9	12 46.4	83 53	75.6	13 11.3	83 53	75.3	13 36.2	83 53	75.1	95
6	10 09.8	83 53	76.2	10 34.8	83 53	75.9	10 59.8	83 53	75.7	11 24.8	83 53	75.4	11 49.8	83 53	75.1	12 14.8	83 52	74.8	12 39.8	83 52	74.5	13 04 7	83 52	74.2	6
7	9 38.1	84 53	75.4	10 03.2	84 53	75.1	10 28.2	84 52	74.9	10 53.3	83 52	74.6	11 18.3	83 52	74.3	11 43.3	83 52	74.0	12 08.3	83 52	73.7	12 33.3	83 52	73.4	7
8	9 06.5	84 52	74.6	9 31.6	84 52	74.3	9 56.7	84 52	74.0	10 21.8	84 52	73.8	10 46.9	84 52	73.5	11 12.0	84 52	73.2	11 37 0	83 52	72.9	12 02.1	83 52	72.6	8
9	8 35.1	84 52	73.8	9 00.2	84 52	73.5	9 25.4	84 52	73.2	9 50.5	84 52	72.9	10 15.7	84 52	72.7	10 40.8	84 52	72.4	11 05.9	84 52	72.1	11 31 0	84 52	71.8	9
100	8 03.8	84 52	73.0	8 29.0	84 52	72.7	8 54.2	84 52	72.4	9 19.4	84 52	72.1	9 44.5	84 52	71 9	10 09.7	84 52	71.6	10 34.8	84 51	71.3	11 00.0	84 51	71.0	100
1	7 32.6	84 52	72.1	7 57.8	84 52	71.9	8 23.1	84 52	71.6	8 48.3	84 51	71.3	9 13.6	84 51	71.1	9 38.8	84 51	70.8	10 04.0	84 51	70.5	10 29 2	84 51	70.2	1
2	7 01.6	84 51	71.3	7 26.9	84 51	71.1	7 52.2	84 51	70.8	8 17.4	84 51	70.5	8 42.7	84 51	70.2	9 08.0	84 51	70.0	9 33.2	84 51	69.7	9 58.5	84 51	69.4	2
3	6 30.7	85 51	70.5	6 56.0	85 51	70.2	7 21.4	84 51	70.0	7 46.7	84 51	69.7	8 12.0	84 51	69.4	8 37.4	84 51	69.2	9 02.7	84 51	68.9	9 28.0	84 51	68.6	3
4	5 59.9	85 51	69.7	6 25.4	85 51	69.4	6 50.8	85 51	69.2	7 16.2	85 51	68.9	7 41.5	85 51	68.6	8 06.9	85 50	68.4	8 32.3	85 50	68.1	8 57.6	84 50	67.8	4
105	5 29.4	85 51	68.9	5 54.8	85 51	68.6	6 20.3	85 50	68.3	6 45.8	85 50	68.1	7 11.2	85 50	67.8	7 36.6	85 50	67.5	8 02.0	85 50	67.3	8 27.5	85 50	67.0	105
6				5 24.5	85 50	67.8	5 50.0	85 50	67.5	6 15.5	85 50	67.3	6 41.0	85 50	67.0	7 06.5	85 50	66.7	7 32.0	85 50	66.5	7 57.5	85 50	66.2	6
7							5 19.9	85 50	66.7	5 45.5	85 50	66.4	6 11.0	85 50	66.2	6 36.6	85 50	65.9	7 02.1	85 49	65.7	7 27.7	85 49	65.4	7
8										5 15.6	85 50	65.6	5 41.2	85 49	65.4	6 06.8	85 49	65.1	6 32.4	85 49	64.8	6 58.0	85 49	64.6	8
9													5 11.6	86 49	64.5	5 37.3	86 49	64.3	6 03.0	86 49	64.0	6 28.6	86 49	63.8	9
110																5 08.0	86 49	63.5	5 33.7	86 48	63.2	5 59.4	86 48	63.0	110
1																			5 04.6	86 48	62.4	5 30.4	86 48	62.1	1
2																						5 01.6	86 48	61.3	2

Lat. 58°

Digitized by Google

Lat. 57°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	53 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	54 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	56 00.0	1.0 01	180.0	56 30.0	1.0 01	180.0	00
1	52 59.6	1.0 02	178.4	53 29.6	1.0 02	178.4	53 59.5	1.0 02	178.4	54 29.5	1.0 02	178.4	54 59.5	1.0 02	178.4	55 29.5	1.0 02	178.4	55 59.5	1.0 02	178.4	56 29.5	1.0 02	178.3	1
2	52 58.2	1.0 04	176.9	53 28.2	1.0 04	176.9	53 58.2	1.0 04	176.8	54 28.2	1.0 04	176.8	54 58.2	1.0 04	176.8	55 28.1	1.0 04	176.7	55 58.1	1.0 04	176.7	56 28.1	1.0 04	176.7	2
3	52 56.0	1.0 05	175.3	53 26.0	1.0 05	175.3	53 55.9	1.0 05	175.2	54 25.9	1.0 05	175.2	54 55.9	1.0 05	175.2	55 25.8	1.0 05	175.1	55 55.8	1.0 06	175.1	56 25.7	1.0 06	175.0	3
4	52 52.9	1.0 07	173.8	53 22.8	1.0 07	173.7	53 52.8	1.0 07	173.7	54 22.7	1.0 07	173.6	54 52.6	1.0 07	173.5	55 22.6	1.0 07	173.5	55 52.5	1.0 07	173.4	56 22.4	1.0 07	173.4	4
05	52 48.9	1.0 08	172.2	53 18.8	1.0 08	172.1	53 48.7	1.0 08	172.1	54 18.6	1.0 08	172.0	54 48.5	1.0 08	171.9	55 18.4	1.0 08	171.9	55 48.3	1.0 08	171.8	56 18.2	1.0 09	171.7	05
6	52 44.0	1.0 10	170.7	53 13.9	1.0 10	170.6	53 43.8	1.0 10	170.5	54 13.6	1.0 10	170.4	54 43.5	1.0 10	170.3	55 13.3	1.0 10	170.3	55 43.2	99 10	170.2	56 13.0	99 10	170.1	6
7	52 38.3	99 11	169.1	53 08.1	99 11	169.0	53 37.9	99 11	168.9	54 07.7	99 11	168.8	54 37.5	99 11	168.7	55 07.3	99 11	168.6	55 37.1	99 12	168.5	56 06.9	99 12	168.4	7
8	52 31.7	99 12	167.6	53 01.5	99 13	167.5	53 31.2	99 12	167.4	54 01.0	99 13	167.3	54 30.7	99 13	167.2	55 00.5	99 13	167.0	55 30.2	99 13	166.9	55 59.9	99 13	166.8	8
9	52 24.3	99 14	166.1	52 54.0	99 14	165.9	53 23.7	99 14	165.8	53 53.3	99 14	165.7	54 23.0	99 14	165.6	54 52.7	99 14	165.5	55 22.4	99 14	165.3	55 52.0	99 15	165.2	9
10	52 16.0	99 15	164.5	52 45.6	99 15	164.4	53 15.2	99 16	164.3	53 44.8	99 16	164.1	54 14.4	99 16	164.0	54 44.0	99 16	163.9	55 13.6	99 16	163.7	55 43.2	99 16	163.6	10
1	52 06.8	99 17	163.0	52 36.4	99 17	162.9	53 05.9	98 17	162.7	53 35.5	98 17	162.6	54 05.0	98 17	162.4	54 34.5	98 17	162.3	55 04.0	98 17	162.1	55 33.5	98 18	162.0	1
2	51 56.9	98 18	161.5	52 26.4	98 18	161.4	52 55.8	98 18	161.2	53 25.3	98 18	161.1	53 54.7	98 18	160.9	54 24.2	98 19	160.7	54 53.6	98 19	160.6	55 23.0	98 19	160.4	2
3	51 46.1	98 19	160.0	52 15.5	98 19	159.9	52 44.9	98 20	159.7	53 14.3	98 20	159.5	53 43.6	98 20	159.4	54 13.0	98 20	159.2	54 42.3	98 20	159.0	55 11.6	98 20	158.8	3
4	51 34.6	98 21	158.5	52 03.9	98 21	158.4	52 33.2	98 21	158.2	53 02.4	98 21	158.0	53 31.7	98 21	157.8	54 01.0	97 21	157.6	54 30.2	97 22	157.4	54 59.4	97 22	157.3	4
15	51 22.2	97 22	157.1	51 51.4	97 22	156.9	52 20.6	97 22	156.7	52 49.8	97 22	156.5	53 19.0	97 22	156.3	53 48.1	97 23	156.1	54 17.2	97 23	155.9	54 46.3	97 23	155.7	15
6	51 09.1	97 23	155.6	51 38.2	97 23	155.4	52 07.3	97 24	155.2	52 36.4	97 24	155.0	53 05.5	97 24	154.8	53 34.5	97 24	154.6	54 03.5	97 24	154.4	54 32.5	97 24	154.2	6
7	50 55.2	97 24	154.2	51 24.2	97 25	154.0	51 53.2	97 25	153.8	52 22.2	97 25	153.5	52 51.2	96 25	153.3	53 20.1	96 25	153.1	53 49.0	96 26	152.9	54 17.9	96 26	152.6	7
8	50 40.6	96 26	152.7	51 09.5	96 26	152.5	51 38.4	96 26	152.3	52 07.3	96 26	152.1	52 36.1	96 26	151.9	53 04.9	96 26	151.6	53 33.7	96 27	151.4	54 02.5	96 27	151.1	8
9	50 25.3	96 27	151.3	50 54.1	96 27	151.1	51 22.9	96 27	150.9	51 51.6	96 27	150.6	52 20.3	96 28	150.4	52 49.0	96 28	150.2	53 17.7	95 28	149.9	53 46.3	95 28	149.7	9
20	50 09.2	96 28	149.9	50 37.9	96 28	149.7	51 06.6	95 28	149.4	51 35.2	95 28	149.2	52 03.8	95 29	148.9	52 32.4	95 29	148.7	53 01.0	95 29	148.4	53 29.5	95 29	148.2	20
1	49 52.5	95 29	148.5	50 21.1	95 29	148.3	50 49.6	95 29	148.0	51 18.2	95 30	147.8	51 46.6	95 30	147.5	52 15.1	95 30	147.3	52 43.5	95 30	147.0	53 11.9	95 30	146.7	1
2	49 35.1	95 30	147.1	50 03.6	95 30	146.9	50 32.0	95 30	146.6	51 00.4	95 31	146.4	51 28.7	94 31	146.1	51 57.1	94 31	145.8	52 25.4	94 31	145.6	52 53.6	94 32	145.3	2
3	49 17.0	95 31	145.7	49 45.4	94 31	145.5	50 13.7	94 32	145.2	50 42.0	94 32	145.0	51 10.2	94 32	144.7	51 38.4	94 32	144.4	52 06.6	94 32	144.2	52 34.7	94 33	143.9	3
4	48 58.3	94 32	144.4	49 26.5	94 32	144.1	49 54.7	94 33	143.9	50 22.9	94 33	143.6	50 51.0	94 33	143.3	51 19.1	94 33	143.0	51 47.1	93 33	142.8	52 15.1	93 24	142.5	4
25	48 39.0	94 33	143.1	49 07.1	94 33	142.8	49 35.1	93 34	142.5	50 03.2	93 34	142.2	50 31.2	93 34	142.0	50 59.1	93 34	141.7	51 27.0	93 34	141.4	51 54.9	93 35	141.1	25
6	48 19.0	93 34	141.7	48 47.0	93 34	141.5	49 15.0	93 35	141.2	49 42.9	93 35	140.9	50 10.7	93 35	140.6	50 38.5	93 35	140.3	51 06.3	92 36	140.0	51 34.0	92 36	139.7	6
7	47 58.5	93 35	140.4	48 26.4	93 35	140.1	48 54.2	93 36	139.9	49 22.0	93 36	139.6	49 49.7	92 36	139.3	50 17.4	92 36	139.0	50 45.0	92 36	138.7	51 12.6	92 37	138.4	7
8	47 37.4	93 36	139.1	48 05.1	92 36	138.8	48 32.8	92 36	138.5	49 00.5	92 37	138.2	49 28.1	92 37	137.9	49 55.6	92 37	137.6	50 23.1	92 37	137.3	50 50.6	91 38	137.0	8
9	47 15.7	92 37	137.8	47 43.3	92 37	137.5	48 10.9	92 37	137.2	48 38.4	92 38	136.9	49 05.9	92 38	136.6	49 33.3	91 38	136.3	50 00.7	91 38	136.0	50 28.0	91 38	135.7	9
30	46 53.5	92 38	136.6	47 21.0	92 38	136.3	47 48.5	91 38	136.0	48 15.9	91 38	135.7	48 43.2	91 39	135.4	49 10.5	91 39	135.0	49 37.8	91 39	134.7	50 05.0	91 39	134.4	30
1	46 30.8	91 39	135.3	46 58.2	91 39	135.0	47 25.5	91 39	134.7	47 52.8	91 39	134.4	48 20.0	91 40	134.1	48 47.2	90 40	133.8	49 14.3	90 40	133.4	49 41.3	90 40	133.1	1
2	46 07.6	91 40	134.1	46 34.8	91 40	133.8	47 02.0	91 40	133.5	47 29.2	90 40	133.1	47 56.3	90 40	132.8	48 23.3	90 41	132.5	48 50.3	90 41	132.2	49 17.2	90 41	131.8	2
3	45 43.8	91 40	132.8	46 11.0	90 41	132.5	46 38.1	90 41	132.2	47 05.1	90 41	131.9	47 32.1	90 41	131.6	47 59.0	90 41	131.3	48 25.9	89 42	130.9	48 52.7	89 42	130.6	3
4	45 19.7	90 41	131.6	45 46.7	90 41	131.3	46 13.6	90 42	131.0	46 40.5	90 42	130.7	47 07.4	89 42	130.4	47 34.2	89 42	130.0	48 00.9	89 42	129.7	48 27.6	89 42	129.3	4
35	44 55.0	90 42	130.4	45 21.9	90 42	130.1	45 48.7	89 42	129.8	46 15.5	89 42	129.5	46 42.3	89 43	129.1	47 09.0	89 43	128.8	47 35.6	89 43	128.5	48 02.1	88 43	128.1	35
6	44 29.9	89 43	129.3	44 56.7	89 43	128.9	45 23.4	89 43	128.6	45 50.1	89 43	128.3	46 16.7	89 43	128.0	46 43.3	88 44	127.6	47 09.8	88 44	127.3	47 36.2	88 44	126.9	6
7	44 04.4	89 43	128.1	44 31.1	89 43	127.8	44 57.7	89 44	127.4	45 24.2	88 44	127.1	45 50.7	88 44	126.8	46 17.2	88 44	126.4	46 43.6	88 44	126.1	47 09.9	88 45	125.7	7
8	43 38.5	89 44	126.9	44 05.0	88 44	126.6	44 31.5	88 44	126.3	44 58.0	88 44	125.9	45 24.4	88 45	125.6	45 50.7	88 45	125.3	46 17.0	87 45	124.9	46 43.2	87 45	124.6	8
9	43 12.2	88 44	125.8	43 38.6	88 45	125.5	44 05.0	88 45	125.1	44 31.3	88 45	124.8	44 57.6	87 45	124.5	45 23.8	87 45	124.1	45 50.0	87 46	123.8	46 16.1	87 46	123.4	9
40	42 45.5	88 45	124.6	43 11.8	88 45	124.3	43 38.1	88 46	124.0	44 04.3	87 46	123.7	44 30.5	87 46	123.3	44 56.6	87 46	123.0	45 22.6	87 46	122.6	45 48.6	86 46	122.3	40
1	42 18.4	88 46	123.5	42 44.6	87 46	123.2	43 10.8	87 46	122.9	43 36.9	87 46	122.5	44 03.0	87 46	122.2	44 29.0	87 47	121.8	44 54.9	86 47	121.5	45 20.8	86 47	121.1	1
2	41 51.0	87 46	122.4	42 17.1	87 46	122.1	42 43.2	87 47	121.8	43 09.2	87 47	121.4	43 35.2	86 47	121.1	44 01.1	86 47	120.7	44 26.9	86 47	120.4	44 52.7	86 47	120.0	2
3	41 23.2	87 47	121.3	41 49.3	87 47	121.0	42 15.2	86 47	120.7	42 41.2	86 47	120.3	43 07.0	86 47	120.0	43 32.8	86 48	119.6	43 58.5	86 48	119.3	44 24.2	85 48	118.9	3
4	40 55.2	87 47	120.2	41 21.1	86 47	119.9	41 47.0	86 48	119.6	42 12.8	86 48	119.2	42 38.6	86 48	118.9	43 04.3	86 48	118.5	43 29.9	85 48	118.2	43 55.4	85 48	117.8	4
45	40 26.8	86 48	119.2	40 52.6	86 48	118.8	41 18.4	86 48	118.5	41 44.1	86 48	118.2	42 09.8	85 48	117.8	42 35.4	85 49	117.5	43 00.9	85 49	117.1	43 26.4	85 49	116.7	45
6	39 58.1	86 48	118.1	40 23.9	86 48	117.8	40 49.5	86 48	117.4	41 15.2	85 49	117.1	41 40.8	85 49	116.7	42 06.3	85 49	116.4	42 31.7	85 49	116.0	42 57.1	84 49	115.7	6
7	39 29.1	86 49	117.1	39 54.8	85 49	116.7	40 20.4	85 49	116.4	40 46.0	85 49	116.0	41 11.4	85 49	115.7	41 36.9	85 49	115.3	42 02.2	84 50	115.0	42 27.5	84 50	114.6	7
8	38 59.9	85 49	116.0	39 25.5	85 49	115.7	39 51.0	85 49	115.4	40 16.5	85 50	115.0	40 41.9	85 50	114.7	41 07.2	84 50	114.3	41 32.5	84 50	113.9	41 57.7	84 50	113.6	8
9	38 30.4	85 50	115.0	38 55.9	85 50	114.7	39 21.4	85 50	114.3	39 46.7	84 50	114.0	40 12.0	84 50	113.6	40 37.3	84 50	113.3	41 02.5	84 50	112.9	41 27.6	84 50	112.6	9
50	38 00.7	85 50	114.0	38 26.1	85 50	113.6	38 51.5	84 50	113.3	39 16.8	84 50	113.0	39 42.0	84 50	112.6	40 07.2	84 51	112.3	40 32.3	84 51	111.9	40 57.3	83 51	111.5	50
1	37 30.7	85 50	113.0	37 56.0	84 50	112.6	38 21.3	84 50	112.3	38 46.6	84 51	112.0	39 11.7	84 51	111.6	39 36.8	84 51	111.2	40 01.9	83 51	110.9	40 26.8	83 51	110.5	1
2	37 00.5	84 51	112.0	37 25.8	84 51	111.6	37 51.0	84 51	111.3	38 16.1	84 51	111.0	38 41.2	84 51	110.6	39 06.3	83 51	110.3	39 31.2	83 51	109.9	39 56.1	83 52	109.5	2
3	36 30.1	84 51	111.0	36 55.3	84 51	110.7	37 20.4	84 51	110.3	37 45.5	84 51	110.0	38 10.5	83 52	109.6	38 35.5	83 52	109.3	39 00.4	83 52	108.9	39 25.2	83 52	108.5	3
4	35 59.5	84 51	110.0	36 24.6	84 51	109.7	36 49.7	83 52	109.3	37 14.7	83 52	109.0	37 39.7	83 52	108.6	38 04.6	83 52	108.3	38 29.4	83 52	107.9	38 54.2	82 52	107.6	4
55	35 28.7	84 52	109.0	35 53.8	83 52	108.7	36 18.8	83 52	108.4	36 43.7	83 52	108.0	37 08.6	83 52	107.7	37 33.5	83 52	107.3	37 58.2	82 52	107.0	38 22.9	82 52	106.6	55
6	34 57.7	83 52	108.1	35 22.7	83 52	107.7	35 47.7	83 52	107.4	36 12.6	83 52	107.1	36 37.4	83 52	106.7	37 02.2	82 52	106.4	37 26.9	82 52	106.0	37 51.5	82 53	105.6	6
7	34 26.6	83 52	107.1	34 51.5	83 52	106.8	35 16.4	83 52	106.5	35 41.3	83 52	106.1	36 06.0	82 52	105.8	36 30.7	82 53	105.4	36 55.4	82 53	105.1	37 20.0	82 53	104.7	7
8	33 55.3	83 52	106.2	34 20.2	83 53	105.9	34 45.0	83 53	105.5	35 09.8	83 53	105.2	35 34.5	82 53	104.8	35 59.2	82 53	104.5	36 23.8	82 53	104.1	36 48.3	82 53	103.8	8
9	33 23.8	83 53	105.3	33 48.7	83 53	104.9	34 13.4	83 53	104.6	34 38.2	82 53	104.2	35 02.9	82 53	103.9	35 27.5	82 53	103.5	35 52.0	82 53	103.2	36 16.5	82 53	102.8	9
60	32 52.2	83 53	104.3	33 17.0	83 53	104.0	33 41.8	82 53	103.6	34 06.4	82 53	103.3	34 31.1	82 53	103.0	34 55.6	82 53	102.6	35 20.1	82 53	102.3	35 44.6	81 53	101.9	60
1	32 20.5	83 53	103.4	32 45.2	82 53	103.1	33 09.9	82 53	102.7	33 34.6	82 53	102.4	33 59.2	82 53	102.0	34 23.7	82 53	101.7	34 48.2	81 54	101.3	35 12.6	81 54	101.0	1
2	31 48.6	82 53	102.5	32 13.4	82 53	102.2	32 38.0	82 53	101.8	33 02.6	82 53	101.5	33 27.2	82 54	101.1	33 51.6	82 54	100.8	34 16.1	81 54	100.4	34 40.4	81 54	100.1	2
3	31 16.7	82 53	101.6	31 41.4	82 54	101.2	32 06.0	82 54	100.9	32 30.5	82 54	100.6	32 55.0	82 54	100.2	33 19.5	81 54	99.9	33 43.9	81 54	99.5	34 08.2	81 54	99.2	3
4	30 44.6	82 54	100.7	31 09.3	82 54	100.3	31 33.8	82 54	100.0	31 58.4	82 54	99.7	32 22.8	81 54	99.3	32 47.3	81 54	99.0	33 11.6	81 54	98.6	33 35.9	81 54	98.3	4
65	30 12.5	82 54	99.8	30 37.1	82 54	99.4	31 01.6	82 54	99.1	31 26.1	82 54	98.8	31 50.5	81 54	98.4	32 14.9	81 54	98.1	32 39.3	81 54	97.7	33 03.5	81 54	97.4	65
6	29 40.2	82 54	98.9	30 04.8	82 54	98.6	30 29.3	82 54	98.2	30 53.8	81 54	97.9	31 18.2	81 54	97.5	31 42.5	81 54	97.2	32 06.9	81 54	96.9	32 31.1	81 54	96.5	6
7	29 07.9	82 54	98.0	29 32.4	82 54	97.7	29 56.9	82 54	97.3	30 21.4	81 54	97.0	30 45.8	81 54	96.7	31 10.1	81 54	96.3	31 34.4	81 54	96.0	31 58.6	81 54	95.6	7
8	28 35.5	82 54	97.1	29 00.0	82 54	96.8	29 24.5	81 54	96.5	29 48.9	81 54	96.1	30 13.3	81 54	95.8	30 37.6	81 54	95.5	31 01.9	81 54	95.1	31 26.1	81 54	94.8	8
9	28 03.0	82 54	96.3	28 27.5	82 54	95.9	28 52.0	81 54	95.6	29 16.4	81 54	95.3	29 40.7	81 54	94.9	30 05.0	81 54	94.6	30 29.3	81 54	94.3	30 53.5	81 54	93.9	9
70	27 30.5	82 54	95.4	27 55.0	82 54	95.1	28 19.4	81 54	94.7	28 43.8	81 54	94.4	29 08.2	81 54	94.1	29 32.4	81 54	93.7	29 56.7	81 54	93.4	30 20.9	81 54	93.0	70
1	26 58.0	82 54	94.5	27 22.4	81 54	94.2	27 46.9	81 54	93.9	28 11.2	81 54	93.5	28 35.5	81 54	93.2	28 59.8	81 54	92.9	29 24.0	81 54	92.5	29 48.2	80 54	92.2	1
2	26 25.4	82 54	93.7	26 49.8	81 54	93.3	27 14.2	81 54	93.0	27 38.6	81 54	92.7	28 02.9	81 54	92.4	28 27.2	81 54	92.0	28 51.4	81 54	91.7	29 15.6	80 54	91.3	2
3	25 52.8	82 54	92.8	26 17.2	81 54	92.5	26 41.6	81 54	92.2	27 05.9	81 54	91.8	27 30.3	81 54	91.5	27 54.5	81 54	91.2	28 18.7	81 54	90.8	28 42.9	80 54	90.5	3
4	25 20.1	82 54	92.0	25 44.5	81 54	91.6	26 08.9	81 54	91.3	26 33.3	81 54	91.0	26 57.6	81 54	90.7	27 21.8	81 54	90.3	27 46.0	81 54	90.0	28 10.2	80 54	89.7	4
75	24 47.4	81 54	91.1	25 11.9	81 54	90.8	25 36.3	81 54	90.5	26 00.6	81 54	90.2	26 24.9	81 54	89.8	26 49.2	81 54	89.5	27 13.4	81 54	89.2	27 37.5	80 54	88.8	75
6	24 14.8	81 54	90.3	24 39.2	81 54	90.0	25 03.6	81 54	89.6	25 27.9	81 54	89.3	25 52.2	81 54	89.0	26 16.5	81 54	88.7	26 40.7	81 54	88.3	27 04.9	80 54	88.0	6
7	23 42.1	81 54	89.4	24 06.5	81 54	89.1	24 30.9	81 54	88.8	24 55.3	81 54	88.5	25 19.6	81 54	88.2	25 43.8	81 54	87.8	26 08.0	81 54	87.5	26 32.2	81 54	87.2	7
8	23 09.4	82 54	88.6	23 33.8	81 54	88.3	23 58.2	81 54	88.0	24 22.6	81 54	87.6	24 46.9	81 54	87.3	25 11.2	81 54	87.0	25 35.4	81 54	86.7	25 59.6	81 54	86.3	8
9	22 36.8	82 54	87.8	23 01.2	81 54	87.5	23 25.6	81 54	87.1	23 50.0	81 54	86.8	24 14.3	81 54	86.5	24 38.6	81 54	86.2	25 02.8	81 54	85.9	25 27.0	81 54	85.5	9
80	22 04.1	82 54	86.9	22 28.6	81 54	86.6	22 53.0	81 54	86.3	23 17.3	81 54	86.0	23 41.7	81 54	85.7	24 06.0	81 54	85.4	24 30.2	81 54	85.0	24 54.4	81 54	84.7	80
1	21 31.5	82 54	86.1	21 55.9	81 54	85.8	22 20.4	81 54	85.5	22 44.8	81 54	85.2	23 09.1	81 54	84.9	23 33.4	81 54	84.5	23 57.7	81 54	84.2	24 21.9	81 54	83.9	1
2	20 58.9	82 54	85.3	21 23.4	82 54	85.0	21 47.8	81 54	84.7	22 12.2	81 54	84.4	22 36.6	81 54	84.0	23 00.9	81 54	83.7	23 25.2	81 54	83.4	23 49.5	81 54	83.1	2
3	20 26.4	82 54	84.5	20 50.8	82 54	84.2	21 15.3	81 54	83.9	21 39.7	81 54	83.5	22 04.1	81 54	83.2	22 28.5	81 54	82.9	22 52.8	81 54	82.6	23 17.0	81 54	82.3	3
4	19 53.9	82 54	83.7	20 18.4	82 54	83.3	20 42.8	82 54	83.0	21 07.3	81 54	82.7	21 31.7	81 54	82.4	21 56.1	81 54	82.1	22 20.4	81 54	81.8	22 44.7	81 54	81.5	4
85	19 21.4	82 54	82.8	19 45.9	82 54	82.5	20 10.4	82 54	82.2	20 34.9	81 54	81.9	20 59.3	81 54	81.6	21 23.7	81 54	81.3	21 48.1	81 54	81.0	22 12.4	81 54	80.7	85
6	18 49.0	82 54	82.0	19 13.6	82 54	81.7	19 38.1	82 54	81.4	20 02.6	82 54	81.1	20 27.0	81 54	80.8	20 51.5	81 54	80.5	21 15.8	81 54	80.2	21 40.2	81 54	79.9	6
7	18 16.7	82 54	81.2	18 41.3	82 54	80.9	19 05.8	82 54	80.6	19 30.3	82 54	80.3	19 54.8	82 54	80.0	20 19.3	81 54	79.7	20 43.7	81 54	79.4	21 08.1	81 53	79.1	7
8	17 44.4	82 54	80.4	18 09.0	82 54	80.1	18 33.6	82 54	79.8	18 58.1	82 53	79.5	19 22.7	82 53	79.2	19 47.2	82 53	78.9	20 11.6	81 53	78.6	20 36.0	81 53	78.3	8
9	17 12.2	82 54	79.6	17 36.9	82 53	79.3	18 01.5	82 54	79.0	18 26.1	82 53	78.7	18 50.6	82 53	78.4	19 15.1	82 53	78.1	19 39.6	82 53	77.8	20 04.1	81 53	77.5	9
90	16 40.1	82 53	78.8	17 04.8	82 53	78.5	17 29.4	82 53	78.2	17 54.1	82 53	77.9	18 18.6	82 53	77.6	18 43.2	82 53	77.3	19 07.7	82 53	77.0	19 32.2	82 53	76.7	90

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 57°

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	13 00.0	1.0	00	180.0	12 30.0	1.0	00	180.0	12 00.0	1.0	00	180.0	11 30.0	1.0	00	180.0	11 00.0	1.0	00	180.0	10 30.0	1.0	00	180.0	10 00.0	1.0	00	180.0	9 30.0	1.0	00	180.0	00
1	12 59.7	1.0	01	179.0	12 29.7	1.0	01	179.0	11 59.7	1.0	01	179.0	11 29.7	1.0	01	179.1	10 59.7	1.0	01	179.1	10 29.7	1.0	01	179.1	9 59.7	1.0	01	179.1	9 29.7	1.0	01	179.1	1
2	12 58.9	1.0	02	178.1	12 28.9	1.0	02	178.1	11 58.9	1.0	02	178.1	11 28.9	1.0	02	178.1	10 58.9	1.0	02	178.1	10 28.9	1.0	02	178.1	9 58.9	1.0	02	178.1	9 28.9	1.0	02	178.1	2
3	12 57.5	1.0	03	177.1	12 27.5	1.0	03	177.1	11 57.6	1.0	03	177.1	11 27.6	1.0	03	177.2	10 57.6	1.0	03	177.2	10 27.6	1.0	03	177.2	9 57.6	1.0	03	177.2	9 27.6	1.0	03	177.2	3
4	12 55.6	1.0	04	176.1	12 25.6	1.0	04	176.2	11 55.6	1.0	04	176.2	11 25.7	1.0	04	176.2	10 55.7	1.0	04	176.2	10 25.7	1.0	04	176.2	9 55.7	1.0	04	176.3	9 25.8	1.0	04	176.3	4
05	12 53.1	1.0	05	175.2	12 23.2	1.0	05	175.2	11 53.2	1.0	05	175.2	11 23.2	1.0	05	175.3	10 53.3	1.0	05	175.3	10 23.3	1.0	05	175.3	9 53.3	1.0	05	175.3	9 23.4	1.0	05	175.4	05
6	12 50.1	1.0	06	174.2	12 20.2	1.0	06	174.2	11 50.2	1.0	06	174.3	11 20.3	1.0	06	174.3	10 50.3	1.0	06	174.3	10 20.4	1.0	06	174.4	9 50.4	1.0	06	174.4	9 20.5	1.0	06	174.4	6
7	12 46.5	1.0	07	173.3	12 16.6	1.0	07	173.3	11 46.7	1.0	07	173.3	11 16.8	1.0	07	173.4	10 46.8	1.0	07	173.4	10 16.9	1.0	07	173.4	9 47.0	1.0	07	173.5	9 17.0	1.0	07	173.5	7
8	12 42.4	1.0	08	172.3	12 12.5	1.0	08	172.3	11 42.6	1.0	08	172.4	11 12.7	1.0	08	172.4	10 42.8	1.0	08	172.5	10 12.9	1.0	08	172.5	9 43.0	1.0	08	172.5	9 13.1	1.0	07	172.6	8
9	12 37.8	1.0	09	171.3	12 07.9	1.0	09	171.4	11 38.0	1.0	08	171.4	11 08.1	1.0	09	171.5	10 38.2	1.0	08	171.5	10 08.4	1.0	08	171.6	9 38.5	1.0	08	171.6	9 08.6	1.0	08	171.6	9
10	12 32.6	1.0	10	170.4	12 02.7	1.0	10	170.4	11 32.9	1.0	10	170.5	11 03.0	1.0	09	170.5	10 33.2	1.0	09	170.6	10 03.3	1.0	09	170.6	9 33.4	1.0	09	170.7	9 03.6	1.0	09	170.7	10
1	12 26.9	99	10	169.4	11 57.0	99	10	169.5	11 27.2	99	10	169.5	10 57.4	99	10	169.6	10 27.5	99	10	169.6	9 57.7	99	10	169.7	9 27.9	99	10	169.7	8 58.0	99	10	169.8	1
2	12 20.6	99	11	168.5	11 50.8	99	11	168.5	11 21.0	99	11	168.6	10 51.2	99	11	168.6	10 21.4	99	11	168.7	9 51.6	99	11	168.8	9 21.8	99	11	168.8	8 52.0	99	11	168.9	2
3	12 13.8	99	12	167.5	11 44.0	99	12	167.6	11 14.3	99	12	167.6	10 44.5	99	12	167.7	10 14.7	99	12	167.8	9 45.0	99	12	167.8	9 15.2	99	12	167.9	8 45.4	99	12	168.0	3
4	12 06.5	99	13	166.6	11 36.7	99	13	166.6	11 07.0	99	13	166.7	10 37.3	99	13	166.8	10 07.5	99	13	166.8	9 37.8	99	13	166.9	9 08.1	99	13	167.0	8 38.4	99	13	167.0	4
15	11 58.6	99	14	165.6	11 28.9	99	14	165.7	10 59.2	99	14	165.8	10 29.5	99	14	165.8	9 59.8	99	14	165.9	9 30.1	99	14	166.0	9 00.5	99	14	166.0	8 30.8	99	14	166.1	15
6	11 50.2	99	15	164.7	11 20.6	99	15	164.7	10 50.9	99	15	164.8	10 21.3	99	15	164.9	9 51.6	99	14	165.0	9 22.0	99	14	165.0	8 52.3	99	14	165.1	8 22.7	99	14	165.2	6
7	11 41.3	99	16	163.7	11 11.7	99	16	163.8	10 42.1	99	16	163.9	10 12.5	99	16	164.0	9 42.9	99	15	164.0	9 13.3	99	15	164.1	8 43.7	99	15	164.2	8 14.1	99	15	164.3	7
8	11 31.9	99	17	162.8	11 02.3	99	16	162.8	10 32.8	99	16	162.9	10 03.2	99	16	163.0	9 33.6	99	16	163.1	9 04.1	99	16	163.2	8 34.5	99	16	163.3	8 05.0	99	16	163.4	8
9	11 21.9	98	17	161.8	10 52.4	98	17	161.9	10 22.9	98	17	162.0	9 53.4	98	17	162.1	9 23.9	98	17	162.2	8 54.4	98	17	162.3	8 24.9	98	17	162.4	7 55.4	98	17	162.5	9
20	11 11.5	98	18	160.9	10 42.0	98	18	161.0	10 12.6	98	18	161.1	9 43.1	98	18	161.2	9 13.7	98	18	161.3	8 44.2	98	18	161.4	8 14.7	98	18	161.5	7 45.3	98	18	161.5	20
1	11 00.5	98	19	159.9	10 31.1	98	19	160.0	10 01.7	98	19	160.1	9 32.3	98	19	160.2	9 02.9	98	19	160.3	8 33.5	98	19	160.4	8 04.1	98	18	160.5	7 34.7	98	18	160.6	1
2	10 49.1	98	20	159.0	10 19.7	98	20	159.1	9 50.4	98	20	159.2	9 21.0	98	20	159.3	8 51.7	98	20	159.4	8 22.3	98	19	159.5	7 53.0	98	19	159.6	7 23.6	98	19	159.7	2
3	10 37.1	98	21	158.1	10 07.8	98	21	158.2	9 38.5	98	20	158.3	9 09.2	98	20	158.4	8 39.9	98	20	158.5	8 10.6	98	20	158.6	7 41.3	98	20	158.7	7 12.0	98	20	158.8	3
4	10 24.6	97	22	157.1	9 55.4	97	21	157.2	9 26.2	97	21	157.4	8 56.9	97	21	157.5	8 27.7	97	21	157.6	7 58.5	97	21	157.7	7 29.2	97	21	157.8	7 00.0	97	21	157.9	4
25	10 11.7	97	22	156.2	9 42.5	97	22	156.3	9 13.4	97	22	156.4	8 44.2	97	22	156.6	8 15.0	97	22	156.7	7 45.8	97	22	156.8	7 16.7	97	22	156.9	6 47.5	97	22	157.0	25
6	9 58.3	97	23	155.3	9 29.2	97	23	155.4	9 00.1	97	23	155.5	8 31.0	97	23	155.6	8 01.8	97	23	155.8	7 32.7	97	23	155.9	7 03.6	97	22	156.0	6 34.5	97	22	156.1	6
7	9 44.4	97	24	154.4	9 15.3	97	24	154.5	8 46.3	97	24	154.6	8 17.2	97	24	154.7	7 48.2	97	24	154.9	7 19.1	97	23	155.0	6 50.1	97	23	155.1	6 21.0	97	23	155.2	7
8	9 30.0	97	25	153.4	9 01.0	97	25	153.6	8 32.0	97	24	153.7	8 03.1	97	24	153.8	7 34.1	97	24	154.0	7 05.1	97	24	154.1	6 36.1	97	24	154.2	6 07.1	97	24	154.3	8
9	9 15.1	96	26	152.5	8 46.2	96	25	152.6	8 17.3	96	25	152.8	7 48.4	96	25	152.9	7 19.5	96	25	153.1	6 50.6	96	25	153.2	6 21.7	96	25	153.3	5 52.7	96	25	153.5	9
30	8 59.8	96	26	151.6	8 31.0	96	26	151.7	8 02.1	96	26	151.9	7 33.3	96	26	152.0	7 04.5	96	26	152.2	6 35.6	96	26	152.3	6 06.7	96	26	152.4	5 37.9	96	25	152.6	30
1	8 44.0	96	27	150.7	8 15.3	96	27	150.8	7 46.5	96	27	151.0	7 17.7	96	27	151.1	6 49.0	96	27	151.3	6 20.2	96	26	151.4	5 51.4	96	26	151.5	5 22.6	96	26	151.7	1
2	8 27.8	96	28	149.8	7 59.1	96	28	149.9	7 30.4	96	28	150.1	7 01.7	96	27	150.2	6 33.0	96	27	150.4	6 04.3	96	27	150.5	5 35.6	96	27	150.7	5 06.9	96	27	150.8	2
3	8 11.1	95	29	148.9	7 42.5	95	28	149.0	7 13.9	95	28	149.2	6 45.3	95	28	149.3	6 16.6	95	28	149.5	5 48.0	95	28	149.6	5 19.4	95	28	149.8					3
4	7 54.0	95	29	148.0	7 25.5	95	29	148.1	6 56.9	95	29	148.3	6 28.4	95	29	148.4	5 59.8	95	29	148.6	5 31.3	95	29	148.7	5 02.7	95	28	148.9					4
35	7 36.5	95	30	147.1	7 08.0	95	30	147.2	6 39.5	95	30	147.4	6 11.1	95	30	147.5	5 42.6	95	30	147.7	5 14.1	95	29	147.9									35
6	7 18.5	95	31	146.2	6 50.1	95	31	146.3	6 21.7	95	30	146.5	5 53.3	95	30	146.6	5 24.9	95	30	146.8													6
7	7 00.1	94	31	145.3	6 31.8	94	31	145.4	6 03.4	94	31	145.6	5 35.1	94	31	145.8	5 06.8	94	31	145.9													7
8	6 41.3	94	32	144.4	6 13.0	94	32	144.5	5 44.8	94	32	144.7	5 16.5	94	32	144.9																	8
9	6 22.0	94	33	143.5	5 53.9	94	33	143.7	5 25.7	94	32	143.8																					9
40	6 02.4	94	33	142.6	5 34.3	94	33	142.8	5 06.2	94	32	143.0																					40
1	5 42.3	93	34	141.7	5 14.3	93	34	141.9																									1
2	5 21.9	93	35	140.8																													2
3	5 01.0	93	35	140.0																													3

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	16 08.1	82	53	78.0	16 32.8	82	53	77.7	16 57.5	82	53	77.4	17 22.2	82	53	77.1	17 46.8	82	53	76.8	18 11.4	82	53	76.5	18 35.9	82	53	76.2	19 00.5	82	53	75.9	91
2	15 36.2	82	53	77.2	16 01.0	82	53	76.9	16 25.7	82	53	76.6	16 50.4	82	53	76.3	17 15.0	82	53	76.0	17 39.7	82	53	75.7	18 04.3	82	53	75.4	18 28.9	82	53	75.1	2
3	15 04.4	83	53	76.4	15 29.2	83	53	76.1	15 53.9	82	53	75.8	16 18.7	82	53	75.5	16 43.4	82	52	75.2	17 08.1	82	52	74.9	17 32.7	82	52	74.6	17 57.3	82	52	74.3	3
4	14 32.7	83	53	75.6	14 57.5	83	53	75.3	15 22.3	83	52	75.0	15 47.1	83	52	74.7	16 11.8	82	52	74.4	16 36.6	82	52	74.1	17 01.3	82	52	73.8	17 25.9	82	52	73.5	4
95	14 01.1	83	52	74.8	14 26.0	83	52	74.5	14 50.8	83	52	74.2	15 15.6	83	52	73.9	15 40.4	83	52	73.6	16 05.2	83	52	73.3	16 29.9	82	52	73.0	16 54.7	82	52	72.7	95
6	13 29.6	83	52	74.0	13 54.6	83	52	73.7	14 19.4	83	52	73.4	14 44.3	83	52	73.1	15 09.1	83	52	72.8	15 34.0	83	52	72.5	15 58.8	83	52	72.2	16 23.5	83	52	71.9	6
7	12 58.3	83	52	73.2	13 23.3	83	52	72.9	13 48.2	83	52	72.6	14 13.1	83	52	72.3	14 38.0	83	52	72.0	15 02.9	83	52	71.7	15 27.7	83	52	71.4	15 52.5	83	51	71.1	7
8	12 27.1	83	52	72.4	12 52.1	83	52	72.1	13 17.1	83	52	71.8	13 42.0	83	52	71.5	14 07.0	83	52	71.2	14 31.9	83	51	70.9	14 56.8	83	51	70.6	15 21.7	83	51	70.4	8
9	11 56.0	84	52	71.6	12 21.1	83	51	71.3	12 46.1	83	51	71.0	13 11.1	83	51	70.7	13 36.1	83	51	70.4	14 01.1	83	51	70.1	14 26.0	83	51	69.9	14 51.0	83	51	69.6	9
100	11 25.1	84	51	70.8	11 50.2	84	51	70.5	12 15.3	84	51	70.2	12 40.4	84	51	69.9	13 05.4	83	51	69.6	13 30.4	83	51	69.3	13 55.4	83	51	69.1	14 20.4	83	51	68.8	100
1	10 54.3	84	51	69.9	11 19.5	84	51	69.7	11 44.6	84	51	69.4	12 09.7	84	51	69.1	12 34.8	84	51	68.8	12 59.9	84	51	68.6	13 25.0	84	50	68.3	13 50.1	83	50	68.0	1
2	10 23.7	84	51	69.1	10 48.9	84	51	68.9	11 14.1	84	50	68.6	11 39.3	84	50	68.3	12 04.5	84	50	68.0	12 29.6	84	50	67.8	12 54.7	84	50	67.5	13 19.9	84	50	67.2	2
3	9 53.2	84	50	68.3	10 18.5	84	50	68.1	10 43.8	84	50	67.8	11 09.0	84	50	67.5	11 34.2	84	50	67.2	11 59.4	84	50	67.0	12 24.6	84	50	66.7	12 49.8	84	50	66.4	3
4	9 23.0	84	50	67.5	9 48.3	84	50	67.3	10 13.6	84	50	67.0	10 38.9	84	50	66.7	11 04.2	84	50	66.4	11 29.5	84	50	66.2	11 54.7	84	50	65.9	12 20.0	84	49	65.6	4
105	8 52.9	85	50	66.7	9 18.2	85	50	66.5	9 43.6	85	50	66.2	10 09.0	85	50	65.9	10 34.3	84	50	65.7	10 59.7	84	49	65.4	11 25.0	84	49	65.1	11 50.3	84	49	64.8	105
6	8 22.9	85	50	65.9	8 48.4	85	49	65.7	9 13.8	85	49	65.4	9 39.2	85	49	65.1	10 04.6	85	49	64.9	10 30.0	85	49	64.6	10 55.4	85	49	64.3	11 20.8	85	49	64.0	6
7	7 53.2	85	49	65.1	8 18.7	85	49	64.9	8 44.2	85	49	64.6	9 09.7	85	49	64.3	9 35.2	85	49	64.1	10 00.6	85	49	63.8	10 26.1	85	48	63.5	10 51.5	85	48	63.2	7
8	7 23.6	85	49	64.3	7 49.2	85	49	64.1	8 14.8	85	49	63.8	8 40.3	85	49	63.5	9 05.9	85	48	63.3	9 31.4	85	48	63.0	9 56.9	85	48	62.7	10 22.4	85	48	62.5	8
9	6 54.3	85	49	63.5	7 19.9	85	48	63.2	7 45.6	85	48	63.0	8 11.2	85	48	62.7	8 36.8	85	48	62.5	9 02.4	85	48	62.2	9 28.0	85	48	61.9	9 53.6	85	48	61.7	9
110	6 25.1	86	48	62.7	6 50.9	86	48	62.4	7 16.6	86	48	62.2	7 42.2	86	48	61.9	8 07.9	86	48	61.7	8 33.6	86	48	61.4	8 59.3	86	48	61.1	9 24.9	85	47	60.9	110
1	5 56.2	86	48	61.9	6 22.0	86	48	61.6	6 47.8	86	48	61.4	7 13.5	86	48	61.1	7 39.3	86	47	60.9	8 05.0	86	47	60.6	8 30.8	86	47	60.3	8 56.5	86	47	60.1	1
2	5 27.5	86	48	61.1	5 53.3	86	47	60.8	6 19.2	86	47	60.6	6 45.0	86	47	60.3	7 10.9	86	47	60.1	7 36.7	86	47	59.8	8 02.5	86	47	59.5	8 28.3	86	47	59.3	2
3					5 24.9	86	47	60.0	5 50.8	86	47	59.8	6 16.8	86	47	59.5	6 42.7	86	47	59.2	7 08.5	86	46	59.0	7 34.4	86	46	58.7	8 00.3	86	46	58.5	3
4									5 22.7	87	47	58.9	5 48.7	87	46	58.7	6 14.7	87	46	58.4	6 40.7	87	46	58.2	7 06.6	87	46	57.9	7 32.6	86	46	57.7	4
115													5 20.9	87	46	57.9	5 47.0	87	46	57.6	6 13.0	87	46	57.4	6 39.0	87	46	57.1	7 05.1	87	45	56.9	115
6																	5 19.5	87	46	56.8	5 45.6	87	45	56.6	6 11.7	87	45	56.3	6 37.8	87	45	56.1	6
7																					5 18.5	87	45	55.8	5 44.7	87	45	55.5	6 10.8	87	45	55.3	7
8																									5 17.9	88	44	54.7	5 44.1	88	44	54.5	8
9																													5 17.7	88	44	53.7	9

Lat. 58°

Lat. 59°

Digitized by Google

Lat. 57°

H.A.	24° 00′ Alt.	Δd Δt	Az.	24° 30′ Alt.	Δd Δt	Az.	25° 00′ Alt.	Δd Δt	Az.	25° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	57 00.0	1.0 01	180.0	57 30.0	1.0 01	180.0	58 00.0	1.0 01	180.0	58 30.0	1.0 01	180.0
1	56 59.5	1.0 02	178.3	57 29.5	1.0 02	178.3	57 59.5	1.0 02	178.3	58 29.5	1.0 02	178.3
2	56 58.1	1.0 04	176.6	57 28.1	1.0 04	176.6	57 58.0	1.0 04	176.6	58 28.0	1.0 04	176.5
3	56 55.7	1.0 06	175.0	57 25.7	1.0 06	174.9	57 55.6	1.0 06	174.9	58 25.6	1.0 06	174.8
4	56 52.4	1.0 07	173.3	57 22.3	1.0 07	173.2	57 52.2	1.0 07	173.2	58 22.1	1.0 07	173.1
05	56 48.1	1.0 09	171.6	57 18.0	1.0 09	171.6	57 47.8	1.0 09	171.5	58 17.7	1.0 09	171.4
6	56 42.9	99 10	170.0	57 12.7	99 10	169.9	57 42.5	99 10	169.8	58 12.4	99 11	169.7
7	56 36.7	99 12	168.3	57 06.5	99 12	168.2	57 36.3	99 12	168.1	58 06.0	99 12	168.0
8	56 29.6	99 13	166.7	56 59.4	99 13	166.6	57 29.1	99 14	166.4	57 58.8	99 14	166.3
9	56 21.7	99 15	165.0	56 51.3	99 15	164.9	57 20.9	99 15	164.8	57 50.5	99 15	164.6
10	56 12.8	99 16	163.4	56 42.3	99 16	163.3	57 11.9	98 16	163.1	57 41.4	98 17	162.9
1	56 03.0	98 18	161.8	56 32.5	98 18	161.6	57 01.9	98 18	161.5	57 31.4	98 18	161.3
2	55 52.4	98 19	160.2	56 21.8	98 19	160.0	56 51.1	98 20	159.8	57 20.5	98 20	159.6
3	55 40.9	98 20	158.6	56 10.2	98 21	158.4	56 39.4	97 21	158.2	57 08.7	97 21	158.0
4	55 28.6	97 22	157.0	55 57.7	97 22	156.8	56 26.9	97 22	156.6	56 56.0	97 22	156.4
15	55 15.4	97 23	155.5	55 44.5	97 23	155.3	56 13.5	97 24	155.0	56 42.5	97 24	154.8
6	55 01.5	97 24	153.9	55 30.4	96 25	153.7	55 59.3	96 25	153.5	56 28.2	96 25	153.2
7	54 46.7	96 26	152.4	55 15.5	96 26	152.2	55 44.3	96 26	151.9	56 13.1	96 26	151.7
8	54 31.2	96 27	150.9	54 59.9	96 27	150.6	55 28.6	95 28	150.4	55 57.2	95 28	150.1
9	54 14.9	96 28	149.4	54 43.5	95 29	149.1	55 12.0	95 29	148.9	55 40.5	95 29	148.6
20	53 57.9	95 30	147.9	54 26.4	95 30	147.6	54 54.8	95 30	147.4	55 23.1	94 30	147.1
1	53 40.2	94 31	146.5	54 08.5	94 31	146.2	54 36.8	94 31	145.9	55 05.0	94 31	145.6
2	53 21.8	94 32	145.0	53 50.0	94 32	144.7	54 18.1	94 32	144.4	54 46.2	94 32	144.1
3	53 02.8	94 33	143.6	53 30.8	93 33	143.3	53 58.8	93 33	143.0	54 26.7	93 34	142.7
4	52 43.0	93 34	142.2	53 10.9	93 34	141.9	53 38.8	93 34	141.5	54 06.6	93 35	141.2
25	52 22.7	93 35	140.8	52 50.4	92 35	140.5	53 18.1	92 35	140.1	53 45.8	92 36	139.8
6	52 01.7	92 36	139.4	52 29.3	92 36	139.1	52 56.9	92 36	138.7	53 24.4	92 37	138.4
7	51 40.1	92 37	138.0	52 07.6	92 37	137.7	52 35.1	91 37	137.4	53 02.4	91 38	137.0
8	51 18.0	91 38	136.7	51 45.4	91 38	136.4	52 12.6	91 38	136.0	52 39.9	91 39	135.7
9	50 55.3	91 39	135.4	51 22.5	91 39	135.0	51 49.7	90 39	134.7	52 16.8	90 39	134.3
30	50 32.1	90 40	134.1	50 59.2	90 40	133.7	51 26.2	90 40	133.4	51 53.1	90 40	133.0
1	50 08.4	90 40	132.8	50 35.3	90 41	132.4	51 02.2	89 41	132.1	51 29.0	89 41	131.7
2	49 44.1	89 41	131.5	50 10.9	89 41	131.1	50 37.7	89 42	130.8	51 04.4	89 42	130.4
3	49 19.4	89 42	130.2	49 46.1	89 42	129.9	50 12.7	89 42	129.5	50 39.3	88 43	129.2
4	48 54.2	89 43	129.0	49 20.8	88 43	128.6	49 47.3	88 43	128.3	50 13.7	88 43	127.9
35	48 28.6	88 43	127.8	48 55.0	88 44	127.4	49 21.4	88 44	127.1	49 47.7	88 44	126.7
6	48 02.6	88 44	126.6	48 28.9	88 44	126.2	48 55.1	87 44	125.8	49 21.3	87 45	125.5
7	47 36.1	87 45	125.4	48 02.3	87 45	125.0	48 28.4	87 45	124.6	48 54.5	87 45	124.3
8	47 09.3	87 45	124.2	47 35.4	87 46	123.8	48 01.4	87 46	123.5	48 27.3	86 46	123.1
9	46 42.1	87 46	123.0	47 08.0	86 46	122.7	47 33.9	86 46	122.3	47 59.7	86 47	121.9
40	46 14.5	86 46	121.9	46 40.3	86 47	121.5	47 06.1	86 47	121.1	47 31.8	86 47	120.8
1	45 46.6	86 47	120.8	46 12.3	86 47	120.4	46 38.0	85 48	120.0	47 03.6	85 48	119.6
2	45 18.4	86 48	119.6	45 44.0	85 48	119.3	46 09.5	85 48	118.9	46 35.0	85 48	118.5
3	44 49.8	85 48	118.5	45 15.3	85 48	118.2	45 40.8	85 48	117.8	46 06.1	84 49	117.4
4	44 20.9	85 48	117.4	44 46.4	85 49	117.1	45 11.7	84 49	116.7	45 37.0	84 49	116.3
45	43 51.8	85 49	116.4	44 17.1	84 49	116.0	44 42.4	84 49	115.6	45 07.6	84 49	115.2
6	43 22.4	84 50	115.3	43 47.6	84 50	114.9	44 12.8	84 50	114.6	44 37.9	83 50	114.2
7	42 52.7	84 50	114.3	43 17.9	84 50	113.9	43 42.9	83 50	113.5	44 07.9	83 50	113.1
8	42 22.8	84 50	113.2	42 47.9	83 50	112.8	43 12.8	83 50	112.5	43 37.8	83 51	112.1
9	41 52.7	83 51	112.2	42 17.6	83 51	111.8	42 42.5	83 51	111.4	43 07.4	83 51	111.0
50	41 22.3	83 51	111.2	41 47.2	83 51	110.8	42 12.0	83 51	110.4	42 36.8	82 51	110.0
1	40 51.7	83 51	110.2	41 16.5	83 51	109.8	41 41.3	82 52	109.4	42 06.0	82 52	109.0
2	40 20.9	83 52	109.2	40 45.7	82 52	108.8	41 10.4	82 52	108.4	41 35.0	82 52	108.0
3	39 50.0	82 52	108.2	40 14.7	82 52	107.8	40 39.3	82 52	107.4	41 03.8	82 52	107.0
4	39 18.8	82 52	107.2	39 43.5	82 52	106.8	40 08.0	82 52	106.5	40 32.5	81 52	106.1
55	38 47.6	82 52	106.2	39 12.1	82 52	105.9	39 36.6	82 53	105.5	40 01.0	81 53	105.1
6	38 16.1	82 53	105.3	38 40.6	82 53	104.9	39 05.0	81 53	104.5	39 29.4	81 53	104.2
7	37 44.5	82 53	104.3	38 09.0	81 53	104.0	38 33.4	81 53	103.6	38 57.7	81 53	103.2
8	37 12.8	81 53	103.4	37 37.2	81 53	103.0	38 01.5	81 53	102.7	38 25.8	81 53	102.3
9	36 40.9	81 53	102.5	37 05.3	81 53	102.1	37 29.6	81 53	101.7	37 53.8	81 53	101.4
60	36 09.0	81 54	101.5	36 33.3	81 54	101.2	36 57.5	81 54	100.8	37 21.7	80 54	100.4
1	35 36.9	81 54	100.6	36 01.2	81 54	100.3	36 25.4	81 54	99.9	36 49.5	80 54	99.5
2	35 04.7	81 54	99.7	35 29.0	81 54	99.4	35 53.2	80 54	99.0	36 17.3	80 54	98.6
3	34 32.5	81 54	98.8	34 56.7	81 54	98.5	35 20.8	80 54	98.1	35 44.9	80 54	97.7
4	34 00.2	81 54	97.9	34 24.3	80 54	97.6	34 48.5	80 54	97.2	35 12.5	80 54	96.8
65	33 27.8	81 54	97.0	33 51.9	80 54	96.7	34 16.0	80 54	96.3	34 40.0	80 54	96.0
6	32 55.3	81 54	96.2	33 19.4	80 54	95.8	33 43.5	80 54	95.4	34 07.5	80 54	95.1
7	32 22.8	80 54	95.3	32 46.9	80 54	94.9	33 10.9	80 54	94.6	33 34.9	80 54	94.2
8	31 50.2	80 54	94.4	32 14.3	80 54	94.1	32 38.4	80 54	93.7	33 02.3	80 54	93.4
9	31 17.6	80 54	93.6	31 41.7	80 54	93.2	32 05.7	80 54	92.9	32 29.7	80 54	92.5
70	30 45.0	80 54	92.7	31 09.1	80 54	92.4	31 33.1	80 54	92.0	31 57.0	80 54	91.6
1	30 12.3	80 54	91.9	30 36.4	80 54	91.5	31 00.4	80 54	91.2	31 24.4	80 54	90.8
2	29 39.7	80 54	91.0	30 03.7	80 54	90.7	30 27.7	80 54	90.3	30 51.7	80 54	90.0
3	29 07.0	80 54	90.2	29 31.1	80 54	89.8	29 55.1	80 54	89.5	30 19.0	80 54	89.1
4	28 34.3	80 54	89.3	28 58.4	80 54	89.0	29 22.4	80 54	88.6	29 46.3	80 54	88.3
75	28 01.6	80 54	88.5	28 25.7	80 54	88.2	28 49.7	80 54	87.8	29 13.7	80 54	87.5
6	27 29.0	80 54	87.7	27 53.1	80 54	87.3	28 17.1	80 54	87.0	28 41.1	80 54	86.6
7	26 56.3	80 54	86.8	27 20.4	80 54	86.5	27 44.5	80 54	86.2	28 08.4	80 54	85.8
8	26 23.7	80 54	86.0	26 47.8	80 54	85.7	27 11.9	80 54	85.3	27 35.9	80 54	85.0
9	25 51.1	80 54	85.2	26 15.3	80 54	84.9	26 39.3	80 54	84.5	27 03.3	80 54	84.2
80	25 18.6	80 54	84.4	25 42.7	80 54	84.1	26 06.8	80 54	83.7	26 30.9	80 54	83.4
1	24 46.1	81 54	83.6	25 10.3	80 54	83.2	25 34.4	80 54	82.9	25 58.4	80 54	82.6
2	24 13.7	81 54	82.8	24 37.8	80 54	82.4	25 02.0	80 54	82.1	25 26.0	80 54	81.8
3	23 41.3	81 54	82.0	24 05.5	81 54	81.6	24 29.6	80 54	81.3	24 53.7	80 54	81.0
4	23 09.0	81 54	81.2	23 33.2	81 54	80.8	23 57.4	81 54	80.5	24 21.5	80 54	80.2
85	22 36.7	81 54	80.3	23 01.0	81 54	80.0	23 25.2	81 54	79.7	23 49.3	81 53	79.4
6	22 04.5	81 54	79.5	22 28.8	81 53	79.2	22 53.1	81 53	78.9	23 17.3	81 53	78.6
7	21 32.4	81 53	78.8	21 56.7	81 53	78.4	22 21.0	81 53	78.1	22 45.3	81 53	77.8
8	21 00.4	81 53	78.0	21 24.8	81 53	77.6	21 49.1	81 53	77.3	22 13.4	81 53	77.0
9	20 28.5	81 53	77.2	20 52.9	81 53	76.9	21 17.3	81 53	76.5	21 41.6	81 53	76.2
90	19 56.7	82 53	76.4	20 21.1	81 53	76.1	20 45.5	81 53	75.8	21 09.9	81 53	75.4

H.A.	26° 00′ Alt.	Δd Δt	Az.	26° 30′ Alt.	Δd Δt	Az.	27° 00′ Alt.	Δd Δt	Az.	27° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	59 00.0	1.0 01	180.0	59 30.0	1.0 01	180.0	60 00.0	1.0 01	180.0	60 30.0	1.0 01	180.0
1	58 59.5	1.0 02	178.3	59 29.5	1.0 03	178.2	59 59.5	1.0 02	178.2	60 29.5	1.0 03	178.2
2	58 58.0	1.0 04	176.5	59 28.0	1.0 04	176.5	59 58.0	1.0 04	176.4	60 27.9	1.0 04	176.4
3	58 55.5	1.0 06	174.8	59 25.5	1.0 06	174.7	59 55.4	1.0 06	174.7	60 25.4	1.0 06	174.6
4	58 52.1	1.0 08	173.0	59 22.0	1.0 07	173.0	59 51.9	1.0 08	172.9	60 21.8	1.0 08	172.8
05	58 47.6	1.0 09	171.3	59 17.5	1.0 09	171.2	59 47.3	1.0 09	171.1	60 17.2	1.0 09	171.0
6	58 42.2	99 11	169.6	59 12.0	99 11	169.5	59 41.8	99 11	169.4	60 11.6	99 11	169.2
7	58 35.8	99 12	167.9	59 05.5	99 12	167.7	59 35.3	99 12	167.6	60 05.0	99 13	167.5
8	58 28.4	99 14	166.2	58 58.1	99 14	166.0	59 27.8	99 14	165.9	59 57.4	99 14	165.7
9	58 20.2	99 16	164.5	58 49.8	99 16	164.3	59 19.3	99 16	164.1	59 48.9	99 16	164.0
10	58 10.9	98 17	162.8	58 40.4	98 17	162.6	59 09.9	98 17	162.4	59 39.4	98 17	162.2
1	58 00.8	98 18	161.1	58 30.2	98 19	160.9	58 59.6	98 19	160.7	59 29.0	98 19	160.5
2	57 49.8	98 20	159.5	58 19.1	98 20	159.3	58 48.4	98 20	159.0	59 17.6	98 20	158.8
3	57 37.9	97 21	157.8	58 07.1	97 21	157.6	58 36.2	97 22	157.4	59 05.4	97 22	157.1
4	57 25.1	97 23	156.2	57 54.2	97 23	156.0	58 23.2	97 23	155.7	58 52.3	97 23	155.5
15	57 11.5	97 24	154.6	57 40.4	96 24	154.3	58 09.4	96 24	154.1	58 38.3	96 25	153.8
6	56 57.1	96 26	153.0	57 25.9	96 26	152.7	57 54.7	96 26	152.5	58 23.4	96 26	152.2
7	56 41.8	96 27	151.4	57 10.5	96 27	151.1	57 39.2	95 27	150.9	58 07.8	95 27	150.6
8	56 25.8	95 28	149.8	56 54.3	95 28	149.6	57 22.9	95 28	149.3	57 51.3	95 29	149.0
9	56 09.0	95 29	148.3	56 37.4	95 29	148.0	57 05.8	95 30	147.7	57 34.1	94 30	147.4
20	55 51.5	94 30	146.8	56 19.7	94 31	146.5	56 48.0	94 31	146.2	57 16.2	94 31	145.9
1	55 33.2	94 32	145.3	56 01.3	94 32	145.0	56 29.4	94 32	144.7	56 57.5	93 32	144.3
2	55 14.2	93 33	143.8	55 42.2	93 33	143.5	56 10.2	93 33	143.2	56 38.1	93 33	142.8
3	54 54.6	93 34	142.3	55 22.5	93 34	142.0	55 50.2	93 34	141.7	56 18.0	92 35	141.3
4	54 34.3	92 35	140.9	55 02.0	92 35	140.6	55 29.7	92 35	140.2	55 57.2	92 36	139.9
25	54 13.4	92 36	139.5	54 41.0	92 36	139.1	55 08.4	92 36	138.8	55 35.9	91 37	138.4
6	53 51.9	91 37	138.1	54 19.3	91 37	137.7	54 46.6	91 37	137.4	55 13.9	91 38	137.0
7	53 29.7	91 38	136.7	53 57.0	91 38	136.3	54 24.2	91 38	136.0	54 51.3	90 39	135.6
8	53 07.0	90 39	135.3	53 34.2	90 39	135.0	54 01.2	90 39	134.6	54 28.2	90 39	134.2
9	52 43.8	90 40	134.0	53 10.8	90 40	133.6	53 37.7	90 40	133.2	54 04.5	89 40	132.9
30	52 20.0	90 40	132.7	52 46.9	89 41	132.3	53 13.6	89 41	131.9	53 40.3	89 41	131.5
1	51 55.7	89 41	131.3	52 22.4	89 42	131.0	52 49.0	89 42	130.6	53 15.6	88 42	130.2
2	51 31.0	89 42	130.1	51 57.5	88 42	129.7	52 24.0	88 42	129.3	52 50.4	88 43	128.9
3	51 05.7	88 43	128.8	51 32.1	88 43	128.4	51 58.5	88 43	128.0	52 24.7	87 44	127.6
4	50 40.0	88 44	127.5	51 06.3	87 44	127.2	51 32.5	87 44	126.8	51 58.6	87 44	126.4
35	50 13.9	87 44	126.3	50 40.1	87 44	125.9	51 06.1	87 45	125.5	51 32.1	86 45	125.1
6	49 47.4	87 45	125.1	50 13.4	87 45	124.7	50 39.3	86 45	124.3	51 05.2	86 46	123.9
7	49 20.4	86 46	123.9	49 46.3	86 46	123.5	50 12.1	86 46	123.1	50 37.9	86 46	122.7
8	48 53.1	86 46	122.7	49 18.9	86 46	122.3	49 44.6	85 46	121.9	50 10.2	85 47	121.5
9	48 25.4	86 47	121.5	48 51.1	85 47	121.1	49 16.7	85 47	120.7	49 42.1	85 47	120.3
40	47 57.4	85 47	120.4	48 23.0	85 47	120.0	48 48.4	85 48	119.6	49 13.8	84 48	119.2
1	47 29.1	85 48	119.2	47 54.5	85 48	118.8	48 19.8	84 48	118.4	48 45.1	84 48	118.0
2	47 00.4	85 48	118.1	47 25.7	84 48	117.7	47 50.9	84 49	117.3	48 16.1	84 49	116.9
3	46 31.4	84 49	117.0	46 56.6	84 49	116.6	47 21.8	84 49	116.2	47 46.8	83 49	115.8
4	46 02.2	84 49	115.9	46 27.3	84 49	115.5	46 52.3	83 50	115.1	47 17.3	83 50	114.7
45	45 32.7	84 50	114.8	45 57.7	83 50	114.4	46 22.6	83 50	114.0	46 47.4	83 50	113.6
6	45 02.9	83 50	113.8	45 27.8	83 50	113.4	45 52.6	83 50	113.0	46 17.4	82 50	112.6
7	44 32.8	83 50	112.7	44 57.7	83 51	112.3	45 22.4	82 51	111.9	45 47.1	82 51	111.5
8	44 02.6	83 51	111.7	44 27.3	82 51	111.3	44 52.0	82 51	110.9	45 16.6	82 51	110.5
9	43 32.1	82 51	110.7	43 56.8	82 51	110.3	44 21.4	82 51	109.9	44 45.9	82 52	109.5
50	43 01.4	82 51	109.6	43 26.0	82 52	109.3	43 50.5	82 52	108.9	44 15.0	81 52	108.4
1	42 30.6	82 52	108.6	42 55.1	82 52	108.2	43 19.5	81 52	107.9	43 43.9	81 52	107.4
2	41 59.5	82 52	107.6	42 24.0	81 52	107.3	42 48.3	81 52	106.9	43 12.6	81 52	106.5
3	41 28.3	81 52	106.7	41 52.7	81 52	106.3	42 17.0	81 52	105.9	42 41.2	81 53	105.5
4	40 56.9	81 52	105.7	41 21.2	81 53	105.3	41 45.5	81 53	104.9	42 09.7	80 53	104.5
55	40 25.4	81 53	104.7	40 49.6	81 53	104.3	41 13.8	81 53	104.0	41 37.9	80 53	103.6
6	39 53.7	81 53	103.8	40 17.9	81 53	103.4	40 42.1	80 53	103.0	41 06.1	80 53	102.6
7	39 21.9	81 53	102.8	39 46.1	80 53	102.5	40 10.2	80 53	102.1	40 34.2	80 53	101.7
8	38 50.0	81 53	101.9	39 14.1	80 53	101.5	39 38.2	80 54	101.1	40 02.1	80 54	100.7
9	38 18.0	80 54	101.0	38 42.0	80 54	100.6	39 06.0	80 54	100.2	39 30.0	80 54	99.8
60	37 45.8	80 54	100.1	38 09.9	80 54	99.7	38 33.8	80 54	99.3	38 57.7	80 54	98.9
1	37 13.6	80 54	99.2	37 37.6	80 54	98.8	38 01.5	80 54	98.4	38 25.4	79 54	98.0
2	36 41.3	80 54	98.3	37 05.3	80 54	97.9	37 29.2	80 54	97.5	37 53.0	79 54	97.1
3	36 08.9	80 54	97.4	36 32.9	80 54	97.0	36 56.7	79 54	96.6	37 20.5	79 54	96.2
4	35 36.5	80 54	96.5	36 00.4	80 54	96.1	36 24.3	79 54	95.7	36 48.0	79 54	95.3
65	35 04.0	80 54	95.6	35 27.9	80 54	95.2	35 51.7	79 54	94.9	36 15.5	79 54	94.5
6	34 31.5	80 54	94.7	34 55.3	79 54	94.4	35 19.1	79 54	94.0	35 42.9	79 54	93.6
7	33 58.9	80 54	93.9	34 22.7	79 54	93.5	34 46.5	79 54	93.1	35 10.3	79 54	92.7
8	33 26.2	80 54	93.0	33 50.1	79 54	92.6	34 13.9	79 54	92.3	34 37.6	79 54	91.9
9	32 53.6	80 54	92.1	33 17.4	79 54	91.8	33 41.2	79 54	91.4	34 04.9	79 54	91.0
70	32 20.9	80 54	91.3	32 44.8	79 54	90.9	33 08.5	79 54	90.6	33 32.3	79 54	90.2
1	31 48.3	80 54	90.4	32 12.1	79 54	90.1	32 35.9	79 54	89.7	32 59.6	79 54	89.4
2	31 15.6	80 54	89.6	31 39.4	79 54	89.3	32 03.2	79 54	88.9	32 26.9	79 54	88.5
3	30 42.9	80 54	88.8	31 06.7	79 54	88.4	31 30.5	79 54	88.1	31 54.2	79 54	87.7
4	30 10.2	80 54	87.9	30 34.1	79 54	87.6	30 57.9	79 54	87.2	31 21.6	79 54	86.9
75	29 37.6	80 54	87.1	30 01.5	79 54	86.8	30 25.3	79 54	86.4	30 49.0	79 54	86.1
6	29 05.0	80 54	86.3	29 28.8	79 54	86.0	29 52.7	79 54	85.6	30 16.4	79 54	85.2
7	28 32.4	80 54	85.5	28 56.3	80 54	85.1	29 20.1	79 54	84.8	29 43.9	79 54	84.4
8	27 59.8	80 54	84.7	28 23.7	80 54	84.3	28 47.6	79 54	84.0	29 11.4	79 54	83.6
9	27 27.3	80 54	83.9	27 51.2	80 54	83.5	28 15.1	79 54	83.2	28 38.9	79 54	82.8
80	26 54.8	80 54	83.1	27 18.8	80 54	82.7	27 42.7	80 54	82.4	28 06.5	79 54	82.0
1	26 22.4	80 54	82.2	26 46.4	80 54	81.9	27 10.3	80 54	81.6	27 34.2	79 54	81.2
2	25 50.1	80 54	81.4	26 14.1	80 54	81.1	26 38.0	80 54	80.8	27 01.9	80 54	80.4
3	25 17.8	80 54	80.6	25 41.8	80 54	80.3	26 05.8	80 54	80.0	26 29.7	80 54	79.6
4	24 45.6	80 54	79.9	25 09.7	80 53	79.5	25 33.7	80 53	79.2	25 57.6	80 53	78.9
85	24 13.5	80 54	79.1	24 37.6	80 53	78.7	25 01.6	80 53	78.4	25 25.6	80 53	78.1
6	23 41.4	80 53	78.3	24 05.6	80 53	77.9	24 29.6	80 53	77.6	24 53.7	80 53	77.3
7	23 09.5	81 53	77.5	23 33.6	80 53	77.2	23 57.8	80 53	76.8	24 21.9	80 53	76.5
8	22 37.6	81 53	76.7	23 01.8	81 53	76.4	23 26.0	81 53	76.1	23 50.1	80 53	75.7
9	22 05.9	81 53	75.9	22 30.1	81 53	75.6	22 54.4	81 53	75.3	23 18.5	81 52	74.9
90	21 34.2	81 52	75.1	21 58.5	81 52	74.8	22 22.8	81 52	74.5	22 47.0	81 52	74.2

Digitized by Google

Lat. 57°

H.A.	24° 00′ Alt.	Az.	24° 30′ Alt.	Az.	25° 00′ Alt.	Az.	25° 30′ Alt.	Az.	26° 00′ Alt.	Az.	26° 30′ Alt.	Az.	27° 00′ Alt.	Az.	27° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	9 00.0 1.0 00	180.0	8 30.0 1.0 00	180.0	8 00.0 1.0 00	180.0	7 30.0 1.0 00	180.0	7 00.0 1.0 00	180.0	6 30.0 1.0 00	180.0	6 00.0 1.0 00	180.0	5 30.0 1.0 00	180.0	00
1	8 59.7 1.0 01	179.1	8 29.7 1.0 01	179.1	7 59.7 1.0 01	179.1	7 29.7 1.0 01	179.1	6 59.7 1.0 01	179.1	6 29.7 1.0 01	179.1	5 59.7 1.0 01	179.1	5 29.7 1.0 01	179.1	1
2	8 58.9 1.0 02	178.2	8 29.0 1.0 02	178.2	7 59.0 1.0 02	178.2	7 29.0 1.0 02	178.2	6 59.0 1.0 02	178.2	6 29.0 1.0 02	178.2	5 59.0 1.0 02	178.2	5 29.0 1.0 02	178.2	2
3	8 57.6 1.0 03	177.2	8 27.6 1.0 03	177.2	7 57.7 1.0 03	177.3	7 27.7 1.0 03	177.3	6 57.7 1.0 03	177.3	6 27.7 1.0 03	177.3	5 57.7 1.0 03	177.3	5 27.7 1.0 03	177.3	3
4	8 55.8 1.0 04	176.3	8 25.8 1.0 04	176.3	7 55.8 1.0 04	176.3	7 25.8 1.0 04	176.4	6 55.9 1.0 04	176.4	6 25.9 1.0 04	176.4	5 55.9 1.0 04	176.4	5 25.9 1.0 04	176.4	4
05	8 53.4 1.0 05	175.4	8 23.4 1.0 05	175.4	7 53.5 1.0 05	175.4	7 23.5 1.0 05	175.5	6 53.5 1.0 05	175.5	6 23.6 1.0 05	175.5	5 53.6 1.0 05	175.5	5 23.7 1.0 05	175.5	05
6	8 50.5 1.0 06	174.5	8 20.6 1.0 06	174.5	7 50.6 1.0 06	174.5	7 20.7 1.0 06	174.5	6 50.7 1.0 06	174.6	6 20.8 1.0 06	174.6	5 50.8 1.0 06	174.6	5 20.9 1.0 06	174.7	6
7	8 47.1 1.0 06	173.5	8 17.2 1.0 07	173.6	7 47.2 1.0 06	173.6	7 17.3 1.0 06	173.6	6 47.4 1.0 06	173.7	6 17.4 1.0 06	173.7	5 47.5 1.0 06	173.7	5 17.6 1.0 06	173.8	7
8	8 43.2 1.0 08	172.6	8 13.2 1.0 07	172.6	7 43.3 1.0 07	172.7	7 13.4 1.0 07	172.7	6 43.5 1.0 07	172.8	6 13.6 1.0 07	172.8	5 43.7 1.0 07	172.8	5 13.8 1.0 07	172.9	8
9	8 38.7 1.0 08	171.7	8 08.8 1.0 08	171.7	7 38.9 1.0 08	171.8	7 09.0 1.0 08	171.8	6 39.1 1.0 08	171.9	6 09.2 1.0 08	171.9	5 39.4 1.0 08	171.9	5 09.5 1.0 08	172.0	9
10	8 33.7 1.0 09	170.8	8 03.8 1.0 09	170.8	7 34.0 1.0 09	170.9	7 04.1 1.0 09	170.9	6 34.3 1.0 09	171.0	6 04.4 1.0 09	171.0	5 34.5 1.0 09	171.1	5 04.7 1.0 09	171.1	10
1	8 28.2 99 10	169.8	7 58.4 99 10	169.9	7 28.5 99 10	170.0	6 58.7 99 10	170.0	6 28.9 99 10	170.1	5 59.0 99 10	170.1	5 29.2 99 10	170.2			1
2	8 22.2 99 11	168.9	7 52.4 99 11	169.0	7 22.6 99 11	169.0	6 52.8 99 11	169.1	6 23.0 99 11	169.2	5 53.2 99 11	169.2	5 23.4 99 10	169.3			2
3	8 15.7 99 12	168.0	7 45.9 99 12	168.1	7 16.1 99 12	168.1	6 46.3 99 12	168.2	6 16.6 99 12	168.3	5 46.8 99 11	168.3	5 17.0 99 11	168.4			3
4	8 08.6 99 12	167.1	7 38.9 99 13	167.2	7 09.2 99 12	167.2	6 39.4 99 12	167.3	6 09.7 99 12	167.4	5 39.9 99 12	167.4	5 10.2 99 12	167.5			4
15	8 01.1 99 13	166.2	7 31.4 99 13	166.3	7 01.7 99 13	166.3	6 32.0 99 13	166.4	6 02.3 99 13	166.5	5 32.6 99 13	166.5	5 02.9 99 13	166.6			15
6	7 53.0 99 14	165.3	7 23.4 99 14	165.3	6 53.7 99 14	165.4	6 24.0 99 14	165.5	5 54.4 99 14	165.6	5 24.7 99 14	165.7					6
7	7 44.5 99 15	164.4	7 14.8 99 15	164.4	6 45.2 99 15	164.5	6 15.6 99 15	164.6	5 46.0 99 15	164.7	5 16.4 99 15	164.8					7
8	7 35.4 99 16	163.5	7 05.8 99 16	163.5	6 36.3 99 16	163.6	6 06.7 99 16	163.7	5 37.1 99 16	163.8	5 07.6 99 15	163.9					8
9	7 25.8 98 17	162.5	6 56.3 98 17	162.6	6 26.8 98 16	162.7	5 57.3 98 16	162.8	5 27.8 98 16	162.9							9
20	7 15.8 98 18	161.6	6 46.3 98 17	161.7	6 16.9 98 17	161.8	5 47.4 98 17	161.9	5 17.9 98 17	162.0							20
1	7 05.3 98 18	160.7	6 35.8 98 18	160.8	6 06.4 98 18	160.9	5 37.0 98 18	161.0	5 07.6 98 18	161.1							1
2	6 54.2 98 19	159.8	6 24.9 98 19	159.9	5 55.5 98 19	160.0	5 26.2 98 19	160.1									2
3	6 42.7 98 20	158.9	6 13.4 98 20	159.0	5 44.1 98 20	159.2	5 14.8 98 20	159.3									3
4	6 30.7 97 21	158.0	6 01.5 97 21	158.2	5 32.3 97 20	158.3	5 03.0 97 20	158.4									4
25	6 18.3 97 22	157.1	5 49.1 97 21	157.3	5 19.9 97 21	157.4											25
6	6 05.4 97 22	156.2	5 36.2 97 22	156.4	5 07.1 97 22	156.5											6
7	5 52.0 97 23	155.4	5 22.9 97 23	155.5													7
8	5 38.1 97 24	154.5	5 09.1 97 24	154.6													8
9	5 23.8 96 25	153.6															9
30	5 09.0 96 26	152.7															30

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′ Alt.	Az.	24° 30′ Alt.	Az.	25° 00′ Alt.	Az.	25° 30′ Alt.	Az.	26° 00′ Alt.	Az.	26° 30′ Alt.	Az.	27° 00′ Alt.	Az.	27° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	19 25.0 82 53	75.6	19 49.5 82 53	75.3	20 13.9 81 52	75.0	20 38.3 81 52	74.7	21 02.7 81 52	74.3	21 27.1 81 52	74.0	21 51.4 81 52	73.7	22 15.7 81 52	73.4	91
2	18 53.4 82 52	74.8	19 17.9 82 52	74.5	19 42.4 82 52	74.2	20 06.9 81 52	73.9	20 31.3 81 52	73.6	20 55.7 81 52	73.2	21 20.1 81 52	72.9	21 44.4 81 52	72.6	2
3	18 21.9 82 52	74.0	18 46.5 82 52	73.7	19 11.0 82 52	73.4	19 35.6 82 52	73.1	20 00.0 82 52	72.8	20 24.5 81 52	72.5	20 48.9 81 52	72.2	21 13.3 81 52	71.8	3
4	17 50.6 82 52	73.2	18 15.2 82 52	72.9	18 39.8 82 52	72.6	19 04.4 82 52	72.3	19 28.9 82 52	72.0	19 53.4 82 52	71.7	20 17.9 82 52	71.4	20 42.3 81 51	71.1	4
95	17 19.4 82 52	72.4	17 44.0 82 52	72.1	18 08.7 82 52	71.8	18 33.3 82 52	71.5	18 57.9 82 52	71.2	19 22.4 82 51	70.9	19 47.0 82 51	70.6	20 11.5 82 51	70.3	95
6	16 48.3 82 52	71.6	17 13.0 82 51	71.3	17 37.7 82 51	71.0	18 02.4 82 51	70.7	18 27.0 82 51	70.4	18 51.6 82 51	70.1	19 16.2 82 51	69.8	19 40.8 82 51	69.5	6
7	16 17.3 83 51	70.8	16 42.1 83 51	70.6	17 06.9 82 51	70.3	17 31.6 82 51	70.0	17 56.3 82 51	69.7	18 21.0 82 51	69.4	18 45.6 82 51	69.1	19 10.2 82 51	68.8	7
8	15 46.5 83 51	70.1	16 11.4 83 51	69.8	16 36.2 83 51	69.5	17 01.0 83 51	69.2	17 25.7 82 51	68.9	17 50.5 82 51	68.6	18 15.2 82 50	68.3	18 39.8 82 50	68.0	8
9	15 15.9 83 51	69.3	15 40.8 83 51	69.0	16 05.7 83 51	68.7	16 30.5 83 50	68.4	16 55.3 83 50	68.1	17 20.1 83 50	67.8	17 44.9 83 50	67.5	18 09.6 82 50	67.2	9
100	14 45.4 83 50	68.5	15 10.4 83 50	68.2	15 35.3 83 50	67.9	16 00.2 83 50	67.6	16 25.1 83 50	67.3	16 49.9 83 50	67.0	17 14.8 83 50	66.7	17 39.6 83 50	66.5	100
1	14 15.1 83 50	67.7	14 40.1 83 50	67.4	15 05.1 83 50	67.1	15 30.1 83 50	66.8	15 55.0 83 50	66.6	16 19.9 83 50	66.3	16 44.8 83 50	66.0	17 09.7 83 49	65.7	1
2	13 44.9 84 50	66.9	14 10.0 84 50	66.6	14 35.1 83 50	66.4	15 00.1 83 50	66.1	15 25.1 83 50	65.8	15 50.1 83 49	65.5	16 15.1 83 49	65.2	16 40.0 83 49	64.9	2
3	13 15.0 84 50	66.1	13 40.1 84 50	65.9	14 05.2 84 49	65.6	14 30.3 84 49	65.3	14 55.4 84 49	65.0	15 20.5 83 49	64.7	15 45.5 83 49	64.4	16 10.5 83 49	64.1	3
4	12 45.2 84 49	65.3	13 10.4 84 49	65.1	13 35.6 84 49	64.8	14 00.7 84 49	64.5	14 25.9 84 49	64.2	14 51.0 84 49	63.9	15 16.1 84 49	63.7	15 41.2 84 49	63.4	4
105	12 15.6 84 49	64.6	12 40.9 84 49	64.3	13 06.1 84 49	64.0	13 31.3 84 49	63.7	13 56.6 84 49	63.4	14 21.8 84 48	63.2	14 46.9 84 48	62.9	15 12.1 84 48	62.6	105
6	11 46.2 84 49	63.8	12 11.5 84 49	63.5	12 36.8 84 48	63.2	13 02.1 84 48	62.9	13 27.4 84 48	62.7	13 52.7 84 48	62.4	14 18.0 84 48	62.1	14 43.2 84 48	61.8	6
7	11 17.0 85 48	63.0	11 42.4 85 48	62.7	12 07.8 85 48	62.4	12 33.1 85 48	62.2	12 58.5 85 48	61.9	13 23.9 84 48	61.6	13 49.2 84 48	61.3	14 14.5 84 47	61.1	7
8	10 47.9 85 48	62.2	11 13.4 85 48	61.9	11 38.9 85 48	61.7	12 04.4 85 48	61.4	12 29.8 85 48	61.1	12 55.2 85 47	60.8	13 20.6 85 47	60.6	13 46.0 85 47	60.3	8
9	10 19.1 85 48	61.4	10 44.7 85 48	61.1	11 10.2 85 47	60.9	11 35.8 85 47	60.6	12 01.3 85 47	60.3	12 26.8 85 47	60.1	12 52.3 85 47	59.8	13 17.7 85 47	59.5	9
110	9 50.6 85 47	60.6	10 16.2 85 47	60.3	10 41.8 85 47	60.1	11 07.4 85 47	59.8	11 33.0 85 47	59.5	11 58.6 85 47	59.3	12 24.1 85 46	59.0	12 49.7 85 46	58.7	110
1	9 22.2 86 47	59.8	9 47.9 86 47	59.6	10 13.6 86 47	59.3	10 39.3 86 46	59.0	11 04.9 86 46	58.8	11 30.6 85 46	58.5	11 56.2 85 46	58.2	12 21.9 85 46	58.0	1
2	8 54.1 86 46	59.0	9 19.9 86 46	58.8	9 45.6 86 46	58.5	10 11.4 86 46	58.2	10 37.1 86 46	58.0	11 02.9 86 46	57.7	11 28.6 86 46	57.5	11 54.3 86 46	57.2	2
3	8 26.2 86 46	58.2	8 52.0 86 46	58.0	9 17.9 86 46	57.7	9 43.7 86 46	57.5	10 09.5 86 46	57.2	10 35.3 86 45	56.9	11 01.1 86 45	56.7	11 26.9 86 45	56.4	3
4	7 58.5 86 46	57.4	8 24.4 86 46	57.2	8 50.4 86 46	56.9	9 16.3 86 45	56.7	9 42.2 86 45	56.4	10 08.1 86 45	56.2	10 34.0 86 45	55.9	10 59.8 86 45	55.6	4
115	7 31.1 87 45	56.6	7 57.1 87 45	56.4	8 23.1 87 45	56.1	8 49.1 87 45	55.9	9 15.1 87 45	55.6	9 41.1 87 45	55.4	10 07.0 87 44	55.1	10 33.0 86 44	54.9	115
6	7 03.9 87 45	55.8	7 30.0 87 45	55.6	7 56.1 87 45	55.3	8 22.2 87 44	55.1	8 48.3 87 44	54.8	9 14.3 87 44	54.6	9 40.4 87 44	54.3	10 06.4 87 44	54.1	6
7	6 37.0 87 44	55.0	7 03.2 87 44	54.8	7 29.4 87 44	54.5	7 55.5 87 44	54.3	8 21.7 87 44	54.0	8 47.8 87 44	53.8	9 13.9 87 44	53.5	9 40.1 87 43	53.3	7
8	6 10.4 88 44	54.2	6 36.6 88 44	54.0	7 02.9 87 44	53.7	7 29.1 87 44	53.5	7 55.4 87 44	53.2	8 21.6 87 43	53.0	8 47.8 87 43	52.8	9 14.0 87 43	52.5	8
9	5 44.0 88 44	53.4	6 10.3 88 43	53.2	6 36.7 88 43	52.9	7 03.0 88 43	52.7	7 29.3 88 43	52.5	7 55.6 88 43	52.2	8 21.9 88 43	52.0	8 48.2 88 43	51.7	9
120	5 17.9 88 43	52.6	5 44.3 88 43	52.4	6 10.7 88 43	52.1	6 37.1 88 43	51.9	7 03.5 88 42	51.7	7 29.9 88 42	51.4	7 56.3 88 42	51.2	8 22.7 88 42	50.9	120
1			5 18.6 88 42	51.6	5 45.1 88 42	51.3	6 11.6 88 42	51.1	6 38.0 88 42	50.9	7 04.5 88 42	50.6	7 31.0 88 42	50.4	7 57.5 88 42	50.1	1
2					5 19.7 89 42	50.5	5 46.3 89 42	50.3	6 12.8 89 42	50.1	6 39.4 89 41	49.8	7 06.0 89 41	49.6	7 32.5 88 41	49.4	2
3							5 21.3 89 41	49.5	5 47.9 89 41	49.3	6 14.6 89 41	49.0	6 41.2 89 41	48.8	7 07.9 89 41	48.6	3
4									5 23.3 89 41	48.5	5 50.1 89 40	48.2	6 16.8 89 40	48.0	6 43.5 89 40	47.8	4
125											5 25.8 89 40	47.4	5 52.7 89 40	47.2	6 19.5 89 40	47.0	125
6											5 01.9 90 39	46.6	5 28.8 90 39	46.4	5 55.7 90 39	46.2	6
7													5 05.3 90 39	45.6	5 32.3 90 38	45.4	7
8															5 09.2 90 38	44.6	8

Lat. 58°

Lat. 59°

Digitized by Google

Lat. 57°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	61 00.0	1.0 01	180.0	61 30.0	1.0 01	180.0	62 00.0	1.0 01	180.0	63 00.0	1.0 01	180.0	65 00.0	1.0 01	180.0	67 00.0	1.0 01	180.0	67 30.0	1.0 01	180.0	68 30.0	1.0 01	180.0	00
1	60 59.5	1.0 03	178.2	61 29.5	1.0 03	178.2	61 59.5	1.0 03	178.1	62 59.5	1.0 03	178.1	64 59.4	1.0 03	178.0	66 59.4	1.0 03	177.9	67 29.4	1.0 03	177.8	68 29.4	1.0 03	177.8	1
2	60 57.9	1.0 04	176.4	61 27.9	1.0 04	176.3	61 57.9	1.0 04	176.3	62 57.8	1.0 05	176.2	64 57.7	1.0 05	176.0	66 57.6	1.0 05	175.8	67 27.5	1.0 05	175.7	68 27.5	1.0 05	175.6	2
3	60 55.3	1.0 06	174.5	61 25.3	1.0 06	174.5	61 55.2	1.0 06	174.4	62 55.1	1.0 06	174.3	64 54.9	1.0 07	174.0	66 54.6	1.0 07	173.6	67 24.5	1.0 07	173.6	68 24.3	1.0 07	173.4	3
4	60 51.7	1.0 08	172.7	61 21.6	1.0 08	172.7	61 51.5	1.0 08	172.6	62 51.3	1.0 08	172.4	64 50.9	1.0 08	172.0	66 50.4	1.0 09	171.5	67 20.2	1.0 09	171.4	68 19.9	99 09	171.2	4
05	60 47.1	1.0 09	170.9	61 16.9	1.0 10	170.8	61 46.8	99 10	170.7	62 46.5	99 10	170.5	64 45.8	99 10	170.0	66 45.0	99 11	169.5	67 14.7	99 11	169.3	68 14.3	99 11	169.0	05
6	60 41.4	99 11	169.1	61 11.2	99 11	169.0	61 41.0	99 11	168.9	62 40.5	99 12	168.6	64 39.5	99 12	168.0	66 38.4	99 13	167.4	67 08.1	99 13	167.2	68 07.4	99 13	166.8	6
7	60 34.8	99 13	167.3	61 04.5	99 13	167.2	61 34.2	99 13	167.1	62 33.6	99 13	166.8	64 32.2	99 14	166.1	66 30.7	99 15	165.3	67 00.3	99 15	165.1	67 59.3	98 15	164.6	7
8	60 27.1	99 14	165.6	60 56.7	99 15	165.4	61 26.4	99 15	165.2	62 25.6	99 15	164.9	64 23.8	98 16	164.2	66 21.8	98 17	163.3	66 51.3	98 17	163.0	67 50.1	98 17	162.5	8
9	60 18.5	99 16	163.8	60 48.0	98 16	163.6	61 17.5	98 16	163.5	62 16.6	98 17	163.1	64 14.4	98 18	162.2	66 11.9	98 18	161.3	66 41.2	98 19	161.0	67 39.7	97 19	160.4	9
10	60 08.9	98 18	162.1	60 38.3	98 18	161.9	61 07.8	98 18	161.7	62 06.6	98 18	161.2	64 03.9	98 19	160.3	66 00.8	97 20	159.3	66 30.0	97 20	159.0	67 28.2	97 21	158.3	10
1	59 58.3	98 19	160.3	60 27.7	98 19	160.1	60 57.0	98 20	159.9	61 55.6	98 20	159.4	63 52.4	97 21	158.4	65 48.7	97 22	157.3	66 17.7	97 22	157.0	67 15.6	96 23	156.3	1
2	59 46.9	97 21	158.6	60 16.1	97 21	158.4	60 45.3	97 21	158.1	61 43.6	97 22	157.7	63 39.9	97 22	156.6	65 35.6	96 24	155.3	66 04.4	96 24	155.0	67 02.0	96 24	154.3	2
3	59 34.5	97 22	156.9	60 03.6	97 22	156.7	60 32.7	97 22	156.4	61 30.7	97 23	155.9	63 26.4	96 24	154.7	65 21.5	96 25	153.4	65 50.1	95 25	153.1	66 47.3	95 26	152.3	3
4	59 21.3	97 24	155.2	59 50.2	97 24	155.0	60 19.2	96 24	154.7	61 16.9	96 24	154.1	63 12.0	96 26	152.9	65 06.4	95 27	151.5	65 34.9	95 27	151.2	66 31.6	94 28	150.4	4
15	59 07.1	96 25	153.6	59 36.0	96 25	153.3	60 04.8	96 26	153.0	61 02.2	96 26	152.4	62 56.7	95 27	151.1	64 50.4	94 28	149.7	65 18.6	94 29	149.3	66 15.0	94 29	148.5	15
6	58 52.2	96 26	151.9	59 20.9	96 27	151.6	59 49.5	95 27	151.3	60 46.7	95 27	150.7	62 40.5	95 28	149.4	64 33.4	94 30	147.9	65 01.5	93 30	147.5	65 57.4	93 31	146.6	6
7	58 36.4	95 28	150.3	59 04.9	95 28	150.0	59 33.4	95 28	149.7	60 30.3	95 29	149.1	62 23.4	94 30	147.7	64 15.6	93 31	146.1	64 43.5	93 31	145.6	65 39.0	92 32	144.7	7
8	58 19.8	95 29	148.7	58 48.2	95 29	148.4	59 16.5	94 30	148.1	60 13.1	94 30	147.4	62 05.5	93 31	146.0	63 57.0	92 32	144.3	64 24.6	92 33	143.9	65 19.7	92 34	142.9	8
9	58 02.4	94 30	147.1	58 30.7	94 30	146.8	58 58.9	94 31	146.5	59 55.1	94 31	145.8	61 46.8	93 32	144.3	63 37.5	92 34	142.6	64 05.0	91 34	142.1	64 59.6	91 35	141.2	9
20	57 44.3	94 31	145.5	58 12.4	94 32	145.2	58 40.4	93 32	144.9	59 36.3	93 32	144.2	61 27.4	92 34	142.6	63 17.3	91 35	140.9	63 44.5	91 35	140.4	64 38.7	90 36	139.4	20
1	57 25.4	93 32	144.0	57 53.4	93 33	143.7	58 21.3	93 33	143.3	59 16.8	92 34	142.6	61 07.2	91 35	141.0	62 56.3	90 36	139.2	63 23.3	90 36	138.8	64 17.1	89 37	137.7	1
2	57 05.9	93 34	142.5	57 33.7	92 34	142.1	58 01.4	92 34	141.8	58 56.6	92 35	141.0	60 46.3	91 36	139.4	62 34.6	90 37	137.6	63 01.4	89 38	137.1	63 54.8	89 38	136.1	2
3	56 45.7	92 35	141.0	57 13.3	92 35	140.6	57 40.8	92 35	140.3	58 35.7	91 36	139.5	60 24.7	90 37	137.9	62 12.2	89 38	136.0	62 38.9	89 39	135.5	63 31.8	88 39	134.5	3
4	56 24.8	92 36	139.5	56 52.2	91 36	139.2	57 19.6	91 36	138.8	58 14.2	91 37	138.0	60 02.4	90 38	136.3	61 49.2	88 39	134.4	62 15.6	88 40	133.9	63 08.2	87 40	132.9	4
25	56 03.2	91 37	138.1	56 30.5	91 37	137.7	56 57.8	91 37	137.3	57 52.0	90 38	136.5	59 39.5	89 39	134.8	61 25.6	88 40	132.9	61 51.8	87 41	132.4	62 43.9	86 41	131.3	25
6	55 41.1	91 38	136.6	56 08.2	90 38	136.3	56 35.3	90 38	135.9	57 29.2	90 39	135.1	59 16.1	88 40	133.3	61 01.3	87 41	131.4	61 27.4	87 42	130.9	62 19.1	86 42	129.8	6
7	55 18.4	90 39	135.2	55 45.4	90 39	134.8	56 12.3	90 39	134.5	57 05.9	89 40	133.6	58 52.0	88 41	131.9	60 36.5	86 42	129.9	61 02.4	86 43	129.4	61 53.7	85 43	128.3	7
8	54 55.1	90 40	133.8	55 21.9	89 40	133.5	55 48.7	89 40	133.1	56 41.9	88 41	132.2	58 27.4	87 42	130.4	60 11.2	86 43	128.5	60 36.9	85 43	128.0	61 27.8	84 44	126.9	8
9	54 31.2	89 41	132.5	54 57.9	89 41	132.1	55 24.5	89 41	131.7	56 17.5	88 42	130.8	58 02.3	87 43	129.0	59 45.4	85 44	127.1	60 10.9	85 44	126.5	61 01.4	84 45	125.4	9
30	54 06.9	89 42	131.1	54 33.4	88 42	130.7	54 59.9	88 42	130.3	55 52.5	87 42	129.5	57 36.6	86 44	127.7	59 19.1	85 45	125.7	59 44.4	84 45	125.1	60 34.6	83 46	124.0	30
1	53 42.0	88 42	129.8	54 08.4	88 42	129.4	54 34.7	88 43	129.0	55 27.0	87 43	128.1	57 10.5	86 44	126.3	58 52.3	84 45	124.3	59 17.4	84 46	123.8	60 07.3	83 46	122.7	1
2	53 16.7	88 43	128.5	53 42.9	87 43	128.1	54 09.1	87 44	127.7	55 01.1	86 44	126.8	56 44.0	85 45	125.0	58 25.1	83 46	123.0	58 50.1	83 46	122.4	59 39.6	82 47	121.3	2
3	52 50.9	87 44	127.2	53 17.0	87 44	126.8	53 43.0	87 44	126.4	54 34.7	86 45	125.5	56 17.0	85 46	123.7	57 57.5	83 47	121.7	58 22.3	82 47	121.1	59 11.5	82 47	120.0	3
4	52 24.7	87 44	126.0	52 50.6	86 45	125.5	53 16.5	86 45	125.1	54 07.9	85 45	124.3	55 49.6	84 46	122.4	57 29.5	82 47	120.4	57 54.1	82 48	119.9	58 43.0	81 48	118.8	4
35	51 58.0	86 45	124.7	52 23.8	86 45	124.3	52 49.5	86 46	123.9	53 40.7	85 46	123.0	55 21.8	84 47	121.1	57 01.1	82 48	119.1	57 25.6	81 48	118.6	58 14.2	80 49	117.5	35
6	51 30.9	86 46	123.5	51 56.6	85 46	123.1	52 22.2	85 46	122.6	53 13.1	85 47	121.8	54 53.7	83 48	119.9	56 32.4	81 48	117.9	56 56.8	81 49	117.4	57 45.1	80 49	116.3	6
7	51 03.5	85 46	122.3	51 29.1	85 47	121.9	51 54.5	85 47	121.4	52 45.2	84 47	120.6	54 25.2	83 48	118.7	56 03.4	81 49	116.7	56 27.6	81 49	116.1	57 15.6	80 50	115.1	7
8	50 35.7	85 47	121.1	51 01.1	85 47	120.7	51 26.5	84 47	120.2	52 16.8	84 48	119.4	53 56.4	82 49	117.5	55 34.0	81 49	115.5	55 58.1	80 50	115.0	56 45.8	79 50	113.9	8
9	50 07.5	85 48	119.9	50 32.8	84 48	119.5	50 58.1	84 48	119.1	51 48.2	83 48	118.2	53 27.2	82 49	116.3	55 04.4	80 50	114.3	55 28.3	80 50	113.8	56 15.8	79 50	112.7	9
40	49 39.1	84 48	118.8	50 04.2	84 48	118.3	50 29.3	83 48	117.9	51 19.2	83 49	117.0	52 57.8	81 50	115.2	54 34.5	80 50	113.2	54 58.3	79 50	112.6	55 45.6	78 51	111.6	40
1	49 10.3	84 48	117.6	49 35.3	83 49	117.2	50 00.3	83 49	116.8	50 50.0	82 49	115.9	52 28.1	81 50	114.0	54 04.3	79 51	112.0	54 28.0	79 51	111.5	55 15.1	78 51	110.4	1
2	48 41.2	83 49	116.5	49 06.1	83 49	116.1	49 31.0	83 49	115.7	50 20.5	82 50	114.8	51 58.1	81 50	112.9	53 33.9	79 51	110.9	53 57.5	79 51	110.4	54 44.3	78 52	109.3	2
3	48 11.8	83 50	115.4	48 36.6	83 50	115.0	49 01.4	82 50	114.5	49 50.7	82 50	113.7	51 27.9	80 51	111.8	53 03.2	79 51	109.8	53 26.8	78 52	109.3	54 13.4	77 52	108.2	3
4	47 42.1	83 50	114.3	48 06.9	82 50	113.9	48 31.6	82 50	113.5	49 20.6	81 50	112.6	50 57.4	80 51	110.7	52 32.4	78 52	108.8	52 55.8	78 52	108.2	53 42.3	77 52	107.2	4
45	47 12.2	82 50	113.2	47 36.9	82 50	112.8	48 01.5	82 50	112.4	48 50.3	81 51	111.5	50 26.8	80 51	109.7	52 01.4	78 52	107.7	52 24.7	78 52	107.2	53 11.0	77 52	106.1	45
6	46 42.1	82 51	112.2	47 06.6	82 51	111.7	47 31.1	81 51	111.3	48 19.8	81 51	110.4	49 55.9	79 52	108.6	51 30.1	78 52	106.7	51 53.4	77 52	106.1	52 39.5	76 53	105.1	6
7	46 11.7	82 51	111.1	46 36.2	81 51	110.7	47 00.6	81 51	110.3	47 49.1	81 52	109.4	49 24.8	79 52	107.6	50 58.8	77 53	105.6	51 21.9	77 53	105.1	52 07.9	76 53	104.1	7
8	45 41.1	82 51	110.1	46 05.5	81 51	109.7	46 29.8	81 52	109.2	47 18.2	80 52	108.4	48 53.6	79 52	106.6	50 27.2	77 53	104.6	50 50.3	77 53	104.1	51 36.1	76 53	103.1	8
9	45 10.3	81 52	109.1	45 34.6	81 52	108.6	45 58.9	81 52	108.2	46 47.0	80 52	107.3	48 22.2	79 53	105.5	49 55.5	77 53	103.6	50 18.5	77 53	103.1	51 04.2	76 53	102.1	9
50	44 39.3	81 52	108.0	45 03.6	81 52	107.6	45 27.7	81 52	107.2	46 15.8	80 52	106.3	47 50.6	78 53	104.5	49 23.7	77 53	102.6	49 46.7	76 53	102.1	50 32.2	75 54	101.1	50
1	44 08.2	81 52	107.0	44 32.3	80 52	106.6	44 56.4	80 52	106.2	45 44.3	80 53	105.4	47 18.9	78 53	103.6	48 51.8	77 53	101.7	49 14.7	76 54	101.2	50 00.1	75 54	100.2	1
2	43 36.8	81 52	106.1	44 01.0	80 53	105.6	44 25.0	80 53	105.2	45 12.8	79 53	104.4	46 47.1	78 53	102.6	48 19.7	76 54	100.7	48 42.5	76 54	100.2	49 27.9	75 54	99.2	2
3	43 05.4	80 53	105.1	43 29.4	80 53	104.7	43 53.4	80 53	104.2	44 41.0	79 53	103.4	46 15.2	78 53	101.6	47 47.5	76 54	99.8	48 10.3	76 54	99.3	48 55.6	75 54	98.3	3
4	42 33.7	80 53	104.1	42 57.7	80 53	103.7	43 21.6	80 53	103.3	44 09.2	79 53	102.4	45 43.1	78 54	100.7	47 15.3	76 54	98.8	47 38.0	76 54	98.3	48 23.2	75 54	97.4	4
55	42 02.0	80 53	103.2	42 25.9	80 53	102.7	42 49.8	79 53	102.3	43 37.2	79 53	101.5	45 10.9	77 54	99.7	46 43.0	76 54	97.9	47 05.7	76 54	97.4	47 50.8	75 54	96.4	55
6	41 30.1	80 53	102.2	41 54.0	79 53	101.8	42 17.8	79 54	101.4	43 05.1	79 54	100.6	44 38.7	77 54	98.8	46 10.6	76 54	97.0	46 33.2	75 54	96.5	47 18.3	75 54	95.5	6
7	40 58.1	80 54	101.3	41 21.9	79 54	100.9	41 45.7	79 54	100.5	42 33.0	78 54	99.6	44 06.3	77 54	97.9	45 38.1	76 54	96.1	46 00.7	75 54	95.6	46 45.7	75 54	94.7	7
8	40 26.0	79 54	100.3	40 49.8	79 54	99.9	41 13.5	79 54	99.5	42 00.7	78 54	98.7	43 33.9	77 54	97.0	45 05.6	76 54	95.2	45 28.2	75 54	94.7	46 13.1	74 54	93.8	8
9	39 53.8	79 54	99.4	40 17.6	79 54	99.0	40 41.3	79 54	98.6	41 28.4	78 54	97.8	43 01.5	77 54	96.1	44 33.0	76 54	94.3	44 55.6	75 54	93.8	45 40.5	74 54	92.9	9
60	39 21.5	79 54	98.5	39 45.3	79 54	98.1	40 08.9	79 54	97.7	40 56.0	78 54	96.9	42 29.0	77 54	95.2	44 00.4	75 54	93.4	44 23.0	75 54	93.0	45 07.8	74 54	92.0	60
1	38 49.2	79 54	97.6	39 12.9	79 54	97.2	39 36.5	79 54	96.8	40 23.5	78 54	96.0	41 56.4	77 54	94.3	43 27.8	75 54	92.6	43 50.3	75 54	92.1	44 35.2	74 54	91.2	1
2	38 16.8	79 54	96.7	38 40.4	79 54	96.3	39 04.0	79 54	95.9	39 51.0	78 54	95.1	41 23.8	77 54	93.5	42 55.1	75 54	91.7	43 17.7	75 54	91.3	44 02.5	74 54	90.3	2
3	37 44.3	79 54	95.8	38 07.9	79 54	95.5	38 31.5	78 54	95.1	39 18.4	78 54	94.3	40 51.2	77 54	92.6	42 22.4	75 54	90.9	42 45.0	75 54	90.4	43 29.8	74 54	89.5	3
4	37 11.7	79 54	95.0	37 35.4	79 54	94.6	37 58.9	78 54	94.2	38 45.8	78 54	93.4	40 18.5	77 54	91.7	41 49.8	75 54	90.0	42 12.3	75 54	89.6	42 57.2	74 54	88.7	4
65	36 39.2	79 54	94.1	37 02.8	79 54	93.7	37 26.3	78 54	93.3	38 13.2	78 54	92.5	39 45.8	77 54	90.9	41 17.1	75 54	89.2	41 39.7	75 54	88.7	42 24.5	74 54	87.8	65
6	36 06.6	79 54	93.2	36 30.2	79 54	92.8	36 53.7	78 54	92.5	37 40.5	78 54	91.7	39 13.2	77 54	90.0	40 44.4	75 54	88.4	41 07.0	75 54	87.9	41 51.8	74 54	87.0	6
7	35 33.9	79 54	92.4	35 57.5	79 54	92.0	36 21.0	78 54	91.6	37 07.8	78 54	90.8	38 40.5	77 54	89.2	40 11.8	75 54	87.5	40 34.3	75 54	87.1	41 19.2	74 54	86.2	7
8	35 01.3	79 54	91.5	35 24.8	78 54	91.1	35 48.3	78 54	90.8	36 35.2	78 54	90.0	38 07.8	77 54	88.4	39 39.1	75 54	86.7	40 01.7	75 54	86.3	40 46.6	75 54	85.4	8
9	34 28.6	79 54	90.7	34 52.2	78 54	90.3	35 15.7	78 54	89.9	36 02.5	78 54	89.1	37 35.2	77 54	87.6	39 06.5	76 54	85.9	39 29.1	75 54	85.5	40 14.1	75 54	84.6	9
70	33 55.9	79 54	89.8	34 19.5	78 54	89.5	34 43.0	78 54	89.1	35 29.8	78 54	88.3	37 02.5	77 54	86.7	38 33.9	76 54	85.1	38 56.6	75 54	84.7	39 41.6	75 54	83.8	70
1	33 23.2	79 54	89.0	33 46.8	78 54	88.6	34 10.3	78 54	88.3	34 57.1	78 54	87.5	36 29.9	77 54	85.9	38 01.4	76 54	84.3	38 24.1	75 54	83.9	39 09.1	75 54	83.0	1
2	32 50.6	79 54	88.2	33 14.1	79 54	87.8	33 37.7	78 54	87.4	34 24.5	78 54	86.7	35 57.3	77 54	85.1	37 28.9	76 54	83.5	37 51.6	75 54	83.1	38 36.7	75 54	82.3	2
3	32 17.9	79 54	87.3	32 41.5	79 54	87.0	33 05.0	78 54	86.6	33 51.9	78 54	85.9	35 24.8	77 54	84.3	36 56.5	76 54	82.7	37 19.2	76 54	82.3	38 04.3	75 54	81.5	3
4	31 45.3	79 54	86.5	32 08.9	79 54	86.2	32 32.4	78 54	85.8	33 19.3	78 54	85.0	34 52.3	77 54	83.5	36 24.1	76 54	81.9	36 46.8	76 54	81.5	37 32.1	75 54	80.7	4
75	31 12.7	79 54	85.7	31 36.3	79 54	85.3	31 59.9	78 54	85.0	32 46.8	78 54	84.2	34 19.9	77 54	82.7	35 51.8	76 54	81.2	36 14.5	76 54	80.8	36 59.8	75 54	79.9	75
6	30 40.1	79 54	84.9	31 03.7	79 54	84.5	31 27.3	78 54	84.2	32 14.3	79 54	83.4	33 47.5	77 54	81.9	35 19.5	76 54	80.4	35 42.3	76 54	80.0	36 27.7	75 53	79.2	6
7	30 07.6	79 54	84.1	30 31.2	79 54	83.7	30 54.8	79 54	83.4	31 41.9	78 54	82.6	33 15.1	77 54	81.2	34 47.3	76 54	79.6	35 10.2	76 53	79.2	35 55.7	76 53	78.4	7
8	29 35.1	79 54	83.3	29 58.8	79 54	82.9	30 22.4	79 54	82.6	31 09.5	78 54	81.9	32 42.9	77 54	80.4	34 15.2	76 53	78.8	34 38.1	76 53	78.4	35 23.7	76 53	77.7	8
9	29 02.7	79 54	82.5	29 26.4	79 54	82.1	29 50.0	79 54	81.8	30 37.2	78 54	81.1	32 10.7	78 54	79.6	33 43.2	77 53	78.1	34 06.1	76 53	77.7	34 51.8	76 53	76.9	9
80	28 30.3	79 54	81.7	28 54.0	79 54	81.3	29 17.7	79 54	81.0	30 04.9	78 54	80.3	31 38.6	78 53	78.8	33 11.3	77 53	77.3	33 34.3	77 53	76.9	34 20.0	76 53	76.1	80
1	27 58.0	79 54	80.9	28 21.8	79 54	80.5	28 45.5	79 54	80.2	29 32.8	79 53	79.5	31 06.6	78 53	78.0	32 39.4	77 53	76.6	33 02.5	77 53	76.2	33 48.4	76 53	75.4	1
2	27 25.8	79 54	80.1	27 49.6	79 54	79.8	28 13.3	79 54	79.4	29 00.7	79 53	78.7	30 34.7	78 53	77.3	32 07.7	77 53	75.8	32 30.8	77 53	75.4	33 16.8	76 52	74.7	2
3	26 53.6	80 54	79.3	27 17.5	79 53	79.0	27 41.2	79 53	78.6	28 28.7	79 53	77.9	30 02.8	78 53	76.5	31 36.1	77 53	75.0	31 59.2	77 52	74.7	32 45.3	77 52	73.9	3
4	26 21.6	80 53	78.5	26 45.4	79 53	78.2	27 09.3	79 53	77.8	27 56.8	79 53	77.2	29 31.1	78 53	75.7	31 04.6	77 52	74.3	31 27.8	77 52	73.9	32 14.0	77 52	73.2	4
85	25 49.6	80 53	77.7	26 13.5	80 53	77.4	26 37.4	79 53	77.1	27 24.9	79 53	76.4	28 59.5	78 52	75.0	30 33.2	78 52	73.5	30 56.4	77 52	73.2	31 42.8	77 52	72.4	85
6	25 17.7	80 53	77.0	25 41.6	80 53	76.6	26 05.6	80 53	76.3	26 53.2	79 53	75.6	28 28.0	79 52	74.2	30 01.9	78 52	72.8	30 25.2	78 52	72.4	31 11.7	77 52	71.7	6
7	24 45.9	80 53	76.2	25 09.9	80 53	75.8	25 33.9	80 53	75.5	26 21.6	79 52	74.8	27 56.6	79 52	73.5	29 30.7	78 52	72.1	29 54.1	78 52	71.7	30 40.7	77 51	71.0	7
8	24 14.2	80 53	75.4	24 38.3	80 53	75.1	25 02.3	80 52	74.7	25 50.2	80 52	74.1	27 25.3	79 52	72.7	28 59.7	78 51	71.3	29 23.2	78 51	71.0	30 09.9	79 51	70.2	8
9	23 42.7	80 52	74.6	24 06.8	80 52	74.3	24 30.8	80 52	74.0	25 18.8	80 52	73.3	26 54.2	79 52	72.0	28 28.8	78 51	70.6	28 52.3	78 51	70.2	29 39.2	78 51	69.5	9
90	23 11.2	81 52	73.8	23 35.4	80 52	73.5	23 59.5	80 52	73.2	24 47.6	80 52	72.5	26 23.2	79 51	71.2	27 58.1	79 51	69.8	28 21.7	79 51	69.5	29 08.7	78 51	68.8	90

Digitized by Google

Lat. 57°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	22 39.9	81 52	73.1	23 04.1	81 52	72.8	23 28.2	80 52	72.4	24 16.5	80 52	71.8	25 52.3	80 51	70.5	27 27.5	79 51	69.1	27 51.1	79 51	68.7	28 38.3	78 50	68.0	91
2	22 08.7	81 52	72.3	22 32.9	81 52	72.0	22 57.2	81 52	71.7	23 45.5	80 51	71.0	25 21.6	80 51	69.7	26 57.0	79 50	68.4	27 20.8	79 50	68.0	28 08.1	79 50	67.3	2
3	21 37.6	81 52	71.5	22 01.9	81 51	71.2	22 26.2	81 51	70.9	23 14.6	81 51	70.3	24 51.0	80 51	69.0	26 26.7	79 50	67.6	26 50.5	79 50	67.3	27 38.0	79 50	66.6	3
4	21 06.7	81 51	70.8	21 31.1	81 51	70.5	21 55.4	81 51	70.1	22 44.0	81 51	69.5	24 20.6	80 50	68.2	25 56.6	80 50	66.9	26 20.5	80 50	66.5	27 08.1	79 50	65.9	4
95	20 35.9	81 51	70.0	21 00.3	81 51	69.7	21 24.7	81 51	69.4	22 13.4	81 51	68.7	23 50.4	81 50	67.5	25 26.6	80 50	66.1	25 50.6	80 50	65.8	26 38.4	79 49	65.1	95
6	20 05.3	82 51	69.2	20 29.8	82 51	68.9	20 54.2	81 50	68.6	21 43.1	81 50	68.0	23 20.3	81 50	66.7	24 56.8	80 49	65.4	25 20.9	80 49	65.1	26 08.8	80 49	64.4	6
7	19 34.8	82 50	68.5	19 59.4	82 50	68.2	20 23.9	82 50	67.8	21 12.8	81 50	67.2	22 50.3	81 50	66.0	24 27.2	80 49	64.7	24 51.3	80 49	64.4	25 39.4	80 49	63.7	7
8	19 04.5	82 50	67.7	19 29.1	82 50	67.4	19 53.7	82 50	67.1	20 42.8	82 50	66.5	22 20.6	81 49	65.2	23 57.7	81 49	63.9	24 21.9	81 49	63.6	25 10.2	80 48	63.0	8
9	18 34.4	82 50	66.9	18 59.0	82 50	66.6	19 23.7	82 50	66.3	20 12.9	82 50	65.7	21 51.0	81 49	64.5	23 28.5	81 48	63.2	23 52.8	81 48	62.9	24 41.2	81 48	62.2	9
100	18 04.4	83 50	66.2	18 29.1	82 50	65.9	18 53.9	82 49	65.6	19 43.2	82 49	65.0	21 21.6	82 49	63.7	22 59.4	81 48	62.5	23 23.8	81 48	62.2	24 12.4	81 48	61.5	100
1	17 34.6	83 49	65.4	17 59.4	83 49	65.1	18 24.2	83 49	64.8	19 13.7	82 49	64.2	20 52.4	82 48	63.0	22 30.5	82 48	61.8	22 55.0	81 48	61.4	23 43.8	81 47	60.8	1
2	17 05.0	83 49	64.6	17 29.9	83 49	64.3	17 54.7	83 49	64.0	18 44.4	83 49	63.4	20 23.4	82 48	62.2	22 01.8	82 47	61.0	22 26.4	82 47	60.7	23 15.3	81 47	60.1	2
3	16 35.5	83 49	63.9	17 00.5	83 49	63.6	17 25.4	83 49	63.3	18 15.2	83 48	62.7	19 54.5	83 48	61.5	21 33.3	82 47	60.3	21 58.0	82 47	60.0	22 47.1	82 47	59.4	3
4	16 06.3	84 48	63.1	16 31.3	83 48	62.8	16 56.3	83 48	62.5	17 46.3	83 48	61.9	19 25.9	83 47	60.8	21 05.1	82 47	59.6	21 29.8	82 47	59.3	22 19.1	82 46	58.6	4
105	15 37.2	84 48	62.3	16 02.4	84 48	62.0	16 27.5	84 48	61.8	17 17.6	83 48	61.2	18 57.5	83 47	60.0	20 37.0	83 46	58.8	21 01.8	83 46	58.5	21 51.3	82 46	57.9	105
6	15 08.4	84 48	61.6	15 33.6	84 48	61.3	15 58.8	84 48	61.0	16 49.1	84 47	60.4	18 29.3	83 47	59.3	20 09.2	83 46	58.1	20 34.0	83 46	57.8	21 23.7	83 46	57.2	6
7	14 39.8	84 47	60.8	15 05.1	84 47	60.5	15 30.3	84 47	60.2	16 20.7	84 47	59.7	18 01.3	84 46	58.5	19 41.5	83 46	57.4	20 06.5	83 46	57.1	20 56.4	83 45	56.5	7
8	14 11.4	85 47	60.0	14 36.7	84 47	59.7	15 02.0	84 47	59.5	15 52.6	84 46	58.9	17 33.6	84 46	57.8	19 14.1	84 45	56.6	19 39.2	84 45	56.3	20 29.2	83 45	55.7	8
9	13 43.2	85 47	59.2	14 08.6	85 46	59.0	14 34.0	85 46	58.7	15 24.8	85 46	58.1	17 06.1	84 46	57.0	18 46.9	84 45	55.9	19 12.1	84 45	55.6	20 02.3	84 44	55.0	9
110	13 15.2	85 46	58.5	13 40.7	85 46	58.2	14 06.2	85 46	57.9	14 57.1	85 46	57.4	16 38.8	85 45	56.3	18 20.0	84 44	55.2	18 45.3	84 44	54.9	19 35.7	84 44	54.3	110
1	12 47.5	85 46	57.7	13 13.1	85 46	57.4	13 38.6	85 46	57.2	14 29.7	85 45	56.6	16 11.7	85 45	55.5	17 53.3	85 44	54.4	18 18.7	84 44	54.1	19 09.3	84 44	53.6	1
2	12 20.0	86 46	56.9	12 45.6	86 45	56.7	13 11.3	85 45	56.4	14 02.6	85 45	55.9	15 44.9	85 44	54.8	17 26.9	85 44	53.7	17 52.3	85 44	53.4	18 43.1	85 43	52.8	2
3	11 52.7	86 45	56.2	12 18.5	86 45	55.9	12 44.2	86 45	55.6	13 35.6	86 44	55.1	15 18.3	85 44	54.0	17 00.7	85 43	52.9	17 26.2	85 43	52.7	18 17.2	85 43	52.1	3
4	11 25.7	86 45	55.4	11 51.5	86 44	55.1	12 17.4	86 44	54.9	13 09.0	86 44	54.3	14 52.0	86 43	53.3	16 34.7	85 43	52.2	17 00.3	85 43	51.9	17 51.5	85 42	51.4	4
115	10 58.9	86 44	54.6	11 24.8	86 44	54.3	11 50.8	86 44	54.1	12 42.5	86 44	53.6	14 25.9	86 43	52.5	16 09.0	86 42	51.5	16 34.7	86 42	51.2	17 26.1	86 42	50.7	115
6	10 32.4	87 44	53.8	10 58.4	87 44	53.6	11 24.4	87 44	53.3	12 16.4	87 43	52.8	14 00.1	86 43	51.8	15 43.6	86 42	50.7	16 09.4	86 42	50.5	17 01.0	86 41	49.9	6
7	10 06.2	87 43	53.0	10 32.3	87 43	52.8	10 58.3	87 43	52.5	11 50.5	87 43	52.0	13 34.6	87 42	51.0	15 18.4	86 41	50.0	15 44.3	86 41	49.7	16 36.1	86 41	49.2	7
8	9 40.2	87 43	52.3	10 06.4	87 43	52.0	10 32.5	87 42	51.8	11 24.8	87 42	51.3	13 09.3	87 42	50.3	14 53.5	87 41	49.2	15 19.5	87 41	49.0	16 11.5	87 41	48.5	8
9	9 14.5	88 42	51.5	9 40.7	88 42	51.2	10 07.0	88 42	51.0	10 59.5	87 42	50.5	12 44.3	87 41	49.5	14 28.9	87 41	48.5	14 55.0	87 40	48.2	15 47.2	87 40	47.7	9
120	8 49.1	88 42	50.7	9 15.4	88 42	50.5	9 41.8	88 42	50.2	10 34.4	88 41	49.7	12 19.6	88 41	48.7	14 04.6	87 40	47.7	14 30.8	87 40	47.5	15 23.2	87 40	47.0	120
1	8 23.9	88 41	49.9	8 50.4	88 41	49.7	9 16.8	88 41	49.4	10 09.6	88 41	49.0	11 55.2	88 40	48.0	13 40.5	88 40	47.0	14 06.8	88 39	46.8	14 59.4	88 39	46.3	1
2	7 59.1	88 41	49.1	8 25.6	88 41	48.9	8 52.1	88 41	48.7	9 45.1	88 40	48.2	11 31.1	88 40	47.2	13 16.8	88 39	46.3	13 43.2	88 39	46.0	14 35.9	88 39	45.5	2
3	7 34.5	89 40	48.3	8 01.1	89 40	48.1	8 27.7	89 40	47.9	9 20.9	89 40	47.4	11 07.2	89 39	46.5	12 53.3	88 39	45.5	13 19.8	88 38	45.3	14 12.8	88 38	44.8	3
4	7 10.2	89 40	47.5	7 36.9	89 40	47.3	8 03.6	80 40	47.1	8 57.0	89 39	46.6	10 43.7	80 39	45.7	12 30.2	89 38	44.7	12 56.8	89 38	44.5	13 49.9	89 38	44.0	4
125	6 46.3	89 40	46.7	7 13.1	89 39	46.5	7 39.9	89 39	46.3	8 33.4	89 39	45.8	10 20.5	89 38	44.9	12 07.3	89 38	44.0	12 34.0	89 37	43.8	13 27.3	89 37	43.3	125
6	6 22.6	90 39	46.0	6 49.5	90 39	45.7	7 16.4	90 39	45.5	8 10.1	90 38	45.1	9 57.5	89 38	44.2	11 44.8	89 37	43.2	12 11.6	89 37	43.0	13 05.1	89 37	42.5	6
7	5 59.3	90 38	45.2	6 26.3	90 38	44.9	6 53.2	90 38	44.7	7 47.2	90 38	44.3	9 34.9	90 37	43.4	11 22.5	90 37	42.5	11 49.4	90 36	42.3	12 43.2	90 36	41.8	7
8	5 36.3	90 38	44.4	6 03.4	90 38	44.1	6 30.4	90 38	43.9	7 24.5	90 37	43.5	9 12.6	90 37	42.6	11 00.6	90 36	41.7	11 27.6	90 36	41.5	12 21.5	90 36	41.1	8
9	5 13.6	91 37	43.6	5 40.8	91 37	43.3	6 07.9	90 37	43.1	7 02.2	90 37	42.7	8 50.7	90 36	41.8	10 39.1	90 35	41.0	11 06.1	90 35	40.7	12 00.2	90 35	40.3	9
130				5 13.5	91 37	42.5	5 45.7	91 36	42.3	6 40.2	91 36	41.9	8 29.1	91 36	41.1	10 17.8	91 35	40.2	10 45.0	91 35	40.0	11 39.3	90 34	39.6	130
1							5 23.9	91 36	41.5	6 18.5	91 36	41.1	8 07.8	91 35	40.3	9 56.9	91 34	39.4	10 24.1	91 34	39.2	11 18.6	91 34	38.8	1
2							5 02.4	91 35	40.7	5 57.2	91 35	40.3	7 46.8	91 34	39.5	9 36.3	91 34	38.7	10 03.6	91 34	38.5	10 58.3	91 33	38.0	2
3										5 36.3	92 34	39.5	7 26.2	92 34	38.7	9 16.0	91 33	37.9	9 43.5	91 33	37.7	10 38.3	91 33	37.3	3
4										5 15.6	92 34	38.7	7 05.9	92 33	37.9	8 56.1	92 33	37.1	9 23.7	92 32	36.9	10 18.7	92 32	36.5	4
135													6 46.0	92 33	37.1	8 36.6	92 32	36.4	9 04.2	92 32	36.2	9 59.4	92 32	35.8	135
6													6 26.5	92 32	36.4	8 17.4	92 31	35.6	8 45.1	92 31	35.4	9 40.5	92 31	35.0	6
7													6 07.3	92 31	35.6	7 58.5	93 31	34.8	8 26.3	93 31	34.6	9 21.9	93 30	34.2	7
8													5 48.4	93 31	34.8	7 40.1	93 30	34.0	8 08.0	93 30	33.9	9 03.7	93 30	33.5	8
9													5 30.0	93 30	34.0	7 22.0	93 30	33.3	7 49.9	93 29	33.1	8 45.9	93 29	32.7	9
140													5 11.9	94 30	33.2	7 04.2	94 29	32.5	7 32.3	94 29	32.3	8 28.4	94 28	31.9	140
1																6 46.9	94 28	31.7	7 15.0	94 28	31.5	8 11.3	94 28	31.2	1
2																6 29.9	94 28	30.9	6 58.1	94 28	30.7	7 54.6	94 27	30.4	2
3																6 13.3	94 27	30.1	6 41.6	94 27	30.0	7 38.2	94 27	29.6	3
4																5 57.1	95 26	29.3	6 25.5	95 26	29.2	7 22.3	95 26	28.8	4
145																5 41.3	95 26	28.5	6 09.8	95 26	28.4	7 06.7	95 25	28.1	145
6																5 25.9	95 25	27.8	5 54.4	95 25	27.6	6 51.5	95 25	27.3	6
7																5 10.8	95 24	27.0	5 39.5	95 24	26.8	6 36.7	95 24	26.5	7
8																			5 24.9	96 24	26.0	6 22.4	96 23	25.7	8
9																			5 10.8	96 23	25.2	6 08.4	96 23	24.9	9
150																						5 54.8	96 22	24.2	150
1																						5 41.6	96 21	23.4	1
2																						5 28.9	97 21	22.6	2
3																						5 16.5	97 20	21.8	3
4																						5 04.6	97 19	21.0	4

Lat. 58°

Digitized by Google

Lat. 57°

H.A.	36° 00′ Alt.	Δd Δt	Az.	37° 00′ Alt.	Δd Δt	Az.	38° 30′ Alt.	Δd Δt	Az.	40° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	69 00.0	1.0 01	180.0	70 00.0	1.0 01	180.0	71 30.0	1.0 01	180.0	73 00.0	1.0 01	180.0
1	68 59.4	1.0 03	177.7	69 59.3	1.0 03	177.7	71 29.3	1.0 04	177.5	72 59.3	1.0 04	177.4
2	68 57.4	1.0 05	175.5	69 57.3	1.0 06	175.3	71 27.2	1.0 06	175.1	72 57.0	1.0 06	174.8
3	68 54.2	1.0 07	173.2	69 54.0	1.0 08	173.0	71 23.7	1.0 08	172.6	72 53.3	1.0 09	172.2
4	68 49.7	99 10	171.0	69 49.4	99 10	170.7	71 18.8	99 10	170.2	72 48.1	99 11	169.6
05	68 44.0	99 12	168.8	69 43.5	99 12	168.4	71 12.6	99 13	167.8	72 41.5	99 13	167.0
6	68 37.0	99 14	166.6	69 36.3	99 14	166.1	71 05.0	98 15	165.4	72 33.5	98 16	164.5
7	68 28.9	98 16	164.4	69 27.8	98 16	163.9	70 56.1	98 17	163.0	72 24.0	98 18	162.0
8	68 19.5	98 18	162.3	69 18.2	98 18	161.7	70 45.9	97 19	160.7	72 13.3	97 20	159.6
9	68 08.9	97 19	160.1	69 07.3	97 20	159.5	70 34.5	97 21	158.4	72 01.2	96 22	157.2
10	67 57.3	97 21	158.0	68 55.3	96 22	157.3	70 21.9	96 23	156.1	71 47.9	95 24	154.8
1	67 44.5	96 23	156.0	68 42.1	96 24	155.2	70 08.1	95 25	153.9	71 33.4	94 26	152.5
2	67 30.6	96 25	153.9	68 27.8	95 26	153.1	69 53.2	94 27	151.8	71 17.8	94 28	150.2
3	67 15.8	95 26	151.9	68 12.5	94 27	151.1	69 37.2	94 28	149.6	71 01.0	93 30	148.0
4	66 59.9	94 28	149.9	67 56.2	94 29	149.0	69 20.1	93 30	147.6	70 43.2	92 31	145.9
15	66 43.0	93 30	148.0	67 38.9	93 30	147.1	69 02.1	92 32	145.5	70 24.3	91 33	143.8
6	66 25.3	93 31	146.1	67 20.7	92 32	145.1	68 43.1	91 33	143.5	70 04.5	90 34	141.7
7	66 06.6	92 32	144.3	67 01.6	91 33	143.3	68 23.3	90 35	141.6	69 43.8	89 36	139.7
8	65 47.1	91 34	142.4	66 41.6	91 35	141.4	68 02.6	89 36	139.7	69 22.3	88 37	137.8
9	65 26.8	90 35	140.7	66 20.8	90 36	139.6	67 41.0	88 37	137.9	68 59.9	87 39	135.9
20	65 05.7	90 36	138.9	65 59.3	89 37	137.8	67 18.7	88 38	136.1	68 36.8	86 40	134.1
1	64 43.9	89 38	137.2	65 37.0	88 38	136.1	66 55.7	87 40	134.3	68 13.0	85 41	132.3
2	64 21.3	88 39	135.6	65 14.0	87 39	134.4	66 32.0	86 41	132.6	67 48.5	84 42	130.6
3	63 58.1	87 40	133.9	64 50.3	87 40	132.8	66 07.6	85 42	130.9	67 23.4	83 43	128.9
4	63 34.3	87 41	132.3	64 26.0	86 42	131.2	65 42.6	84 43	129.3	66 57.6	82 44	127.2
25	63 09.8	86 42	130.8	64 01.1	85 42	129.6	65 17.0	83 44	127.7	66 31.3	82 45	125.6
6	62 44.8	85 43	129.2	63 35.7	84 43	128.1	64 50.9	83 44	126.2	66 04.5	81 46	124.1
7	62 19.2	85 44	127.8	63 09.7	84 44	126.6	64 24.3	82 45	124.7	65 37.2	80 46	122.6
8	61 53.1	84 44	126.3	62 43.2	83 45	125.1	63 57.2	81 46	123.2	65 09.5	79 47	121.1
9	61 26.5	83 45	124.9	62 16.2	82 46	123.7	63 29.6	81 47	121.8	64 41.3	79 48	119.7
30	60 59.5	83 46	123.5	61 48.8	82 46	122.3	63 01.6	80 47	120.4	64 12.7	78 48	118.3
1	60 32.0	82 46	122.1	61 21.0	81 47	120.9	62 33.2	79 48	119.0	63 43.8	77 49	117.0
2	60 04.1	82 47	120.8	60 52.8	81 48	119.6	62 04.5	79 49	117.7	63 14.5	77 49	115.6
3	59 35.9	81 48	119.5	60 24.2	80 48	118.3	61 35.4	78 49	116.4	62 44.8	76 50	114.3
4	59 07.2	80 48	118.2	59 55.2	79 49	117.0	61 05.9	78 50	115.1	62 14.9	76 50	113.1
35	58 38.3	80 49	116.9	59 25.9	79 49	115.7	60 36.2	77 50	113.9	61 44.7	75 51	111.9
6	58 09.0	79 49	115.7	58 56.4	78 50	114.5	60 06.2	77 50	112.6	61 14.3	75 51	110.6
7	57 39.4	79 50	114.5	58 26.5	78 50	113.3	59 35.9	76 51	111.5	60 43.6	74 52	109.5
8	57 09.5	79 50	113.3	57 56.3	78 51	112.1	59 05.3	76 51	110.3	60 12.6	74 52	108.3
9	56 39.4	78 51	112.1	57 26.0	77 51	111.0	58 34.6	75 52	109.2	59 41.5	73 52	107.2
40	56 09.0	78 51	111.0	56 55.3	77 51	109.8	58 03.6	75 52	108.0	59 10.2	73 52	106.1
1	55 38.4	77 51	109.9	56 24.5	76 52	108.7	57 32.4	75 52	106.9	58 38.7	73 53	105.0
2	55 07.5	77 52	108.8	55 53.4	76 52	107.6	57 01.1	74 53	105.9	58 07.1	72 53	104.0
3	54 36.5	77 52	107.7	55 22.2	76 52	106.6	56 29.6	74 53	104.8	57 35.3	72 53	102.9
4	54 05.3	76 52	106.6	54 50.8	75 53	105.5	55 57.9	74 53	103.8	57 03.4	72 53	101.9
45	53 33.9	76 53	105.6	54 19.2	75 53	104.5	55 26.1	73 53	102.7	56 31.4	72 54	100.9
6	53 02.3	76 53	104.6	53 47.5	75 53	103.5	54 54.2	73 53	101.7	55 59.2	71 54	99.9
7	52 30.6	76 53	103.6	53 15.7	75 53	102.5	54 22.1	73 54	100.7	55 27.0	71 54	98.9
8	51 58.8	75 53	102.6	52 43.7	74 53	101.5	53 49.9	73 54	99.8	54 54.7	71 54	98.0
9	51 26.8	75 53	101.6	52 11.6	74 54	100.5	53 17.7	73 54	98.8	54 22.3	71 54	97.0
50	50 54.8	75 54	100.6	51 39.5	74 54	99.5	52 45.4	72 54	97.9	53 49.8	71 54	96.1
1	50 22.6	75 54	99.6	51 07.2	74 54	98.6	52 13.0	72 54	96.9	53 17.3	71 54	95.2
2	49 50.3	75 54	98.7	50 34.8	74 54	97.7	51 40.5	72 54	96.0	52 44.7	71 54	94.3
3	49 18.0	75 54	97.8	50 02.4	74 54	96.7	51 08.0	72 54	95.1	52 12.1	70 54	93.4
4	48 45.6	74 54	96.9	49 29.9	73 54	95.8	50 35.4	72 54	94.2	51 39.5	70 54	92.5
55	48 13.1	74 54	95.9	48 57.4	73 54	94.9	50 02.8	72 54	93.3	51 06.8	70 54	91.7
6	47 40.6	74 54	95.1	48 24.8	73 54	94.0	49 30.2	72 54	92.5	50 34.2	70 54	90.8
7	47 08.0	74 54	94.2	47 52.2	73 54	93.2	48 57.5	72 54	91.6	50 01.5	70 54	90.0
8	46 35.4	74 54	93.3	47 19.6	73 54	92.3	48 24.8	72 54	90.8	49 28.8	70 54	89.2
9	46 02.8	74 54	92.4	46 46.9	73 54	91.4	47 52.1	72 54	89.9	48 56.1	70 54	88.3
60	45 30.1	74 54	91.6	46 14.2	73 54	90.6	47 19.5	72 54	89.1	48 23.5	70 54	87.5
1	44 57.4	74 54	90.7	45 41.5	73 54	89.7	46 46.8	72 54	88.3	47 50.8	70 54	86.7
2	44 24.7	74 54	89.9	45 08.9	73 54	88.9	46 14.1	72 54	87.4	47 18.2	71 54	85.9
3	43 52.1	74 54	89.0	44 36.2	73 54	88.1	45 41.5	72 54	86.6	46 45.6	71 54	85.1
4	43 19.4	74 54	88.2	44 03.6	73 54	87.3	45 08.9	72 54	85.8	46 13.1	71 54	84.3
65	42 46.7	74 54	87.4	43 30.9	73 54	86.5	44 36.3	72 54	85.0	45 40.6	71 54	83.5
6	42 14.1	74 54	86.6	42 58.3	73 54	85.7	44 03.8	72 54	84.2	45 08.2	71 54	82.8
7	41 41.5	74 54	85.8	42 25.8	73 54	84.9	43 31.3	72 54	83.5	44 35.8	71 54	82.0
8	41 08.9	74 54	85.0	41 53.2	73 54	84.1	42 58.9	72 54	82.7	44 03.4	71 54	81.2
9	40 36.4	74 54	84.2	41 20.8	74 54	83.3	42 26.5	72 54	81.9	43 31.2	71 54	80.5
70	40 03.9	74 54	83.4	40 48.3	74 54	82.5	41 54.2	73 54	81.1	42 59.0	71 54	79.7
1	39 31.5	74 54	82.6	40 16.0	74 54	81.7	41 21.9	73 54	80.4	42 26.9	72 53	79.0
2	38 59.1	75 54	81.8	39 43.6	74 54	81.0	40 49.7	73 54	79.6	41 54.8	72 53	78.2
3	38 26.8	75 54	81.1	39 11.4	74 54	80.2	40 17.6	73 53	78.9	41 22.9	72 53	77.5
4	37 54.5	75 54	80.3	38 39.2	74 53	79.4	39 45.6	73 53	78.1	40 51.0	72 53	76.8
75	37 22.4	75 53	79.5	38 07.2	74 53	78.7	39 13.7	73 53	77.4	40 19.3	72 53	76.0
6	36 50.3	75 53	78.8	37 35.2	75 53	77.9	38 41.8	74 53	76.6	39 47.6	73 53	75.3
7	36 18.3	75 53	78.0	37 03.3	75 53	77.2	38 10.1	74 53	75.9	39 16.0	73 52	74.6
8	35 46.4	75 53	77.2	36 31.4	75 53	76.4	37 38.4	74 53	75.2	38 44.6	73 52	73.9
9	35 14.5	76 53	76.5	35 59.7	75 53	75.7	37 06.9	74 52	74.4	38 13.3	73 52	73.2
80	34 42.8	76 53	75.8	35 28.1	75 52	75.0	36 35.5	74 52	73.7	37 42.0	74 52	72.5
1	34 11.2	76 53	75.0	34 56.6	75 52	74.2	36 04.2	75 52	73.0	37 10.9	74 52	71.7
2	33 39.7	76 52	74.3	34 25.2	76 52	73.5	35 33.0	75 52	72.3	36 40.0	74 51	71.0
3	33 08.3	76 52	73.5	33 54.0	76 52	72.7	35 01.9	75 52	71.6	36 09.1	74 51	70.3
4	32 37.0	77 52	72.8	33 22.8	76 52	72.0	34 31.0	75 51	70.8	35 38.4	75 51	69.6
85	32 05.8	77 52	72.1	32 51.8	76 51	71.3	34 00.2	76 51	70.1	35 07.9	75 51	68.9
6	31 34.8	77 51	71.3	32 20.9	77 51	70.6	33 29.5	76 51	69.4	34 37.4	75 50	68.2
7	31 03.9	77 51	70.6	31 50.2	77 51	69.8	32 59.0	76 51	68.7	34 07.2	75 50	67.5
8	30 33.2	77 51	69.9	31 19.6	77 51	69.1	32 28.6	76 50	68.0	33 37.1	76 50	66.8
9	30 02.6	78 51	69.1	30 49.1	77 51	68.4	31 58.4	77 50	67.3	33 07.1	76 50	66.1
90	29 32.1	78 51	68.4	30 18.8	78 50	67.7	31 28.3	77 50	66.6	32 37.3	76 49	65.4

H.A.	42° 00′ Alt.	Δd Δt	Az.	42° 30′ Alt.	Δd Δt	Az.	43° 00′ Alt.	Δd Δt	Az.	45° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	75 00.0	1.0 01	180.0	75 30.0	1.0 01	180.0	76 00.0	1.0 01	180.0	78 00.0	1.0 02	180.0
1	74 59.2	1.0 04	177.1	75 29.2	1.0 04	177.1	75 59.1	1.0 04	177.0	77 59.0	1.0 05	176.6
2	74 56.7	1.0 07	174.3	75 26.6	1.0 07	174.1	75 56.6	1.0 07	174.0	77 56.1	1.0 08	173.2
3	74 52.7	99 09	171.4	75 22.5	99 10	171.2	75 52.3	99 10	171.0	77 51.3	99 11	169.9
4	74 47.0	99 12	168.6	75 16.7	99 12	168.3	75 46.3	99 13	168.0	77 44.6	98 14	166.6
05	74 39.8	98 15	165.8	75 09.3	98 15	165.5	75 38.7	98 15	165.1	77 36.2	98 17	163.3
6	74 31.0	98 17	163.1	75 00.3	98 17	162.7	75 29.5	97 18	162.2	77 25.9	97 20	160.1
7	74 20.8	97 19	160.4	74 49.8	97 20	159.9	75 18.8	97 20	159.4	77 14.0	95 23	157.0
8	74 09.1	96 22	157.7	74 37.9	96 22	157.2	75 06.6	96 23	156.7	77 00.4	94 25	154.0
9	73 56.0	95 24	155.2	74 24.5	95 24	154.6	74 52.9	95 25	154.0	76 45.4	93 27	151.1
10	73 41.7	94 26	152.6	74 09.8	94 27	152.0	74 37.9	93 27	151.4	76 28.9	91 30	148.3
1	73 26.0	93 28	150.2	73 53.9	93 29	149.5	74 21.6	92 29	148.8	76 11.1	90 32	145.6
2	73 09.2	92 30	147.8	73 36.7	92 31	147.1	74 04.1	91 31	146.4	75 52.0	89 34	143.0
3	72 51.2	91 32	145.5	73 18.4	90 32	144.7	73 45.5	90 33	144.0	75 31.8	87 36	140.5
4	72 32.1	90 33	143.2	72 59.0	89 34	142.4	73 25.7	89 35	141.7	75 10.4	86 37	138.0
15	72 12.1	89 35	141.0	72 38.6	88 36	140.2	73 04.9	87 36	139.4	74 48.1	84 39	135.7
6	71 51.0	88 37	138.9	72 17.2	87 37	138.1	72 43.2	86 38	137.3	74 24.8	83 40	133.5
7	71 29.1	87 38	136.8	71 55.0	86 38	136.0	72 20.6	85 39	135.2	74 00.7	82 42	131.4
8	71 06.3	85 39	134.8	71 31.9	85 40	134.0	71 57.2	84 40	133.2	73 35.8	80 43	129.3
9	70 42.8	84 40	132.9	71 08.0	84 41	132.1	71 32.9	83 42	131.2	73 10.2	79 44	127.3
20	70 18.5	83 42	131.0	70 43.4	83 42	130.2	71 08.0	82 43	129.3	72 43.9	78 45	125.4
1	69 53.5	82 43	129.2	70 18.1	82 43	128.4	70 42.4	81 44	127.5	72 16.9	77 46	123.6
2	69 27.9	81 44	127.5	69 52.1	81 44	126.6	70 16.2	80 45	125.8	71 49.5	76 47	121.9
3	69 01.6	80 45	125.8	69 25.6	80 45	124.9	69 49.4	79 46	124.1	71 21.5	75 47	120.2
4	68 34.8	80 46	124.1	68 58.6	79 46	123.3	69 22.0	78 46	122.4	70 53.0	74 48	118.6
25	68 07.5	79 46	122.5	68 31.0	78 47	121.7	68 54.2	77 47	120.8	70 24.1	73 49	117.0
6	67 39.8	78 47	121.0	68 03.0	77 47	120.2	68 25.9	76 48	119.3	69 54.8	72 49	115.5
7	67 11.5	77 48	119.5	67 34.5	76 48	118.7	67 57.2	75 48	117.8	69 25.1	71 50	114.1
8	66 42.9	76 48	118.0	67 05.6	75 49	117.2	67 28.1	74 49	116.4	68 55.1	70 50	112.6
9	66 13.9	76 49	116.6	66 36.4	75 49	115.8	66 58.7	74 50	115.0	68 24.8	70 51	111.3
30	65 44.5	75 50	115.3	66 06.8	74 50	114.4	66 28.9	73 50	113.6	67 54.2	69 51	110.0
1	65 14.8	74 50	113.9	65 36.9	73 50	113.1	65 58.8	72 51	112.3	67 23.4	68 52	108.7
2	64 44.7	74 51	112.6	65 06.7	73 51	111.8	65 28.4	72 51	111.0	66 52.3	68 52	107.5
3	64 14.4	73 51	111.4	64 36.2	72 51	110.6	64 57.8	71 51	109.7	66 21.0	67 52	106.2
4	63 43.9	73 51	110.1	64 05.5	72 52	109.3	64 26.9	71 52	108.5	65 49.6	67 53	105.1
35	63 13.1	72 52	108.9	63 34.6	71 52	108.1	63 55.8	70 52	107.3	65 17.9	66 53	103.9
6	62 42.1	72 52	107.7	63 03.4	71 52	107.0	63 24.5	70 52	106.2	64 46.1	66 53	102.8
7	62 10.8	71 52	106.6	62 32.1	70 53	105.8	62 53.1	69 53	105.1	64 14.2	66 53	101.7
8	61 39.4	71 53	105.5	62 00.6	70 53	104.7	62 21.4	69 53	104.0	63 42.2	65 54	100.7
9	61 07.9	70 53	104.4	61 28.9	70 53	103.6	61 49.6	69 53	102.9	63 10.0	65 54	99.7
40	60 36.1	70 53	103.3	60 57.0	69 53	102.6	61 17.7	68 53	101.8	62 37.7	65 54	98.7
1	60 04.3	70 53	102.3	60 25.1	69 53	101.5	60 45.7	68 54	100.8	62 05.4	65 54	97.7
2	59 32.3	70 54	101.2	59 53.0	69 54	100.5	60 13.5	68 54	99.8	61 33.0	64 54	96.7
3	59 00.2	69 54	100.2	59 20.8	68 54	99.5	59 41.3	68 54	98.8	61 00.5	64 54	95.8
4	58 28.0	69 54	99.2	58 48.6	68 54	98.5	59 08.9	68 54	97.8	60 27.9	64 54	94.8
45	57 55.7	69 54	98.3	58 16.2	68 54	97.6	58 36.5	67 54	96.9	59 55.4	64 54	93.9
6	57 23.3	69 54	97.3	57 43.8	68 54	96.6	58 04.0	67 54	95.9	59 22.7	64 54	93.0
7	56 50.8	69 54	96.4	57 11.3	68 54	95.7	57 31.5	67 54	95.0	58 50.1	64 54	92.1
8	56 18.3	68 54	95.4	56 38.7	68 54	94.8	56 58.9	67 54	94.1	58 17.4	64 54	91.3
9	55 45.8	68 54	94.5	56 06.2	68 54	93.9	56 26.3	67 54	93.2	57 44.8	64 54	90.4
50	55 13.2	68 54	93.6	55 33.5	68 54	93.0	55 53.7	67 54	92.3	57 12.1	64 54	89.6
1	54 40.6	68 54	92.8	55 00.9	67 54	92.1	55 21.0	67 54	91.5	56 39.4	64 54	88.8
2	54 07.9	68 54	91.9	54 28.2	67 54	91.3	54 48.4	67 54	90.6	56 06.7	64 54	87.9
3	53 35.2	68 54	91.0	53 55.6	67 54	90.4	54 15.7	67 54	89.8	55 34.1	64 54	87.1
4	53 02.6	68 54	90.2	53 22.9	67 54	89.6	53 43.0	67 54	88.9	55 01.5	64 54	86.3
55	52 29.9	68 54	89.3	52 50.2	67 54	88.7	53 10.3	67 54	88.1	54 28.9	64 54	85.6
6	51 57.2	68 54	88.5	52 17.5	67 54	87.9	52 37.7	67 54	87.3	53 56.3	64 54	84.8
7	51 24.6	68 54	87.7	51 44.9	68 54	87.1	52 05.1	67 54	86.5	53 23.8	64 54	84.0
8	50 51.9	68 54	86.9	51 12.3	68 54	86.3	51 32.4	67 54	85.7	52 51.3	64 54	83.3
9	50 19.3	68 54	86.1	50 39.7	68 54	85.5	50 59.9	67 54	84.9	52 18.9	65 54	82.5
60	49 46.7	68 54	85.3	50 07.1	68 54	84.7	50 27.3	67 54	84.2	51 46.5	65 54	81.8
1	49 14.2	68 54	84.5	49 34.6	68 54	84.0	49 54.9	67 54	83.4	51 14.2	65 54	81.0
2	48 41.6	69 54	83.8	49 02.1	68 54	83.2	49 22.4	67 54	82.6	50 42.0	65 54	80.3
3	48 09.2	69 54	83.0	48 29.7	68 54	82.4	48 50.0	68 54	81.9	50 09.8	65 54	79.6
4	47 36.8	69 54	82.2	47 57.3	68 54	81.7	48 17.7	68 54	81.1	49 37.7	65 53	78.9
65	47 04.4	69 54	81.5	47 25.0	68 54	80.9	47 45.5	68 54	80.4	49 05.7	66 53	78.1
6	46 32.2	69 54	80.7	46 52.8	69 54	80.2	47 13.3	68 54	79.7	48 33.7	66 53	77.4
7	45 59.9	69 54	80.0	46 20.6	69 53	79.5	46 41.2	68 53	78.9	48 01.9	66 53	76.7
8	45 27.8	69 53	79.2	45 48.5	69 53	78.7	46 09.2	68 53	78.2	47 30.1	66 53	76.0
9	44 55.7	70 53	78.5	45 16.5	69 53	78.0	45 37.2	69 53	77.5	46 58.4	67 53	75.3
70	44 23.7	70 53	77.8	44 44.6	69 53	77.3	45 05.4	69 53	76.8	46 26.9	67 52	74.7
1	43 51.9	70 53	77.1	44 12.8	70 53	76.6	44 33.6	69 53	76.1	45 55.4	67 52	74.0
2	43 20.1	70 53	76.3	43 41.1	70 53	75.8	44 01.9	69 53	75.3	45 24.1	68 52	73.3
3	42 48.4	70 53	75.6	43 09.4	70 53	75.1	43 30.4	70 52	74.6	44 52.8	68 52	72.6
4	42 16.7	71 52	74.9	42 37.9	70 52	74.4	42 58.9	70 52	73.9	44 21.7	68 52	71.9
75	41 45.3	71 52	74.2	42 06.5	71 52	73.7	42 27.6	70 52	73.2	43 50.7	68 51	71.3
6	41 13.9	71 52	73.5	41 35.2	71 52	73.0	41 56.3	70 52	72.6	43 19.8	69 51	70.6
7	40 42.6	71 52	72.8	41 04.0	71 52	72.3	41 25.2	71 52	71.9	42 49.0	69 51	69.9
8	40 11.4	72 52	72.1	40 32.9	71 52	71.6	40 54.2	71 51	71.2	42 18.4	69 51	69.3
9	39 40.4	72 52	71.4	40 01.9	72 51	70.9	40 23.3	71 51	70.5	41 47.9	70 51	68.6
80	39 09.5	72 51	70.7	39 31.1	72 51	70.3	39 52.6	72 51	69.8	41 17.6	70 50	67.9
1	38 38.7	73 51	70.0	39 00.4	72 51	69.6	39 22.0	72 51	69.1	40 47.3	70 50	67.3
2	38 08.1	73 51	69.3	38 29.9	72 51	68.9	38 51.5	72 51	68.4	40 17.3	71 50	66.6
3	37 37.6	73 51	68.6	37 59.4	73 50	68.2	38 21.2	72 50	67.8	39 47.3	71 50	66.0
4	37 07.2	73 50	68.0	37 29.2	73 50	67.5	37 51.1	73 50	67.1	39 17.6	71 49	65.3
85	36 37.0	74 50	67.3	36 59.1	73 50	66.8	37 21.0	73 50	66.4	38 48.0	72 49	64.7
6	36 06.9	74 50	66.6	36 29.1	74 50	66.2	36 51.2	73 50	65.7	38 18.5	72 49	64.0
7	35 37.0	74 50	65.9	35 59.3	74 49	65.5	36 21.4	74 49	65.1	37 49.2	73 49	63.4
8	35 07.3	75 49	65.2	35 29.6	74 49	64.8	35 51.9	74 49	64.4	37 20.1	73 48	62.7
9	34 37.7	75 49	64.6	35 00.1	75 49	64.1	35 22.5	74 49	63.7	36 51.1	73 48	62.1
90	34 08.2	75 49	63.9	34 30.8	75 49	63.5	34 53.3	75 48	63.1	36 22.3	74 48	61.4

Digitized by Google

16—15006

Lat. 57°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	29 01.8	78 50	67.7	29 48.6	78 50	67.0	30 58.4	77 50	65.9	32 07.7	77 49	64.7	33 39.0	76 48	63.2	34 01.6	75 48	62.8	34 24.2	75 48	62.4	35 53.7	74 47	60.8	91
2	28 31.7	78 50	67.0	29 18.6	78 50	66.3	30 28.7	78 49	65.2	31 38.2	77 49	64.1	33 09.9	76 48	62.5	33 32.7	76 48	62.1	33 55.3	75 48	61.7	35 25.3	74 47	60.1	2
3	28 01.7	79 50	66.2	28 48.8	78 49	65.5	29 59.1	78 49	64.5	31 08.9	77 49	63.4	32 41.0	76 48	61.9	33 03.9	76 48	61.5	33 26.7	76 48	61.1	34 57.1	75 47	59.5	3
4	27 31.8	79 49	65.5	28 19.1	79 49	64.8	29 29.7	78 49	63.8	30 39.8	78 48	62.7	32 12.3	77 48	61.2	32 35.3	76 47	60.8	32 58.1	76 47	60.4	34 29.0	75 46	58.8	4
95	27 02.2	79 49	64.8	27 49.7	79 49	64.1	29 00.5	78 48	63.1	30 10.8	78 48	62.0	31 43.7	77 47	60.5	32 06.8	77 47	60.1	32 29.8	77 47	59.7	34 01.1	76 46	58.2	95
6	26 32.7	80 49	64.1	27 20.4	79 49	63.4	28 31.5	79 48	62.4	29 42.1	78 48	61.3	31 15.4	77 47	59.8	31 38.6	77 47	59.5	32 01.7	77 47	59.1	33 33.5	76 46	57.6	6
7	26 03.4	80 49	63.4	26 51.2	80 48	62.7	28 02.6	79 48	61.7	29 13.5	79 47	60.6	30 47.2	78 47	59.2	31 10.5	78 46	58.8	31 33.8	77 46	58.4	33 06.0	76 45	56.9	7
8	25 34.3	80 48	62.6	26 22.3	80 48	62.0	27 33.9	79 47	61.0	28 45.1	79 47	59.9	30 19.3	78 46	58.5	30 42.7	78 46	58.1	31 06.0	78 46	57.8	32 38.7	77 45	56.3	8
9	25 05.4	80 48	61.9	25 53.5	80 48	61.3	27 05.5	80 47	60.3	28 17.0	79 47	59.2	29 51.5	78 46	57.8	30 15.0	78 46	57.5	30 38.5	78 46	57.1	32 11.6	77 45	55.6	9
100	24 36.6	81 48	61.2	25 25.0	80 47	60.5	26 37.2	80 47	59.6	27 49.0	80 46	58.5	29 24.0	79 46	57.1	29 47.6	79 45	56.8	30 11.1	78 45	56.4	31 44.8	78 44	55.0	100
1	24 08.1	81 47	60.5	24 56.6	81 47	59.8	26 09.1	80 46	58.9	27 21.2	80 46	57.8	28 56.6	79 45	56.5	29 20.3	79 45	56.1	29 44.0	79 45	55.8	31 18.1	78 44	54.3	1
2	23 39.7	81 47	59.8	24 28.5	81 47	59.1	25 41.3	81 46	58.2	26 53.6	80 46	57.2	28 29.5	80 45	55.8	28 53.3	79 45	55.5	29 17.1	79 44	55.1	30 51.7	78 44	53.7	2
3	23 11.6	82 47	59.0	24 00.5	81 46	58.4	25 13.6	81 46	57.5	26 26.3	81 45	56.5	28 02.6	80 44	55.1	28 26.5	80 44	54.8	28 50.4	80 44	54.4	30 25.4	79 43	53.0	3
4	22 43.7	82 46	58.3	23 32.8	82 46	57.7	24 46.2	81 45	56.8	25 59.2	81 45	55.8	27 35.9	80 44	54.5	27 59.9	80 44	54.1	28 23.9	80 44	53.8	29 59.4	79 43	52.4	4
105	22 16.0	82 46	57.6	23 05.3	82 45	57.0	24 18.9	82 45	56.1	25 32.3	81 44	55.1	27 09.4	81 44	53.8	27 33.6	80 44	53.4	27 57.7	80 43	53.1	29 33.7	80 43	51.7	105
6	21 48.5	83 45	56.9	22 38.0	82 45	56.3	23 52.0	82 45	55.3	25 05.6	82 44	54.4	26 43.1	81 43	53.1	27 07.4	81 43	52.8	27 31.7	81 43	52.4	29 08.1	80 42	51.1	6
7	21 21.3	83 45	56.2	22 10.9	83 45	55.6	23 25.2	82 44	54.6	24 39.1	82 44	53.7	26 17.1	81 43	52.4	26 41.5	81 43	52.1	27 05.9	81 43	51.8	28 42.8	80 42	50.4	7
8	20 54.2	83 45	55.5	21 44.1	83 44	54.9	22 58.7	83 44	53.9	24 12.9	82 43	53.0	25 51.3	82 43	51.8	26 15.9	82 42	51.4	26 40.3	81 42	51.1	28 17.7	81 41	49.8	8
9	20 27.4	84 44	54.7	21 17.5	83 44	54.1	22 32.4	83 43	53.2	23 46.9	83 43	52.3	25 25.8	82 42	51.1	25 50.4	82 42	50.8	26 15.0	82 42	50.4	27 52.9	81 41	49.1	9
110	20 00.9	84 44	54.0	20 51.1	84 44	53.4	22 06.3	83 43	52.5	23 21.2	83 42	51.6	25 00.5	83 42	50.4	25 25.2	82 42	50.1	25 49.9	82 41	49.8	27 28.3	82 41	48.5	110
1	19 34.5	84 43	53.3	20 25.0	84 43	52.7	21 40.5	84 43	51.8	22 55.7	83 42	50.9	24 35.4	83 41	49.7	25 00.3	83 41	49.4	25 25.1	83 41	49.1	27 04.0	82 40	47.8	1
2	19 08.5	85 43	52.6	19 59.1	84 43	52.0	21 14.9	84 42	51.1	22 30.4	84 42	50.2	24 10.6	83 41	49.1	24 35.6	83 41	48.7	25 00.5	83 41	48.4	26 39.9	83 40	47.2	2
3	18 42.7	85 43	51.8	19 33.5	85 42	51.3	20 49.6	84 42	50.4	22 05.4	84 41	49.6	23 46.1	84 40	48.4	24 11.2	84 40	48.1	24 36.2	83 40	47.8	26 16.0	83 39	46.5	3
4	18 17.1	85 42	51.1	19 08.1	85 42	50.6	20 24.5	85 41	49.7	21 40.7	84 41	48.9	23 21.8	84 40	47.7	23 47.0	84 40	47.4	24 12.1	84 40	47.1	25 52.4	83 39	45.9	4
115	17 51.8	86 42	50.4	18 43.0	85 41	49.8	19 59.7	85 41	49.0	21 16.2	85 40	48.2	22 57.7	84 40	47.0	23 23.1	84 39	46.7	23 48.3	84 39	46.4	25 29.1	84 38	45.2	115
6	17 26.7	86 41	49.7	18 18.2	86 41	49.1	19 35.2	85 40	48.3	20 52.0	85 40	47.5	22 34.0	85 39	46.3	22 59.4	85 39	46.0	23 24.8	85 39	45.8	25 06.0	84 38	44.6	6
7	17 02.0	86 41	48.9	17 53.6	86 40	48.4	19 10.9	86 40	47.6	20 28.0	86 39	46.8	22 10.5	85 39	45.6	22 36.0	85 39	45.4	23 01.5	85 38	45.1	24 43.2	85 38	43.9	7
8	16 37.5	86 40	48.2	17 29.3	86 40	47.7	18 47.0	86 40	46.9	20 04.4	86 39	46.1	21 47.2	86 38	45.0	22 12.9	85 38	44.7	22 38.5	85 38	44.4	24 20.7	85 37	43.3	8
9	16 13.3	87 40	47.5	17 05.3	87 40	47.0	18 23.2	86 39	46.2	19 41.0	86 39	45.4	21 24.3	86 38	44.3	21 50.1	86 38	44.0	22 15.8	86 37	43.7	23 58.4	85 37	42.6	9
120	15 49.3	87 39	46.7	16 41.6	87 39	46.2	17 59.8	87 39	45.4	19 17.9	87 38	44.7	21 01.6	86 37	43.6	21 27.5	86 37	43.3	21 53.3	86 37	43.0	23 36.5	86 36	41.9	120
1	15 25.7	87 39	46.0	16 18.1	87 39	45.5	17 36.7	87 38	44.7	18 55.0	87 38	44.0	20 39.2	87 37	42.9	21 05.2	87 37	42.6	21 31.2	86 36	42.4	23 14.8	86 36	41.3	1
2	15 02.3	88 38	45.3	15 55.0	88 38	44.8	17 13.8	88 38	44.0	18 32.5	87 37	43.3	20 17.1	87 36	42.2	20 43.2	87 36	41.9	21 09.3	87 36	41.7	22 53.3	87 35	40.6	2
3	14 39.2	88 38	44.5	15 32.1	88 38	44.0	16 51.3	88 37	43.3	18 10.3	88 37	42.5	19 55.3	87 36	41.5	20 21.5	87 36	41.3	20 47.7	87 35	41.0	22 32.2	87 35	39.9	3
4	14 16.5	88 37	43.8	15 09.5	88 37	43.3	16 29.0	88 37	42.6	17 48.3	88 36	41.8	19 33.8	88 35	40.8	20 00.1	88 35	40.6	20 26.4	88 35	40.3	22 11.4	87 34	39.3	4
125	13 54.0	89 37	43.1	14 47.3	89 37	42.6	16 07.0	89 36	41.9	17 26.7	88 36	41.1	19 12.6	88 35	40.1	19 39.0	88 35	39.9	20 05.4	88 34	39.6	21 50.8	88 34	38.6	125
6	13 31.8	89 36	42.3	14 25.3	89 36	41.8	15 45.4	89 36	41.1	17 05.3	89 35	40.4	18 51.7	88 34	39.4	19 18.2	88 34	39.2	19 44.7	88 34	39.0	21 30.6	88 33	37.9	6
7	13 10.0	89 36	41.6	14 03.7	89 36	41.1	15 24.0	89 35	40.4	16 44.3	89 35	39.7	18 31.1	89 34	38.7	18 57.7	89 34	38.5	19 24.3	89 33	38.3	21 10.7	88 33	37.3	7
8	12 48.5	90 35	40.8	13 42.3	90 35	40.4	15 03.0	90 35	39.7	16 23.6	89 34	39.0	18 10.8	89 33	38.1	18 37.5	89 33	37.8	19 04.3	89 33	37.6	20 51.0	89 32	36.6	8
9	12 27.3	90 35	40.1	13 21.3	90 34	39.6	14 42.3	90 34	39.0	16 03.2	90 33	38.3	17 50.8	90 33	37.4	18 17.6	90 33	37.1	18 44.5	89 32	36.9	20 31.7	89 32	35.9	9
130	12 06.4	90 34	39.3	13 00.6	90 34	38.9	14 21.9	90 33	38.2	15 43.1	90 33	37.6	17 31.1	90 32	36.7	17 58.1	90 32	36.4	18 25.0	90 32	36.2	20 12.7	90 31	35.3	130
1	11 45.9	91 34	38.6	12 40.3	91 33	38.2	14 01.9	91 33	37.5	15 23.3	90 32	36.8	17 11.8	90 32	36.0	17 38.8	90 32	35.7	18 05.9	90 31	35.5	19 54.0	90 31	34.6	1
2	11 25.6	91 33	37.8	12 20.3	91 33	37.4	13 42.1	91 32	36.8	15 03.9	91 32	36.1	16 52.7	91 31	35.2	17 19.9	91 31	35.0	17 47.1	91 31	34.8	19 35.6	90 30	33.9	2
3	11 05.8	91 33	37.1	12 00.6	91 32	36.7	13 22.7	91 32	36.0	14 44.8	91 31	35.4	16 34.0	91 31	34.5	17 01.3	91 30	34.3	17 28.6	91 30	34.1	19 17.5	91 30	33.2	3
4	10 46.2	92 32	36.3	11 41.2	92 32	35.9	13 03.7	92 31	35.3	14 26.0	91 31	34.7	16 15.7	91 30	33.8	16 43.1	91 30	33.6	17 10.4	91 30	33.4	18 59.8	91 29	32.5	4
135	10 27.0	92 31	35.6	11 22.2	92 31	35.2	12 45.0	92 31	34.6	14 07.6	92 30	34.0	15 57.7	92 29	33.1	16 25.1	92 29	32.9	16 52.6	92 29	32.7	18 42.4	91 28	31.9	135
6	10 08.2	92 31	34.8	11 03.6	92 30	34.4	12 26.6	92 30	33.8	13 49.5	92 30	33.2	15 40.0	92 29	32.4	16 07.5	92 29	32.2	16 35.1	92 29	32.0	18 25.3	92 28	31.2	6
7	9 49.7	93 30	34.1	10 45.3	93 30	33.7	12 08.6	93 29	33.1	13 31.8	92 29	32.5	15 22.6	92 28	31.7	15 50.3	92 28	31.5	16 18.0	92 28	31.3	18 08.5	92 27	30.5	7
8	9 31.6	93 30	33.3	10 27.4	93 29	32.9	11 50.9	93 29	32.3	13 14.4	93 28	31.8	15 05.6	93 28	31.0	15 33.4	93 28	30.8	16 01.2	93 27	30.6	17 52.1	92 27	29.8	8
9	9 13.9	93 29	32.5	10 09.8	93 29	32.2	11 33.6	93 28	31.6	12 57.4	93 28	31.0	14 49.0	93 27	30.3	15 16.8	93 27	30.1	15 44.7	93 27	29.9	17 36.0	93 26	29.1	9
140	8 56.5	94 28	31.8	9 52.6	93 28	31.4	11 16.7	93 28	30.9	12 40.7	93 27	30.3	14 32.7	93 27	29.6	15 00.6	93 26	29.4	15 28.6	93 26	29.2	17 20.3	93 26	28.4	140
1	8 39.5	94 28	31.0	9 35.7	94 27	30.6	11 00.1	94 27	30.1	12 24.4	94 27	29.6	14 16.7	94 26	28.9	14 44.8	94 26	28.7	15 12.8	93 26	28.5	17 04.9	93 25	27.7	1
2	8 22.8	94 27	30.2	9 19.3	94 27	29.9	10 43.9	94 26	29.4	12 08.4	94 26	28.8	14 01.1	94 25	28.1	14 29.3	94 25	28.0	14 57.4	94 25	27.8	16 49.9	94 24	27.1	2
3	8 06.6	94 26	29.5	9 03.2	94 26	29.1	10 28.0	94 26	28.6	11 52.9	94 25	28.1	13 45.9	94 25	27.4	14 14.1	94 25	27.2	14 42.3	94 24	27.1	16 35.2	94 24	26.4	3
4	7 50.7	95 26	28.7	8 47.5	95 26	28.4	10 12.6	95 25	27.9	11 37.7	95 25	27.4	13 31.0	94 24	26.7	13 59.3	94 24	26.5	14 27.7	94 24	26.4	16 20.9	94 23	25.7	4
145	7 35.2	95 25	27.9	8 32.1	95 25	27.6	9 57.5	95 24	27.1	11 22.8	95 24	26.6	13 16.5	95 24	26.0	13 44.9	95 23	25.8	14 13.3	95 23	25.6	16 06.9	95 23	25.0	145
6	7 20.1	95 24	27.1	8 17.2	95 24	26.8	9 42.8	95 24	26.4	11 08.4	95 23	25.9	13 02.4	95 23	25.2	13 30.9	95 23	25.1	13 59.4	95 23	24.9	15 53.3	95 22	24.3	6
7	7 05.4	95 24	26.4	8 02.6	95 24	26.1	9 28.5	95 23	25.6	10 54.3	95 23	25.1	12 48.6	95 22	24.5	13 17.2	95 22	24.4	13 45.8	95 22	24.2	15 40.0	95 21	23.6	7
8	6 51.1	96 23	25.6	7 48.5	96 23	25.3	9 14.6	96 23	24.8	10 40.6	96 22	24.4	12 35.3	96 22	23.8	13 03.9	96 22	23.6	13 32.6	95 21	23.5	15 27.1	95 21	22.9	8
9	6 37.2	96 22	24.8	7 34.7	96 22	24.5	9 01.0	96 22	24.1	10 27.3	96 22	23.7	12 22.3	96 21	23.1	12 51.0	96 21	22.9	13 19.7	96 21	22.8	15 14.6	96 20	22.2	9
150	6 23.7	96 22	24.0	7 21.3	96 22	23.7	8 47.9	96 21	23.3	10 14.4	96 21	22.9	12 09.7	96 20	22.3	12 38.5	96 20	22.2	13 07.3	96 20	22.1	15 02.5	96 20	21.5	150
1	6 10.6	96 21	23.2	7 08.4	96 21	23.0	8 35.1	96 21	22.6	10 01.9	96 20	22.2	11 57.4	96 20	21.6	12 26.3	96 20	21.5	12 55.2	96 20	21.3	14 50.7	96 19	20.8	1
2	5 57.9	97 20	22.5	6 55.8	97 20	22.2	8 22.8	97 20	21.8	9 49.7	97 20	21.4	11 45.6	97 19	20.9	12 14.6	97 19	20.7	12 43.5	97 19	20.6	14 39.3	96 18	20.1	2
3	5 45.6	97 20	21.7	6 43.7	97 20	21.4	8 10.9	97 19	21.0	9 38.0	97 19	20.7	11 34.1	97 18	20.1	12 03.2	97 18	20.0	12 32.2	97 18	19.9	14 28.2	97 18	19.4	3
4	5 33.7	97 19	20.9	6 32.0	97 19	20.6	7 59.3	97 19	20.3	9 26.7	97 18	19.9	11 23.1	97 18	19.4	11 52.2	97 18	19.3	12 21.3	97 18	19.2	14 17.6	97 17	18.7	4
155	5 22.3	97 18	20.1	6 20.7	97 18	19.9	7 48.2	97 18	19.5	9 15.8	97 18	19.1	11 12.4	97 17	18.7	11 41.6	97 17	18.6	12 10.7	97 17	18.4	14 07.3	97 16	17.9	155
6	5 11.3	97 18	19.3	6 09.8	97 17	19.1	7 37.5	97 17	18.7	9 05.2	97 17	18.4	11 02.2	97 16	17.9	11 31.4	97 16	17.8	12 00.6	97 16	17.7	13 57.5	97 16	17.2	6
7	5 00.7	98 17	18.5	5 59.3	98 17	18.3	7 27.2	98 16	18.0	8 55.1	98 16	17.6	10 52.3	98 16	17.2	11 21.6	98 16	17.1	11 50.9	98 16	17.0	13 48.0	98 15	16.5	7
8				5 49.3	98 16	17.5	7 17.4	98 16	17.2	8 45.4	98 15	16.9	10 42.8	98 15	16.5	11 12.2	98 15	16.4	11 41.5	98 15	16.2	13 38.9	98 14	15.8	8
9				5 39.7	98 15	16.7	7 07.9	98 15	16.4	8 36.2	98 15	16.1	10 33.8	98 14	15.7	11 03.2	98 14	15.6	11 32.6	98 14	15.5	13 30.2	98 14	15.1	9
160				5 30.5	98 15	15.9	6 58.9	98 14	15.6	8 27.3	98 14	15.4	10 25.1	98 14	15.0	10 54.6	98 14	14.9	11 24.0	98 14	14.8	13 21.8	98 13	14.4	160
1				5 21.7	98 14	15.1	6 50.3	98 14	14.9	8 18.8	98 13	14.6	10 16.9	98 13	14.2	10 46.4	98 13	14.1	11 15.9	98 13	14.1	13 13.9	98 13	13.7	1
2				5 13.4	99 13	14.3	6 42.1	99 13	14.1	8 10.8	99 13	13.8	10 09.1	99 12	13.5	10 38.6	99 12	13.4	11 08.2	99 12	13.3	13 06.4	98 12	13.0	2
3				5 05.5	99 13	13.6	6 34.4	99 12	13.3	8 03.2	99 12	13.1	10 01.6	99 12	12.7	10 31.3	99 12	12.7	11 00.9	99 12	12.6	12 59.3	99 11	12.2	3
4							6 27.1	99 11	12.5	7 56.0	99 11	12.3	9 54.6	99 11	12.0	10 24.3	99 11	11.9	10 53.9	99 11	11.8	12 52.5	99 11	11.5	4
165							6 20.2	99 11	11.8	7 49.3	99 11	11.5	9 48.1	99 10	11.3	10 17.7	99 10	11.2	10 47.4	99 10	11.1	12 46.2	99 10	10.8	165
6							6 13.8	99 10	11.0	7 43.0	99 10	10.8	9 41.9	99 10	10.5	10 11.6	99 10	10.4	10 41.3	99 09	10.4	12 40.3	99 09	10.1	6
7							6 07.7	99 09	10.2	7 37.1	99 09	10.0	9 36.1	99 09	09.8	10 05.9	99 09	09.7	10 35.7	99 09	09.6	12 34.7	99 09	09.4	7
8							6 02.2	99 09	09.4	7 31.6	99 08	09.2	9 30.8	99 08	09.0	10 00.6	99 08	09.0	10 30.4	99 08	08.9	12 29.6	99 08	08.7	8
9							5 57.1	99 08	08.6	7 26.6	99 08	08.5	9 25.9	99 07	08.3	9 55.7	99 07	08.2	10 25.6	99 07	08.2	12 24.9	99 07	07.9	9
170							5 52.4	1.0 07	07.9	7 22.0	1.0 07	07.7	9 21.4	1.0 07	07.5	9 51.3	1.0 07	07.5	10 21.1	1.0 07	07.4	12 20.6	1.0 07	07.2	170
1							5 48.1	1.0 06	07.1	7 17.8	1.0 06	06.9	9 17.4	1.0 06	06.8	9 47.2	1.0 06	06.7	10 17.1	1.0 06	06.7	12 16.7	1.0 06	06.5	1
2							5 44.3	1.0 06	06.3	7 14.1	1.0 06	06.2	9 13.7	1.0 05	06.0	9 43.6	1.0 05	06.0	10 13.5	1.0 05	05.9	12 13.2	1.0 05	05.8	2
3							5 41.0	1.0 05	05.5	7 10.8	1.0 05	05.4	9 10.5	1.0 05	05.3	9 40.4	1.0 05	05.2	10 10.4	1.0 05	05.2	12 10.1	1.0 04	05.1	3
4							5 38.1	1.0 04	04.7	7 07.9	1.0 04	04.6	9 07.7	1.0 04	04.5	9 37.7	1.0 04	04.5	10 07.6	1.0 04	04.5	12 07.4	1.0 04	04.3	4
175							5 35.6	1.0 03	03.9	7 05.5	1.0 03	03.9	9 05.4	1.0 03	03.8	9 35.3	1.0 03	03.7	10 05.3	1.0 03	03.7	12 05.2	1.0 03	03.6	175
6							5 33.6	1.0 03	03.1	7 03.5	1.0 03	03.1	9 03.4	1.0 02	03.0	9 33.4	1.0 02	03.0	10 03.4	1.0 02	03.0	12 03.3	1.0 02	02.9	6
7							5 32.0	1.0 02	02.4	7 02.0	1.0 02	02.3	9 01.9	1.0 02	02.3	9 31.9	1.0 02	02.2	10 01.9	1.0 02	02.2	12 01.9	1.0 02	02.2	7
8							5 30.9	1.0 01	01.6	7 00.9	1.0 01	01.5	9 00.9	1.0 01	01.5	9 30.9	1.0 01	01.5	10 00.8	1.0 01	01.5	12 00.8	1.0 01	01.4	8
9							5 30.2	1.0 00	00.8	7 00.2	1.0 00	00.8	9 00.2	1.0 00	00.8	9 30.2	1.0 00	00.7	10 00.2	1.0 00	00.7	12 00.2	1.0 00	00.7	9
180							5 30.0	1.0 00	00.0	7 00.0	1.0 00	00.0	9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0	10 00.0	1.0 00	00.0	12 00.0	1.0 00	00.0	180

Lat. 58°

Lat. 59°

Lat. 57°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	°
00	79 00.0	1.0 02	180.0	80 00.0	1.0 02	180.0	81 30.0	1.0 02	180.0	82 30.0	1.0 02	180.0	83 30.0	1.0 03	180.0	84 30.0	1.0 03	180.0	85 30.0	1.0 04	180.0	87 00.0	1.0 05	180.0	00
1	78 59.0	1.0 05	176.4	79 58.9	1.0 06	176.1	81 28.7	1.0 06	175.5	82 28.6	1.0 07	175.0	83 28.4	1.0 08	174.4	84 28.2	1.0 09	173.5	85 27.8	99 11	172.3	86 56.8	98 15	168.9	1
2	78 55.9	1.0 09	172.7	79 55.5	99 09	172.2	81 24.9	99 10	171.1	82 24.4	99 12	170.1	83 23.6	99 13	168.9	84 22.7	98 15	167.2	85 21.3	97 18	164.8	86 47.6	94 24	158.5	2
3	78 50.7	99 12	169.2	79 50.0	99 13	168.3	81 18.6	98 14	166.7	82 17.4	98 16	165.3	83 15.8	97 18	163.5	84 13.7	96 20	161.1	85 10.8	94 24	157.7	86 33.2	88 31	149.2	3
4	78 43.6	98 15	165.6	79 42.3	98 16	164.6	81 09.9	97 18	162.5	82 07.8	96 20	160.7	83 05.2	95 22	158.4	84 01.6	93 25	155.3	84 56.7	90 29	151.2	86 14.5	81 37	141.3	4
05	78 34.5	97 18	162.2	79 32.6	97 19	160.9	80 59.0	95 22	158.4	81 55.8	94 24	156.2	82 51.8	92 26	153.5	83 46.6	90 29	150.0	84 39.4	86 33	145.3	85 52.6	75 41	134.6	05
6	78 23.6	96 21	158.8	79 21.0	95 22	157.3	80 45.9	93 25	154.4	81 41.6	92 27	152.0	82 36.1	90 30	148.9	83 29.0	87 33	145.0	84 19.6	82 37	139.9	85 28.2	69 44	128.9	6
7	78 11.0	95 24	155.6	79 07.5	94 25	153.9	80 30.8	92 28	150.7	81 25.2	90 30	148.0	82 18.2	87 33	144.6	83 09.2	83 36	140.5	83 57.5	78 40	135.2	85 01.9	64 46	124.2	7
8	77 56.7	93 26	152.4	78 52.2	92 28	150.5	80 13.9	89 31	147.1	81 06.9	87 33	144.2	81 58.3	84 36	140.7	82 47.5	80 39	136.3	83 33.6	74 42	130.9	84 34.3	60 48	120.2	8
9	77 40.8	92 29	149.4	78 35.4	90 31	147.4	79 55.4	87 34	143.7	80 47.0	85 36	140.6	81 33.8	81 38	137.0	82 24.2	76 41	132.6	83 08.2	70 44	127.2	84 05.5	56 49	116.7	9
10	77 23.4	90 31	146.5	78 17.0	88 33	144.3	79 35.3	85 36	140.5	80 25.6	82 38	137.3	81 13.8	78 40	133.6	81 59.4	73 43	129.1	82 41.6	67 46	123.8	83 35.9	53 50	113.7	10
1	77 04.7	89 33	143.6	77 57.3	87 35	141.4	79 13.8	83 38	137.4	80 02.7	80 40	134.2	80 49.5	76 42	130.4	81 33.5	71 45	126.0	82 14.0	64 47	120.7	83 05.7	50 51	111.1	1
2	76 44.7	87 35	141.0	77 36.3	85 37	138.7	78 51.1	81 40	134.6	79 38.7	78 42	131.3	80 24.1	73 44	127.5	81 06.6	68 46	123.1	81 45.5	61 49	118.0	82 35.0	48 52	108.8	2
3	76 23.6	85 37	138.4	77 14.2	83 39	136.0	78 27.3	79 41	131.9	79 13.7	76 43	128.6	79 57.7	71 45	124.8	80 38.8	66 48	120.5	81 16.3	59 50	115.5	82 03.9	46 52	106.7	3
4	76 01.3	84 39	135.9	76 50.9	82 40	133.5	78 02.5	77 43	129.3	78 47.7	74 45	126.0	79 30.5	69 47	122.3	80 10.3	64 49	118.1	80 46.6	57 50	113.3	81 32.4	44 53	104.8	4
15	75 38.1	82 40	133.6	76 26.8	80 42	131.1	77 36.7	75 44	126.9	78 20.9	72 46	123.7	79 02.5	67 48	120.0	79 41.2	62 49	115.8	80 16.3	55 51	111.2	81 00.7	43 53	103.1	15
6	75 14.0	81 42	131.3	76 01.8	78 43	128.9	77 10.2	74 45	124.7	77 53.3	70 47	121.4	78 33.9	65 49	117.8	79 11.5	60 50	113.8	79 45.6	54 52	109.3	80 28.8	42 53	101.6	6
7	74 49.0	79 43	129.2	75 35.9	77 44	126.7	76 43.0	72 46	122.5	77 25.1	68 48	119.3	78 04.8	64 49	115.8	78 41.4	58 51	111.9	79 14.6	52 52	107.5	79 56.7	41 54	100.2	7
8	74 23.3	78 44	127.1	75 09.4	75 45	124.6	76 15.2	71 47	120.5	76 56.4	67 49	117.4	77 35.1	62 50	113.9	78 10.9	57 51	110.1	78 43.3	51 53	105.9	79 24.5	40 54	98.8	8
9	73 56.9	77 45	125.1	74 42.2	74 46	122.7	75 46.7	69 48	118.6	76 27.1	65 50	115.5	77 05.0	61 51	112.1	77 40.0	56 52	108.4	78 11.8	50 53	104.3	78 52.1	40 54	97.6	9
20	73 29.9	75 46	123.2	74 14.4	73 47	120.8	75 17.8	68 49	116.8	75 57.4	64 50	113.7	76 34.6	60 51	110.4	77 08.9	55 52	106.8	77 40.0	49 53	102.9	78 19.7	39 54	96.4	20
1	73 02.3	74 47	121.4	73 46.1	72 48	119.0	74 48.4	67 50	115.0	75 27.3	63 51	112.1	76 03.8	59 52	108.8	76 37.5	54 53	105.3	77 08.1	48 53	101.5	77 47.2	39 54	95.3	1
2	72 34.1	73 48	119.7	73 17.3	70 49	117.3	74 18.6	66 50	113.4	74 56.9	62 51	110.5	75 32.7	58 52	107.3	76 05.9	53 53	103.9	76 36.0	47 54	100.3	77 14.6	38 54	94.3	2
3	72 05.5	72 48	118.0	72 48.0	69 49	115.7	73 48.4	65 51	111.8	74 26.1	61 52	109.0	75 01.4	57 53	105.9	75 34.1	52 53	102.6	76 03.8	47 54	99.0	76 42.0	38 54	93.3	3
4	71 36.5	71 49	116.4	72 18.4	68 50	114.1	73 17.9	64 51	110.3	73 55.1	60 52	107.5	74 29.9	56 53	104.5	75 02.1	51 54	101.3	75 31.4	46 54	97.9	76 09.4	38 54	92.3	4
25	71 07.0	70 50	114.9	71 48.4	68 51	112.6	72 47.1	63 52	108.9	73 23.8	59 52	106.2	73 58.2	55 53	103.2	74 30.0	51 54	100.1	74 59.0	46 54	96.8	75 36.7	38 54	91.4	25
6	70 37.2	69 50	113.4	71 18.1	67 51	111.2	72 16.1	62 52	107.5	72 52.3	59 53	104.8	73 26.3	55 53	102.0	73 57.8	50 54	99.0	74 26.6	46 54	95.7	75 04.1	38 54	90.5	6
7	70 07.0	69 51	112.0	70 47.4	66 51	109.8	71 44.8	61 52	106.2	72 20.6	58 53	103.6	72 54.2	54 54	100.8	73 25.4	50 54	97.8	73 54.0	45 54	94.7	74 31.4	38 54	89.7	7
8	69 36.6	68 51	110.6	70 16.6	65 52	108.4	71 13.3	61 53	104.9	71 48.8	57 53	102.4	72 22.1	54 54	99.6	72 53.0	50 54	96.8	73 21.4	45 54	93.7	73 58.7	38 54	88.9	8
9	69 05.9	67 52	109.3	69 45.4	65 52	107.1	70 41.7	60 53	103.7	71 16.8	57 54	101.2	71 49.8	53 54	98.5	72 20.5	49 54	95.7	72 48.8	45 54	92.8	73 26.0	38 54	88.1	9
30	68 34.9	67 52	108.0	69 14.1	64 53	105.9	70 09.8	60 53	102.5	70 44.7	56 54	100.1	71 17.4	53 54	97.5	71 48.0	49 54	94.8	72 16.1	45 54	91.9	72 53.4	38 54	87.3	30
1	68 03.7	66 52	106.7	68 42.6	63 53	104.7	69 37.8	59 54	101.3	70 12.4	56 54	99.0	70 45.0	53 54	96.4	71 15.4	49 54	93.8	71 43.5	45 54	91.0	72 20.8	38 54	86.6	1
2	67 32.3	66 53	105.5	68 10.9	63 53	103.5	69 05.7	59 54	100.2	69 40.1	56 54	97.9	70 12.5	52 54	95.4	70 42.8	49 54	92.9	71 10.8	45 54	90.2	71 48.1	38 54	85.9	2
3	67 00.8	65 53	104.4	67 39.0	63 53	102.4	68 33.5	58 54	99.2	69 07.7	55 54	96.9	69 40.0	52 54	94.5	70 10.1	49 54	92.0	70 38.1	45 54	89.3	71 15.6	38 54	85.1	3
4	66 29.0	65 53	103.2	67 07.1	62 54	101.3	68 01.2	58 54	98.1	68 35.2	55 54	95.9	69 07.4	52 54	93.5	69 37.5	48 54	91.1	70 05.5	45 54	88.5	70 43.0	39 54	84.4	4
35	65 57.1	64 53	102.1	66 34.9	62 54	100.2	67 28.8	58 54	97.1	68 02.7	55 54	94.9	68 34.7	52 54	92.6	69 04.8	48 54	90.2	69 32.8	45 54	87.7	70 10.5	39 54	83.8	35
6	65 25.1	64 54	101.0	66 02.7	62 54	99.1	66 56.4	58 54	96.1	67 30.1	55 54	94.0	68 02.1	52 54	91.7	68 32.1	48 54	89.4	69 00.1	45 54	87.0	69 38.1	39 54	83.1	6
7	64 53.0	64 54	100.0	65 30.4	61 54	98.1	66 23.9	57 54	95.1	66 57.5	55 54	93.1	67 29.4	52 54	90.9	67 59.5	48 54	88.6	68 27.5	45 54	86.2	69 05.6	40 54	82.4	7
8	64 20.8	63 54	98.9	64 58.0	61 54	97.1	65 51.3	57 54	94.2	66 24.8	55 54	92.2	66 56.7	52 54	90.0	67 26.8	49 54	87.8	67 54.9	45 54	85.5	68 33.3	40 54	81.8	8
9	63 48.4	63 54	97.9	64 25.6	61 54	96.1	65 18.7	57 54	93.3	65 52.2	55 54	91.3	66 24.0	52 54	89.2	66 54.2	49 54	87.0	67 22.4	45 54	84.7	68 00.9	40 54	81.2	9
40	63 16.0	63 54	97.0	63 53.1	61 54	95.2	64 46.0	57 54	92.4	65 19.5	54 54	90.4	65 51.4	52 54	88.4	66 21.5	49 54	86.2	66 49.9	46 54	84.0	67 28.7	41 54	80.5	40
1	62 43.6	63 54	96.0	63 20.5	60 54	94.3	64 13.4	57 54	91.5	64 46.8	54 54	89.6	65 18.7	52 54	87.6	65 48.9	49 54	85.5	66 17.4	46 54	83.3	66 56.5	41 54	79.9	1
2	62 11.0	62 54	95.1	62 47.9	60 54	93.4	63 40.7	57 54	90.7	64 14.2	55 54	88.8	64 46.1	52 54	86.8	65 16.4	49 54	84.8	65 44.9	46 54	82.6	66 24.3	41 53	79.3	2
3	61 38.5	62 54	94.1	62 15.2	60 54	92.5	63 08.0	57 54	89.8	63 41.5	55 54	88.0	64 13.5	52 54	86.0	64 43.9	49 54	84.0	65 12.6	46 54	82.0	65 52.3	42 53	78.7	3
4	61 05.8	62 54	93.2	61 42.6	60 54	91.6	62 35.4	57 54	89.0	63 08.8	55 54	87.2	63 40.9	52 54	85.3	64 11.4	49 54	83.3	64 40.2	47 54	81.3	65 20.2	42 53	78.1	4
45	60 33.2	62 54	92.4	61 09.9	60 54	90.7	62 02.7	57 54	88.2	62 36.2	55 54	86.4	63 08.3	52 54	84.5	63 38.9	50 54	82.6	64 08.0	47 54	80.6	64 48.3	43 53	77.5	45
6	60 00.5	62 54	91.5	60 37.2	60 54	89.9	61 30.0	57 54	87.4	62 03.6	55 54	85.6	62 35.8	52 54	83.8	63 06.6	50 54	81.9	63 35.8	47 54	80.0	64 16.4	43 53	76.9	6
7	59 27.9	62 54	90.6	60 04.6	60 54	89.1	60 57.4	57 54	86.6	61 31.0	55 54	84.9	62 03.4	53 54	83.1	62 34.2	50 54	81.2	63 03.6	48 53	79.3	63 44.6	44 53	76.3	7
8	58 55.2	62 54	89.8	59 31.9	60 54	88.2	60 24.8	57 54	85.8	60 58.5	55 54	84.1	61 30.9	53 54	82.4	62 02.0	51 54	80.6	62 31.5	48 53	78.7	63 12.9	44 53	75.8	8
9	58 22.5	62 54	89.0	58 59.2	60 54	87.4	59 52.2	57 54	85.0	60 26.0	55 54	83.4	60 58.6	53 54	81.7	61 29.8	51 54	79.9	61 59.5	48 53	78.1	62 41.3	44 53	75.2	9
50	57 49.9	62 54	88.1	58 26.6	60 54	86.6	59 19.7	58 54	84.3	59 53.6	56 54	82.7	60 26.3	53 54	81.0	60 57.6	51 53	79.2	61 27.6	49 53	77.4	62 09.7	45 52	74.6	50
1	57 17.2	62 54	87.3	57 54.0	60 54	85.9	58 47.2	58 54	83.6	59 21.2	56 54	82.0	59 54.0	54 54	80.3	60 25.6	51 53	78.6	60 55.7	49 53	76.8	61 38.3	45 52	74.1	1
2	56 44.6	62 54	86.5	57 21.4	61 54	85.1	58 14.7	58 54	82.8	58 48.9	56 54	81.2	59 21.9	54 54	79.6	59 53.6	52 53	77.9	60 24.0	50 53	76.2	61 06.9	46 52	73.5	2
3	56 12.0	62 54	85.8	56 48.9	61 54	84.3	57 42.3	58 54	82.1	58 16.6	56 54	80.5	58 49.7	54 53	78.9	59 21.6	52 53	77.3	59 52.3	50 53	75.6	60 35.6	46 52	73.0	3
4	55 39.4	62 54	85.0	56 16.4	61 54	83.6	57 10.0	58 54	81.4	57 44.4	56 54	79.9	58 17.7	55 53	78.3	58 49.8	52 53	76.7	59 20.6	50 53	75.0	60 04.4	47 52	72.4	4
55	55 06.9	63 54	84.2	55 43.9	61 54	82.8	56 37.7	58 54	80.7	57 12.3	57 53	79.2	57 45.8	55 53	77.6	58 18.1	53 53	76.0	58 49.1	51 52	74.4	59 33.3	47 52	71.8	55
6	54 34.4	63 54	83.5	55 11.5	61 54	82.1	56 05.5	59 54	80.0	56 40.2	57 53	78.5	57 13.9	55 53	77.0	57 46.4	53 53	75.4	58 17.7	51 52	73.8	59 02.3	48 52	71.3	6
7	54 01.9	63 54	82.7	54 39.2	61 54	81.4	55 33.4	59 53	79.3	56 08.2	57 53	77.8	56 42.1	55 53	76.3	57 14.8	54 52	74.8	57 46.4	52 52	73.2	58 31.4	48 51	70.8	7
8	53 29.5	63 54	82.0	54 06.9	62 54	80.7	55 01.3	59 53	78.6	55 36.3	58 53	77.2	56 10.4	56 53	75.7	56 43.3	54 52	74.2	57 15.1	52 52	72.6	58 00.6	49 51	70.2	8
9	52 57.2	63 54	81.2	53 34.7	62 54	79.9	54 29.3	60 53	77.9	55 04.5	58 53	76.5	55 38.7	56 53	75.1	56 11.9	54 52	73.6	56 44.0	53 52	72.0	57 29.9	50 51	69.7	9
60	52 24.9	63 54	80.5	53 02.6	62 53	79.2	53 57.4	60 53	77.2	54 32.8	58 53	75.8	55 07.2	57 52	74.4	55 40.6	55 52	73.0	56 13.0	53 52	71.5	56 59.3	50 51	69.1	60
1	51 52.8	64 54	79.8	52 30.5	62 53	78.5	53 25.6	60 53	76.6	54 01.2	59 53	75.2	54 35.8	57 52	73.8	55 09.4	55 52	72.4	55 42.0	53 51	70.9	56 28.8	51 51	68.6	1
2	51 20.6	64 53	79.1	51 58.5	62 53	77.8	52 53.8	60 53	75.9	53 29.6	59 52	74.6	54 04.5	57 52	73.2	54 38.3	56 52	71.8	55 11.2	54 51	70.3	55 58.5	51 50	68.0	2
3	50 48.6	64 53	78.4	51 26.6	63 53	77.1	52 22.2	61 53	75.2	52 58.2	59 52	73.9	53 33.2	58 52	72.6	54 07.4	56 51	71.2	54 40.5	54 51	69.7	55 28.2	52 50	67.5	3
4	50 16.6	64 53	77.7	50 54.8	63 53	76.5	51 50.6	61 52	74.6	52 26.8	60 52	73.3	53 02.1	58 52	71.9	53 36.5	57 51	70.6	54 09.9	55 51	69.2	54 58.1	52 50	67.0	4
65	49 44.7	65 53	77.0	50 23.1	63 53	75.8	51 19.2	61 52	73.9	51 55.6	60 52	72.6	52 31.1	58 52	71.3	53 05.7	57 51	70.0	53 39.4	55 51	68.6	54 28.1	53 50	66.4	65
6	49 12.9	65 53	76.3	49 51.5	64 53	75.1	50 47.8	62 52	73.3	51 24.4	60 52	72.0	52 00.2	59 51	70.7	52 35.1	57 51	69.4	53 09.1	56 50	68.0	53 58.2	53 50	65.9	6
7	48 41.2	65 53	75.6	49 19.9	64 52	74.4	50 16.6	62 52	72.6	50 53.4	61 52	71.4	51 29.4	59 51	70.1	52 04.6	58 51	68.8	52 38.8	56 50	67.5	53 28.4	54 49	65.4	7
8	48 09.6	65 52	74.9	48 48.5	64 52	73.8	49 45.5	62 52	72.0	50 22.5	61 51	70.8	50 58.7	60 51	69.5	51 34.2	58 50	68.2	52 08.7	57 50	66.9	52 58.8	54 49	64.8	8
9	47 38.1	66 52	74.2	48 17.2	65 52	73.1	49 14.4	63 52	71.4	49 51.7	61 51	70.1	50 28.2	60 51	68.9	51 03.9	59 50	67.6	51 38.7	57 50	66.3	52 29.3	55 49	64.3	9
70	47 06.7	66 52	73.6	47 46.0	65 52	72.4	48 43.5	63 51	70.7	49 21.0	62 51	69.5	49 57.8	61 50	68.3	50 33.7	59 50	67.1	51 08.8	58 50	65.8	51 59.9	56 49	63.8	70
1	46 35.4	66 52	72.9	47 14.9	65 52	71.8	48 12.7	63 51	70.1	48 50.5	62 51	68.9	49 27.5	61 50	67.7	50 03.7	60 50	66.5	50 39.1	58 49	65.2	51 30.6	56 49	63.2	1
2	46 04.3	67 52	72.2	46 43.9	65 51	71.1	47 42.1	64 51	69.5	48 20.0	63 50	68.3	48 57.3	61 50	67.1	49 33.8	60 50	65.9	50 09.5	59 49	64.6	51 01.5	57 48	62.7	2
3	45 33.2	67 52	71.6	46 13.0	66 51	70.5	47 11.6	64 51	68.8	47 49.8	63 50	67.7	48 27.3	62 50	66.5	49 04.0	61 49	65.3	49 40.0	59 49	64.1	50 32.5	57 48	62.2	3
4	45 02.3	67 51	70.9	45 42.3	66 51	69.8	46 41.1	65 50	68.2	47 19.6	64 50	67.1	47 57.3	62 50	65.9	48 34.4	61 49	64.7	49 10.7	60 49	63.5	50 03.7	58 48	61.7	4
75	44 31.5	67 51	70.2	45 11.7	67 51	69.2	46 10.9	65 50	67.6	46 49.6	64 50	66.5	47 27.6	63 49	65.3	48 04.9	62 49	64.2	48 41.5	60 48	63.0	49 35.0	58 48	61.1	75
6	44 00.8	68 51	69.6	44 41.2	67 51	68.6	45 40.7	65 50	67.0	46 19.7	64 50	65.9	46 58.0	63 49	64.7	47 35.6	62 49	63.6	48 12.5	61 48	62.4	49 06.5	59 47	60.6	6
7	43 30.2	68 51	68.9	44 10.8	67 50	67.9	45 10.7	66 50	66.3	45 49.9	65 49	65.3	46 28.5	64 49	64.2	47 06.4	63 48	63.0	47 43.6	61 48	61.9	48 38.1	60 47	60.1	7
8	42 59.8	69 50	68.3	43 40.6	68 50	67.3	44 40.9	66 50	65.7	45 20.3	65 49	64.7	45 59.1	64 49	63.6	46 37.3	63 48	62.4	47 14.9	62 48	61.3	48 09.8	60 47	59.5	8
9	42 29.5	69 50	67.6	43 10.5	68 50	66.6	44 11.2	67 49	65.1	44 50.8	66 49	64.1	45 30.0	65 48	63.0	46 08.4	64 48	61.9	46 46.3	63 47	60.7	47 41.8	61 47	59.0	9
80	41 59.3	69 50	67.0	42 40.6	68 50	66.0	43 41.6	67 49	64.5	44 21.5	66 49	63.5	45 00.9	65 48	62.4	45 39.7	64 48	61.3	46 17.8	63 47	60.2	47 13.8	61 46	58.5	80
1	41 29.3	70 50	66.3	42 10.8	69 49	65.4	43 12.2	67 49	63.9	43 52.4	67 48	62.9	44 32.0	66 48	61.8	45 11.1	65 47	60.7	45 49.6	64 47	59.6	46 46.0	62 46	57.9	1
2	40 59.5	70 50	65.7	41 41.2	69 49	64.7	42 42.9	68 48	63.3	43 23.4	67 48	62.3	44 03.3	66 48	61.2	44 42.7	65 47	60.2	45 21.5	64 47	59.1	46 18.4	62 46	57.4	2
3	40 29.8	70 49	65.0	41 11.7	70 49	64.1	42 13.8	68 48	62.6	42 54.5	67 48	61.7	43 34.8	67 47	60.6	44 14.4	66 47	59.6	44 53.5	65 46	58.5	45 51.0	63 45	56.9	3
4	40 00.2	71 49	64.4	40 42.4	70 49	63.5	41 44.9	69 48	62.0	42 25.9	68 48	61.1	43 06.4	67 47	60.0	43 46.3	66 47	59.0	44 25.7	65 46	58.0	45 23.7	64 45	56.4	4
85	39 30.8	71 49	63.8	40 13.3	70 48	62.8	41 16.1	69 48	61.4	41 57.4	68 47	60.5	42 38.1	68 47	59.5	43 18.4	67 46	58.5	43 58.1	66 46	57.4	44 56.6	64 45	55.8	85
6	39 01.6	71 48	63.1	39 44.3	71 48	62.2	40 47.5	70 47	60.8	41 29.0	69 47	59.9	42 10.1	68 46	58.9	42 50.6	67 46	57.9	43 30.6	66 45	56.9	44 29.6	65 45	55.3	6
7	38 32.5	72 48	62.5	39 15.4	71 48	61.6	40 19.0	70 47	60.2	41 00.8	69 47	59.3	41 42.2	69 46	58.3	42 23.0	68 46	57.3	43 03.4	67 45	56.3	44 02.8	65 44	54.8	7
8	38 03.6	72 48	61.9	38 46.8	72 47	61.0	39 50.7	71 47	59.6	40 32.8	70 46	58.7	41 14.5	69 46	57.7	41 55.6	68 45	56.7	42 36.3	67 45	55.7	43 36.2	66 44	54.2	8
9	37 34.9	73 48	61.2	38 18.3	72 47	60.3	39 22.6	71 47	59.0	40 05.0	70 46	58.1	40 46.9	69 46	57.1	41 28.4	69 45	56.2	42 09.3	68 45	55.2	43 09.8	67 44	53.7	9
90	37 06.4	73 47	60.6	37 50.0	72 47	59.7	38 54.7	71 46	58.4	39 37.4	71 46	57.5	40 19.6	70 45	56.5	41 01.3	69 45	55.6	41 42.6	68 44	54.6	42 43.6	67 43	53.1	90

Lat. 57°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	36 38.0	73 47	59.9	37 21.9	73 47	59.1	38 27.0	72 46	57.8	39 09.9	71 45	56.9	39 52.4	70 45	56.0	40 34.5	70 44	55.0	41 16.1	69 44	54.1	42 17.5	68 43	52.6	91
2	36 09.8	74 47	59.3	36 53.9	73 46	58.5	37 59.4	72 46	57.2	38 42.6	72 45	56.3	39 25.4	71 45	55.4	40 07.8	70 44	54.5	40 49.7	69 44	53.5	41 51.7	68 43	52.1	2
3	35 41.8	74 46	58.7	36 26.2	74 46	57.8	37 32.1	73 45	56.6	38 15.5	72 45	55.7	38 58.6	71 44	54.8	39 41.3	71 44	53.9	40 23.5	70 43	53.0	41 26.0	69 42	51.5	3
4	35 14.0	75 46	58.0	35 58.6	74 46	57.2	37 04.9	73 45	56.0	37 48.6	73 44	55.1	38 32.0	72 44	54.2	39 15.0	71 44	53.3	39 57.5	71 43	52.4	41 00.5	69 42	51.0	4
95	34 46.3	75 46	57.4	35 31.2	75 45	56.6	36 37.9	74 45	55.3	37 21.9	73 44	54.5	38 05.6	72 44	53.6	38 48.9	72 43	52.7	39 31.7	71 43	51.8	40 35.2	70 42	50.4	95
6	34 18.9	75 45	56.8	35 04.0	75 45	56.0	36 11.1	74 44	54.7	36 55.4	74 44	53.9	37 39.4	73 43	53.0	38 22.9	72 43	52.2	39 06.1	72 42	51.3	40 10.1	71 42	49.9	6
7	33 51.7	76 45	56.1	34 37.1	75 45	55.3	35 44.6	75 44	54.1	36 29.1	74 44	53.3	37 13.4	73 43	52.5	37 57.3	73 42	51.6	38 40.7	72 42	50.7	39 45.2	71 41	49.4	7
8	33 24.6	76 45	55.5	34 10.3	76 44	54.7	35 18.2	75 44	53.5	36 03.0	74 43	52.7	36 47.6	74 43	51.9	37 31.7	73 42	51.0	38 15.5	73 42	50.2	39 20.5	72 41	48.8	8
9	32 57.8	77 44	54.9	33 43.7	76 44	54.1	34 52.0	76 43	52.9	35 37.2	75 43	52.1	36 22.0	74 42	51.3	37 06.4	74 42	50.4	37 50.6	73 41	49.6	38 56.0	72 40	48.3	9
100	32 31.2	77 44	54.2	33 17.3	77 44	53.5	34 26.1	76 43	52.3	35 11.5	75 42	51.5	35 56.6	75 42	50.7	36 41.4	74 41	49.9	37 25.8	74 41	49.0	38 31.7	73 40	47.7	100
1	32 04.8	78 44	53.6	32 51.2	77 43	52.8	34 00.3	76 43	51.7	34 46.0	76 42	50.9	35 31.4	75 42	50.1	36 16.5	75 41	49.3	37 01.2	74 41	48.5	38 07.7	73 40	47.2	1
2	31 38.6	78 43	53.0	32 25.3	78 43	52.2	33 34.8	77 42	51.1	34 20.8	76 42	50.3	35 06.4	76 41	49.5	35 51.8	75 41	48.7	36 36.9	75 40	47.9	37 43.8	74 39	46.6	2
3	31 12.6	78 43	52.3	31 59.6	78 42	51.6	33 09.5	77 42	50.5	33 55.7	77 41	49.7	34 41.7	76 41	48.9	35 27.4	76 40	48.1	36 12.7	75 40	47.3	37 20.1	74 39	46.1	3
4	30 46.9	79 43	51.7	31 34.1	78 42	51.0	32 44.4	78 41	49.9	33 30.9	77 41	49.1	34 17.2	77 40	48.3	35 03.2	76 40	47.5	35 48.8	76 39	46.8	36 56.7	75 39	45.5	4
105	30 21.3	79 42	51.0	31 08.8	79 42	50.3	32 19.5	78 41	49.2	33 06.3	78 41	48.5	33 52.9	77 40	47.7	34 39.2	77 40	47.0	35 25.1	76 39	46.2	36 33.5	76 38	45.0	105
6	29 56.1	80 42	50.4	30 43.8	79 41	49.7	31 54.9	79 41	48.6	32 42.0	78 40	47.9	33 28.8	78 40	47.1	34 15.4	77 39	46.4	35 01.7	77 39	45.6	36 10.5	76 38	44.4	6
7	29 31.0	80 41	49.8	30 18.9	80 41	49.1	31 30.5	79 40	48.0	32 17.8	79 40	47.3	33 05.0	78 39	46.6	33 51.8	78 39	45.8	34 38.4	77 38	45.0	35 47.8	77 38	43.9	7
8	29 06.2	81 41	49.1	29 54.4	80 41	48.4	31 06.3	80 40	47.4	31 54.0	79 39	46.7	32 41.4	79 39	46.0	33 28.5	78 38	45.2	34 15.4	78 38	44.5	35 25.2	77 37	43.3	8
9	28 41.6	81 41	48.5	29 30.0	81 40	47.8	30 42.4	80 40	46.8	31 30.3	80 39	46.1	32 18.0	79 39	45.4	33 05.4	79 38	44.6	33 52.6	78 38	43.9	35 02.9	78 37	42.8	9
110	28 17.2	81 40	47.8	29 06.0	81 40	47.2	30 18.7	81 39	46.2	31 06.9	80 39	45.5	31 54.9	80 38	44.8	32 42.6	79 38	44.0	33 30.1	79 37	43.3	34 40.9	78 36	42.2	110
1	27 53.1	82 40	47.2	28 42.1	81 39	46.5	29 55.2	81 39	45.5	30 43.7	81 38	44.9	31 32.0	80 38	44.2	32 20.0	80 37	43.5	33 07.8	79 37	42.7	34 19.0	79 36	41.6	1
2	27 29.3	82 39	46.6	28 18.5	82 39	45.9	29 32.0	81 38	44.9	30 20.8	81 38	44.2	31 09.3	81 37	43.6	31 57.7	80 37	42.9	32 45.8	80 36	42.2	33 57.4	79 36	41.1	2
3	27 05.7	83 39	45.9	27 55.2	82 38	45.3	29 09.1	82 38	44.3	29 58.1	82 37	43.6	30 46.9	81 37	43.0	31 35.6	81 36	42.3	32 23.9	80 36	41.6	33 36.1	80 35	40.5	3
4	26 42.3	83 38	45.3	27 32.1	83 38	44.6	28 46.4	82 37	43.7	29 35.7	82 37	43.0	30 24.8	82 36	42.4	31 13.7	81 36	41.7	32 02.4	81 36	41.0	33 15.0	80 35	39.9	4
115	26 19.2	83 38	44.6	27 09.2	83 38	44.0	28 23.9	83 37	43.1	29 13.5	82 37	42.4	30 02.9	82 36	41.8	30 52.1	82 36	41.1	31 41.1	81 35	40.4	32 54.1	81 34	39.4	115
6	25 56.4	84 38	44.0	26 46.7	84 37	43.4	28 01.8	83 37	42.4	28 51.6	83 36	41.8	29 41.3	83 36	41.2	30 30.7	82 35	40.5	31 20.0	82 35	39.8	32 33.5	81 34	38.8	6
7	25 33.9	84 37	43.3	26 24.4	84 37	42.7	27 39.8	84 36	41.8	28 30.0	83 36	41.2	29 19.9	83 35	40.5	30 09.6	83 35	39.9	30 59.2	82 34	39.3	32 13.2	82 34	38.2	7
8	25 11.6	85 37	42.7	26 02.3	84 36	42.1	27 18.2	84 36	41.2	28 08.6	84 35	40.6	28 58.8	84 35	39.9	29 48.8	83 34	39.3	30 38.7	83 34	38.7	31 53.1	82 33	37.7	8
9	24 49.6	85 36	42.0	25 40.6	85 36	41.4	26 56.8	85 35	40.6	27 47.5	84 35	39.9	28 37.9	84 34	39.3	29 28.2	84 34	38.7	30 18.4	83 33	38.1	31 33.2	83 33	37.1	9
120	24 27.8	86 36	41.4	25 19.1	85 35	40.8	26 35.7	85 35	39.9	27 26.6	85 34	39.3	28 17.4	84 34	38.7	29 07.9	84 33	38.1	29 58.4	84 33	37.5	31 13.6	83 32	36.5	120
1	24 06.4	86 35	40.7	24 57.9	86 35	40.2	26 14.9	85 34	39.3	27 06.0	85 34	38.7	27 57.0	85 33	38.1	28 47.9	85 33	37.5	29 38.6	84 32	36.9	30 54.3	84 32	36.0	1
2	23 45.2	86 35	40.1	24 36.9	86 34	39.5	25 54.3	86 34	38.7	26 45.7	86 33	38.1	27 37.0	85 33	37.5	28 28.1	85 32	36.9	29 19.1	85 32	36.3	30 35.3	84 31	35.4	2
3	23 24.3	87 34	39.4	24 16.3	87 34	38.9	25 34.0	86 33	38.0	26 25.7	86 33	37.5	27 17.3	86 32	36.9	28 08.7	86 32	36.3	28 59.9	85 32	35.7	30 16.5	85 31	34.8	3
4	23 03.7	87 34	38.7	23 55.9	87 33	38.2	25 14.1	87 33	37.4	26 06.0	86 32	36.8	26 57.8	86 32	36.3	27 49.4	86 32	35.7	28 41.0	86 31	35.1	29 58.0	85 30	34.2	4
125	22 43.4	88 33	38.1	23 35.9	87 33	37.6	24 54.4	87 32	36.8	25 46.5	87 32	36.2	26 38.6	87 32	35.7	27 30.5	86 31	35.1	28 22.3	86 31	34.5	29 39.7	86 30	33.6	125
6	22 23.4	88 33	37.4	23 16.1	88 32	36.9	24 34.9	87 32	36.1	25 27.4	87 31	35.6	26 19.7	87 31	35.0	27 11.9	87 31	34.5	28 03.9	87 30	33.9	29 21.7	86 29	33.1	6
7	22 03.7	88 32	36.8	22 56.6	88 32	36.3	24 15.8	88 31	35.5	25 08.5	88 31	35.0	26 01.1	88 31	34.4	26 53.5	87 30	33.9	27 45.8	87 30	33.3	29 04.0	87 29	32.5	7
8	21 44.3	89 32	36.1	22 37.4	89 31	35.6	23 57.0	88 31	34.8	24 49.9	88 30	34.3	25 42.7	88 30	33.8	26 35.4	88 30	33.3	27 28.0	88 29	32.7	28 46.6	87 29	31.9	8
9	21 25.2	89 31	35.4	22 18.6	89 31	35.0	23 38.5	89 30	34.2	24 31.7	89 30	33.7	25 24.7	88 30	33.2	26 17.7	88 29	32.7	27 10.5	88 29	32.1	28 29.5	88 28	31.3	9
130	21 06.4	89 31	34.8	22 00.0	89 30	34.3	23 20.3	89 30	33.6	24 13.7	89 29	33.1	25 07.0	89 29	32.6	26 00.2	89 29	32.0	26 53.3	88 28	31.5	28 12.7	88 28	30.7	130
1	20 47.9	90 30	34.1	21 41.7	90 30	33.6	23 02.4	89 29	32.9	23 56.0	89 29	32.4	24 49.5	89 29	31.9	25 43.0	89 28	31.4	26 36.3	89 28	30.9	27 56.1	89 27	30.1	1
2	20 29.7	90 30	33.4	21 23.8	90 29	33.0	22 44.8	90 29	32.3	23 38.6	90 28	31.8	24 32.4	90 28	31.3	25 26.1	89 28	30.8	26 19.7	89 27	30.3	27 39.9	89 27	29.6	2
3	20 11.9	91 29	32.8	21 06.2	90 29	32.3	22 27.5	90 28	31.6	23 21.6	90 28	31.2	24 15.6	90 28	30.7	25 09.5	90 27	30.2	26 03.3	90 27	29.7	27 23.9	89 26	29.0	3
4	19 54.3	91 29	32.1	20 48.9	91 28	31.7	22 10.5	91 28	31.0	23 04.8	90 27	30.5	23 59.1	90 27	30.1	24 53.2	90 27	29.6	25 47.3	90 26	29.1	27 08.2	90 26	28.4	4
135	19 37.1	91 28	31.4	20 31.9	91 28	31.0	21 53.8	91 27	30.3	22 48.4	91 27	29.9	23 42.8	91 26	29.4	24 37.2	91 26	29.0	25 31.5	90 26	28.5	26 52.8	90 25	27.8	135
6	19 20.3	92 28	30.8	20 15.2	92 27	30.3	21 37.5	91 27	29.7	22 32.3	91 26	29.2	23 27.0	91 26	28.8	24 21.6	91 26	28.3	25 16.1	91 25	27.9	26 37.8	91 25	27.2	6
7	19 03.7	92 27	30.1	19 58.9	92 27	29.7	21 21.5	92 26	29.0	22 16.5	92 26	28.6	23 11.4	91 25	28.2	24 06.2	91 25	27.7	25 01.0	91 25	27.3	26 23.0	91 24	26.6	7
8	18 47.5	92 26	29.4	19 42.9	92 26	29.0	21 05.8	92 26	28.4	22 01.0	92 25	28.0	22 56.1	92 25	27.5	23 51.2	92 25	27.1	24 46.2	92 24	26.7	26 08.5	91 24	26.0	8
9	18 31.6	93 26	28.7	19 27.2	93 26	28.3	20 50.4	92 25	27.7	21 45.8	92 25	27.3	22 41.2	92 24	26.9	23 36.5	92 24	26.5	24 31.7	92 24	26.0	25 54.3	92 23	25.4	9
140	18 16.1	93 25	28.0	19 11.8	93 25	27.7	20 35.4	93 24	27.1	21 31.0	93 24	26.7	22 26.5	93 24	26.3	23 22.0	92 23	25.8	24 17.5	92 23	25.4	25 40.5	92 23	24.8	140
1	18 00.9	93 25	27.4	18 56.8	93 24	27.0	20 20.7	93 24	26.4	21 16.5	93 24	26.0	22 12.3	93 23	25.6	23 08.0	93 23	25.2	24 03.6	93 23	24.8	25 27.0	93 22	24.2	1
2	17 46.0	94 24	26.7	18 42.2	94 24	26.3	20 06.3	93 23	25.7	21 02.3	93 23	25.4	21 58.3	93 23	25.0	22 54.2	93 22	24.6	23 50.1	93 22	24.2	25 13.7	93 22	23.6	2
3	17 31.5	94 24	26.0	18 27.9	94 23	25.6	19 52.3	94 23	25.1	20 48.5	94 22	24.7	21 44.7	94 22	24.3	22 40.8	93 22	24.0	23 36.8	93 22	23.6	25 00.8	93 21	23.0	3
4	17 17.4	94 23	25.3	18 13.9	94 23	25.0	19 38.6	94 22	24.4	20 35.0	94 22	24.1	21 31.4	94 22	23.7	22 27.7	94 21	23.3	23 23.9	94 21	22.9	24 48.2	94 20	22.4	4
145	17 03.6	95 22	24.6	18 00.3	94 22	24.3	19 25.3	94 22	23.8	20 21.8	94 21	23.4	21 18.4	94 21	23.1	22 14.9	94 21	22.7	23 11.3	94 20	22.3	24 35.9	94 20	21.8	145
6	16 50.2	95 22	23.9	17 47.0	95 22	23.6	19 12.3	95 21	23.1	20 09.0	95 21	22.8	21 05.8	95 20	22.4	22 02.5	94 20	22.1	22 59.1	94 20	21.7	24 24.0	94 19	21.2	6
7	16 37.1	95 21	23.3	17 34.1	95 21	22.9	18 59.6	95 20	22.4	19 56.6	95 20	22.1	20 53.5	95 20	21.8	21 50.4	95 20	21.4	22 47.2	95 19	21.1	24 12.3	95 19	20.5	7
8	16 24.4	95 21	22.6	17 21.6	95 20	22.2	18 47.3	95 20	21.8	19 44.4	95 20	21.4	20 41.5	95 19	21.1	21 38.6	95 19	20.8	22 35.6	95 19	20.5	24 01.0	95 18	19.9	8
9	16 12.0	96 20	21.9	17 09.4	96 20	21.6	18 35.4	96 19	21.1	19 32.7	95 19	20.8	20 29.9	95 19	20.5	21 27.2	95 18	20.2	22 24.3	95 18	19.8	23 50.1	95 18	19.3	9
150	16 00.0	96 19	21.2	16 57.5	96 19	20.9	18 23.8	96 19	20.4	19 21.2	96 18	20.1	20 18.7	96 18	19.8	21 16.1	96 18	19.5	22 13.4	96 18	19.2	23 39.4	95 17	18.7	150
1	15 48.4	96 19	20.5	16 46.1	96 18	20.2	18 12.5	96 18	19.8	19 10.2	96 18	19.5	20 07.8	96 18	19.2	21 05.3	96 17	18.9	22 02.9	96 17	18.6	23 29.1	96 17	18.1	1
2	15 37.1	96 18	19.8	16 35.0	96 18	19.5	18 01.7	96 18	19.1	18 59.5	96 17	18.8	19 57.2	96 17	18.5	20 54.9	96 17	18.2	21 52.6	96 16	17.9	23 19.1	96 16	17.5	2
3	15 26.3	97 18	19.1	16 24.2	97 17	18.8	17 51.2	97 17	18.4	18 49.1	97 17	18.1	19 47.0	96 16	17.9	20 44.9	96 16	17.6	21 42.7	96 16	17.3	23 09.5	96 16	16.9	3
4	15 15.7	97 17	18.4	16 13.9	97 17	18.1	17 41.0	97 16	17.8	18 39.1	97 16	17.5	19 37.2	97 16	17.2	20 35.2	97 16	16.9	21 33.2	97 15	16.7	23 00.1	97 15	16.3	4
155	15 05.6	97 16	17.7	16 03.9	97 16	17.5	17 31.2	97 16	17.1	18 29.5	97 15	16.8	19 27.7	97 15	16.6	20 25.8	97 15	16.3	21 24.0	97 15	16.0	22 51.2	97 14	15.6	155
6	14 55.9	97 16	17.0	15 54.3	97 15	16.8	17 21.8	97 15	16.4	18 20.2	97 15	16.2	19 18.5	97 15	15.9	20 16.8	97 14	15.7	21 15.1	97 14	15.4	22 42.5	97 14	15.0	6
7	14 46.5	98 15	16.3	15 45.0	98 15	16.1	17 12.8	97 14	15.7	18 11.3	97 14	15.5	19 09.7	97 14	15.3	20 08.2	97 14	15.0	21 06.6	97 14	14.8	22 34.2	97 13	14.4	7
8	14 37.5	98 14	15.6	15 36.2	98 14	15.4	17 04.1	98 14	15.0	18 02.7	98 14	14.8	19 01.3	98 13	14.6	19 59.9	98 13	14.4	20 58.5	98 13	14.1	22 26.3	98 13	13.8	8
9	14 28.9	98 14	14.9	15 27.7	98 14	14.7	16 55.8	98 13	14.4	17 54.5	98 13	14.2	18 53.3	98 13	13.9	19 52.0	98 13	13.7	20 50.7	98 12	13.5	22 18.6	98 12	13.2	9
160	14 20.7	98 13	14.2	15 19.6	98 13	14.0	16 47.9	98 13	13.7	17 46.7	98 12	13.5	18 45.6	98 12	13.3	19 44.4	98 12	13.1	20 43.2	98 12	12.9	22 11.4	98 12	12.5	160
1	14 12.9	98 12	13.5	15 11.9	98 12	13.3	16 40.3	98 12	13.0	17 39.3	98 12	12.8	18 38.3	98 12	12.6	19 37.2	98 11	12.4	20 36.1	98 11	12.2	22 04.5	98 11	11.9	1
2	14 05.5	98 12	12.8	15 04.6	98 12	12.6	16 33.2	98 11	12.3	17 32.2	98 11	12.2	18 31.3	98 11	12.0	19 30.3	98 11	11.8	20 29.4	98 11	11.6	21 57.9	98 10	11.3	2
3	13 58.4	99 11	12.1	14 57.6	99 11	11.9	16 26.4	99 11	11.7	17 25.6	99 11	11.5	18 24.7	99 10	11.3	19 23.8	99 10	11.1	20 23.0	99 10	10.9	21 51.7	99 10	10.7	3
4	13 51.8	99 10	11.4	14 51.1	99 10	11.2	16 20.0	99 10	11.0	17 19.2	99 10	10.8	18 18.5	99 10	10.6	19 17.7	99 10	10.5	20 17.0	99 09	10.3	21 45.8	99 09	10.0	4
165	13 45.6	99 10	10.7	14 44.9	99 10	10.5	16 13.9	99 09	10.3	17 13.3	99 09	10.1	18 12.6	99 09	10.0	19 12.0	99 09	09.8	20 11.3	99 09	09.7	21 40.3	99 09	09.4	165
6	13 39.7	99 09	10.0	14 39.1	99 09	09.8	16 08.3	99 09	09.6	17 07.7	99 09	09.5	18 07.2	99 08	09.3	19 06.6	99 08	09.2	20 06.0	99 08	09.0	21 35.1	99 08	08.8	6
7	13 34.3	99 08	09.3	14 33.8	99 08	09.1	16 03.0	99 08	08.9	17 02.5	99 08	08.8	18 02.1	99 08	08.7	19 01.5	99 08	08.5	20 01.0	99 08	08.4	21 30.3	99 07	08.2	7
8	13 29.2	99 08	08.5	14 28.8	99 08	08.4	15 58.2	99 07	08.2	16 57.7	99 07	08.1	17 57.3	99 07	08.0	18 56.9	99 07	07.9	19 56.5	99 07	07.7	21 25.8	99 07	07.5	8
9	13 24.5	99 07	07.8	14 24.2	99 07	07.7	15 53.7	99 07	07.6	16 53.3	99 07	07.4	17 53.0	99 07	07.3	18 52.6	99 07	07.2	19 52.2	99 06	07.1	21 21.7	99 06	06.9	9
170	13 20.3	1.0 06	07.1	14 20.0	1.0 06	07.0	15 49.6	1.0 06	06.9	16 49.3	1.0 06	06.8	17 49.0	1.0 06	06.7	18 48.7	99 06	06.6	19 48.4	99 06	06.5	21 17.9	99 06	06.3	170
1	13 16.4	1.0 06	06.4	14 16.2	1.0 06	06.3	15 45.9	1.0 06	06.2	16 45.6	1.0 05	06.1	17 45.4	1.0 05	06.0	18 45.1	1.0 05	05.9	19 44.9	1.0 05	05.8	21 14.5	1.0 05	05.7	1
2	13 13.0	1.0 05	05.7	14 12.8	1.0 05	05.6	15 42.5	1.0 05	05.5	16 42.3	1.0 05	05.4	17 42.2	1.0 05	05.3	18 42.0	1.0 05	05.2	19 41.8	1.0 05	05.2	21 11.5	1.0 04	05.0	2
3	13 10.0	1.0 04	05.0	14 09.8	1.0 04	04.9	15 39.6	1.0 04	04.8	16 39.5	1.0 04	04.7	17 39.3	1.0 04	04.7	18 39.2	1.0 04	04.6	19 39.0	1.0 04	04.5	21 08.8	1.0 04	04.4	3
4	13 07.3	1.0 04	04.3	14 07.2	1.0 04	04.2	15 37.1	1.0 04	04.1	16 37.0	1.0 04	04.1	17 36.8	1.0 04	04.0	18 36.7	1.0 03	03.9	19 36.6	1.0 03	03.9	21 06.5	1.0 03	03.8	4
175	13 05.1	1.0 03	03.6	14 05.0	1.0 03	03.5	15 34.9	1.0 03	03.4	16 34.8	1.0 03	03.4	17 34.8	1.0 03	03.3	18 34.7	1.0 03	03.3	19 34.6	1.0 03	03.2	21 04.5	1.0 03	03.1	175
6	13 03.3	1.0 02	02.9	14 03.2	1.0 02	02.8	15 33.1	1.0 02	02.8	16 33.1	1.0 02	02.7	17 33.0	1.0 02	02.7	18 33.0	1.0 02	02.6	19 32.9	1.0 02	02.6	21 02.9	1.0 02	02.5	6
7	13 01.8	1.0 02	02.1	14 01.8	1.0 02	02.1	15 31.8	1.0 02	02.1	16 31.7	1.0 02	02.0	17 31.7	1.0 02	02.0	18 31.7	1.0 02	02.0	19 31.7	1.0 02	01.9	21 01.6	1.0 02	01.9	7
8	13 00.8	1.0 01	01.4	14 00.8	1.0 01	01.4	15 30.8	1.0 01	01.4	16 30.8	1.0 01	01.4	17 30.8	1.0 01	01.3	18 30.7	1.0 01	01.3	19 30.7	1.0 01	01.3	21 00.7	1.0 01	01.3	8
9	13 00.2	1.0 00	00.7	14 00.2	1.0 00	00.7	15 30.2	1.0 00	00.7	16 30.2	1.0 00	00.7	17 30.2	1.0 00	00.7	18 30.2	1.0 00	00.7	19 30.2	1.0 00	00.6	21 00.2	1.0 00	00.6	9
180	13 00.0	1.0 00	00.0	14 00.0	1.0 00	00.0	15 30.0	1.0 00	00.0	16 30.0	1.0 00	00.0	17 30.0	1.0 00	00.0	18 30.0	1.0 00	00.0	19 30.0	1.0 00	00.0	21 00.0	1.0 00	00.0	180

Lat. 58°

La 59

Lat. 57°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	87 30.0	1.0 06	180.0	88 00.0	1.0 08	180.0	89 00.0	1.0 14	180.0	89 30.0	1.0 24	180.0	90 00.0	. . 54	. . .	89 30.0	1.0 24	00.0	88 00.0	1.0 07	00.0	87 30.0	1.0 05	00.0	00
1	87 26.3	98 18	166.9	87 55.4	96 21	164.0	88 51.5	88 35	150.7	89 15.5	68 46	131.9	89 27.3	01 54	89.6	89 15.8	67 46	46.8	87 55.9	96 19	14.4	87 26.7	98 16	11.5	1
2	87 15.5	92 27	154.9	87 42.5	88 32	150.0	88 30.7	68 45	131.3	88 47.7	43 51	113.7	88 54.6	01 54	89.2	88 48.5	41 51	64.4	87 44.2	88 29	27.1	87 17.3	92 24	22.0	2
3	86 59.0	84 35	144.7	87 23.4	78 29	138.8	88 04.0	54 49	119.9	88 16.9	31 53	105.6	88 22.0	02 54	88.7	88 18.1	27 52	71.6	87 26.8	77 36	37.2	87 02.6	83 31	31.0	3
4	86 38.2	76 40	136.3	87 00.0	69 44	130.1	87 34.6	44 51	112.7	87 45.0	25 54	101.2	87 49.3	03 54	88.3	87 46.8	20 53	75.3	87 05.2	66 40	45.0	86 44.0	75 36	38.4	4
05	86 14.3	69 44	129.5	86 33.8	61 47	123.5	87 03.9	37 52	107.8	87 12.8	22 54	98.2	87 16.6	04 54	87.9	87 15.0	15 53	77.4	86 40.9	57 44	50.9	86 22.4	66 40	44.4	05
6	85 48.1	63 46	124.0	86 05.8	55 49	118.3	86 32.5	33 53	104.3	86 40.4	19 54	96.1	86 44.0	04 54	87.5	86 43.0	11 54	78.7	86 14.8	49 46	55.3	85 58.5	58 42	49.1	6
7	85 20.2	58 48	119.5	85 36.4	50 50	114.1	86 00.7	30 54	101.6	86 07.9	18 54	94.5	86 11.4	05 54	87.1	86 10.9	08 54	79.5	85 47.3	43 47	58.7	85 33.1	52 44	52.9	7
8	84 51.3	53 50	115.7	85 06.2	46 51	110.7	85 28.5	28 54	99.4	85 35.3	17 54	93.1	85 38.7	06 54	86.6	85 38.8	06 54	80.1	85 19.0	37 48	61.4	85 06.5	46 46	55.9	8
9	84 21.4	50 51	112.5	84 35.4	43 52	107.9	84 56.2	26 54	97.6	85 02.6	17 54	92.0	85 06.1	07 54	86.2	85 06.6	04 54	80.4	84 50.0	32 49	63.5	84 39.0	41 47	58.4	9
10	83 51.0	47 52	109.8	84 04.1	40 53	105.5	84 23.8	25 54	96.1	84 30.0	16 54	91.0	84 33.5	07 54	85.8	84 34.3	02 54	80.5	84 20.6	28 50	65.1	84 10.9	36 48	60.4	10
1	83 20.0	45 52	107.4	83 32.4	38 53	103.4	83 51.2	24 54	94.7	83 57.3	16 54	90.1	84 00.9	08 54	85.4	84 02.1	00 54	80.6	83 50.8	25 50	66.4	83 42.3	32 48	62.0	1
2	82 48.6	43 53	105.3	83 00.5	37 54	101.6	83 18.6	23 54	93.5	83 24.6	16 54	89.3	83 28.4	09 54	85.0	83 29.9	01 54	80.6	83 20.7	21 50	67.5	83 13.2	28 49	63.4	2
3	82 17.0	41 53	103.4	82 28.4	35 54	99.9	82 46.0	23 54	92.5	82 51.9	16 54	88.6	82 55.8	10 54	84.5	82 57.6	02 54	80.5	82 50.4	18 51	68.4	82 43.9	25 49	64.5	3
4	81 45.0	40 53	101.7	81 56.2	34 54	98.4	82 13.4	23 54	91.5	82 19.3	17 54	87.8	82 23.3	10 54	84.1	82 25.4	04 54	80.3	82 19.9	16 51	69.0	82 14.3	22 50	65.4	4
15	81 13.0	38 54	100.2	81 23.8	33 54	97.1	81 40.7	23 54	90.6	81 46.6	17 54	87.2	81 50.8	11 54	83.7	81 53.2	05 54	80.2	81 49.4	13 51	69.6	81 44.5	19 50	66.1	15
6	80 40.7	38 54	98.8	80 51.3	33 54	95.9	81 08.0	23 54	89 7	81 14.0	17 54	86.5	81 18.3	12 54	83.3	81 21.0	06 54	80.0	81 18.7	11 51	70.0	81 14.5	17 50	66.7	6
7	80 08.4	37 54	97.5	80 18.8	32 54	94.7	80 35.3	23 54	88.9	80 41.4	18 54	85.9	80 45.9	12 54	82.9	80 48.8	07 54	79.7	80 47.9	09 51	70.3	80 44.4	14 50	67.3	7
8	79 35.9	36 54	96.3	79 46.2	32 54	93.7	80 02.6	23 54	88.2	80 08.8	18 54	85.3	80 13.5	13 54	82.4	80 16.7	08 54	79.5	80 17.1	07 51	70.6	80 14.2	12 50	67.7	8
9	79 03.4	36 54	95.2	79 13.5	32 54	92.7	79 30.0	23 54	87.5	79 36.2	19 54	84.8	79 41.1	14 54	82.0	79 44.6	09 54	79.2	79 46.3	05 51	70.8	79 44.0	10 51	68.0	9
20	78 30.9	35 54	94.1	78 40.9	31 54	91.7	78 57.4	23 54	86.8	79 03.7	19 54	84.2	79 08.8	15 54	81.6	79 12.5	10 53	78.9	79 15.4	04 51	70.9	79 13.7	08 51	68.2	20
1	77 58.2	35 54	93.1	78 08.2	31 54	90.8	78 24.8	24 54	86.1	78 31.2	20 54	83.6	78 36.5	15 54	81.2	78 40.4	11 53	78.6	78 44.5	02 52	71.0	78 43.3	06 51	68.4	1
2	77 25.6	35 54	92.1	77 35.5	31 54	90.0	77 52.2	24 54	85.4	77 58.8	20 54	83.1	78 04.2	16 54	80.7	78 08.4	12 53	78.3	78 13.6	00 52	71.0	78 12.9	05 51	68.6	2
3	76 52.9	35 54	91.2	77 02.9	31 54	89.1	77 19.6	24 54	84.8	77 26.3	21 54	82.6	77 32.0	17 54	80.3	77 36.4	13 53	78.0	77 42.7	01 52	71.0	77 42.5	03 51	68.7	3
4	76 20.3	35 54	90.4	76 30.2	31 54	88.4	76 47.1	25 54	84.2	76 54.0	21 54	82.1	76 59.8	18 54	79.9	77 04.5	14 53	77.7	77 11.8	02 51	71.0	77 12.0	01 51	68.7	4
25	75 47.6	35 54	89.5	75 57.5	32 54	87.6	76 14.6	25 54	83.6	76 21.6	22 54	81.6	76 27.6	18 54	79.5	76 32.6	15 53	77.4	76 41.0	04 51	70.9	76 41.6	00 51	68.7	25
6	75 14.9	35 54	88.7	75 24.9	32 54	86.9	75 42.1	26 54	83.0	75 49.3	22 54	81.0	75 55.5	19 53	79.0	76 00.7	16 53	77.0	76 10.1	05 51	70.8	76 11.1	02 51	68.7	6
7	74 42.2	35 54	87.9	74 52.3	32 54	86.1	75 09.7	26 54	82.4	75 17.1	23 54	80.5	75 23.5	20 53	78.6	75 28.9	16 53	76.7	75 39.2	06 51	70.7	75 40.7	03 51	68.7	7
8	74 09.6	35 54	87.2	74 19.7	32 54	85.5	74 37.3	27 54	81.9	74 44.8	24 54	80.1	74 51.4	20 53	78.2	74 57.1	17 53	76.3	75 08.4	08 51	70.5	75 10.2	04 51	68.6	8
9	73 37.0	35 54	86.5	73 47.1	33 54	84.8	74 05.0	27 54	81.3	74 12.7	24 54	79.6	74 19.5	21 53	77.8	74 25.4	18 53	75.9	74 37.6	09 51	70.4	74 39.8	06 51	68.5	9
30	73 04.4	35 54	85.7	73 14.6	33 54	84.1	73 32.7	28 54	80.8	73 40.6	25 53	79.1	73 47.6	22 53	77.3	73 53.7	19 53	75.6	74 06.9	10 51	70.2	74 09.4	07 51	68.4	30
1	72 31.8	36 54	85.0	72 42.1	33 54	83.5	73 00.5	28 54	80.2	73 08.5	25 53	78.6	73 15.7	23 53	76.9	73 22.1	20 53	75.2	73 36.1	11 51	70.0	73 39.1	08 51	68.2	1
2	71 59.3	36 54	84.4	72 09.7	34 54	82.8	72 28.3	29 54	79.7	72 36.5	26 53	78.1	72 43.9	23 53	76.5	72 50.5	21 53	74.8	73 05.4	12 51	69.8	73 08.7	10 50	68.1	2
3	71 26.8	36 54	83.7	71 37.3	34 54	82.2	71 56.2	29 53	79.2	72 04.6	27 53	77.6	72 12.2	24 53	76.0	72 19.0	22 52	74.5	72 34.8	14 51	69.6	72 38.4	11 50	67.9	3
4	70 54.3	37 54	83.0	71 04.9	34 54	81.6	71 24.1	30 53	78.7	71 32.7	27 53	77.1	71 40.5	25 53	75.6	71 47.6	22 52	74.1	72 04.2	15 51	69.3	72 08.2	12 50	67.7	4
35	70 21.9	37 54	82.4	70 32.6	35 54	81.0	70 52.1	30 53	78.1	71 00.6	28 53	76.7	71 08.9	26 53	75.2	71 16.2	23 52	73.7	71 33.7	16 51	69.1	71 38.0	13 50	67.5	35
6	69 49.5	37 54	81.8	70 00.4	35 54	80.4	70 20.2	31 53	77.6	70 29.1	29 53	76.2	70 37.3	26 52	74.8	70 44.8	24 52	73.3	71 03.2	17 51	68.8	71 07.8	14 50	67.3	6
7	69 17.2	38 54	81.1	69 28.2	36 54	79.8	69 48.3	31 53	77.1	69 57.4	29 53	75.7	70 05.8	27 52	74.3	70 13.6	25 52	72.9	70 32.7	18 51	68.5	70 37.1	15 50	67.1	7
8	68 44.9	38 54	80.5	68 56.0	36 53	79.2	69 16.4	32 53	76.6	69 25.7	30 53	75.3	69 34.4	28 52	73.9	69 42.4	26 52	72.5	70 02.3	19 51	68.3	70 07.6	16 50	66.8	8
9	68 12.7	38 54	79.9	68 24.0	36 53	78.7	68 44.7	33 53	76.1	68 54.2	31 52	74.8	69 03.0	28 52	73.5	69 11.2	26 52	72.1	69 32.0	20 50	68.0	69 37.6	18 50	66.6	9
40	67 40.6	39 53	79.3	67 52.0	37 53	78.1	68 13.0	33 53	75.6	68 22.7	31 52	74.3	68 31.7	29 52	73.0	68 40.2	27 52	71.7	69 01.8	21 50	67.7	69 07.7	19 50	66.3	40
1	67 08.5	39 53	78.7	67 20.0	37 53	77.5	67 41.4	34 53	75.1	67 51.2	32 52	73.9	68 00.5	30 52	72.6	68 09.2	28 52	71.3	68 31.6	22 50	67.4	68 37.8	20 50	66.0	1
2	66 36.5	40 53	78.2	66 48.1	38 53	77.0	67 09.8	34 52	74.6	67 19.9	33 52	73.4	67 29.4	31 52	72.2	67 38.3	29 51	70.9	68 01.4	23 50	67.1	68 07.9	21 50	65.8	2
3	66 04.5	40 53	77.6	66 16.3	38 53	76.4	66 38.4	35 52	74.1	66 48.6	33 52	72.9	66 58.3	31 52	71.7	67 07.4	29 51	70.5	67 31.4	24 50	66.7	67 38.2	22 50	65.5	3
4	65 32.7	41 53	77.0	65 44.6	39 53	75.9	66 07.0	36 52	73.6	66 17.4	34 52	72.5	66 27.3	32 52	71.3	66 36.7	30 51	70.1	67 01.4	25 50	66.4	67 08.5	23 49	65.2	4
45	65 00.9	41 53	76.4	65 13.0	39 53	75.4	65 35.7	36 52	73.1	65 46.3	35 52	72.0	65 56.4	33 51	70.8	66 06.0	31 51	69.7	66 31.5	26 50	66.1	66 38.9	24 49	64.9	45
6	64 29.1	42 53	75.9	64 41.4	40 52	74.8	65 04.4	37 52	72.6	65 15.3	35 52	71.5	65 25.6	34 51	70.4	65 35.4	32 51	69.3	66 01.6	26 50	65.8	66 09.3	25 49	64.6	6
7	63 57.5	42 53	75.3	64 09.9	41 52	74.3	64 33.3	37 52	72.2	64 44.3	36 51	71.1	64 54.8	34 51	70.0	65 04.9	33 51	68.8	65 31.9	27 49	65.4	65 39.8	26 49	64.3	7
8	63 25.9	43 52	74.8	63 38.5	41 52	73.7	64 02.2	38 52	71.7	64 13.4	37 51	70.6	64 24.2	35 51	69.5	64 34.4	33 51	68.4	65 02.2	28 49	65.1	65 10.4	27 49	63.9	8
9	62 54.4	43 52	74.2	63 07.1	42 52	73.2	63 31.3	39 51	71.2	63 42.7	37 51	70.1	63 53.6	36 51	69.1	64 04.1	34 50	68.0	64 32.6	29 49	64.7	64 41.1	28 49	63.6	9
50	62 23.0	44 52	73.7	62 35.9	42 52	72.7	63 00.4	39 51	70.7	63 12.0	38 51	69.7	63 23.1	36 51	68.6	63 33.8	35 50	67.6	64 03.1	30 49	64.4	64 11.9	28 49	63.3	50
1	61 51.7	44 52	73.1	62 04.7	43 52	72.2	62 29.6	40 51	70.2	62 41.4	39 51	69.2	62 52.7	37 50	68.2	63 03.7	36 50	67.2	63 33.7	31 49	64.0	63 42.8	29 48	63.0	1
2	61 20.5	45 52	72.6	61 33.7	43 52	71.6	61 58.9	41 51	69.7	62 10.9	39 51	68.7	62 22.4	38 50	67.8	62 33.6	36 50	66.7	63 04.3	32 49	63.7	63 13.7	30 48	62.6	2
3	60 49.3	45 52	72.0	61 02.7	44 51	71.1	61 28.3	41 51	69.2	61 40.5	40 51	68.3	61 52.2	39 50	67.3	62 03.6	37 50	66.3	62 35.1	33 49	63.3	62 44.7	31 48	62.3	3
4	60 18.3	46 52	71.5	60 31.8	44 51	70.6	60 57.8	42 51	68.8	61 10.2	41 50	67.8	61 22.1	39 50	66.9	61 33.7	38 50	65.9	62 06.0	34 48	62.9	62 15.8	32 48	61.9	4
55	59 47.4	46 51	71.0	60 01.1	45 51	70.1	60 27.4	43 50	68.3	60 39.9	41 50	67.4	60 52.1	40 50	66.4	61 03.9	39 49	65.5	61 36.9	35 48	62.6	61 47.1	33 48	61.6	55
6	59 16.5	47 51	70.4	59 30.4	46 51	69.6	59 57.1	43 50	67.8	60 09.8	42 50	66.9	60 22.2	41 50	66.0	60 34.3	39 49	65.0	61 08.0	35 48	62.2	61 18.4	34 48	61.2	6
7	58 45.8	47 51	69.9	58 59.8	46 51	69.1	59 26.8	44 50	67.3	59 39.8	43 50	66.4	59 52.5	41 49	65.5	60 04.7	40 49	64.6	60 39.1	36 48	61.8	60 49.8	35 47	60.8	7
8	58 15.1	48 51	69.4	58 29.3	47 51	68.5	58 56.8	45 50	66.8	59 09.9	43 50	66.0	59 22.8	42 49	65.1	59 35.2	41 49	64.2	60 10.4	37 48	61.4	60 21.3	36 47	60.5	8
9	57 44.6	48 51	68.9	57 59.0	47 50	68.0	58 26.8	45 50	66.3	58 40.2	44 49	65.5	58 53.2	43 49	64.6	59 05.9	42 49	63.7	59 41.7	38 48	61.0	59 52.9	37 47	60.1	9
60	57 14.2	49 50	68.3	57 28.7	48 50	67.5	57 56.9	46 50	65.9	58 10.5	45 49	65.0	58 23.7	44 49	64.2	58 36.6	42 49	63.3	59 13.2	39 47	60.6	59 24.6	38 47	59.7	60
1	56 43.9	50 50	67.8	56 58.6	49 50	67.0	57 27.1	46 49	65.4	57 40.9	45 49	64.5	57 54.4	44 49	63.7	58 07.5	43 48	62.9	58 44.8	40 47	60.3	58 56.5	38 47	59.4	1
2	56 13.7	50 50	67.3	56 28.6	49 50	66.5	56 57.5	47 49	64.9	57 11.5	46 49	64.1	57 25.1	45 49	63.3	57 38.5	44 48	62.4	58 16.4	40 47	59.9	58 28.4	39 47	59.0	2
3	55 43.6	51 50	66.8	55 58.7	50 50	66.0	56 27.9	48 49	64.4	56 42.1	47 49	63.6	56 56.0	46 48	62.8	57 09.6	45 48	62.0	57 48.2	41 47	59.5	58 00.4	40 46	58.6	3
4	55 13.6	51 50	66.2	55 28.9	50 49	65.5	55 58.5	48 49	63.9	56 12.9	47 48	63.1	56 27.0	46 48	62.3	56 40.8	45 48	61.5	57 20.1	42 47	59.1	57 32.6	41 46	58.2	4
65	54 43.8	52 50	65.7	54 59.2	51 49	65.0	55 29.2	49 49	63.4	55 43.8	48 48	62.7	55 58.1	47 48	61.9	56 12.1	46 48	61.1	56 52.2	43 46	58.7	57 04.9	42 46	57.8	65
6	54 14.1	52 49	65.2	54 29.7	52 49	64.5	55 00.1	50 48	63.0	55 14.9	49 48	62.2	55 29.4	48 48	61.4	55 43.6	47 47	60.6	56 24.3	44 46	58.2	56 37.3	43 46	57.4	6
7	53 44.5	53 49	64.7	54 00.3	52 49	63.9	54 31.0	50 48	62.5	54 46.0	49 48	61.7	55 00.7	49 48	61.0	55 15.1	48 47	60.2	55 56.6	45 46	57.8	56 09.8	44 46	57.0	7
8	53 15.0	54 49	64.1	53 31.0	53 49	63.4	54 02.1	51 48	62.0	54 17.3	50 48	61.2	54 32.2	49 47	60.5	54 46.8	48 47	59.7	55 29.0	45 46	57.4	55 42.5	44 45	56.6	8
9	52 45.7	54 49	63.6	53 01.8	53 48	62.9	53 33.3	52 48	61.5	53 48.7	51 47	60.8	54 03.8	50 47	60.0	54 18.7	49 47	59.3	55 01.5	46 46	57.0	55 15.2	45 45	56.2	9
70	52 16.4	55 48	63.1	52 32.8	54 48	62.4	53 04.7	52 48	61.0	53 20.3	52 47	60.3	53 35.6	51 47	59.6	53 50.6	50 46	58.8	54 34.2	47 45	56.6	54 48.1	46 45	55.8	70
1	51 47.4	55 48	62.6	52 03.9	55 48	61.9	52 36.2	53 47	60.5	52 51.9	52 47	59.8	53 07.5	51 47	59.1	53 22.7	50 46	58.4	54 07.0	48 45	56.2	54 21.2	47 45	55.4	1
2	51 18.4	56 48	62.1	51 35.1	55 48	61.4	52 07.8	54 47	60.0	52 23.8	53 47	59.3	52 39.5	52 46	58.6	52 55.0	51 46	57.9	53 39.9	49 45	55.8	53 54.3	48 45	55.0	2
3	50 49.6	57 48	61.5	51 06.5	56 47	60.9	51 39.5	54 47	59.5	51 55.7	54 46	58.9	52 11.7	53 46	58.2	52 27.4	52 46	57.5	53 12.9	49 45	55.3	53 27.6	48 44	54.6	3
4	50 21.0	57 48	61.0	50 38.0	56 47	60.4	51 11.4	55 47	59.1	51 27.8	54 46	58.4	51 44.0	53 46	57.7	51 59.9	53 46	57.0	52 46.1	50 44	54.9	53 01.0	49 44	54.2	4
75	49 52.5	58 47	60.5	50 09.7	57 47	59.9	50 43.5	56 46	58.6	51 00.1	55 46	57.9	51 16.4	54 46	57.2	51 32.5	53 45	56.6	52 19.5	51 44	54.5	52 34.6	50 44	53.8	75
6	49 24.1	58 47	60.0	49 41.5	58 47	59.4	50 15.7	56 46	58.1	50 32.5	56 46	57.4	50 49.0	55 45	56.8	51 05.3	54 45	56.1	51 52.9	52 44	54.1	52 08.3	51 44	53.4	6
7	48 55.9	59 47	59.5	49 13.5	58 46	58.8	49 48.0	57 46	57.6	50 05.0	56 46	56.9	50 21.7	55 45	56.3	50 38.3	55 45	55.6	51 26.5	52 44	53.6	51 42.2	52 43	52.9	7
8	48 27.8	60 47	58.9	48 45.6	59 46	58.3	49 20.5	58 46	57.1	49 37.7	57 45	56.5	49 54.6	56 45	55.8	50 11.4	55 45	55.2	51 00.3	53 43	53.2	51 16.2	52 43	52.5	8
9	47 59.9	60 46	58.4	48 17.8	60 46	57.8	48 53.2	58 45	56.6	49 10.5	58 45	56.0	49 27.7	57 45	55.3	49 44.6	56 44	54.7	50 34.2	54 43	52.8	50 50.3	53 43	52.1	9
80	47 32.1	61 46	57.9	47 50.3	60 46	57.3	48 26.0	59 45	56.1	48 43.5	58 45	55.5	49 00.9	58 44	54.9	49 18.0	57 44	54.2	50 08.3	55 43	52.3	50 24.6	54 43	51.7	80
1	47 04.5	61 46	57.4	47 22.8	61 45	56.8	47 58.9	60 45	55.6	48 16.7	59 44	55.0	48 34.2	58 44	54.4	48 51.6	58 44	53.8	49 42.5	56 43	51.9	49 59.0	55 42	51.2	1
2	46 37.1	62 45	56.8	46 55.6	61 45	56.3	47 32.0	60 45	55.1	47 50.0	60 44	54.5	48 07.8	59 44	53.9	48 25.3	58 44	53.3	49 16.9	56 42	51.4	49 33.6	56 42	50.8	2
3	46 09.8	63 45	56.3	46 28.5	62 45	55.8	47 05.3	61 44	54.6	47 23.5	60 44	54.0	47 41.4	60 44	53.4	47 59.2	59 43	52.8	48 51.4	57 42	51.0	49 08.4	56 42	50.4	3
4	45 42.7	63 45	55.8	46 01.5	63 45	55.2	46 38.8	61 44	54.1	46 57.1	61 44	53.5	47 15.3	60 43	52.9	47 33.3	60 43	52.4	48 26.1	58 42	50.5	48 43.3	57 42	49.9	4
85	45 15.8	64 45	55.3	45 34.8	63 44	54.7	46 12.4	62 44	53.6	46 30.9	62 43	53.0	46 49.3	61 43	52.5	47 07.5	60 43	51.9	48 00.9	58 42	50.1	48 18.4	58 41	49.5	85
6	44 49.0	64 44	54.7	45 08.2	64 44	54.2	45 46.1	63 43	53.1	46 04.9	62 43	52.5	46 23.4	62 43	52.0	46 41.8	61 42	51.4	47 36.0	59 41	49.6	47 53.6	59 41	49.0	6
7	44 22.4	65 44	54.2	44 41.8	64 44	53.7	45 20.1	63 43	52.6	45 39.0	63 43	52.0	45 57.8	62 42	51.5	46 16.4	62 42	50.9	47 11.2	60 41	49.2	47 29.0	59 41	48.6	7
8	43 56.0	66 44	53.7	44 15.5	65 43	53.2	44 54.2	64 43	52.1	45 13.3	63 42	51.5	45 32.3	63 42	51.0	45 51.1	62 42	50.4	46 46.5	61 41	48.7	47 04.6	60 40	48.1	8
	43 29.7	66 43	53.2	43 49.5	66 43	52.6	44 28.5	65 43	51.6	44 47.8	64 42	51.1	45 07.0	64 42	50.5	45 26.0	63 42	50.0	46 22.0	61 40	48.3	46 40.4	61 40	47.7	9
	43 03.7	67 43	52.6	43 23.6	66 43	52.1	44 03.0	65 42	51.1	44 22.5	65 42	50.6	44 41.9	64 42	50.0	45 01.1	64 41	49.5	45 57.7	62 40	47.8	46 16.3	62 40	47.2	90

Copyright © 2008 Celestaire

Lat. 57°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	42 37.8	67 43	52.1	42 57.9	67 43	51.6	43 37.7	66 42	50.6	43 57.4	65 42	50.1	44 16.9	65 41	49.5	44 36.3	64 41	49.0	45 33.6	63 40	47.3	45 52.4	62 40	46.8	91
2	42 12.1	68 43	51.6	42 32.4	67 42	51.1	43 12.5	67 42	50.1	43 32.4	66 41	49.5	43 52.2	66 41	49.0	44 11.8	65 41	48.5	45 09.7	64 40	46.9	45 28.7	63 39	46.3	2
3	41 46.6	68 42	51.0	42 07.0	68 42	50.6	42 47.6	67 41	49.6	43 07.6	67 41	49.0	43 27.6	66 41	48.5	43 47.4	66 40	48.0	44 45.9	64 39	46.4	45 05.1	64 39	45.9	3
4	41 21.3	69 42	50.5	41 41.9	69 42	50.0	42 22.8	68 41	49.0	42 43.1	67 41	48.5	43 03.2	67 40	48.0	43 23.2	66 40	47.5	44 22.3	65 39	46.0	44 41.7	64 39	45.4	4
95	40 56.1	70 42	50.0	41 16.9	69 41	49.5	41 58.2	68 41	48.5	42 18.7	68 40	48.0	42 39.0	68 40	47.5	42 59.2	67 40	47.0	43 58.9	66 39	45.5	44 18.6	65 38	45.0	95
6	40 31.2	70 41	49.4	40 52.2	70 41	49.0	41 33.8	69 40	48.0	41 54.5	69 40	47.5	42 15.0	68 40	47.0	42 35.4	68 39	46.5	43 35.7	66 38	45.0	43 55.6	66 38	44.5	6
7	40 06.5	71 41	48.9	40 27.6	70 41	48.4	41 09.6	70 40	47.5	41 30.5	69 40	47.0	41 51.2	69 39	46.5	42 11.7	68 39	46.0	43 12.7	67 38	44.5	43 32.8	67 38	44.0	7
8	39 42.0	71 41	48.4	40 03.3	71 40	47.9	40 45.7	70 40	47.0	41 06.7	70 39	46.5	41 27.5	69 39	46.0	41 48.3	69 39	45.5	42 49.9	68 38	44.1	43 10.1	67 37	43.6	8
9	39 17.6	72 40	47.8	39 39.2	72 40	47.4	40 21.9	71 39	46.5	40 43.1	70 39	46.0	41 04.1	70 39	45.5	41 25.1	70 38	45.0	42 27.2	68 37	43.6	42 47.7	68 37	43.1	9
100	38 53.5	72 40	47.3	39 15.2	72 40	46.8	39 58.3	71 39	45.9	40 19.7	71 39	45.5	40 40.9	71 38	45.0	41 02.1	70 38	44.5	42 04.8	69 37	43.1	42 25.5	69 37	42.6	100
1	38 29.6	73 40	46.7	38 51.5	73 39	46.3	39 34.9	72 39	45.4	39 56.5	72 38	45.0	40 17.9	71 38	44.5	40 39.2	71 38	44.0	41 42.6	70 37	42.6	42 03.5	69 36	42.1	1
2	38 05.9	74 39	46.2	38 28.0	73 39	45.8	39 11.7	73 38	44.9	39 33.5	72 38	44.4	39 55.1	72 38	44.0	40 16.6	72 37	43.5	41 20.6	70 36	42.1	41 41.6	70 36	41.7	2
3	37 42.4	74 39	45.7	38 04.6	74 38	45.2	38 48.8	73 38	44.4	39 10.7	73 38	43.9	39 32.5	73 37	43.5	39 54.2	72 37	43.0	40 58.7	71 36	41.7	41 20.0	71 36	41.2	3
4	37 19.2	75 38	45.1	37 41.6	74 38	44.7	38 26.0	74 38	43.8	38 48.1	73 37	43.4	39 10.1	73 37	43.0	39 32.0	73 37	42.5	40 37.1	72 36	41.2	40 58.6	71 35	40.7	4
105	36 56.1	75 38	44.6	37 18.7	75 38	44.2	38 03.5	74 37	43.3	38 25.8	74 37	42.9	38 48.0	74 37	42.5	39 10.0	73 36	42.0	40 15.7	72 35	40.7	40 37.4	72 35	40.2	105
6	36 33.3	76 38	44.0	36 56.0	76 37	43.6	37 41.2	75 37	42.8	38 03.6	75 37	42.4	38 26.0	74 36	41.9	38 48.3	74 36	41.5	39 54.5	73 35	40.2	40 16.4	73 35	39.8	6
7	36 10.7	76 37	43.5	36 33.6	76 37	43.1	37 19.1	76 36	42.3	37 41.7	75 36	41.8	38 04.3	75 36	41.4	38 26.7	75 36	41.0	39 33.5	74 35	39.7	39 55.6	73 34	39.3	7
8	35 48.4	77 37	42.9	36 11.4	77 37	42.5	36 57.2	76 36	41.7	37 20.1	76 36	41.3	37 42.8	76 35	40.9	38 05.4	75 35	40.5	39 12.8	74 34	39.2	39 35.0	74 34	38.8	8
9	35 26.2	77 36	42.4	35 49.4	77 36	42.0	36 35.6	77 36	41.2	36 58.6	76 35	40.8	37 21.5	76 35	40.4	37 44.3	76 35	40.0	38 52.2	75 34	38.7	39 14.7	75 34	38.3	9
110	35 04.3	78 36	41.8	35 27.7	78 36	41.4	36 14.2	77 35	40.7	36 37.4	77 35	40.3	37 00.4	77 35	39.9	37 23.4	76 34	39.5	38 31.9	76 34	38.2	38 54.5	75 33	37.8	110
1	34 42.6	79 36	41.3	35 06.2	78 35	40.9	35 53.0	78 35	40.1	36 16.4	78 35	39.7	36 39.6	77 34	39.3	37 02.8	77 34	38.9	38 11.8	76 33	37.7	38 34.6	76 33	37.3	1
2	34 21.2	79 35	40.7	34 44.9	79 35	40.3	35 32.1	78 34	39.6	35 55.6	78 34	39.2	36 19.0	78 34	38.8	36 42.3	78 34	38.4	37 51.9	77 33	37.2	38 14.9	77 32	36.8	2
3	34 00.0	80 35	40.1	34 23.9	79 35	39.8	35 11.4	79 34	39.0	35 35.1	79 34	38.7	35 58.6	78 34	38.3	36 22.2	78 33	37.9	37 32.2	77 32	36.7	37 55.4	77 32	36.3	3
4	33 39.1	80 34	39.6	34 03.1	80 34	39.2	34 50.9	80 34	38.5	35 14.8	79 33	38.1	35 38.5	79 33	37.8	36 02.2	79 33	37.4	37 12.8	78 32	36.2	37 36.2	78 32	35.8	4
115	33 18.4	81 34	39.0	33 42.5	80 34	38.7	34 30.7	80 33	38.0	34 54.7	80 33	37.6	35 18.6	80 33	37.2	35 42.5	79 32	36.8	36 53.6	79 32	35.7	37 17.2	78 31	35.3	115
6	32 57.9	81 34	38.5	33 22.2	81 33	38.1	34 10.7	81 33	37.4	34 34.9	80 33	37.1	34 59.0	80 32	36.7	35 23.0	80 32	36.3	36 34.7	79 31	35.2	36 58.4	79 31	34.8	6
7	32 37.7	82 33	37.9	33 02.2	82 33	37.6	33 51.0	81 32	36.9	34 15.3	81 32	36.5	34 39.6	81 32	36.2	35 03.8	81 32	35.8	36 15.9	80 31	34.7	36 39.9	80 30	34.3	7
8	32 17.8	82 33	37.3	32 42.4	82 33	37.0	33 31.5	82 32	36.3	33 56.0	81 32	36.0	34 20.4	81 32	35.6	34 44.8	81 31	35.3	35 57.5	80 30	34.2	36 21.6	80 30	33.8	8
9	31 58.1	83 32	36.8	32 22.9	83 32	36.4	33 12.3	82 32	35.8	33 36.9	82 31	35.4	34 01.5	82 31	35.1	34 26.0	82 31	34.7	35 39.2	81 30	33.7	36 03.5	81 30	33.3	9
120	31 38.6	83 32	36.2	32 03.6	83 32	35.9	32 53.3	83 31	35.2	33 18.1	83 31	34.9	33 42.9	82 31	34.5	34 07.5	82 30	34.2	35 21.2	82 30	33.2	35 45.7	81 29	32.8	120
1	31 19.5	84 32	35.6	31 44.6	84 31	35.3	32 34.6	83 31	34.7	32 59.6	83 31	34.3	33 24.5	83 30	34.0	33 49.3	83 30	33.7	35 03.5	82 29	32.6	35 28.1	82 29	32.3	1
2	31 00.6	84 31	35.1	31 25.8	84 31	34.8	32 16.2	84 30	34.1	32 41.3	84 30	33.8	33 06.3	83 30	33.5	33 31.3	83 30	33.1	34 46.0	83 29	32.1	35 10.8	83 28	31.8	2
3	30 41.9	85 31	34.5	31 07.3	85 30	34.2	31 58.0	84 30	33.6	32 23.2	84 30	33.2	32 48.4	84 29	32.9	33 13.6	84 29	32.6	34 28.7	83 28	31.6	34 53.7	83 28	31.3	3
4	30 23.5	85 30	33.9	30 49.1	85 30	33.6	31 40.0	85 29	33.0	32 05.4	85 29	32.7	32 30.8	84 29	32.4	32 56.1	84 29	32.1	34 11.7	84 28	31.1	34 36.9	84 28	30.7	4
125	30 05.4	86 30	33.4	30 31.1	86 29	33.1	31 22.4	85 29	32.4	31 47.9	85 29	32.1	32 13.4	85 28	31.8	32 38.9	85 28	31.5	33 55.0	84 27	30.6	34 20.3	84 27	30.2	125
6	29 47.6	86 29	32.8	30 13.4	86 29	32.5	31 05.0	86 29	31.9	31 30.7	86 28	31.6	31 56.3	85 28	31.3	32 21.9	85 28	31.0	33 38.5	85 27	30.0	34 03.9	85 27	29.7	6
7	29 30.1	87 29	32.2	29 56.0	86 29	31.9	30 47.8	86 28	31.3	31 13.7	86 28	31.0	31 39.5	86 28	30.7	32 05.3	86 27	30.4	33 22.3	85 27	29.5	33 47.9	85 26	29.2	7
8	29 12.8	87 28	31.6	29 38.9	87 28	31.3	30 31.0	87 28	30.8	30 57.0	87 27	30.5	31 22.9	86 27	30.2	31 48.8	86 27	29.9	33 06.3	86 26	29.0	33 32.1	86 26	28.7	8
9	28 55.8	88 28	31.0	29 22.0	87 28	30.8	30 14.4	87 27	30.2	30 40.5	87 27	29.9	31 06.6	87 27	29.6	31 32.7	87 26	29.3	32 50.6	86 26	28.5	33 16.5	86 25	28.2	9
130	28 39.1	88 27	30.5	29 05.5	88 27	30.2	29 58.1	88 27	29.6	30 24.4	88 26	29.4	30 50.6	87 26	29.1	31 16.8	87 26	28.8	32 35.2	87 25	27.9	33 01.2	87 25	27.6	130
1	28 22.7	88 27	29.9	28 49.2	88 27	29.6	29 42.1	88 26	29.1	30 08.5	88 26	28.8	30 34.9	88 26	28.5	31 01.2	88 26	28.2	32 20.0	87 25	27.4	32 46.2	87 25	27.1	1
2	28 06.5	89 26	29.3	28 33.2	89 26	29.0	29 26.4	89 26	28.5	29 52.9	88 26	28.2	30 19.4	88 25	28.0	30 45.9	88 25	27.7	32 05.1	88 24	26.9	32 31.5	88 24	26.6	2
3	27 50.7	89 26	28.7	28 17.5	89 26	28.4	29 10.9	89 25	27.9	29 37.6	89 25	27.7	30 04.2	89 25	27.4	30 30.9	89 25	27.1	31 50.5	88 24	26.3	32 17.0	88 24	26.0	3
4	27 35.1	90 25	28.1	28 02.0	90 25	27.9	28 55.7	89 25	27.4	29 22.6	89 25	27.1	29 49.3	89 24	26.8	30 16.1	89 24	26.6	31 36.1	89 23	25.8	32 02.8	89 23	25.5	4
135	27 19.9	90 25	27.5	27 46.9	90 25	27.3	28 40.9	90 24	26.8	29 07.8	90 24	26.5	29 34.7	90 24	26.3	30 01.6	90 24	26.0	31 22.1	89 23	25.2	31 48.8	89 23	25.0	135
6	27 04.9	91 24	26.9	27 32.1	90 24	26.7	28 26.3	90 24	26.2	28 53.4	90 24	26.0	29 20.4	90 23	25.7	29 47.4	90 23	25.5	31 08.3	90 23	24.7	31 35.2	90 22	24.4	6
7	26 50.3	91 24	26.3	27 17.5	91 24	26.1	28 12.0	91 23	25.6	28 39.2	91 23	25.4	29 06.4	91 23	25.2	29 33.5	90 23	24.9	30 54.8	90 22	24.2	31 21.8	90 22	23.9	7
8	26 35.9	91 23	25.8	27 03.3	91 23	25.5	27 58.0	91 23	25.1	28 25.3	91 23	24.8	28 52.6	91 22	24.6	29 19.9	91 22	24.4	30 41.5	91 22	23.6	31 08.7	90 21	23.4	8
9	26 21.9	92 23	25.2	26 49.4	92 23	24.9	27 44.3	91 22	24.5	28 11.7	91 22	24.3	28 39.2	91 22	24.0	29 06.5	91 22	23.8	30 28.6	91 21	23.1	30 55.8	91 21	22.8	9
140	26 08.1	92 22	24.6	26 35.7	92 22	24.4	27 30.9	92 22	23.9	27 58.5	92 22	23.7	28 26.0	92 21	23.5	28 53.5	92 21	23.2	30 15.9	91 21	22.5	30 43.3	91 20	22.3	140
1	25 54.7	92 22	24.0	26 22.4	92 22	23.8	27 17.8	92 21	23.3	27 45.5	92 21	23.1	28 13.1	92 21	22.9	28 40.8	92 21	22.7	30 03.5	92 20	22.0	30 31.0	92 20	21.8	1
2	25 41.6	93 21	23.4	26 09.4	93 21	23.2	27 05.0	93 21	22.7	27 32.8	93 21	22.5	28 00.6	93 20	22.3	28 28.3	92 20	22.1	29 51.4	92 20	21.4	30 19.1	92 19	21.2	2
3	25 28.8	93 21	22.8	25 56.7	93 21	22.6	26 52.5	93 20	22.2	27 20.4	93 20	22.0	27 48.3	93 20	21.8	28 16.2	93 20	21.5	29 39.6	93 19	20.9	30 07.4	93 19	20.7	3
4	25 16.3	94 20	22.2	25 44.3	93 20	22.0	26 40.4	93 20	21.6	27 08.4	93 20	21.4	27 36.4	93 19	21.2	28 04.3	93 19	21.0	29 28.1	93 19	20.3	29 56.0	93 19	20.1	4
145	25 04.1	94 20	21.6	25 32.3	94 20	21.4	26 28.5	94 19	21.0	26 56.6	94 19	20.8	27 24.7	94 19	20.6	27 52.8	94 19	20.4	29 16.9	93 18	19.8	29 44.9	93 18	19.6	145
6	24 52.2	94 19	21.0	25 20.5	94 19	20.8	26 17.0	94 19	20.4	26 45.2	94 19	20.2	27 13.4	94 18	20.0	27 41.5	94 18	19.8	29 06.0	94 18	19.2	29 34.1	94 18	19.0	6
7	24 40.7	95 19	20.4	25 09.1	94 19	20.2	26 05.7	94 18	19.8	26 34.0	94 18	19.6	27 02.3	94 18	19.5	27 30.6	94 18	19.3	28 55.3	94 17	18.7	29 23.6	94 17	18.5	7
8	24 29.5	95 18	19.8	24 57.9	95 18	19.6	25 54.8	95 18	19.2	26 23.4	95 18	19.1	26 51.6	95 17	18.9	27 20.0	95 17	18.7	28 45.0	94 17	18.1	29 13.3	94 17	17.9	8
9	24 18.6	95 18	19.2	24 47.1	95 17	19.0	25 44.2	95 17	18.6	26 12.7	95 17	18.5	26 41.2	95 17	18.3	27 09.7	95 17	18.1	28 35.0	95 16	17.6	29 03.4	95 16	17.4	9
150	24 08.0	95 17	18.6	24 36.7	95 17	18.4	25 33.9	95 17	18.1	26 02.5	95 16	17.9	26 31.1	95 16	17.7	26 59.6	95 16	17.5	28 25.3	95 16	17.0	28 53.8	95 16	16.8	150
1	23 57.8	96 16	17.9	24 26.5	96 16	17.8	25 23.9	96 16	17.5	25 52.6	96 16	17.3	26 21.3	96 16	17.1	26 50.0	96 16	17.0	28 15.9	95 15	16.5	28 44.5	95 15	16.3	1
2	23 47.9	96 16	17.3	24 16.7	96 16	17.2	25 14.3	96 16	16.9	25 43.1	96 15	16.7	26 11.8	96 15	16.6	26 40.6	96 15	16.4	28 06.8	96 15	15.9	28 35.5	96 15	15.7	2
3	23 38.3	96 15	16.7	24 07.2	96 15	16.6	25 05.0	96 15	16.3	25 33.8	96 15	16.1	26 02.7	96 15	16.0	26 31.5	96 15	15.8	27 58.0	96 14	15.4	28 26.7	96 14	15.2	3
4	23 29.1	97 15	16.1	23 58.1	97 15	16.0	24 56.0	96 14	15.7	25 24.9	96 14	15.5	25 53.8	96 14	15.4	26 22.8	96 14	15.2	27 49.5	96 14	14.8	28 18.3	96 14	14.6	4
155	23 20.2	97 14	15.5	23 49.2	97 14	15.4	24 47.3	97 14	15.1	25 16.3	97 14	14.9	25 45.3	97 14	14.8	26 14.3	97 14	14.7	27 41.3	97 13	14.2	28 10.2	97 13	14.1	155
6	23 11.6	97 14	14.9	23 40.7	97 14	14.8	24 39.0	97 13	14.5	25 08.0	97 13	14.4	25 37.1	97 13	14.2	26 06.2	97 13	14.1	27 33.4	97 13	13.7	28 02.4	97 12	13.5	6
7	23 03.4	97 13	14.3	23 32.6	97 13	14.2	24 30.9	97 13	13.9	25 00.1	97 13	13.8	25 29.3	97 13	13.6	25 58.4	97 12	13.5	27 25.8	97 12	13.1	27 54.9	97 12	13.0	7
8	22 55.5	98 13	13.7	23 24.8	97 12	13.5	24 23.3	97 12	13.3	24 52.5	97 12	13.2	25 21.7	97 12	13.0	25 50.9	97 12	12.9	27 18.6	97 12	12.5	27 47.8	97 11	12.4	8
9	22 48.0	98 12	13.0	23 17.3	98 12	12.9	24 15.9	98 12	12.7	24 45.2	98 12	12.6	25 14.5	98 11	12.5	25 43.8	98 11	12.3	27 11.6	98 11	12.0	27 40.9	98 11	11.9	9
160	22 40.8	98 11	12.4	23 10.1	98 11	12.3	24 08.9	98 11	12.1	24 38.3	98 11	12.0	25 07.6	98 11	11.9	25 37.0	98 11	11.8	27 05.0	98 10	11.4	27 34.3	98 10	11.3	160
1	22 33.9	98 11	11.8	23 03.3	98 11	11.7	24 02.2	98 11	11.5	24 31.6	98 10	11.4	25 01.1	98 10	11.3	25 30.5	98 10	11.2	26 58.7	98 10	10.8	27 28.1	98 10	10.7	1
2	22 27.4	98 10	11.2	22 56.9	98 10	11.1	23 55.9	98 10	10.9	24 25.3	98 10	10.8	24 54.8	98 10	10.7	25 24.3	98 10	10.6	26 52.7	98 09	10.3	27 22.2	98 09	10.2	2
3	22 21.2	99 10	10.6	22 50.8	98 10	10.5	23 49.9	98 09	10.3	24 19.4	98 09	10.2	24 48.9	98 09	10.1	25 18.5	98 09	10.0	26 47.0	98 09	09.7	27 16.6	98 09	09.6	3
4	22 15.4	99 09	10.0	22 45.0	99 09	09.9	23 44.2	99 09	09.7	24 13.8	99 09	09.6	24 43.4	99 09	09.5	25 13.0	99 09	09.4	26 41.7	99 08	09.1	27 11.3	99 08	09.0	4
165	22 09.9	99 09	09.3	22 39.6	99 08	09.3	23 38.9	99 08	09.1	24 08.5	99 08	09.0	24 38.1	99 08	08.9	25 07.8	99 08	08.8	26 36.7	99 08	08.6	27 06.3	99 08	08.5	165
6	22 04.8	99 08	08.7	22 34.5	99 08	08.6	23 33.9	99 08	08.5	24 03.5	99 08	08.4	24 33.2	99 08	08.3	25 02.9	99 08	08.2	26 31.9	99 07	08.0	27 01.6	99 07	07.9	6
7	22 00.0	99 07	08.1	22 29.7	99 07	08.0	23 29.2	99 07	07.9	23 58.9	99 07	07.8	24 28.7	99 07	07.7	24 58.4	99 07	07.7	26 27.6	99 07	07.4	26 57.3	99 07	07.4	7
8	21 55.6	99 07	07.5	22 25.3	99 07	07.4	23 24.9	99 07	07.3	23 54.7	99 07	07.2	24 24.4	99 06	07.1	24 54.2	99 06	07.1	26 23.5	99 06	06.9	26 53.2	99 06	06.8	8
9	21 51.5	99 06	06.9	22 21.3	99 06	06.8	23 20.9	99 06	06.7	23 50.7	99 06	06.6	24 20.5	99 06	06.5	24 50.3	99 06	06.5	26 19.7	99 06	06.3	26 49.5	99 06	06.2	9
170	21 47.8	99 06	06.2	22 17.6	99 06	06.2	23 17.3	99 05	06.1	23 47.1	99 05	06.0	24 17.0	99 05	06.0	24 46.8	99 05	05.9	26 16.3	99 05	05.7	26 46.2	99 05	05.7	170
1	21 44.4	1.0 05	05.6	22 14.3	1.0 05	05.6	23 14.0	1.0 05	05.5	23 43.9	1.0 05	05.4	24 13.8	1.0 05	05.4	24 43.6	1.0 05	05.3	26 13.2	1.0 05	05.2	26 43.1	1.0 05	05.1	1
2	21 41.4	1.0 04	05.0	22 11.3	1.0 04	04.9	23 11.1	1.0 04	04.9	23 41.0	1.0 04	04.8	24 10.9	1.0 04	04.8	24 40.8	1.0 04	04.7	26 10.4	1.0 04	04.6	26 40.3	1.0 04	04.5	2
3	21 38.7	1.0 04	04.4	22 08.6	1.0 04	04.3	23 08.5	1.0 04	04.2	23 38.4	1.0 04	04.2	24 08.3	1.0 04	04.2	24 38.2	1.0 04	04.1	26 08.0	1.0 04	04.0	26 37.9	1.0 04	04.0	3
4	21 36.4	1.0 03	03.7	22 06.3	1.0 03	03.7	23 06.2	1.0 03	03.6	23 36.2	1.0 03	03.6	24 06.1	1.0 03	03.6	24 36.1	1.0 03	03.5	26 05.9	1.0 03	03.4	26 35.8	1.0 03	03.4	4
175	21 34.4	1.0 03	03.1	22 04.4	1.0 03	03.1	23 04.3	1.0 03	03.0	23 34.3	1.0 03	03.0	24 04.2	1.0 03	03.0	24 34.2	1.0 02	03.0	26 04.1	1.0 02	02.9	26 34.0	1.0 02	02.8	175
6	21 32.8	1.0 02	02.5	22 02.8	1.0 02	02.5	23 02.8	1.0 02	02.4	23 32.7	1.0 02	02.4	24 02.7	1.0 02	02.4	24 32.7	1.0 02	02.4	26 02.6	1.0 02	02.3	26 32.6	1.0 02	02.3	6
7	21 31.6	1.0 01	01.9	22 01.6	1.0 01	01.9	23 01.6	1.0 01	01.8	23 31.5	1.0 01	01.8	24 01.5	1.0 01	01.8	24 31.5	1.0 01	01.8	26 01.5	1.0 01	01.7	26 31.5	1.0 01	01.7	7
8	21 30.7	1.0 01	01.2	22 00.7	1.0 01	01.2	23 00.7	1.0 01	01.2	23 30.7	1.0 01	01.2	24 00.7	1.0 01	01.2	24 30.7	1.0 01	01.2	26 00.7	1.0 01	01.1	26 30.6	1.0 01	01.1	8
9	21 30.2	1.0 00	00.6	22 00.2	1.0 00	00.6	23 00.2	1.0 00	00.6	23 30.2	1.0 00	00.6	24 00.2	1.0 00	00.6	24 30.2	1.0 00	00.6	26 00.2	1.0 00	00.6	26 30.2	1.0 00	00.6	9
180	21 30.0	1.0 00	00.0	22 00.0	1.0 00	00.0	23 00.0	1.0 00	00.0	23 30.0	1.0 00	00.0	24 00.0	1.0 00	00.0	24 30.0	1.0 00	00.0	26 00.0	1.0 00	00.0	26 30.0	1.0 00	00.0	180

Lat. 58°

La 59

Lat. 57°

H.A.	60° 00′ Alt.		Az.	60° 30′ Alt.		Az.	62° 00′ Alt.		Az.	62° 30′ Alt.		Az.	63° 00′ Alt.		Az.	69° 00′ Alt.		Az.	69° 30′ Alt.		Az.	74° 80′ Alt.		Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	87 00.0	1.0 04	00.0	86 30.0	1.0 04	00.0	85 00.0	1.0 03	00.0	84 30.0	1.0 02	00.0	84 00.0	1.0 02	00.0	78 00.0	1.0 01	00.0	77 30.0	1.0 01	00.0	72 30.0	1.0 00	00.0	00
1	86 57.3	98 13	09.5	86 27.7	99 11	08.0	84 58.5	99 08	05.4	84 28.6	1.0 07	04.8	83 58.8	1.0 06	04.3	77 59.5	1.0 02	01.7	77 29.5	1.0 02	01.6	72 29.8	1.0 01	00.9	1
2	86 49.4	94 21	18.4	86 21.0	95 18	15.7	84 53.9	98 12	10.6	84 24.6	98 11	09.5	83 55.1	98 10	08.6	77 58.0	1.0 04	03.4	77 28.2	1.0 04	03.2	72 29.0	1.0 02	01.8	2
3	86 37.0	88 27	26.3	86 10.2	90 24	22.7	84 46.5	95 17	15.7	84 17.9	96 15	14.1	83 49.0	96 14	12.7	77 55.6	99 06	05.1	77 25.9	99 05	04.8	72 27.7	1.0 03	02.7	3
4	86 20.7	80 32	33.2	85 56.0	84 29	29.0	84 36.4	91 21	20.4	84 08.7	93 19	18.4	83 40.7	94 17	16.7	77 52.2	98 07	06.8	77 22.7	98 07	06.4	72 26.0	99 04	03.5	4
05	86 01.4	73 36	38.9	85 38.8	78 33	34.4	84 23.8	87 25	24.8	83 57.3	89 22	22.5	83 30.3	91 21	20.5	77 47.8	97 09	08.5	77 18.6	98 08	08.0	72 23.7	99 05	04.4	05
6	85 39.8	66 39	43.7	85 19.2	72 36	39.1	84 09.1	83 28	28.8	83 43.8	85 26	26.2	83 17.9	87 24	24.0	77 42.5	96 10	10.1	77 13.6	97 10	09.5	72 20.9	98 05	05.3	6
7	85 16.4	59 41	47.7	84 57.7	65 38	43.1	83 52.4	78 31	32.4	83 28.5	81 28	29.7	83 03.8	84 26	27.3	77 36.3	95 12	11.7	77 07.7	95 11	11.0	72 17.7	98 06	06.1	7
8	84 51.6	53 43	51.0	84 34.6	60 40	46.5	83 34.1	74 33	35.7	83 11.5	77 31	32.8	82 48.0	80 29	30.3	77 29.2	94 13	13.3	77 01.1	94 12	12.5	72 13.9	97 07	07.0	8
9	84 25.8	48 45	53.7	84 10.4	54 42	49.4	83 14.4	69 35	38.6	82 53.1	73 33	35.7	82 30.9	76 31	33.0	77 21.3	92 15	14.8	76 53.6	93 14	14.0	72 09.7	96 08	07.8	9
10	83 59.0	43 46	55.9	83 45.1	49 43	51.8	82 53.4	65 37	41.2	82 33.5	68 35	38.2	82 12.4	72 33	35.6	77 12.5	90 16	16.3	76 45.3	91 15	15.4	72 05.0	95 09	08.7	10
1	83 31.7	39 47	57.8	83 19.1	45 44	53.9	82 31.4	60 38	43.5	82 12.7	64 36	40.6	81 52.9	68 34	37.8	77 02.9	89 17	17.8	76 36.2	89 16	16.8	71 59.8	94 09	09.5	1
2	83 03.8	35 47	59.4	82 52.4	41 45	55.6	82 08.4	56 40	45.5	81 51.0	60 38	42.6	81 32.4	64 36	39.9	76 52.6	87 18	19.2	76 26.4	88 18	18.1	71 54.2	93 10	10.3	2
3	82 35.4	31 48	60.7	82 25.2	37 46	57.1	81 44.8	52 41	47.4	81 28.5	56 39	44.5	81 11.0	60 37	41.8	76 41.5	85 20	20.5	76 15.9	86 19	19.4	71 48.2	92 11	11.1	3
4	82 06.8	28 48	61.8	81 57.5	34 47	58.4	81 20.4	48 42	49.0	81 05.2	53 40	46.1	80 48.9	56 38	43.5	76 29.7	83 21	21.8	76 04.8	84 20	20.6	71 41.6	91 12	11.9	4
15	81 37.8	25 49	62.8	81 29.5	30 47	59.5	80 55.5	45 42	50.4	80 41.4	49 41	47.6	80 26.1	53 39	45.0	76 17.2	80 22	23.0	75 52.9	82 21	21.8	71 34.7	89 12	12.6	15
6	81 08.7	22 49	63.5	81 01.3	27 48	60.4	80 30.1	42 43	51.6	80 17.0	46 41	48.9	80 02.7	50 40	46.4	76 04.1	78 23	24.2	75 40.5	79 22	23.0	71 27.4	88 13	13.4	6
7	80 39.3	20 49	64.2	80 32.7	25 48	61.2	80 04.3	38 44	52.8	79 52.1	42 42	50.1	79 38.8	46 41	47.6	75 50.4	76 24	25.4	75 27.4	77 23	24.1	71 19.6	87 14	14.1	7
8	80 09.8	17 49	64.8	80 04.0	22 48	61.9	79 38.1	35 44	53.7	79 26.8	39 43	51.2	79 14.4	43 41	48.7	75 36.2	74 25	26.4	75 13.8	75 24	25.1	71 11.4	85 14	14.8	8
9	79 40.2	15 50	65.2	79 35.1	19 48	62.5	79 11.6	33 45	54.6	79 01.2	37 43	52.1	78 49.7	40 42	49.7	75 21.3	71 26	27.5	74 59.7	73 24	26.1	71 02.8	84 15	15.5	9
20	79 10.5	13 50	65.6	79 06.0	17 49	63.0	78 44.8	30 45	55.4	78 35.3	34 44	53.0	78 24.6	37 42	50.6	75 06.0	69 26	28.5	74 45.1	71 25	27.1	70 53.9	82 16	16.2	20
1	78 40.7	11 50	65.9	78 36.9	15 49	63.4	78 17.8	27 45	56.0	78 09.1	31 44	53.7	77 59.2	35 43	51.4	74 50.2	67 27	29.4	74 30.0	68 26	28.0	70 44.6	81 16	16.9	1
2	78 10.9	09 50	66.1	78 07.6	13 49	63.7	77 50.6	25 46	56.6	77 42.6	29 44	54.4	77 33.5	32 43	52.1	74 33.9	64 28	30.3	74 14.4	66 27	28.9	70 34.9	79 17	17.5	2
3	77 41.0	07 50	66.3	77 38.3	11 49	64.0	77 23.2	22 46	57.1	77 16.0	26 45	54.9	77 07.6	30 44	52.8	74 17.2	62 28	31.1	73 58.4	64 27	29.7	70 24.9	77 17	18.1	3
4	77 11.0	05 50	66.5	77 08.9	09 49	64.2	76 55.7	20 46	57.6	76 49.1	24 45	55.4	76 41.5	27 44	53.3	74 00.1	59 29	31.9	73 42.0	61 28	30.5	70 14.6	76 18	18.8	4
25	76 41.0	04 50	66.6	76 39.4	07 49	64.4	76 28.1	18 46	58.0	76 22.1	21 45	55.9	76 15.2	25 44	53.8	73 42.7	57 30	32.7	73 25.2	59 29	31.2	70 03.9	74 18	19.3	25
6	76 11.1	02 50	66.6	76 10.0	05 49	64.5	76 00.3	16 46	58.3	75 55.0	19 45	56.3	75 48.7	23 44	54.3	73 24.9	55 30	33.4	73 08.1	57 29	31.9	69 52.9	72 19	19.9	6
7	75 41.1	00 50	66.6	75 40.4	04 49	64.6	75 32.5	14 47	58.6	75 27.8	17 46	56.6	75 22.1	20 45	54.7	73 06.7	52 31	34.1	72 50.7	55 30	32.6	69 41.6	70 19	20.5	7
8	75 11.1	01 50	66.6	75 10.9	02 49	64.7	75 04.5	12 47	58.8	75 00.4	15 46	56.9	74 55.4	18 45	55.0	72 48.3	50 31	34.7	72 32.9	52 30	33.2	69 30.1	68 20	21.0	8
9	74 41.1	03 50	66.6	74 41.4	01 49	64.7	74 36.5	10 47	59.0	74 33.0	13 46	57.2	74 28.6	16 45	55.3	72 29.5	48 32	35.3	72 14.8	50 31	33.8	69 18.2	66 20	21.5	9
30	74 11.1	04 50	66.5	74 11.8	01 49	64.7	74 08.5	08 47	59.2	74 05.5	11 46	57.4	74 01.7	14 45	55.6	72 10.5	46 32	35.8	71 56.5	48 31	34.4	69 06.1	65 21	22.0	30
1	73 41.1	05 50	66.5	73 42.3	02 49	64.7	73 40.4	07 47	59.3	73 38.0	10 46	57.6	73 34.7	12 45	55.8	71 51.3	43 32	36.3	71 37.9	46 31	34.9	68 53.8	63 21	22.5	1
2	73 11.2	07 50	66.3	73 12.7	04 49	64.6	73 12.3	05 47	59.4	73 10.4	08 46	57.7	73 07.6	11 45	56.0	71 31.8	41 33	36.8	71 19.1	43 32	35.4	68 41.1	61 21	22.9	2
3	72 41.3	08 50	66.2	72 43.2	05 49	64.5	72 44.1	03 47	59.5	72 42.7	06 46	57.8	72 40.5	09 45	56.1	71 12.1	39 33	37.3	71 00.1	41 32	35.9	68 28.3	59 22	23.4	3
4	72 11.4	09 50	66.1	72 13.7	07 49	64.4	72 16.0	02 47	59.5	72 15.1	04 46	57.9	72 13.4	07 45	56.3	70 52.2	37 33	37.7	70 40.8	39 32	36.3	68 15.2	57 22	23.8	4
35	71 41.5	10 50	65.9	71 44.3	08 49	64.3	71 47.8	00 47	59.5	71 47.4	03 46	57.9	71 46.2	05 45	56.3	70 32.1	35 34	38.1	70 21.4	37 33	36.7	68 01.9	55 22	24.2	35
6	71 11.7	12 50	65.7	71 14.8	09 49	64.2	71 19.6	01 47	59.5	71 19.7	01 46	58.0	71 19.0	04 45	56.4	70 11.9	33 34	38.4	70 01.8	35 33	37.1	67 48.4	53 23	24.6	6
7	70 41.9	13 50	65.6	70 45.4	10 49	64.1	70 51.5	03 47	59.5	70 52.0	00 46	58.0	70 51.7	02 45	56.4	69 51.5	31 34	38.8	69 42.0	33 33	37.4	67 34.8	51 23	24.9	7
8	70 12.2	14 49	65.4	70 16.1	12 49	63.9	70 23.3	04 47	59.4	70 24.3	02 46	58.0	70 24.5	00 45	56.5	69 31.0	29 34	39.1	69 22.1	31 33	37.7	67 20.9	49 23	25.3	8
9	69 42.5	15 49	65.1	69 46.7	13 49	63.7	69 55.2	06 47	59.4	69 56.6	03 46	57.9	69 57.3	01 45	56.5	69 10.3	27 35	39.4	69 02.0	29 34	38.0	67 06.8	47 24	25.6	9
40	69 12.9	16 49	64.9	69 17.5	14 49	63.5	69 27.1	07 47	59.3	69 28.9	05 46	57.9	69 30.0	03 45	56.4	68 49.5	25 35	39.6	68 41.8	27 34	38.3	66 52.6	45 24	25.9	40
1	68 43.3	17 49	64.7	68 48.2	15 49	63.3	68 59.0	09 47	59.2	69 01.2	06 46	57.8	69 02.8	04 45	56.4	68 28.6	23 35	39.9	68 21.5	25 34	38.5	66 38.3	43 24	26.2	1
2	68 13.8	19 49	64.4	68 19.1	16 48	63.1	68 31.0	10 47	59.1	68 33.6	08 46	57.7	68 35.6	06 45	56.3	68 07.6	21 35	40.1	68 01.1	23 34	38.8	66 23.7	41 24	26.5	2
3	67 44.4	20 49	64.2	67 50.0	18 48	62.9	68 02.9	11 47	58.9	68 06.0	09 46	57.6	68 08.4	07 45	56.3	67 46.6	19 35	40.3	67 40.6	21 34	39.0	66 09.1	40 25	26.8	3
4	67 15.0	21 49	63.9	67 20.9	19 48	62.6	67 35.0	13 47	58.8	67 38.4	10 46	57.5	67 41.2	08 45	56.2	67 25.4	17 35	40.4	67 20.0	19 34	39.1	65 54.3	38 25	27.0	4
45	66 45.7	22 49	63.6	66 51.9	20 48	62.4	67 07.0	14 46	58.6	67 10.9	12 46	57.3	67 14.1	10 45	56.1	67 04.2	15 35	40.6	66 59.3	17 35	39.3	65 39.4	36 25	27.3	45
6	66 16.4	23 49	63.4	66 23.0	21 48	62.2	66 39.2	15 46	58.4	66 43.4	13 46	57.2	66 47.0	11 45	55.9	66 42.9	13 36	40.7	66 38.6	15 35	39.5	65 24.3	34 25	27.5	6
7	65 47.3	24 49	63.1	65 54.1	22 48	61.9	66 11.4	16 46	58.3	66 16.0	14 46	57.0	66 20.0	12 45	55.8	66 21.6	12 36	40.8	66 17.8	13 35	39.6	65 09.2	32 25	27.7	7
8	65 18.2	25 48	62.8	65 25.3	23 48	61.6	65 43.6	18 46	58.1	65 48.6	16 46	56.9	65 53.0	14 45	55.7	66 00.2	10 36	40.9	65 57.0	12 35	39.7	64 53.9	30 26	27.9	8
9	64 49.1	26 48	62.5	64 56.6	24 48	61.3	65 15.9	19 46	57.9	65 21.2	17 45	56.7	65 26.0	15 45	55.5	65 38.8	08 36	41.0	65 36.1	10 35	39.8	64 38.6	28 26	28.1	9
50	64 20.2	27 48	62.2	64 28.0	25 48	61.1	64 48.3	20 46	57.6	64 53.9	18 45	56.5	64 59.1	16 45	55.3	65 17.3	06 36	41.0	65 15.2	08 35	39.9	64 23.1	26 26	28.3	50
1	63 51.3	28 48	61.9	63 59.4	26 47	60.8	64 20.7	21 46	57.4	64 26.7	19 45	56.3	64 32.3	18 45	55.2	64 55.9	05 36	41.1	64 54.2	06 35	39.9	64 07.6	24 26	28.4	1
2	63 22.6	29 48	61.5	63 31.0	27 47	60.5	63 53.2	22 46	57.2	63 59.6	20 45	56.1	64 05.5	19 45	55.0	64 34.4	03 36	41.1	64 33.2	05 35	40.0	63 52.0	22 26	28.6	2
3	62 53.9	30 48	61.2	63 02.6	28 47	60.2	63 25.7	23 46	57.0	63 32.5	22 45	55.9	63 38.7	20 44	54.8	64 12.9	01 36	41.1	64 12.2	03 35	40.0	63 36.4	21 26	28.7	3
4	62 25.3	31 48	60.9	62 34.3	29 47	59.9	62 58.4	24 45	56.7	63 05.5	23 45	55.6	63 12.1	21 44	54.6	63 51.4	00 36	41.1	63 51.2	01 35	40.0	63 20.7	19 26	28.8	4
55	61 56.8	32 47	60.6	62 06.0	30 47	59.5	62 31.1	26 45	56.4	62 38.6	24 45	55.4	62 45.5	22 44	54.3	63 29.9	02 36	41.1	63 30.2	00 35	40.0	63 04.9	17 26	28.9	55
6	61 28.4	33 47	60.2	61 37.9	31 47	59.2	62 03.9	27 45	56.2	62 11.7	25 45	55.2	62 19.0	24 44	54.1	63 08.4	04 36	41.1	63 09.2	02 35	40.0	62 49.1	15 26	29.0	6
7	61 00.0	34 47	59.9	61 09.9	32 47	58.9	61 36.8	28 45	55.9	61 44.9	26 44	54.9	61 52.6	25 44	53.9	62 46.9	05 36	41.1	62 48.2	03 35	40.0	62 33.2	13 27	29.1	7
8	60 31.8	34 47	59.5	60 42.0	33 46	58.6	61 09.8	29 45	55.6	61 18.2	27 44	54.6	61 26.2	26 44	53.6	62 25.4	07 36	41.0	62 27.2	06 35	40.0	62 17.3	12 27	29.2	8
9	60 03.7	35 47	59.2	60 14.1	34 46	58.2	60 42.9	30 45	55.4	60 51.6	28 44	54.4	60 59.9	27 44	53.4	62 04.0	08 36	41.0	62 06.2	07 35	39.9	62 01.3	10 27	29.2	9
60	59 35.7	36 46	58.8	59 46.4	35 46	57.9	60 16.0	31 45	55.1	60 25.1	30 44	54.1	60 33.7	28 44	53.1	61 42.6	10 36	40.9	61 45.3	08 35	39.9	61 45.4	08 27	29.3	60
1	59 07.8	37 46	58.5	59 18.8	36 46	57.6	59 49.3	32 44	54.8	59 58.7	31 44	53.8	60 07.6	29 43	52.9	61 21.2	11 36	40.8	61 24.3	10 35	39.8	61 29.4	06 27	29.3	1
2	58 40.0	38 46	58.1	58 51.2	37 46	57.2	59 22.7	33 44	54.5	59 32.3	32 44	53.5	59 41.6	30 43	52.6	60 59.8	13 36	40.7	61 03.4	11 35	39.7	61 13.4	05 27	29.3	2
3	58 12.3	39 46	57.7	58 23.8	38 46	56.9	58 56.1	34 44	54.2	59 06.1	33 44	53.2	59 15.7	31 43	52.3	60 38.5	14 35	40.6	60 42.6	13 35	39.6	60 57.4	03 27	29.4	3
4	57 44.7	40 46	57.4	57 56.5	39 45	56.5	58 29.7	35 44	53.8	58 40.0	34 43	52.9	58 49.9	32 43	52.0	60 17.3	16 35	40.5	60 21.8	14 35	39.5	60 41.3	01 27	29.4	4
65	57 17.3	41 46	57.0	57 29.3	40 45	56.1	58 03.3	36 44	53.5	58 14.0	35 43	52.6	58 24.2	34 43	51.7	59 56.1	17 35	40.4	60 01.0	16 35	39.4	60 25.3	00 27	29.4	65
6	56 49.9	42 45	56.6	57 02.2	40 45	55.8	57 37.1	37 44	53.2	57 48.0	36 43	52.3	57 58.6	35 43	51.5	59 34.9	19 35	40.3	59 40.3	17 34	39.3	60 09.3	02 27	29.4	6
7	56 22.7	42 45	56.2	56 35.3	41 45	55.4	57 11.0	38 43	52.9	57 22.2	37 43	52.0	57 33.1	36 42	51.2	59 13.8	20 35	40.2	59 19.6	18 34	39.2	59 53.2	04 27	29.4	7
8	55 55.6	43 45	55.8	56 08.4	42 45	55.0	56 45.0	39 43	52.6	56 56.5	38 43	51.7	57 07.7	37 42	50.9	58 52.8	21 35	40.0	58 59.0	20 34	39.1	59 37.2	05 27	29.3	8
9	55 28.6	44 45	55.5	55 41.7	43 44	54.7	56 19.1	40 43	52.2	56 30.9	39 42	51.4	56 42.4	38 42	50.5	58 31.8	23 35	39.9	58 38.4	21 34	38.9	59 21.2	07 27	29.3	9
70	55 01.8	45 45	55.1	55 15.1	44 44	54.3	55 53.3	41 43	51.9	56 05.5	40 42	51.1	56 17.2	39 42	50.2	58 10.9	24 35	39.7	58 17.9	23 34	38.8	59 05.2	09 27	29.3	70
1	54 35.1	46 44	54.7	54 48.7	45 44	53.9	55 27.7	42 43	51.5	55 40.1	41 42	50.7	55 52.2	40 42	49.9	57 50.1	25 35	39.5	57 57.5	24 34	38.6	58 49.3	10 27	29.2	1
2	54 08.5	47 44	54.3	54 22.3	46 44	53.5	55 02.2	43 42	51.2	55 14.9	42 42	50.4	55 27.2	41 41	49.6	57 29.3	27 34	39.4	57 37.1	25 34	38.5	58 33.3	12 27	29.2	2
3	53 42.0	48 44	53.9	53 56.1	47 43	53.1	54 36.8	44 42	50.8	54 49.7	43 42	50.0	55 02.4	42 41	49.3	57 08.6	28 34	39.2	57 16.8	27 34	38.3	58 17.4	13 26	29.1	3
4	53 15.7	48 44	53.5	53 30.1	47 43	52.7	54 11.5	45 42	50.5	54 24.8	44 41	49.7	54 37.7	43 41	48.9	56 48.0	29 34	39.0	56 56.6	28 34	38.1	58 01.6	15 26	29.0	4
75	52 49.5	49 43	53.1	53 04.1	48 43	52.3	53 46.4	46 42	50.1	53 59.9	45 41	49.4	54 13.1	44 41	48.6	56 27.5	31 34	38.8	56 36.5	29 33	37.9	57 45.7	17 26	28.9	75
6	52 23.4	50 43	52.7	52 38.3	49 43	51.9	53 21.4	46 41	49.7	53 35.2	46 41	49.0	53 48.7	45 41	48.2	56 07.1	32 34	38.6	56 16.4	31 33	37.7	57 29.9	18 26	28.9	6
7	51 57.5	51 43	52.2	52 12.7	50 43	51.5	52 56.5	47 41	49.4	53 10.6	46 41	48.6	53 24.4	46 40	47.9	55 46.7	33 34	38.4	55 56.5	32 33	37.5	57 14.2	20 26	28.8	7
8	51 31.8	52 43	51.8	51 47.1	51 42	51.1	52 31.8	48 41	49.0	52 46.1	47 41	48.3	53 00.2	47 40	47.6	55 26.5	34 34	38.2	55 36.6	33 33	37.3	56 58.5	21 26	28.7	8
9	51 06.2	52 42	51.4	51 21.8	52 42	50.7	52 07.2	49 41	48.6	52 21.8	48 40	47.9	52 36.1	47 40	47.2	55 06.3	36 33	37.9	55 16.8	34 33	37.1	56 42.8	23 26	28.6	9
80	50 40.7	53 42	51.0	50 56.5	52 42	50.3	51 42.7	50 41	48.3	51 57.6	49 40	47.6	52 12.2	48 40	46.8	54 46.3	37 33	37.7	54 57.2	36 33	36.9	56 27.2	24 26	28.4	80
1	50 15.4	54 42	50.6	50 31.5	53 42	49.9	51 18.4	51 40	47.9	51 33.6	50 40	47.2	51 48.5	49 39	46.5	54 26.4	38 33	37.5	54 37.6	37 32	36.7	56 11.7	26 26	28.3	1
2	49 50.2	55 42	50.1	50 06.5	54 41	49.5	50 54.2	52 40	47.5	51 09.7	51 40	46.8	51 24.8	50 39	46.1	54 06.5	39 33	37.3	54 18.1	38 32	36.5	55 56.2	27 26	28.2	2
3	49 25.2	56 41	49.7	49 41.8	55 41	49.1	50 30.2	53 40	47.1	50 45.9	52 39	46.4	51 01.4	51 39	45.8	53 46.8	40 33	37.0	53 58.8	39 32	36.2	55 40.8	28 26	28.1	3
4	49 00.3	56 41	49.3	49 17.2	56 41	48.7	50 06.3	54 40	46.7	50 22.3	53 39	46.1	50 38.0	52 39	45.4	53 27.2	42 32	36.8	53 39.5	41 32	36.0	55 25.5	30 25	27.9	4
85	48 35.7	57 41	48.9	48 52.7	57 40	48.2	49 42.6	54 39	46.3	49 58.8	54 39	45.7	50 14.8	53 38	45.0	53 07.7	43 32	36.5	53 20.3	42 32	35.8	55 10.2	31 25	27.8	85
6	48 11.1	58 41	48.4	48 28.4	57 40	47.8	49 19.1	55 39	45.9	49 35.5	55 39	45.3	49 51.8	54 38	44.6	52 48.3	44 32	36.3	53 01.3	43 32	35.5	54 55.0	33 25	27.6	6
7	47 46.8	59 40	48.0	48 04.3	58 40	47.4	48 55.7	56 39	45.5	49 12.4	55 38	44.9	49 28.9	55 38	44.3	52 29.0	45 32	36.0	52 42.4	44 31	35.3	54 39.9	34 25	27.5	7
8	47 22.6	59 40	47.6	47 40.3	59 40	47.0	48 32.4	57 38	45.1	48 49.4	56 38	44.5	49 06.2	56 38	43.9	52 09.9	46 32	35.7	52 23.6	45 31	35.0	54 24.9	35 25	27.3	8
9	46 58.5	60 40	47.1	47 16.5	60 39	46.5	48 09.4	58 38	44.7	48 26.6	57 38	44.1	48 43.6	56 37	43.5	51 50.9	47 31	35.5	52 04.9	46 31	34.7	54 09.9	37 25	27.2	9
90	46 34.7	61 39	46.7	46 52.9	60 39	46.1	47 46.5	59 38	44.3	48 03.9	58 38	43.7	48 21.2	57 37	43.1	51 32.0	48 31	35.2	51 46.3	47 31	34.5	53 55.0	38 25	27.0	90

Digitized by Google

Lat. 57°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	46 11.0	62 39	46.2	46 29.4	61 39	45.7	47 23.7	59 38	43.9	47 41.4	59 37	43.3	47 59.0	58 37	42.7	51 13.2	49 31	34.9	51 27.9	49 30	34.2	53 40.3	39 24	26.8	91
2	45 47.5	63 39	45.8	46 06.2	62 38	45.2	47 01.1	60 37	43.5	47 19.1	60 37	42.9	47 36.9	59 37	42.3	50 54.6	50 31	34.6	51 09.6	50 30	33.9	53 25.6	41 24	26.6	2
3	45 24.2	63 39	45.3	45 43.0	63 38	44.8	46 38.7	61 37	43.1	46 56.9	60 37	42.5	47 15.0	60 36	41.9	50 36.1	52 31	34.3	50 51.4	51 30	33.6	53 11.0	42 24	26.4	3
4	45 01.0	64 38	44.9	45 20.1	63 38	44.3	46 16.5	62 37	42.7	46 35.0	61 36	42.1	46 53.2	61 36	41.5	50 17.7	53 30	34.0	50 33.4	52 30	33.4	52 56.5	43 24	26.3	4
95	44 38.0	65 38	44.4	44 57.4	64 38	43.9	45 54.4	63 36	42.2	46 13.1	62 36	41.7	46 31.7	61 36	41.1	49 59.5	54 30	33.7	50 15.5	53 30	33.1	52 42.1	45 24	26.1	95
6	44 15.3	65 38	44.0	44 34.8	65 37	43.4	45 32.6	63 36	41.8	45 51.5	63 36	41.3	46 10.3	62 35	40.7	49 41.4	55 30	33.4	49 57.7	54 29	32.8	52 27.7	46 24	25.9	6
7	43 52.7	66 37	43.5	44 12.4	66 37	43.0	45 10.9	64 36	41.4	45 30.1	64 35	40.8	45 49.1	63 35	40.3	49 23.5	56 30	33.1	49 40.1	55 29	32.5	52 13.5	47 24	25.7	7
8	43 30.3	67 37	43.0	43 50.3	66 37	42.5	44 49.4	65 36	41.0	45 08.8	64 35	40.4	45 28.0	64 35	39.9	49 05.7	57 29	32.8	49 22.6	56 29	32.2	51 59.4	48 23	25.5	8
9	43 08.1	68 37	42.6	43 28.3	67 36	42.1	44 28.0	66 35	40.5	44 47.7	65 35	40.0	45 07.2	65 34	39.5	48 48.1	58 29	32.5	49 05.3	57 29	31.9	51 45.5	49 23	25.2	9
100	42 46.0	68 36	42.1	43 06.5	68 36	41.6	44 06.9	66 35	40.1	44 26.8	66 35	39.6	44 46.5	66 34	39.0	48 30.6	59 29	32.2	48 48.1	58 28	31.6	51 31.6	51 23	25.0	100
1	42 24.2	69 36	41.7	42 44.8	69 36	41.2	43 46.0	67 35	39.7	44 06.1	67 34	39.1	44 26.0	66 34	38.6	48 13.3	60 29	31.9	48 31.1	59 28	31.3	51 17.8	52 23	24.8	1
2	42 02.6	70 36	41.2	42 23.4	69 35	40.7	43 25.2	68 34	39.2	43 45.5	68 34	38.7	44 05.7	67 34	38.2	47 56.1	61 28	31.5	48 14.2	60 28	31.0	51 04.2	53 23	24.6	2
3	41 41.2	70 35	40.7	42 02.2	70 35	40.2	43 04.6	69 34	38.8	43 25.2	68 34	38.3	43 45.6	68 33	37.8	47 39.1	62 28	31.2	47 57.5	61 28	30.6	50 50.6	54 22	24.4	3
4	41 20.0	71 35	40.2	41 41.2	71 35	39.8	42 44.3	69 34	38.3	43 05.0	69 33	37.8	43 25.7	69 33	37.3	47 22.2	63 28	30.9	47 40.9	62 27	30.3	50 37.2	55 22	24.1	4
105	40 59.0	72 35	39.8	41 20.4	71 34	39.3	42 24.1	70 33	37.9	42 45.1	70 33	37.4	43 06.0	69 33	36.9	47 05.5	63 28	30.6	47 24.5	63 27	30.0	50 23.9	56 22	23.9	105
6	40 38.1	72 34	39.3	40 59.8	72 34	38.8	42 04.1	71 33	37.4	42 25.3	70 33	37.0	42 46.4	70 32	36.5	46 49.0	64 27	30.2	47 08.2	64 27	29.7	50 10.7	58 22	23.6	6
7	40 17.6	73 34	38.8	40 39.4	73 34	38.4	41 44.4	72 33	37.0	42 05.8	71 32	36.5	42 27.1	71 32	36.0	46 32.6	65 27	29.9	46 52.1	65 27	29.3	49 57.7	59 22	23.4	7
8	39 57.2	74 34	38.3	40 19.2	73 33	37.9	41 24.8	72 32	36.5	41 46.5	72 32	36.1	42 08.0	72 32	35.6	46 16.4	66 27	29.5	46 36.2	66 26	29.0	49 44.8	60 21	23.2	8
9	39 37.0	74 33	37.9	39 59.3	74 33	37.4	41 05.5	73 32	36.1	41 27.3	73 32	35.6	41 49.1	72 31	35.2	46 00.4	67 26	29.2	46 20.5	67 26	28.7	49 32.0	61 21	22.9	9
110	39 17.1	75 33	37.4	39 39.5	75 33	36.9	40 46.3	74 32	35.6	41 08.4	73 31	35.2	41 30.3	73 31	34.7	45 44.6	68 26	28.9	46 04.9	67 26	28.3	49 19.3	62 21	22.7	110
1	38 57.3	76 33	36.9	39 20.0	75 32	36.5	40 27.4	74 31	35.2	40 49.7	74 31	34.7	41 11.8	74 30	34.3	45 28.9	69 26	28.5	45 49.5	68 25	28.0	49 06.8	63 21	22.4	1
2	38 37.8	76 32	36.4	39 00.7	76 32	36.0	40 08.7	75 31	34.7	40 31.1	75 30	34.3	40 53.5	74 30	33.8	45 13.4	70 26	28.1	45 34.2	69 25	27.6	48 54.4	64 20	22.1	2
3	38 18.6	77 32	35.9	38 41.6	77 31	35.5	39 50.2	76 30	34.2	40 12.8	75 30	33.8	40 35.4	75 30	33.4	44 58.0	71 25	27.8	45 19.1	70 25	27.3	48 42.2	65 20	21.9	3
4	37 59.5	78 31	35.4	38 22.7	77 31	35.0	39 31.9	76 30	33.8	39 54.8	76 30	33.4	40 17.6	76 29	32.9	44 42.9	71 25	27.4	45 04.2	71 25	26.9	48 30.1	66 20	21.6	4
115	37 40.7	78 31	34.9	38 04.1	78 31	34.5	39 13.8	77 30	33.3	39 36.9	77 29	32.9	39 59.9	76 29	32.5	44 27.9	72 25	27.1	44 49.5	72 24	26.6	48 18.1	67 20	21.4	115
6	37 22.1	79 31	34.4	37 45.7	79 30	34.0	38 56.0	78 29	32.9	39 19.3	77 29	32.4	39 42.5	77 29	32.0	44 13.1	73 24	26.7	44 35.0	73 24	26.2	48 06.3	68 19	21.1	6
7	37 03.7	79 30	33.9	37 27.5	79 30	33.6	38 38.4	78 29	32.4	39 01.8	78 29	32.0	39 25.2	78 28	31.6	43 58.6	74 24	26.3	44 20.6	73 24	25.9	47 54.6	69 19	20.8	7
8	36 45.6	80 30	33.4	37 09.6	80 30	33.1	38 21.0	79 29	31.9	38 44.7	79 28	31.5	39 08.2	78 28	31.1	43 44.2	75 24	26.0	44 06.5	74 23	25.5	47 43.1	70 19	20.5	8
9	36 27.7	81 29	32.9	36 51.8	80 29	32.6	38 03.8	80 28	31.4	38 27.7	79 28	31.0	38 51.5	79 28	30.7	43 29.9	75 23	25.6	43 52.5	75 23	25.1	47 31.7	71 19	20.3	9
120	36 10.1	81 29	32.4	36 34.4	81 29	32.1	37 46.9	80 28	31.0	38 10.9	80 28	30.6	38 34.9	80 27	30.2	43 15.9	76 23	25.2	43 38.7	76 23	24.8	47 20.4	72 18	20.0	120
1	35 52.7	82 29	31.9	36 17.1	82 28	31.6	37 30.2	81 27	30.5	37 54.4	81 27	30.1	38 18.6	80 27	29.7	43 02.1	77 23	24.9	43 25.1	77 22	24.4	47 09.3	73 18	19.7	1
2	35 35.5	82 28	31.4	36 00.2	82 28	31.1	37 13.8	81 27	30.0	37 38.2	81 27	29.6	38 02.5	81 26	29.3	42 48.4	78 22	24.5	43 11.7	77 22	24.0	46 58.4	74 18	19.4	2
3	35 18.6	83 28	30.9	35 43.4	83 28	30.6	36 57.5	82 27	29.5	37 22.1	82 26	29.2	37 46.6	82 26	28.8	42 35.0	78 22	24.1	42 58.5	78 22	23.7	46 47.6	74 18	19.1	3
4	35 01.9	83 27	30.4	35 26.9	83 27	30.1	36 41.6	83 26	29.0	37 06.3	82 26	28.7	37 31.0	82 26	28.3	42 21.8	79 22	23.7	42 45.5	79 21	23.3	46 37.0	75 17	18.8	4
125	34 45.5	84 27	29.9	35 10.7	84 27	29.6	36 25.8	83 26	28.6	36 50.7	83 26	28.2	37 15.6	83 25	27.9	42 08.7	80 21	23.3	42 32.6	80 21	22.9	46 26.6	76 17	18.5	125
6	34 29.3	85 27	29.4	34 54.7	84 26	29.1	36 10.3	84 25	28.1	36 35.4	84 25	27.7	37 00.5	83 25	27.4	41 55.9	81 21	22.9	42 20.0	80 21	22.5	46 16.3	77 17	18.2	6
7	34 13.4	85 26	28.9	34 38.9	85 26	28.6	35 55.1	84 25	27.6	36 20.3	84 25	27.2	36 45.6	84 24	26.9	41 43.3	81 21	22.5	42 07.6	81 20	22.2	46 06.1	78 17	17.9	7
8	33 57.8	86 26	28.4	34 23.4	85 25	28.0	35 40.1	85 25	27.1	36 05.5	85 24	26.8	36 30.9	85 24	26.4	41 30.8	82 20	22.2	41 55.4	82 20	21.8	45 56.1	79 16	17.6	8
9	33 42.4	86 25	27.8	34 08.2	86 25	27.5	35 25.3	85 24	26.6	35 50.9	85 24	26.3	36 16.5	85 24	26.0	41 18.6	83 20	21.8	41 43.4	82 20	21.4	45 46.3	79 16	17.3	9
130	33 27.2	87 25	27.3	33 53.2	86 25	27.0	35 10.8	86 24	26.1	35 36.6	86 23	25.8	36 02.3	86 23	25.5	41 06.6	83 20	21.4	41 31.5	83 19	21.0	45 36.7	80 16	17.0	130
1	33 12.4	87 24	26.8	33 38.5	87 24	26.5	34 56.5	87 23	25.6	35 22.5	86 23	25.3	35 48.4	86 23	25.0	40 54.8	84 19	21.0	41 19.9	84 19	20.6	45 27.2	81 16	16.7	1
2	32 57.8	88 24	26.3	33 24.0	87 24	26.0	34 42.5	87 23	25.1	35 08.6	87 23	24.8	35 34.7	87 22	24.5	40 43.2	85 19	20.6	41 08.5	84 19	20.2	45 17.9	82 15	16.4	2
3	32 43.4	88 23	25.8	33 09.8	88 23	25.5	34 28.8	88 22	24.6	34 55.1	87 22	24.3	35 21.3	87 22	24.0	40 31.8	85 19	20.2	40 57.4	85 18	19.8	45 08.8	83 15	16.1	3
4	32 29.4	89 23	25.2	32 55.9	88 23	25.0	34 15.3	88 22	24.1	34 41.7	88 22	23.8	35 08.1	88 22	23.5	40 20.7	86 18	19.8	40 46.4	86 18	19.4	44 59.8	83 15	15.8	4
135	32 15.6	89 23	24.7	32 42.2	89 22	24.4	34 02.1	89 22	23.6	34 28.6	88 21	23.3	34 55.2	88 21	23.0	40 09.7	86 18	19.4	40 35.6	86 18	19.0	44 51.0	84 14	15.5	135
6	32 02.0	89 22	24.2	32 28.9	89 22	23.9	33 49.1	89 21	23.1	34 15.8	89 21	22.8	34 42.5	89 21	22.6	39 59.0	87 18	19.0	40 25.1	87 17	18.6	44 42.4	85 14	15.1	6
7	31 48.8	90 22	23.7	32 15.7	90 21	23.4	33 36.4	90 21	22.6	34 03.3	89 20	22.3	34 30.1	89 20	22.1	39 48.5	88 17	18.6	40 14.7	87 17	18.2	44 33.9	85 14	14.8	7
8	31 35.8	90 21	23.1	32 02.9	90 21	22.9	33 24.0	90 20	22.1	33 51.0	90 20	21.8	34 17.9	90 20	21.6	39 38.2	88 17	18.1	40 04.6	88 16	17.8	44 25.6	86 14	14.5	8
9	31 23.1	91 21	22.6	31 50.3	91 20	22.4	33 11.9	90 20	21.6	33 39.0	90 20	21.3	34 06.0	90 19	21.1	39 28.1	89 16	17.7	39 54.7	88 16	17.4	44 17.5	87 13	14.2	9
140	31 10.7	91 20	22.1	31 38.1	91 20	21.8	33 00.0	91 19	21.1	33 27.2	91 19	20.8	33 54.4	91 19	20.6	39 18.3	89 16	17.3	39 45.0	89 16	17.0	44 09.6	87 13	13.9	140
1	30 58.6	92 20	21.5	31 26.0	92 20	21.3	32 48.3	91 19	20.6	33 15.7	91 19	20.3	33 43.1	91 18	20.1	39 08.7	90 16	16.9	39 35.6	90 15	16.6	44 01.9	88 13	13.5	1
2	30 46.7	92 19	21.0	31 14.3	92 19	20.8	32 37.0	92 18	20.1	33 04.5	92 18	19.8	33 32.0	92 18	19.6	38 59.3	90 15	16.5	39 26.3	90 15	16.2	43 54.3	89 12	13.2	2
3	30 35.1	92 19	20.5	31 02.9	92 19	20.2	32 25.9	92 18	19.6	32 53.5	92 18	19.3	33 21.2	92 18	19.1	38 50.1	91 15	16.1	39 17.3	91 15	15.8	43 47.0	89 12	12.9	3
4	30 23.9	93 18	19.9	30 51.7	93 18	19.7	32 15.1	93 18	19.0	32 42.9	92 17	18.8	33 10.6	92 17	18.6	38 41.2	91 14	15.7	39 08.5	91 14	15.4	43 39.8	90 12	12.5	4
145	30 12.9	93 18	19.4	30 40.8	93 18	19.2	32 04.6	93 17	18.5	32 32.5	93 17	18.3	33 00.3	93 17	18.1	38 32.5	92 14	15.2	39 00.0	92 14	15.0	43 32.8	90 11	12.2	145
6	30 02.2	94 17	18.8	30 30.2	94 17	18.6	31 54.3	93 17	18.0	32 22.3	93 16	17.8	32 50.3	93 16	17.6	38 24.0	92 14	14.8	38 51.7	92 14	14.6	43 26.0	91 11	11.9	6
7	29 51.8	94 17	18.3	30 19.9	94 17	18.1	31 44.4	94 16	17.5	32 12.5	94 16	17.3	32 40.6	94 16	17.1	38 15.8	93 13	14.4	38 43.5	92 13	14.2	43 19.3	91 11	11.5	7
8	29 41.6	94 16	17.8	30 09.9	94 16	17.6	31 34.7	94 16	17.0	32 02.9	94 16	16.8	32 31.1	94 15	16.6	38 07.8	93 13	14.0	38 35.7	93 13	13.7	43 12.9	92 10	11.2	8
9	29 31.8	95 16	17.2	30 00.2	95 16	17.0	31 25.3	94 15	16.5	31 53.6	94 15	16.3	32 21.9	94 15	16.1	38 00.0	93 13	13.5	38 28.0	93 12	13.3	43 06.6	92 10	10.9	9
150	29 22.3	95 15	16.7	29 50.8	95 15	16.5	31 16.2	95 15	15.9	31 44.6	95 15	15.8	32 13.0	95 14	15.6	37 52.5	94 12	13.1	38 20.6	94 12	12.9	43 00.6	93 10	10.5	150
1	29 13.1	95 15	16.1	29 41.7	95 15	16.0	31 07.3	95 14	15.4	31 35.9	95 14	15.2	32 04.4	95 14	15.1	37 45.2	94 12	12.7	38 13.4	94 12	12.5	42 54.7	93 09	10.2	1
2	29 04.2	96 14	15.6	29 32.8	96 14	15.4	30 58.8	95 14	14.9	31 27.4	95 14	14.7	31 56.0	95 13	14.5	37 38.1	95 11	12.3	38 06.5	95 11	12.1	42 49.0	94 09	09.8	2
3	28 55.5	96 14	15.0	29 24.3	96 14	14.9	30 50.5	96 13	14.4	31 19.3	96 13	14.2	31 48.0	96 13	14.0	37 31.3	95 11	11.8	37 59.8	95 11	11.6	42 43.5	94 09	09.5	3
4	28 47.2	96 13	14.5	29 16.1	96 13	14.3	30 42.6	96 13	13.8	31 11.4	96 13	13.7	31 40.2	96 12	13.5	37 24.7	95 11	11.4	37 53.3	95 10	11.2	42 38.2	95 08	09.2	4
155	28 39.2	96 13	13.9	29 08.1	96 13	13.8	30 34.9	96 12	13.3	31 03.8	96 12	13.2	31 32.7	96 12	13.0	37 18.4	96 10	11.0	37 47.1	96 10	10.8	42 33.1	95 08	08.8	155
6	28 31.5	97 12	13.4	29 00.5	97 12	13.2	30 27.5	97 12	12.8	30 56.5	97 12	12.6	31 25.5	97 12	12.5	37 12.3	96 10	10.5	37 41.1	96 10	10.4	42 28.2	95 08	08.5	6
7	28 24.1	97 12	12.8	28 53.2	97 12	12.7	30 20.4	97 11	12.3	30 49.5	97 11	12.1	31 18.6	97 11	12.0	37 06.4	96 09	10.1	37 35.3	96 09	09.9	42 23.5	96 08	08.1	7
8	28 17.0	97 11	12.3	28 46.1	97 11	12.1	30 13.6	97 11	11.7	30 42.8	97 11	11.6	31 11.9	97 11	11.5	37 00.8	97 09	09.7	37 29.8	97 09	09.5	42 19.0	96 07	07.8	8
9	28 10.2	98 11	11.7	28 39.4	97 11	11.6	30 07.1	97 10	11.2	30 36.3	97 10	11.1	31 05.6	97 10	11.0	36 55.4	97 09	09.2	37 24.5	97 08	09.1	42 14.6	96 07	07.4	9
160	28 03.7	98 10	11.2	28 33.0	98 10	11.1	30 00.9	98 10	10.7	30 30.2	98 10	10.6	30 59.5	98 10	10.4	36 50.3	97 08	08.8	37 19.5	97 08	08.7	42 10.5	97 07	07.1	160
1	27 57.5	98 10	10.6	28 26.9	98 10	10.5	29 55.0	98 09	10.2	30 24.4	98 09	10.0	30 53.7	98 09	09.9	36 45.4	98 08	08.4	37 14.7	97 08	08.2	42 06.6	97 06	06.7	1
2	27 51.6	98 09	10.1	28 21.1	98 09	10.0	29 49.4	98 09	09.6	30 18.8	98 09	09.5	30 48.2	98 09	09.4	36 40.8	98 07	07.9	37 10.1	98 07	07.8	42 02.8	97 06	06.4	2
3	27 46.1	98 09	09.5	28 15.6	98 09	09.4	29 44.1	98 08	09.1	30 13.6	98 08	09.0	30 43.0	98 08	08.9	36 36.4	98 07	07.5	37 05.8	98 07	07.4	41 59.3	98 06	06.0	3
4	27 40.8	99 08	09.0	28 10.4	99 08	08.9	29 39.1	98 08	08.6	30 08.6	98 08	08.5	30 38.1	98 08	08.4	36 32.2	98 06	07.1	37 01.7	98 06	06.9	41 56.0	98 05	05.7	4
165	27 35.9	99 08	08.4	28 05.5	99 08	08.3	29 34.3	99 07	08.0	30 03.9	99 07	07.9	30 33.5	99 07	07.8	36 28.3	98 06	06.6	36 57.9	98 06	06.5	41 52.8	98 05	05.3	165
6	27 31.3	99 07	07.8	28 00.9	99 07	07.8	29 29.9	99 07	07.5	29 59.6	99 07	07.4	30 29.2	99 07	07.3	36 24.7	99 06	06.2	36 54.3	99 06	06.1	41 49.9	98 05	05.0	6
7	27 27.0	99 07	07.3	27 56.7	99 07	07.2	29 25.8	99 06	07.0	29 55.5	99 06	06.9	30 25.2	99 06	06.8	36 21.3	99 05	05.7	36 51.0	99 05	05.6	41 47.2	99 04	04.6	7
8	27 23.0	99 06	06.7	27 52.8	99 06	06.7	29 22.0	99 06	06.4	29 51.7	99 06	06.4	30 21.5	99 06	06.3	36 18.2	99 05	05.3	36 47.9	99 05	05.2	41 44.6	99 04	04.3	8
9	27 19.3	99 06	06.2	27 49.1	99 06	06.1	29 18.5	99 05	05.9	29 48.3	99 05	05.8	30 18.1	99 05	05.8	36 15.3	99 04	04.9	36 45.0	99 04	04.8	41 42.3	99 04	03.9	9
170	27 16.0	99 05	05.6	27 45.8	99 05	05.5	29 15.3	99 05	05.4	29 45.1	99 05	05.3	30 14.9	99 05	05.2	36 12.6	99 04	04.4	36 42.4	99 04	04.4	41 40.2	99 03	03.6	170
1	27 12.9	1.0 05	05.0	27 42.8	1.0 04	05.0	29 12.4	1.0 04	04.8	29 42.2	1.0 04	04.8	30 12.1	1.0 04	04.7	36 10.2	99 04	04.0	36 40.1	99 04	03.9	41 38.2	99 03	03.2	1
2	27 10.2	1.0 04	04.5	27 40.1	1.0 04	04.4	29 09.8	1.0 04	04.3	29 39.7	1.0 04	04.2	30 09.6	1.0 04	04.2	36 08.1	1.0 03	03.5	36 37.9	1.0 03	03.5	41 36.5	99 03	02.9	2
3	27 07.8	1.0 03	03.9	27 37.8	1.0 03	03.9	29 07.5	1.0 03	03.8	29 37.4	1.0 03	03.7	30 07.3	1.0 03	03.7	36 06.2	1.0 03	03.1	36 36.1	1.0 03	03.0	41 35.0	1.0 02	02.5	3
4	27 05.8	1.0 03	03.4	27 35.7	1.0 03	03.3	29 05.5	1.0 03	03.2	29 35.4	1.0 03	03.2	30 05.4	1.0 03	03.1	36 04.5	1.0 02	02.7	36 34.5	1.0 02	02.6	41 33.7	1.0 02	02.1	4
175	27 04.0	1.0 02	02.8	27 34.0	1.0 02	02.8	29 03.8	1.0 02	02.7	29 33.8	1.0 02	02.7	30 03.7	1.0 02	02.6	36 03.2	1.0 02	02.2	36 33.1	1.0 02	02.2	41 32.5	1.0 02	01.8	175
6	27 02.6	1.0 02	02.2	27 32.5	1.0 02	02.2	29 02.4	1.0 02	02.1	29 32.4	1.0 02	02.1	30 02.4	1.0 02	02.1	36 02.0	1.0 01	01.8	36 32.0	1.0 01	01.7	41 31.6	1.0 01	01.4	6
7	27 01.4	1.0 01	01.7	27 31.4	1.0 01	01.7	29 01.4	1.0 01	01.6	29 31.4	1.0 01	01.6	30 01.3	1.0 01	01.6	36 01.1	1.0 01	01.3	36 31.1	1.0 01	01.3	41 30.9	1.0 01	01.1	7
8	27 00.6	1.0 01	01.1	27 30.6	1.0 01	01.1	29 00.6	1.0 01	01.1	29 30.6	1.0 01	01.1	30 00.6	1.0 01	01.0	36 00.5	1.0 01	00.9	36 30.5	1.0 01	00.9	41 30.4	1.0 00	00.7	8
9	27 00.2	1.0 00	00.6	27 30.2	1.0 00	00.6	29 00.2	1.0 00	00.5	29 30.2	1.0 00	00.5	30 00.2	1.0 00	00.5	36 00.1	1.0 00	00.4	36 30.1	1.0 00	00.4	41 30.1	1.0 00	00.4	9
180	27 00.0	1.0 00	00.0	27 30.0	1.0 00	00.0	29 00.0	1.0 00	00.0	29 30.0	1.0 00	00.0	30 00.0	1.0 00	00.0	36 00.0	1.0 00	00.0	36 30.0	1.0 00	00.0	41 30.0	1.0 00	00.0	180

Lat. 58°

Lat. 59°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 57°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	37	180	41	180	45	180	49	180	53	180	57	180	61	180	65	180	69	180	73	180	77	180	00
4	37	175	41	175	45	174	49	174	53	174	57	173	61	173	65	172	69	171	73	170	77	167	4
8	37	170	41	170	45	169	49	168	53	168	56	167	60	166	64	164	68	162	72	160	76	155	8
12	36	165	40	164	44	164	48	163	52	162	56	160	60	159	64	157	68	154	71	150	75	145	12
16	36	160	39	159	43	158	47	157	51	156	55	154	59	152	63	149	66	146	70	142	74	135	16
20	35	155	39	154	42	153	46	152	50	150	54	148	58	146	61	143	65	139	69	134	72	127	20
24	34	151	38	149	41	148	45	146	49	144	53	142	56	140	60	136	64	132	67	127	70	121	24
28	33	146	36	145	40	143	44	141	48	139	51	137	55	134	58	130	62	126	65	121	68	115	28
32	31	142	35	140	39	138	42	136	46	134	50	131	53	129	57	125	60	121	63	116	66	109	32
36	30	137	34	136	37	134	41	132	44	129	48	127	52	123	55	120	58	116	61	111	64	105	36
40	28	133	32	131	36	129	39	127	43	125	46	122	50	119	53	115	56	111	59	106	62	100	40
44	27	129	30	127	34	125	37	123	41	120	44	117	48	114	51	111	54	107	57	102	60	96	44
48	25	125	29	123	32	121	36	119	39	116	42	113	46	110	49	107	52	103	55	98	58	93	48
52	23	121	27	119	30	117	34	115	37	112	40	109	44	106	47	103	50	99	53	94	55	89	52
56	21	117	25	115	28	113	32	111	35	108	38	105	42	102	45	99	48	95	51	91	53	86	56
60	19	114	23	112	26	109	30	107	33	104	36	102	39	99	42	95	46	92	48	88	51	83	60
64	17	110	21	108	24	106	27	103	31	101	34	98	37	95	40	92	43	88	46	84	49	80	64
68	15	107	19	104	22	102	25	100	29	97	32	94	35	92	38	88	41	85	44	81	47	77	68
72	13	103	16	101	20	99	23	96	26	94	30	91	33	88	36	85	39	82	42	78	45	74	72
76	11	100	14	97	18	95	21	93	24	90	27	88	31	85	34	82	37	79	40	75	43	72	76
80	09	96	12	94	15	92	19	89	22	87	25	84	29	82	32	79	35	76	38	72	41	69	80
84	07	93	10	91	13	88	17	86	20	84	23	81	26	79	30	76	33	73	36	70	39	66	84
88	04	89	08	87	11	85	14	83	18	80	21	78	24	75	27	73	31	70	34	67	37	64	88
92	02	86	06	84	09	82	12	79	16	77	19	75	22	72	25	70	29	67	32	64	35	61	92
96	00	83	03	80	07	78	10	76	13	74	17	72	20	69	23	67	27	64	30	61	33	58	96
100	*02*	79	01	77	05	75	08	73	11	71	15	68	18	66	21	64	25	61	28	59	31	56	100
104	*04*	76	*01*	74	03	72	06	70	09	68	13	65	16	63	19	61	23	58	26	56	29	53	104
108	*06*	73	*03*	71	01	68	04	66	07	64	11	62	14	60	18	58	21	55	24	53	27	50	108
112	*08*	69	*05*	67	*01*	65	02	63	05	61	09	59	12	57	16	55	19	53	23	50	26	48	112
116	*10*	66	*07*	64	*03*	62	00	60	04	58	07	56	11	54	14	52	17	50	21	47	24	45	116
120	*12*	62	*09*	60	*05*	58	*02*	56	02	55	05	53	09	51	12	49	16	47	19	45	23	42	120
124	*14*	59	*11*	57	*07*	55	*04*	53	00	51	04	49	07	48	11	46	14	44	18	42	21	40	124
128	*16*	55	*12*	53	*09*	51	*05*	50	*02*	48	02	46	06	44	09	43	13	41	16	39	20	37	128
132	*18*	51	*14*	49	*10*	48	*07*	46	*03*	44	00	43	04	41	08	39	11	38	15	36	19	34	132
136	*19*	47	*16*	46	*12*	44	*08*	42	*05*	41	*01*	39	03	38	06	36	10	35	14	33	18	32	136
140	*21*	43	*17*	42	*14*	40	*10*	39	*06*	37	*02*	36	01	35	05	33	09	32	13	30	16	29	140
144	*22*	39	*19*	38	*15*	37	*11*	35	*07*	34	*04*	33	00	31	04	30	08	29	12	27	15	26	144
148	*24*	35	*20*	34	*16*	33	*12*	31	*08*	30	*05*	29	*01*	28	03	27	07	26	11	24	14	23	148
152	*25*	31	*21*	30	*17*	29	*13*	28	*09*	27	*06*	26	*02*	25	02	23	06	22	10	21	14	20	152
156	*26*	27	*22*	26	*18*	25	*14*	24	*10*	23	*07*	22	*03*	21	01	20	05	19	09	18	13	17	156
160	*27*	22	*23*	22	*19*	21	*15*	20	*11*	19	*07*	18	*03*	18	01	17	05	16	08	15	12	15	160
164	*28*	18	*24*	17	*20*	17	*16*	16	*12*	15	*08*	15	*04*	14	00	14	04	13	08	12	12	12	164
168	*28*	14	*24*	13	*20*	13	*16*	12	*12*	12	*08*	11	*04*	11	*00*	10	04	10	08	09	11	09	168
172	*29*	09	*25*	09	*21*	08	*17*	08	*13*	08	*09*	07	*05*	07	*01*	07	03	06	07	06	11	06	172
176	*29*	05	*25*	04	*21*	04	*17*	04	*13*	04	*09*	04	*05*	04	*01*	03	03	03	07	03	11	03	176
180	*29*	00	*25*	00	*21*	00	*17*	00	*13*	00	*09*	00	*05*	00	*01*	00	03	00	07	00	11	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18956

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

Lat. 57°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	81	180	85	180	89	180	87	00	83	00	79	00	75	00	71	00	67	00	63	00	59	00	00
4	81	163	84	153	88	113	86	33	83	14	79	08	75	05	71	03	67	02	63	01	59	00	4
8	80	148	83	134	85	99	85	51	82	26	78	15	75	09	71	06	67	04	63	02	59	01	8
12	78	136	81	121	83	94	83	59	81	35	78	22	74	14	70	09	67	05	63	03	59	01	12
16	77	126	79	112	81	90	81	64	80	42	77	27	74	18	70	11	66	07	63	04	59	01	16
20	75	118	77	105	79	87	79	66	78	46	76	31	73	21	70	14	66	08	63	04	59	01	20
24	73	112	75	100	77	84	77	66	76	49	75	35	72	24	69	16	66	10	62	05	59	02	24
28	71	106	73	95	75	82	75	67	75	51	73	38	71	27	68	18	65	11	62	06	59	02	28
32	69	101	71	92	72	80	73	66	73	53	72	40	70	29	68	20	65	13	62	07	59	02	32
36	67	97	69	88	70	78	71	66	71	53	71	41	69	31	67	21	64	14	62	07	59	02	36
40	64	93	67	85	68	76	69	65	70	54	69	42	68	32	66	23	64	15	61	08	59	02	40
44	62	90	64	82	66	74	67	64	68	54	68	43	67	33	65	24	63	16	61	09	58	03	44
48	60	87	62	80	64	72	65	63	66	53	66	43	66	34	64	25	63	16	61	09	58	03	48
52	58	84	60	77	62	70	63	62	64	53	65	43	64	34	63	25	62	17	60	10	58	03	52
56	56	81	58	75	60	68	61	60	63	52	63	43	63	34	63	26	62	18	60	10	58	03	56
60	54	78	56	72	58	66	60	59	61	51	62	43	62	35	62	26	61	18	60	10	58	03	60
64	52	75	54	70	56	64	58	57	59	50	60	43	61	34	61	26	60	18	59	11	58	03	64
68	49	73	52	68	54	62	56	56	57	49	59	42	59	34	60	26	59	18	59	11	58	03	68
72	47	70	50	65	52	60	54	54	56	48	57	41	58	34	59	26	59	19	58	11	58	04	72
76	45	67	48	63	50	58	52	53	54	47	56	40	57	33	58	26	58	19	58	11	57	04	76
80	43	65	46	61	48	56	51	51	53	45	54	39	56	33	57	26	57	19	58	11	57	04	80
84	41	63	44	59	47	54	49	49	51	44	53	38	55	32	56	25	57	18	57	11	57	04	84
88	39	60	42	56	45	52	47	48	50	43	52	37	53	31	55	25	56	18	57	11	57	04	88
92	38	58	40	54	43	50	46	46	48	41	50	36	52	30	54	24	55	18	56	11	57	04	92
96	36	55	39	52	42	48	44	44	47	40	49	35	51	29	53	24	55	17	56	11	57	04	96
100	34	53	37	49	40	46	43	42	45	38	48	33	50	28	52	23	54	17	56	10	57	04	100
104	32	50	35	47	38	44	41	40	44	36	47	32	49	27	51	22	53	16	55	10	56	04	104
108	31	48	34	45	37	42	40	38	43	35	46	31	48	26	51	21	53	16	55	10	56	03	108
112	29	45	32	43	36	40	39	36	42	33	45	29	47	25	50	20	52	15	54	10	56	03	112
116	28	43	31	40	34	37	37	34	40	31	43	28	46	24	49	19	52	15	54	09	56	03	116
120	26	40	30	38	33	35	36	32	39	29	42	26	46	22	48	18	51	14	54	09	56	03	120
124	25	38	28	35	32	33	35	30	38	28	42	25	45	21	48	17	51	13	53	08	56	03	124
128	24	35	27	33	31	31	34	28	37	26	41	23	44	20	47	16	50	12	53	08	56	03	128
132	22	33	26	31	29	29	33	26	36	24	40	21	43	18	47	15	50	12	53	07	56	03	132
136	21	30	25	28	28	26	32	24	36	22	39	20	43	17	46	14	49	11	52	07	56	02	136
140	20	27	24	26	28	24	31	22	35	20	38	18	42	15	45	13	49	10	52	06	55	02	140
144	19	25	23	23	27	22	30	20	34	18	38	16	41	14	45	12	49	09	52	06	55	02	144
148	18	22	22	21	26	19	30	18	33	16	37	14	41	13	45	10	48	08	52	05	55	02	148
152	18	19	21	18	25	17	29	16	33	14	37	13	40	11	44	09	48	07	52	05	55	02	152
156	17	17	21	16	25	14	29	13	32	12	36	11	40	09	44	08	48	06	51	04	55	01	156
160	16	14	20	13	24	12	28	11	32	10	36	09	40	08	44	07	47	05	51	03	55	01	160
164	16	11	20	10	24	10	28	09	32	08	36	07	39	06	43	05	47	04	51	03	55	01	164
168	15	08	19	08	23	07	27	07	31	06	35	05	39	05	43	04	47	03	51	02	55	01	168
172	15	06	19	05	23	05	27	04	31	04	35	04	39	03	43	03	47	02	51	01	55	00	172
176	15	03	19	03	23	02	27	02	31	02	35	02	39	02	43	01	47	01	51	01	55	00	176
180	15	00	19	00	23	00	27	00	31	00	35	00	39	00	43	00	47	00	51	00	55	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

16—15086

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 58°

Digitized by Google

Lat. 58°

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		°
00	32 00.0 1.0 01 180.0		32 30.0 1.0 01 180.0		33 00.0 1.0 01 180.0		33 30.0 1.0 01 180.0		34 00.0 1.0 01 180.0		34 30.0 1.0 01 180.0		35 00.0 1.0 01 180.0		35 30.0 1.0 01 180.0		00
1	31 59.7 1.0 02 178.8		32 29.7 1.0 02 178.8		32 59.7 1.0 02 178.8		33 29.7 1.0 02 178.8		33 59.7 1.0 02 178.8		34 29.7 1.0 02 178.8		34 59.7 1.0 02 178.8		35 29.7 1.0 02 178.8		1
2	31 58.7 1.0 03 177.6		32 28.7 1.0 03 177.6		32 58.7 1.0 03 177.6		33 28.7 1.0 03 177.6		33 58.7 1.0 03 177.6		34 28.7 1.0 03 177.6		34 58.6 1.0 03 177.6		35 28.6 1.0 03 177.5		2
3	31 57.1 1.0 04 176.5		32 27.0 1.0 04 176.4		32 57.0 1.0 04 176.4		33 27.0 1.0 04 176.4		33 57.0 1.0 04 176.4		34 27.0 1.0 04 176.4		34 57.0 1.0 04 176.3		35 26.9 1.0 04 176.3		3
4	31 54.8 1.0 05 175.3		32 24.7 1.0 05 175.3		32 54.7 1.0 05 175.2		33 24.7 1.0 05 175.2		33 54.7 1.0 05 175.2		34 24.6 1.0 05 175.2		34 54.6 1.0 05 175.1		35 24.6 1.0 05 175.1		4
05	31 51.8 1.0 06 174.1		32 21.8 1.0 06 174.1		32 51.7 1.0 06 174.0		33 21.7 1.0 06 174.0		33 51.7 1.0 06 174.0		34 21.6 1.0 06 173.9		34 51.6 1.0 06 173.9		35 21.5 1.0 06 173.9		05
6	31 48.2 1.0 07 172.9		32 18.2 1.0 07 172.9		32 48.1 1.0 07 172.9		33 18.0 1.0 07 172.8		33 48.0 1.0 07 172.8		34 17.9 1.0 07 172.7		34 47.8 1.0 07 172.7		35 17.8 1.0 07 172.7		6
7	31 44.0 1.0 08 171.8		32 13.9 1.0 08 171.7		32 43.8 1.0 08 171.7		33 13.7 1.0 08 171.6		33 43.7 1.0 08 171.6		34 13.6 1.0 08 171.5		34 43.5 1.0 08 171.5		35 13.4 1.0 08 171.4		7
8	31 39.1 1.0 09 170.6		32 09.0 1.0 09 170.5		32 38.9 1.0 09 170.5		33 08.8 1.0 09 170.4		33 38.7 1.0 09 170.4		34 08.6 1.0 09 170.3		34 38.4 1.0 10 170.3		35 08.3 1.0 10 170.2		8
9	31 33.6 1.0 10 169.4		32 03.5 1.0 10 169.4		32 33.3 1.0 10 169.3		33 03.2 1.0 10 169.2		33 33.0 1.0 10 169.2		34 02.9 99 11 169.1		34 32.7 99 11 169.1		35 02.6 99 11 169.0		9
10	31 27.5 99 11 168.3		31 57.3 99 11 168.2		32 27.1 99 11 168.1		32 56.9 99 12 168.1		33 26.7 99 12 168.0		33 56.6 99 12 167.9		34 26.4 99 12 167.9		34 56.2 99 12 167.8		10
1	31 20.7 99 12 167.1		31 50.5 99 12 167.0		32 20.2 99 12 167.0		32 50.0 99 13 166.9		33 19.8 99 13 166.8		33 49.6 99 13 166.7		34 19.4 99 13 166.7		34 49.1 99 13 166.6		1
2	31 13.3 99 13 165.9		31 43.0 99 13 165.9		32 12.8 99 14 165.8		32 42.5 99 14 165.7		33 12.2 99 14 165.6		33 42.0 99 14 165.5		34 11.7 99 14 165.5		34 41.4 99 14 165.4		2
3	31 05.2 99 14 164.8		31 34.9 99 14 164.7		32 04.6 99 15 164.6		32 34.3 99 15 164.5		33 04.0 99 15 164.4		33 33.7 99 15 164.4		34 03.4 99 15 164.3		34 33.1 99 15 164.2		3
4	30 56.6 99 15 163.6		31 26.2 99 16 163.5		31 55.9 99 16 163.4		32 25.5 99 16 163.4		32 55.2 99 16 163.3		33 24.8 99 16 163.2		33 54.5 99 16 163.1		34 24.1 99 16 163.0		4
15	30 47.3 99 16 162.5		31 16.9 99 17 162.4		31 46.5 99 17 162.3		32 16.1 99 17 162.2		32 45.7 99 17 162.1		33 15.3 99 17 162.0		33 44.9 99 17 161.9		34 14.5 99 17 161.8		15
6	30 37.4 99 17 161.3		31 07.0 99 18 161.2		31 36.5 99 18 161.1		32 06.1 99 18 161.0		32 35.6 98 18 160.9		33 05.2 98 18 160.8		33 34.7 98 18 160.7		34 04.2 98 18 160.6		6
7	30 26.9 98 18 160.2		30 56.4 98 19 160.1		31 25.9 98 19 160.0		31 55.4 98 19 159.9		32 24.9 98 19 159.7		32 54.4 98 19 159.6		33 23.9 98 19 159.5		33 53.4 98 19 159.4		7
8	30 15.8 98 19 159.0		30 45.3 98 20 158.9		31 14.7 98 20 158.8		31 44.2 98 20 158.7		32 13.6 98 20 158.6		32 43.0 98 20 158.5		33 12.5 98 20 158.4		33 41.9 98 20 158.2		8
9	30 04.2 98 20 157.9		30 33.6 98 20 157.8		31 02.9 98 21 157.7		31 32.3 98 21 157.6		32 01.7 98 21 157.4		32 31.1 98 21 157.3		33 00.4 98 21 157.2		33 29.8 98 21 157.1		9
20	29 51.9 98 21 156.8		30 21.2 98 22 156.7		30 50.6 98 22 156.5		31 19.9 98 22 156.4		31 49.2 98 22 156.3		32 18.5 98 22 156.2		32 47.8 98 22 156.0		33 17.1 98 22 155.9		20
1	29 39.1 98 22 155.6		30 08.4 98 22 155.5		30 37.6 98 23 155.4		31 06.9 98 23 155.3		31 36.1 97 23 155.1		32 05.4 97 23 155.0		32 34.6 97 23 154.9		33 03.8 97 23 154.7		1
2	29 25.7 97 23 154.5		29 54.9 97 23 154.4		30 24.1 97 23 154.3		30 53.3 97 24 154.1		31 22.5 97 24 154.0		31 51.6 97 24 153.9		32 20.8 97 24 153.7		32 50.0 97 24 153.6		2
3	29 11.7 97 24 153.4		29 40.9 97 24 153.3		30 10.0 97 24 153.1		30 39.1 97 25 153.0		31 08.2 97 25 152.9		31 37.4 97 25 152.7		32 06.4 97 25 152.6		32 35.5 97 25 152.4		3
4	28 57.2 97 25 152.3		29 26.3 97 25 152.2		29 55.4 97 25 152.0		30 24.4 97 25 151.9		30 53.5 97 26 151.7		31 22.5 97 26 151.6		31 51.5 97 26 151.4		32 20.5 97 26 151.3		4
25	28 42.2 97 26 151.2		29 11.2 97 26 151.0		29 40.2 97 26 150.9		30 09.2 97 26 150.8		30 38.1 97 26 150.6		31 07.1 97 27 150.4		31 36.0 96 27 150.3		32 05.0 96 27 150.1		25
6	28 26.6 96 27 150.1		28 55.5 96 27 149.9		29 24.4 96 27 149.8		29 53.4 96 27 149.6		30 22.3 96 27 149.5		30 51.1 96 27 149.3		31 20.0 96 28 149.2		31 48.9 96 28 149.0		6
7	28 10.5 96 28 149.0		28 39.3 96 28 148.8		29 08.2 96 28 148.7		29 37.0 96 28 148.5		30 05.8 96 28 148.4		30 34.6 96 28 148.2		31 03.4 96 28 148.0		31 32.2 96 29 147.9		7
8	27 53.8 96 29 147.9		28 22.6 96 29 147.8		28 51.4 96 29 147.6		29 20.2 96 29 147.4		29 48.9 96 29 147.3		30 17.6 96 29 147.1		30 46.4 96 29 146.9		31 15.1 96 29 146.8		8
9	27 36.7 96 29 146.8		28 05.4 96 30 146.7		28 34.1 96 30 146.5		29 02.8 96 30 146.3		29 31.5 96 30 146.2		30 00.1 95 30 146.0		30 28.8 95 30 145.8		30 57.4 95 30 145.6		9
30	27 19.1 95 30 145.8		27 47.7 95 30 145.6		28 16.3 95 30 145.4		28 44.9 95 31 145.2		29 13.5 95 31 145.1		29 42.1 95 31 144.9		30 10.6 95 31 144.7		30 39.2 95 31 144.5		30
1	27 00.9 95 31 144.7		27 29.5 95 31 144.5		27 58.0 95 31 144.3		28 26.5 95 31 144.2		28 55.0 95 32 144.0		29 23.5 95 32 143.8		29 52.0 95 32 143.6		30 20.5 95 32 143.4		1
2	26 42.3 95 32 143.6		27 10.8 95 32 143.4		27 39.2 95 32 143.3		28 07.7 95 32 143.1		28 36.1 95 32 142.9		29 04.5 95 32 142.7		29 32.9 95 33 142.5		30 01.3 95 33 142.3		2
3	26 23.2 95 33 142.6		26 51.6 95 33 142.4		27 20.0 95 33 142.2		27 48.3 95 33 142.0		28 16.7 94 33 141.8		28 45.0 94 33 141.6		29 13.3 94 33 141.4		29 41.7 94 34 141.3		3
4	26 03.6 94 33 141.5		26 32.0 94 34 141.3		27 00.3 94 34 141.1		27 28.5 94 34 140.9		27 56.8 94 34 140.8		28 25.1 94 34 140.6		28 53.3 94 34 140.4		29 21.5 94 34 140.2		4
35	25 43.6 94 34 140.5		26 11.9 94 34 140.3		26 40.1 94 34 140.1		27 08.3 94 35 139.9		27 36.5 94 35 139.7		28 04.6 94 35 139.5		28 32.8 94 35 139.3		29 00.9 94 35 139.1		35
6	25 23.2 94 35 139.4		25 51.3 94 35 139.2		26 19.4 94 35 139.0		26 47.6 94 35 138.8		27 15.7 94 35 138.6		27 43.8 94 36 138.4		28 11.8 94 36 138.2		28 39.9 93 36 138.0		6
7	25 02.3 94 36 138.4		25 30.3 94 36 138.2		25 58.4 93 36 138.0		26 26.4 93 36 137.8		26 54.4 93 36 137.6		27 22.5 93 36 137.4		27 50.4 93 36 137.2		28 18.4 93 36 137.0		7
8	24 40.9 93 36 137.3		25 08.9 93 36 137.1		25 36.9 93 36 136.9		26 04.8 93 37 136.7		26 32.8 93 37 136.5		27 00.7 93 37 136.3		27 28.6 93 37 136.1		27 56.5 93 37 135.9		8
9	24 19.2 93 37 136.3		24 47.1 93 37 136.1		25 15.0 93 37 135.9		25 42.9 93 37 135.7		26 10.7 93 37 135.5		26 38.6 93 38 135.3		27 06.4 93 38 135.1		27 34.2 93 38 134.9		9
40	23 57.0 93 38 135.3		24 24.8 93 38 135.1		24 52.7 93 38 134.9		25 20.4 93 38 134.7		25 48.2 93 38 134.5		26 16.0 93 38 134.3		26 43.7 92 38 134.1		27 11.5 92 39 133.8		40
1	23 34.4 93 38 134.3		24 02.2 92 38 134.1		24 29.9 92 39 133.9		24 57.6 92 39 133.7		25 25.3 92 39 133.5		25 53.0 92 39 133.2		26 20.7 92 39 133.0		26 48.3 92 39 132.8		1
2	23 11.5 92 39 133.3		23 39.2 92 39 133.1		24 06.8 92 39 132.9		24 34.5 92 39 132.6		25 02.1 92 39 132.4		25 29.7 92 40 132.2		25 57.2 92 40 132.0		26 24.8 92 40 131.8		2
3	22 48.2 92 40 132.3		23 15.7 92 40 132.1		23 43.3 92 40 131.9		24 10.9 92 40 131.6		24 38.4 92 40 131.4		25 05.9 92 40 131.2		25 33.4 92 40 131.0		26 00.9 92 40 130.8		3
4	22 24.5 92 40 131.3		22 52.0 92 40 131.1		23 19.5 92 40 130.9		23 46.9 92 41 130.6		24 14.4 91 41 130.4		24 41.8 91 41 130.2		25 09.2 91 41 130.0		25 36.6 91 41 129.7		4
45	22 00.4 91 41 130.3		22 27.8 91 41 130.1		22 55.2 91 41 129.9		23 22.6 91 41 129.6		23 50.0 91 41 129.4		24 17.4 91 41 129.2		24 44.7 91 42 129.0		25 12.0 91 42 128.7		45
6	21 36.0 91 41 129.3		22 03.3 91 41 129.1		22 30.6 91 42 128.9		22 58.0 91 42 128.6		23 25.3 91 42 128.4		23 52.5 91 42 128.2		24 19.8 91 42 128.0		24 47.0 91 42 127.7		6
7	21 11.2 91 42 128.3		21 38.5 91 42 128.1		22 05.7 91 42 127.9		22 33.0 91 42 127.7		23 00.2 91 42 127.4		23 27.4 91 42 127.2		23 54.6 91 43 127.0		24 21.7 90 43 126.7		7
8	20 46.1 91 42 127.4		21 13.3 91 43 127.1		21 40.5 91 43 126.9		22 07.6 91 43 126.7		22 34.8 90 43 126.5		23 01.9 90 43 126.2		23 29.0 90 43 126.0		23 56.1 90 43 125.8		8
9	20 20.6 90 43 126.4		20 47.8 90 43 126.2		21 14.9 90 43 125.9		21 42.0 90 43 125.7		22 09.0 90 43 125.5		22 36.1 90 44 125.2		23 03.1 90 44 125.0		23 30.1 90 44 124.8		9
50	19 54.9 90 43 125.4		20 22.0 90 44 125.2		20 49.0 90 44 125.0		21 16.0 90 44 124.7		21 43.0 90 44 124.5		22 10.0 90 44 124.3		22 36.9 90 44 124.0		23 03.9 90 44 123.8		50
1	19 28.8 90 44 124.5		19 55.8 90 44 124.2		20 22.8 90 44 124.0		20 49.7 90 44 123.8		21 16.6 90 44 123.5		21 43.5 90 45 123.3		22 10.4 90 45 123.1		22 37.3 89 45 122.8		1
2	19 02.5 90 44 123.5		19 29.4 90 45 123.3		19 56.3 90 45 123.1		20 23.1 90 45 122.8		20 50.0 89 45 122.6		21 16.8 89 45 122.3		21 43.6 89 45 122.1		22 10.4 89 45 121.9		2
3	18 35.8 89 45 122.6		19 02.7 89 45 122.3		19 29.5 89 45 122.1		19 56.3 89 45 121.9		20 23.1 89 45 121.6		20 49.8 89 45 121.4		21 16.6 89 46 121.1		21 43.3 89 46 120.9		3
4	18 08.9 89 45 121.6		18 35.7 89 45 121.4		19 02.4 89 46 121.2		19 29.1 89 46 120.9		19 55.8 89 46 120.7		20 22.5 89 46 120.4		20 49.2 89 46 120.2		21 15.9 89 46 119.9		4
55	17 41.7 89 46 120.7		18 08.4 89 46 120.5		18 35.1 89 46 120.2		19 01.7 89 46 120.0		19 28.4 89 46 119.7		19 55.0 89 46 119.5		20 21.6 89 46 119.2		20 48.2 89 47 119.0		55
6	17 14.2 89 46 119.8		17 40.9 89 46 119.5		18 07.5 89 46 119.3		18 34.1 89 47 119.0		19 00.6 89 47 118.8		19 27.2 88 47 118.6		19 53.7 88 47 118.3		20 20.2 88 47 118.1		6
7	16 46.5 89 47 118.8		17 13.1 89 47 118.6		17 39.6 88 47 118.4		18 06.1 88 47 118.1		18 32.6 88 47 117.9		18 59.1 88 47 117.6		19 25.6 88 47 117.4		19 52.1 88 47 117.1		7
8	16 18.5 88 47 117.9		16 45.0 88 47 117.7		17 11.5 88 47 117.4		17 38.0 88 47 117.2		18 04.4 88 47 116.9		18 30.8 88 48 116.7		18 57.3 88 48 116.4		19 23.6 88 48 116.2		8
9	15 50.3 88 47 117.0		16 16.8 88 48 116.8		16 43.2 88 48 116.5		17 09.6 88 48 116.3		17 36.0 88 48 116.0		18 02.3 88 48 115.8		18 28.7 88 48 115.5		18 55.0 88 48 115.3		9
60	15 21.9 88 48 116.1		15 48.2 88 48 115.8		16 14.6 88 48 115.6		16 41.0 88 48 115.3		17 07.3 88 48 115.1		17 33.6 88 48 114.8		17 59.9 88 48 114.6		18 26.1 88 48 114.3		60
1	14 53.2 88 48 115.2		15 19.5 88 48 114.9		15 45.8 88 48 114.7		16 12.1 88 48 114.4		16 38.4 88 48 114.2		17 04.6 87 49 113.9		17 30.8 87 49 113.7		17 57.1 87 49 113.4		1
2	14 24.3 88 48 114.3		14 50.6 88 49 114.0		15 16.8 87 49 113.8		15 43.1 87 49 113.5		16 09.3 87 49 113.3		16 35.5 87 49 113.0		17 01.6 87 49 112.8		17 27.8 87 49 112.5		2
3	13 55.2 87 49 113.4		14 21.4 87 49 113.1		14 47.6 87 49 112.9		15 13.8 87 49 112.6		15 40.0 87 49 112.4		16 06.1 87 49 112.1		16 32.2 87 49 111.8		16 58.3 87 49 111.6		3
4	13 26.0 87 49 112.5		13 52.1 87 49 112.2		14 18.2 87 49 112.0		14 44.4 87 49 111.7		15 10.5 87 49 111.5		15 36.5 87 50 111.2		16 02.6 87 50 110.9		16 28.7 87 50 110.7		4
65	12 56.5 87 49 111.6		13 22.6 87 50 111.3		13 48.7 87 50 111.1		14 14.7 87 50 110.8		14 40.8 87 50 110.6		15 06.8 87 50 110.3		15 32.8 87 50 110.0		15 58.8 87 50 109.8		65
6	12 26.8 87 50 110.7		12 52.9 87 50 110.4		13 18.9 87 50 110.2		13 44.9 87 50 109.9		14 10.9 87 50 109.7		14 36.9 87 50 109.4		15 02.9 87 50 109.1		15 28.8 86 50 108.9		6
7	11 57.0 87 50 109.8		12 23.0 87 50 109.5		12 49.0 87 50 109.3		13 14.9 87 50 109.0		13 40.9 86 50 108.8		14 06.8 86 50 108.5		14 32.8 86 50 108.3		14 58.7 86 50 108.0		7
8	11 27.0 87 50 108.9		11 52.9 86 50 108.7		12 18.9 86 50 108.4		12 44.8 86 50 108.1		13 10.7 86 51 107.9		13 36.6 86 51 107.6		14 02.5 86 51 107.4		14 28.3 86 51 107.1		8
9	10 56.8 86 50 108.0		11 22.7 86 51 107.8		11 48.6 86 51 107.5		12 14.5 86 51 107.3		12 40.4 86 51 107.0		13 06.2 86 51 106.7		13 32.1 86 51 106.5		13 57.9 86 51 106.2		9
70	10 26.5 86 51 107.2		10 52.4 86 51 106.9		11 18.2 86 51 106.6		11 44.1 86 51 106.4		12 09.9 86 51 106.1		12 35.7 86 51 105.9		13 01.5 86 51 105.6		13 27.3 86 51 105.3		70
1	9 56.1 86 51 106.3		10 21.9 86 51 106.0		10 47.7 86 51 105.8		11 13.5 86 51 105.5		11 39.3 86 51 105.2		12 05.1 86 51 105.0		12 30.8 86 51 104.7		12 56.6 86 51 104.5		1
2	9 25.5 86 51 105.4		9 51.3 86 51 105.1		10 17.0 86 51 104.9		10 42.8 86 51 104.6		11 08.6 86 51 104.4		11 34.3 86 52 104.1		12 00.0 86 52 103.8		12 25.7 86 52 103.6		2
3	8 54.8 86 51 104.5		9 20.5 86 51 104.3		9 46.3 86 52 104.0		10 12.0 86 52 103.8		10 37.7 86 52 103.5		11 03.4 86 52 103.2		11 29.1 86 52 103.0		11 54.7 86 52 102.7		3
4	8 23.9 86 52 103.7		8 49.7 86 52 103.4		9 15.4 86 52 103.1		9 41.0 86 52 102.9		10 06.7 86 52 102.6		10 32.4 86 52 102.4		10 58.0 85 52 102.1		11 23.7 85 52 101.8		4
75	7 53.0 86 52 102.8		8 18.7 86 52 102.5		8 44.3 86 52 102.3		9 10.0 86 52 102.0		9 35.6 85 52 101.8		10 01.3 85 52 101.5		10 26.9 85 52 101.2		10 52.5 85 52 101.0		75
6	7 21.9 86 52 101.9		7 47.6 85 52 101.7		8 13.2 85 52 101.4		8 38.8 85 52 101.2		9 04.5 85 52 100.9		9 30.1 85 52 100.6		9 55.7 85 52 100.4		10 21.2 85 52 100.1		6
7	6 50.8 85 52 101.1		7 16.4 85 52 100.8		7 42.0 85 52 100.6		8 07.6 85 52 100.3		8 33.2 85 52 100.0		8 58.8 85 52 99.8		9 24.3 85 52 99.5		9 49.9 85 52 99.2		7
8	6 19.5 85 52 100.2		6 45.1 85 52 100.0		7 10.7 85 52 99.7		7 36.3 85 52 99.4		8 01.8 85 52 99.2		8 27.4 85 52 98.9		8 53.0 85 52 98.6		9 18.5 85 52 98.4		8
9	5 48.2 85 52 99.4		6 13.8 85 52 99.1		6 39.3 85 52 98.8		7 04.9 85 52 98.6		7 30.4 85 52 98.3		7 56.0 85 52 98.0		8 21.5 85 53 97.8		8 47.0 85 53 97.5		9
80	5 16.8 85 52 98.5		5 42.3 85 52 98.2		6 07.9 85 53 98.0		6 33.4 85 53 97.7		6 58.9 85 53 97.4		7 24.4 85 53 97.2		7 49.9 85 53 96.9		8 15.4 85 53 96.7		80
1			5 10.8 85 53 97.4		5 36.4 85 53 97.1		6 01.9 85 53 96.9		6 27.4 85 53 96.6		6 52.9 85 53 96.3		7 18.4 85 53 96.1		7 43.8 85 53 95.8		1
2					5 04.8 85 53 96.3		5 30.3 85 53 96.0		5 55.8 85 53 95.7		6 21.2 85 53 95.5		6 46.7 85 53 95.2		7 12.2 85 53 94.9		2
3									5 24.1 85 53 94.9		5 49.6 85 53 94.6		6 15.0 85 53 94.4		6 40.5 85 53 94.1		3
4											5 17.9 85 53 93.8		5 43.3 85 53 93.5		6 08.8 85 53 93.2		4
85													5 11.6 85 53 92.7		5 37.0 85 53 92.4		85
6															5 05.2 85 53 91.5		6

Digitized by Google

Lat. 58°

H.A.	0° 00′ Alt.	Az.	0° 30′ Alt.	Az.	1° 00′ Alt.	Az.	1° 30′ Alt.	Az.	2° 00′ Alt.	Az.	2° 30′ Alt.	Az.	3° 00′ Alt.	Az.	3° 30′ Alt.	Az.	H.A.
°	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	°
00	32 00.0	1.0 01 180.0	31 30.0	1.0 01 180.0	31 00.0	1.0 01 180.0	30 30.0	1.0 01 180.0	30 00.0	1.0 01 180.0	29 30.0	1.0 01 180.0	29 00.0	1.0 01 180.0	28 30.0	1.0 01 180.0	00
1	31 59.7	1.0 02 178.8	31 29.7	1.0 02 178.8	30 59.7	1.0 02 178.8	30 29.7	1.0 02 178.8	29 59.7	1.0 02 178.8	29 29.7	1.0 02 178.9	28 59.7	1.0 02 178.9	28 29.7	1.0 02 178.9	1
2	31 58.7	1.0 03 177.6	31 28.7	1.0 03 177.7	30 58.7	1.0 03 177.7	30 28.7	1.0 03 177.7	29 58.7	1.0 03 177.7	29 28.7	1.0 03 177.7	28 58.7	1.0 03 177.7	28 28.7	1.0 03 177.7	2
3	31 57.1	1.0 04 176.5	31 27.1	1.0 04 176.5	30 57.1	1.0 04 176.5	30 27.1	1.0 04 176.5	29 57.1	1.0 04 176.5	29 27.1	1.0 04 176.6	28 57.1	1.0 04 176.6	28 27.2	1.0 04 176.6	3
4	31 54.8	1.0 05 175.3	31 24.8	1.0 05 175.3	30 54.8	1.0 05 175.3	30 24.9	1.0 05 175.4	29 54.9	1.0 05 175.4	29 24.9	1.0 05 175.4	28 54.9	1.0 05 175.4	28 25.0	1.0 05 175.5	4
05	31 51.8	1.0 06 174.1	31 21.9	1.0 06 174.1	30 51.9	1.0 06 174.2	30 22.0	1.0 06 174.2	29 52.0	1.0 06 174.2	29 22.0	1.0 06 174.3	28 52.1	1.0 06 174.3	28 22.1	1.0 06 174.3	05
6	31 48.2	1.0 07 172.9	31 18.3	1.0 07 173.0	30 48.4	1.0 07 173.0	30 18.4	1.0 07 173.0	29 48.5	1.0 07 173.1	29 18.6	1.0 07 173.1	28 48.6	1.0 07 173.2	28 18.7	1.0 07 173.2	6
7	31 44.0	1.0 08 171.8	31 14.1	1.0 08 171.8	30 44.2	1.0 08 171.8	30 14.3	1.0 08 171.9	29 44.4	1.0 08 171.9	29 14.4	1.0 08 172.0	28 44.5	1.0 08 172.0	28 14.6	1.0 08 172.1	7
8	31 39.1	1.0 09 170.6	31 09.2	1.0 09 170.6	30 39.4	1.0 09 170.7	30 09.5	1.0 09 170.7	29 39.6	1.0 09 170.8	29 09.7	1.0 09 170.8	28 39.8	1.0 09 170.9	28 09.9	1.0 09 170.9	8
9	31 33.6	1.0 10 169.4	31 03.8	1.0 10 169.5	30 33.9	1.0 10 169.5	30 04.0	1.0 10 169.6	29 34.2	1.0 10 169.6	29 04.3	1.0 10 169.7	28 34.4	1.0 10 169.8	28 04.6	1.0 10 169.8	9
10	31 27.5	99 11 168.3	30 57.6	99 11 168.3	30 27.8	99 11 168.4	29 58.0	99 11 168.4	29 28.1	99 11 168.5	28 58.3	99 11 168.6	28 28.5	99 11 168.6	27 58.6	99 11 168.7	10
1	31 20.7	99 12 167.1	30 50.9	99 12 167.2	30 21.1	99 12 167.2	29 51.3	99 12 167.3	29 21.5	99 12 167.4	28 51.7	99 12 167.4	28 21.9	99 12 167.5	27 52.1	99 12 167.6	1
2	31 13.3	99 13 165.9	30 43.5	99 13 166.0	30 13.8	99 13 166.1	29 44.0	99 13 166.2	29 14.2	99 13 166.2	28 44.5	99 13 166.3	28 14.7	99 13 166.4	27 44.9	99 13 166.4	2
3	31 05.2	99 14 164.8	30 35.5	99 14 164.9	30 05.8	99 14 164.9	29 36.1	99 14 165.0	29 06.4	99 14 165.1	28 36.6	99 14 165.2	28 06.9	99 14 165.2	27 37.2	99 14 165.3	3
4	30 56.6	99 15 163.6	30 26.9	99 15 163.7	29 57.2	99 15 163.8	29 27.5	99 15 163.9	28 57.9	99 15 164.0	28 28.2	99 15 164.0	27 58.5	99 15 164.1	27 28.8	99 15 164.2	4
15	30 47.3	99 16 162.5	30 17.7	99 16 162.6	29 48.0	99 16 162.6	29 18.4	99 16 162.7	28 48.8	99 16 162.8	28 19.2	99 16 162.9	27 49.5	99 16 163.0	27 19.9	99 16 163.1	15
6	30 37.4	99 17 161.3	30 07.8	99 17 161.4	29 38.3	99 17 161.5	29 08.7	99 17 161.6	28 39.1	99 17 161.7	28 09.5	99 17 161.8	27 39.9	99 17 161.9	27 10.3	99 17 162.0	6
7	30 26.9	98 18 160.2	29 57.4	98 18 160.3	29 27.9	98 18 160.4	28 58.4	98 18 160.5	28 28.8	98 18 160.6	27 59.3	98 18 160.7	27 29.8	98 18 160.8	27 00.2	98 18 160.9	7
8	30 15.8	98 19 159.0	29 46.4	98 19 159.1	29 16.9	98 19 159.3	28 47.4	98 19 159.4	28 18.0	98 19 159.5	27 48.5	98 19 159.6	27 19.0	98 19 159.7	26 49.5	98 19 159.8	8
9	30 04.2	98 20 157.9	29 34.8	98 20 158.0	29 05.4	98 20 158.1	28 35.9	98 20 158.2	28 06.5	98 20 158.4	27 37.1	98 20 158.5	27 07.7	98 20 158.6	26 38.2	98 20 158.7	9
20	29 51.9	98 21 156.8	29 22.6	98 21 156.9	28 53.2	98 21 157.0	28 23.9	98 21 157.1	27 54.5	98 21 157.2	27 25.1	98 21 157.4	26 55.8	98 21 157.5	26 26.4	98 21 157.6	20
1	29 39.1	98 22 155.6	29 09.8	98 22 155.8	28 40.5	98 22 155.9	28 11.2	98 22 156.0	27 41.9	98 22 156.1	27 12.6	98 22 156.3	26 43.3	98 22 156.4	26 14.0	98 22 156.5	1
2	29 25.7	97 23 154.5	28 56.5	97 23 154.7	28 27.3	97 23 154.8	27 58.0	97 23 154.9	27 28.8	97 23 155.0	26 59.5	97 23 155.2	26 30.3	98 23 155.3	26 01.0	98 22 155.4	2
3	29 11.7	97 24 153.4	28 42.6	97 24 153.5	28 13.4	97 24 153.7	27 44.3	97 24 153.8	27 15.1	97 24 153.9	26 45.9	97 24 154.1	26 16.7	97 24 154.2	25 47.5	97 23 154.3	3
4	28 57.2	97 25 152.3	28 28.2	97 25 152.4	27 59.1	97 25 152.6	27 30.0	97 25 152.7	27 00.9	97 25 152.9	26 31.8	97 24 153.0	26 02.6	97 24 153.1	25 33.5	97 24 153.3	4
25	28 42.2	97 26 151.2	28 13.2	97 26 151.3	27 44.2	97 26 151.5	27 15.1	97 26 151.6	26 46.1	97 26 151.8	26 17.0	97 25 151.9	25 48.0	97 25 152.0	25 18.9	97 25 152.2	25
6	28 26.6	96 27 150.1	27 57.7	96 27 150.2	27 28.7	97 27 150.4	26 59.8	97 26 150.5	26 30.8	97 26 150.7	26 01.8	97 26 150.8	25 32.8	97 26 151.0	25 03.8	97 26 151.1	6
7	28 10.5	96 28 149.0	27 41.6	96 28 149.2	27 12.7	96 27 149.3	26 43.9	96 27 149.5	26 15.0	96 27 149.6	25 46.1	96 27 149.8	25 17.1	96 27 149.9	24 48.2	96 27 150.1	7
8	27 53.8	96 29 147.9	27 25.1	96 28 148.1	26 56.3	96 28 148.2	26 27.4	96 28 148.4	25 58.6	96 28 148.5	25 29.8	96 28 148.7	25 00.9	96 28 148.8	24 32.1	96 28 149.0	8
9	27 36.7	96 29 146.8	27 08.0	96 29 147.0	26 39.3	96 29 147.2	26 10.5	96 29 147.3	25 41.8	96 29 147.5	25 13.0	96 29 147.6	24 44.2	96 29 147.8	24 15.5	96 29 147.9	9
30	27 19.1	95 30 145.8	26 50.4	95 30 145.9	26 21.8	96 30 146.1	25 53.1	96 30 146.3	25 24.4	96 30 146.4	24 55.7	96 30 146.6	24 27.0	96 29 146.7	23 58.3	96 29 146.9	30
1	27 00.9	95 31 144.7	26 32.4	95 31 144.9	26 03.8	95 31 145.0	25 35.2	95 31 145.2	25 06.6	95 31 145.4	24 38.0	95 30 145.5	24 09.4	95 30 145.7	23 40.7	95 30 145.9	1
2	26 42.3	95 32 143.6	26 13.8	95 32 143.8	25 45.3	95 32 144.0	25 16.8	95 31 144.1	24 48.3	95 31 144.3	24 19.7	95 31 144.5	23 51.2	95 31 144.6	23 22.6	95 31 144.8	2
3	26 23.2	95 33 142.6	25 54.8	95 32 142.7	25 26.4	95 32 142.9	24 57.9	95 32 143.1	24 29.5	95 32 143.3	24 01.0	95 32 143.4	23 32.6	95 32 143.6	23 04.1	95 32 143.8	3
4	26 03.6	94 33 141.5	25 35.3	94 33 141.7	25 07.0	94 33 141.9	24 38.6	95 33 142.0	24 10.3	95 33 142.2	23 41.9	95 33 142.4	23 13.5	95 33 142.6	22 45.1	95 32 142.8	4
35	25 43.6	94 34 140.5	25 15.4	94 34 140.6	24 47.1	94 34 140.8	24 18.8	94 34 141.0	23 50.5	94 34 141.2	23 22.2	94 33 141.4	22 53.9	94 33 141.6	22 25.6	94 33 141.7	35
6	25 23.2	94 35 139.4	24 55.0	94 35 139.6	24 26.8	94 35 139.8	23 58.6	94 34 140.0	23 30.4	94 34 140.2	23 02.2	94 34 140.3	22 33.9	94 34 140.5	22 05.7	94 34 140.7	6
7	25 02.3	94 36 138.4	24 34.2	94 35 138.6	24 06.1	94 35 138.8	23 37.9	94 35 139.0	23 09.8	94 35 139.1	22 41.7	94 35 139.3	22 13.5	94 35 139.5	21 45.3	94 35 139.7	7
8	24 40.9	93 36 137.3	24 12.9	93 36 137.5	23 44.9	93 36 137.7	23 16.9	93 36 137.9	22 48.8	94 36 138.1	22 20.7	94 36 138.3	21 52.7	94 35 138.5	21 24.6	94 35 138.7	8
9	24 19.2	93 37 136.3	23 51.2	93 37 136.5	23 23.3	93 37 136.7	22 55.3	93 37 136.9	22 27.4	93 36 137.1	21 59.4	93 36 137.3	21 31.4	93 36 137.5	21 03.4	93 36 137.7	9
40	23 57.0	93 38 135.3	23 29.2	93 37 135.5	23 01.3	93 37 135.7	22 33.4	93 37 135.9	22 05.5	93 37 136.1	21 37.6	93 37 136.3	21 09.7	93 37 136.5	20 41.8	93 37 136.7	40
1	23 34.4	93 38 134.3	23 06.7	93 38 134.5	22 38.9	93 38 134.7	22 11.1	93 38 134.9	21 43.3	93 38 135.1	21 15.5	93 38 135.3	20 47.6	93 37 135.5	20 19.8	93 37 135.7	1
2	23 11.5	92 39 133.3	22 43.8	92 39 133.5	22 16.1	92 39 133.7	21 48.4	92 38 133.9	21 20.7	92 38 134.1	20 52.9	93 38 134.3	20 25.1	93 38 134.5	19 57.4	93 38 134.7	2
3	22 48.2	92 40 132.3	22 20.6	92 39 132.5	21 52.9	92 39 132.7	21 25.3	92 39 132.9	20 57.6	92 39 133.1	20 30.0	92 39 133.3	20 02.3	92 39 133.5	19 34.6	92 39 133.7	3
4	22 24.5	92 40 131.3	21 56.9	92 40 131.5	21 29.4	92 40 131.7	21 01.8	92 40 131.9	20 34.2	92 40 132.1	20 06.7	92 39 132.3	19 39.0	92 39 132.6	19 11.4	92 39 132.8	4
45	22 00.4	91 41 130.3	21 32.9	92 41 130.5	21 05.5	92 40 130.7	20 38.0	92 40 130.9	20 10.5	92 40 131.2	19 43.0	92 40 131.4	19 15.4	92 40 131.6	18 47.9	92 40 131.8	45
6	21 36.0	91 41 129.3	21 08.6	91 41 129.5	20 41.2	91 41 129.8	20 13.8	91 41 130.0	19 46.4	91 41 130.2	19 18.9	91 41 130.4	18 51.5	92 40 130.6	18 24.0	92 40 130.8	6
7	21 11.2	91 42 128.3	20 43.9	91 42 128.6	20 16.6	91 42 128.8	19 49.3	91 41 129.0	19 21.9	91 41 129.2	18 54.5	91 41 129.4	18 27.2	91 41 129.7	17 59.8	91 41 129.9	7
8	20 46.1	91 42 127.4	20 18.9	91 42 127.6	19 51.6	91 42 127.8	19 24.4	91 42 128.0	18 57.1	91 42 128.3	18 29.8	91 42 128.5	18 02.5	91 42 128.7	17 35.2	91 42 128.9	8
9	20 20.6	90 43 126.4	19 53.5	91 43 126.6	19 26.3	91 43 126.9	18 59.2	91 43 127.1	18 32.0	91 42 127.3	18 04.8	91 42 127.5	17 37.5	91 42 127.7	17 10.3	91 42 128.0	9
50	19 54.9	90 43 125.4	19 27.8	90 43 125.7	19 00.7	90 43 125.9	18 33.6	90 43 126.1	18 06.5	90 43 126.3	17 39.4	90 43 126.6	17 12.2	91 43 126.8	16 45.1	91 43 127.0	50
1	19 28.8	90 44 124.5	19 01.8	90 44 124.7	18 34.8	90 44 124.9	18 07.8	90 44 125.2	17 40.8	90 43 125.4	17 13.7	90 43 125.6	16 46.6	90 43 125.8	16 19.5	90 43 126.1	1
2	19 02.5	90 44 123.5	18 35.6	90 44 123.8	18 08.6	90 44 124.0	17 41.7	90 44 124.2	17 14.7	90 44 124.5	16 47.7	90 44 124.7	16 20.7	90 44 124.9	15 53.7	90 44 125.1	2
3	18 35.8	89 45 122.6	18 09.0	90 45 122.8	17 42.1	90 45 123.0	17 15.2	90 45 123.3	16 48.3	90 44 123.5	16 21.4	90 44 123.7	15 54.5	90 44 124.0	15 27.5	90 44 124.2	3
4	18 08.9	89 45 121.6	17 42.1	89 45 121.9	17 15.3	89 45 122.1	16 48.5	89 45 122.3	16 21.7	89 45 122.6	15 54.8	90 45 122.8	15 28.0	90 45 123.0	15 01.1	90 45 123.3	4
55	17 41.7	89 46 120.7	17 15.0	89 46 120.9	16 48.3	89 46 121.2	16 21.5	89 45 121.4	15 54.7	89 45 121.6	15 28.0	89 45 121.9	15 01.2	89 45 122.1	14 34.4	89 45 122.3	55
6	17 14.2	89 46 119.8	16 47.6	89 46 120.0	16 20.9	89 46 120.3	15 54.2	89 46 120.5	15 27.5	89 46 120.7	15 00.8	89 46 121.0	14 34.1	89 46 121.2	14 07.4	89 45 121.4	6
7	16 46.5	89 47 118.8	16 19.9	89 46 119.1	15 53.3	89 46 119.3	15 26.7	89 46 119.6	15 00.1	89 46 119.8	14 33.4	89 46 120.0	14 06.8	89 46 120.3	13 40.1	89 46 120.5	7
8	16 18.5	88 47 117.9	15 52.0	88 47 118.2	15 25.5	88 47 118.4	14 58.9	89 47 118.6	14 32.4	89 47 118.9	14 05.8	89 46 119.1	13 39.2	89 46 119.4	13 12.6	89 46 119.6	8
9	15 50.3	88 47 117.0	15 23.9	88 47 117.2	14 57.4	88 47 117.5	14 30.9	88 47 117.7	14 04.4	88 47 118.0	13 37.9	88 47 118.2	13 11.4	88 47 118.5	12 44.8	88 47 118.7	9
60	15 21.9	88 48 116.1	14 55.5	88 48 116.3	14 29.1	88 48 116.6	14 02.6	88 47 116.8	13 36.2	88 47 117.1	13 09.8	88 47 117.3	12 43.3	88 47 117.6	12 16.8	88 47 117.8	60
1	14 53.2	88 48 115.2	14 26.9	88 48 115.4	14 00.5	88 48 115.7	13 34.2	88 48 115.9	13 07.8	88 48 116.2	12 41.4	88 48 116.4	12 15.0	88 48 116.6	11 48.6	88 47 116.9	1
2	14 24.3	88 48 114.3	13 58.1	88 48 114.5	13 31.8	88 48 114.8	13 05.5	88 48 115.0	12 39.1	88 48 115.3	12 12.8	88 48 115.5	11 46.5	88 48 115.8	11 20.1	88 48 116.0	2
3	13 55.2	87 49 113.4	13 29.0	87 49 113.6	13 02.8	87 49 113.9	12 36.5	88 49 114.1	12 10.3	88 48 114.4	11 44.0	88 48 114.6	11 17.7	88 48 114.9	10 51.4	88 48 115.1	3
4	13 26.0	87 49 112.5	12 59.8	87 49 112.7	12 33.6	87 49 113.0	12 07.4	87 49 113.2	11 41.2	87 49 113.5	11 15.0	87 49 113.7	10 48.8	87 49 114.0	10 22.5	87 48 114.2	4
65	12 56.5	87 49 111.6	12 30.4	87 49 111.8	12 04.2	87 49 112.1	11 38.1	87 49 112.3	11 12.0	87 49 112.6	10 45.8	87 49 112.8	10 19.6	87 49 113.1	9 53.4	87 49 113.3	65
6	12 26.8	87 50 110.7	12 00.8	87 50 110.9	11 34.7	87 50 111.2	11 08.6	87 49 111.4	10 42.5	87 49 111.7	10 16.4	87 49 111.9	9 50.3	87 49 112.2	9 24.1	87 49 112.4	6
7	11 57.0	87 50 109.8	11 31.0	87 50 110.1	11 05.0	87 50 110.3	10 38.9	87 50 110.6	10 12.9	87 50 110.8	9 46.8	87 50 111.1	9 20.7	87 50 111.3	8 54.7	87 49 111.6	7
8	11 27.0	87 50 108.9	11 01.0	87 50 109.2	10 35.1	87 50 109.4	10 09.1	87 50 109.7	9 43.1	87 50 109.9	9 17.1	87 50 110.2	8 51.0	87 50 110.4	8 25.0	87 50 110.7	8
9	10 56.8	86 50 108.0	10 30.9	86 50 108.3	10 05.0	86 50 108.5	9 39.0	86 50 108.8	9 13.1	87 50 109.1	8 47.1	87 50 109.3	8 21.1	87 50 109.6	7 55.2	87 50 109.8	9
70	10 26.5	86 51 107.2	10 00.7	86 51 107.4	9 34.8	86 51 107.7	9 08.9	86 51 107.9	8 43.0	86 50 108.2	8 17.0	86 50 108.4	7 51.1	86 50 108.7	7 25.2	86 50 108.9	70
1	9 56.1	86 51 106.3	9 30.2	86 51 106.5	9 04.4	86 51 106.8	8 38.5	86 51 107.0	8 12.7	86 51 107.3	7 46.8	86 51 107.6	7 20.9	86 51 107.8	6 55.0	86 50 108.1	1
2	9 25.5	86 51 105.4	8 59.7	86 51 105.7	8 33.9	86 51 105.9	8 08.1	86 51 106.2	7 42.2	86 51 106.4	7 16.4	86 51 106.7	6 50.6	86 51 106.9	6 24.7	86 51 107.2	2
3	8 54.8	86 51 104.5	8 29.0	86 51 104.8	8 03.3	86 51 105.1	7 37.5	86 51 105.3	7 11.7	86 51 105.6	6 45.9	86 51 105.8	6 20.1	86 51 106.1	5 54.3	86 51 106.3	3
4	8 23.9	86 52 103.7	7 58.2	86 52 103.9	7 32.5	86 51 104.2	7 06.7	86 51 104.4	6 41.0	86 51 104.7	6 15.2	86 51 105.0	5 49.5	86 51 105.2	5 23.7	86 51 105.5	4
75	7 53.0	86 52 102.8	7 27.3	86 52 103.1	7 01.6	86 52 103.3	6 35.9	86 52 103.6	6 10.2	86 52 103.8	5 44.5	86 51 104.1	5 18.7	86 51 104.4			75
6	7 21.9	86 52 101.9	6 56.3	86 52 102.2	6 30.6	86 52 102.5	6 04.9	86 52 102.7	5 39.3	86 52 103.0	5 13.6	86 52 103.2					6
7	6 50.8	85 52 101.1	6 25.1	85 52 101.3	5 59.5	85 52 101.6	5 33.9	85 52 101.9	5 08.2	86 52 102.1							7
8	6 19.5	85 52 100.2	5 53.9	85 52 100.5	5 28.3	85 52 100.7	5 02.7	85 52 101.0									8
9	5 48.2	85 52 99.4	5 22.6	85 52 99.6													9
80	5 16.8	85 52 98.5															80

Lat. 58°

Lat. 59°

Digitized by Google

Lat. 58°

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30′		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	°
00	36 00.0 1.0 01	180.0	36 30.0 1.0 01	180.0	37 00.0 1.0 01	180.0	37 30.0 1.0 01	180.0	38 00.0 1.0 01	180.0	38 30.0 1.0 01	180.0	39 00.0 1.0 01	180.0	39 30.0 1.0 01	180.0	00
1	35 59.7 1.0 02	178.8	36 29.7 1.0 02	178.8	36 59.7 1.0 02	178.8	37 29.7 1.0 02	178.7	37 59.6 1.0 02	178.7	38 29.6 1.0 02	178.7	38 59.6 1.0 02	178.7	39 29.6 1.0 02	178.7	1
2	35 58.6 1.0 03	177.5	36 28.6 1.0 03	177.5	36 58.6 1.0 03	177.5	37 28.6 1.0 03	177.5	37 58.6 1.0 03	177.5	38 28.6 1.0 03	177.5	38 58.6 1.0 03	177.4	39 28.6 1.0 03	177.4	2
3	35 56.9 1.0 04	176.3	36 26.9 1.0 04	176.3	36 56.9 1.0 04	176.3	37 26.9 1.0 04	176.2	37 56.8 1.0 04	176.2	38 26.8 1.0 04	176.2	38 56.8 1.0 04	176.2	39 26.8 1.0 04	176.1	3
4	35 54.5 1.0 05	175.1	36 24.5 1.0 05	175.0	36 54.5 1.0 05	175.0	37 24.4 1.0 05	175.0	37 54.4 1.0 05	175.0	38 24.4 1.0 05	174.9	38 54.3 1.0 05	174.9	39 24.3 1.0 05	174.9	4
05	35 51.5 1.0 06	173.8	36 21.4 1.0 06	173.8	36 51.4 1.0 06	173.8	37 21.3 1.0 06	173.7	37 51.3 1.0 06	173.7	38 21.2 1.0 06	173.7	38 51.2 1.0 06	173.6	39 21.1 1.0 06	173.6	05
6	35 47.7 1.0 07	172.6	36 17.6 1.0 07	172.6	36 47.6 1.0 07	172.5	37 17.5 1.0 08	172.5	37 47.4 1.0 08	172.4	38 17.3 1.0 08	172.4	38 47.3 1.0 08	172.4	39 17.2 1.0 08	172.3	6
7	35 43.3 1.0 08	171.4	36 13.2 1.0 09	171.3	36 43.1 1.0 09	171.3	37 13.0 1.0 09	171.2	37 42.9 1.0 09	171.2	38 12.8 1.0 09	171.1	38 42.7 1.0 09	171.1	39 12.6 1.0 09	171.0	7
8	35 38.2 1.0 10	170.2	36 08.1 1.0 10	170.1	36 37.9 1.0 10	170.1	37 07.8 1.0 10	170.0	37 37.7 1.0 10	169.9	38 07.6 1.0 10	169.9	38 37.4 1.0 10	169.8	39 07.3 1.0 10	169.8	8
9	35 32.4 99 11	168.9	36 02.3 99 11	168.9	36 32.1 99 11	168.8	37 01.9 99 11	168.8	37 31.8 99 11	168.7	38 01.6 99 11	168.6	38 31.4 99 11	168.6	39 01.3 99 11	168.5	9
10	35 26.0 99 12	167.7	35 55.8 99 12	167.7	36 25.6 99 12	167.6	36 55.4 99 12	167.5	37 25.2 99 12	167.4	37 55.0 99 12	167.4	38 24.8 99 12	167.3	38 54.6 99 12	167.2	10
1	35 18.9 99 13	166.5	35 48.7 99 13	166.4	36 18.4 99 13	166.4	36 48.2 99 13	166.3	37 18.0 99 13	166.2	37 47.7 99 13	166.1	38 17.5 99 13	166.0	38 47.2 99 13	166.0	1
2	35 11.2 99 14	165.3	35 40.9 99 14	165.2	36 10.6 99 14	165.1	36 40.3 99 14	165.0	37 10.0 99 14	165.0	37 39.8 99 14	164.9	38 09.5 99 14	164.8	38 39.2 99 15	164.7	2
3	35 02.8 99 15	164.1	35 32.4 99 15	164.0	36 02.1 99 15	163.9	36 31.8 99 15	163.8	37 01.5 99 15	163.7	37 31.1 99 15	163.6	38 00.8 99 16	163.5	38 30.4 99 16	163.4	3
4	34 53.7 99 16	162.9	35 23.4 99 16	162.8	35 53.0 99 16	162.7	36 22.6 99 16	162.6	36 52.2 99 16	162.5	37 21.8 99 17	162.4	37 51.4 99 17	162.3	38 21.0 99 17	162.2	4
15	34 44.1 99 17	161.7	35 13.6 99 17	161.6	35 43.2 99 17	161.5	36 12.8 99 17	161.4	36 42.3 99 18	161.3	37 11.9 99 18	161.2	37 41.4 99 18	161.1	38 11.0 99 18	160.9	15
6	34 33.8 98 18	160.5	35 03.3 98 18	160.4	35 32.8 98 18	160.3	36 02.3 98 18	160.2	36 31.8 98 19	160.1	37 01.3 98 19	159.9	37 30.8 98 19	159.8	38 00.3 98 19	159.7	6
7	34 22.8 98 19	159.3	34 52.3 98 19	159.2	35 21.8 98 19	159.1	35 51.2 98 20	159.0	36 20.6 98 20	158.8	36 50.1 98 20	158.7	37 19.5 98 20	158.6	37 48.9 98 20	158.5	7
8	34 11.3 98 20	158.1	34 40.7 98 20	158.0	35 10.1 98 20	157.9	35 39.5 98 21	157.8	36 08.9 98 21	157.6	36 38.2 98 21	157.5	37 07.6 98 21	157.4	37 36.9 98 21	157.2	8
9	33 59.1 98 21	156.9	34 28.5 98 21	156.8	34 57.8 98 21	156.7	35 27.1 98 22	156.6	35 56.4 98 22	156.4	36 25.8 98 22	156.3	36 55.1 98 22	156.2	37 24.3 98 22	156.0	9
20	33 46.4 98 22	155.8	34 15.7 98 22	155.6	34 44.9 98 22	155.5	35 14.2 98 23	155.4	35 43.4 97 23	155.2	36 12.7 97 23	155.1	36 41.9 97 23	155.0	37 11.1 97 23	154.8	20
1	33 33.0 97 23	154.6	34 02.2 97 23	154.5	34 31.4 97 23	154.3	35 00.6 97 24	154.2	35 29.8 97 24	154.0	35 59.0 97 24	153.9	36 28.1 97 24	153.7	36 57.3 97 24	153.6	1
2	33 19.1 97 24	153.4	33 48.2 97 24	153.3	34 17.4 97 24	153.1	34 46.5 97 25	153.0	35 15.6 97 25	152.9	35 44.7 97 25	152.7	36 13.8 97 25	152.6	36 42.8 97 25	152.4	2
3	33 04.6 97 25	152.3	33 33.7 97 25	152.1	34 02.7 97 25	152.0	34 31.8 97 26	151.8	35 00.8 97 26	151.7	35 29.8 97 26	151.5	35 58.8 97 26	151.4	36 27.8 97 26	151.2	3
4	32 49.5 97 26	151.1	33 18.5 97 26	151.0	33 47.5 97 26	150.8	34 16.5 97 26	150.7	34 45.4 96 27	150.5	35 14.4 96 27	150.3	35 43.3 96 27	150.2	36 12.2 96 27	150.0	4
25	32 33.9 96 27	150.0	33 02.8 96 27	149.8	33 31.7 96 27	149.7	34 00.6 96 27	149.5	34 29.5 96 27	149.3	34 58.4 96 28	149.2	35 27.2 96 28	149.0	35 56.0 96 28	148.8	25
6	32 17.7 96 28	148.8	32 46.6 96 28	148.7	33 15.4 96 28	148.5	33 44.2 96 28	148.4	34 13.0 96 28	148.2	34 41.8 96 29	148.0	35 10.6 96 29	147.8	35 39.3 96 29	147.7	6
7	32 01.0 96 29	147.7	32 29.8 96 29	147.5	32 58.5 96 29	147.4	33 27.2 96 29	147.2	33 56.0 96 29	147.0	34 24.7 96 29	146.9	34 53.4 96 30	146.7	35 22.0 96 30	146.5	7
8	31 43.8 96 30	146.6	32 12.4 96 30	146.4	32 41.1 96 30	146.2	33 09.8 96 30	146.1	33 38.4 95 30	145.9	34 07.0 95 30	145.7	34 35.6 96 30	145.5	35 04.2 96 31	145.3	8
9	31 26.0 96 30	145.5	31 54.6 96 31	145.3	32 23.2 96 31	145.1	32 51.8 96 31	144.9	33 20.3 95 31	144.8	33 48.8 96 31	144.6	34 17.4 96 31	144.4	34 45.9 96 31	144.2	9
30	31 07.7 96 31	144.4	31 36.2 96 31	144.2	32 04.7 96 32	144.0	32 33.2 96 32	143.8	33 01.7 96 32	143.6	33 30.2 96 32	143.4	33 58.6 96 32	143.2	34 27.0 96 32	143.0	30
1	30 48.9 96 32	143.3	31 17.4 96 32	143.1	31 45.8 96 32	142.9	32 14.2 96 33	142.7	32 42.6 96 33	142.5	33 11.0 96 33	142.3	33 39.3 94 33	142.1	34 07.6 94 33	141.9	1
2	30 29.7 96 33	142.2	30 58.0 94 33	142.0	31 26.4 94 33	141.8	31 54.7 94 33	141.6	32 23.0 94 33	141.4	32 51.3 94 34	141.2	33 19.5 94 34	141.0	33 47.8 94 34	140.8	2
3	30 09.9 94 34	141.1	30 38.2 94 34	140.9	31 06.5 94 34	140.7	31 34.7 94 34	140.5	32 02.9 94 34	140.3	32 31.1 94 34	140.1	32 59.3 94 35	139.9	33 27.4 94 35	139.7	3
4	29 49.7 94 34	140.0	30 17.9 94 35	139.8	30 46.1 94 35	139.6	31 14.2 94 35	139.4	31 42.4 94 35	139.2	32 10.5 94 35	139.0	32 38.6 94 35	138.8	33 06.6 94 35	138.6	4
35	29 29.1 94 35	138.9	29 57.2 94 35	138.7	30 25.2 94 35	138.5	30 53.3 94 36	138.3	31 21.4 93 36	138.1	31 49.4 93 36	137.9	32 17.4 93 36	137.7	32 45.4 93 36	137.5	35
6	29 07.9 93 36	137.8	29 36.0 93 36	137.6	30 03.9 93 36	137.4	30 31.9 93 36	137.2	30 59.9 93 36	137.0	31 27.8 93 37	136.8	31 55.7 93 37	136.6	32 23.6 93 37	136.4	6
7	28 46.4 93 37	136.8	29 14.3 93 37	136.6	29 42.2 93 37	136.4	30 10.1 93 37	136.1	30 38.0 93 37	135.9	31 05.8 93 37	135.7	31 33.7 93 38	135.5	32 01.5 93 38	135.3	7
8	28 24.4 93 37	135.7	28 52.2 93 38	135.5	29 20.1 93 38	135.3	29 47.9 93 38	135.1	30 15.7 93 38	134.9	30 43.4 93 38	134.6	31 11.2 92 38	134.4	31 38.9 92 38	134.2	8
9	28 02.0 93 38	134.7	28 29.7 93 38	134.4	28 57.5 92 38	134.2	29 25.2 92 38	134.0	29 52.9 92 39	133.8	30 20.6 92 39	133.6	30 48.3 92 39	133.3	31 15.9 92 39	133.1	9
40	27 39.2 92 39	133.6	28 06.8 92 39	133.4	28 34.5 92 39	133.2	29 02.1 92 39	133.0	29 29.8 92 39	132.7	29 57.4 92 39	132.5	30 24.9 92 40	132.3	30 52.5 92 40	132.1	40
1	27 15.9 92 39	132.6	27 43.5 92 40	132.4	28 11.1 92 40	132.1	28 38.7 92 40	131.9	29 06.2 92 40	131.7	29 33.7 92 40	131.5	30 01.2 92 40	131.2	30 28.7 92 40	131.0	1
2	26 52.3 92 40	131.6	27 19.9 92 40	131.3	27 47.4 92 40	131.1	28 14.8 92 40	130.9	28 42.3 91 41	130.6	29 09.7 91 41	130.4	29 37.1 91 41	130.2	30 04.5 91 41	129.9	2
3	26 28.4 91 41	130.5	26 55.8 91 41	130.3	27 23.2 91 41	130.1	27 50.6 91 41	129.8	28 18.0 91 41	129.6	28 45.3 91 41	129.4	29 12.6 91 41	129.1	29 39.9 91 42	128.9	3
4	26 04.0 91 41	129.5	26 31.4 91 41	129.3	26 58.7 91 41	129.1	27 26.0 91 42	128.8	27 53.3 91 42	128.6	28 20.6 91 42	128.4	28 47.8 91 42	128.1	29 15.0 91 42	127.9	4
45	25 39.3 91 42	128.5	26 06.6 91 42	128.3	26 33.8 91 42	128.0	27 01.1 91 42	127.8	27 28.3 91 42	127.6	27 55.4 91 42	127.3	28 22.6 90 43	127.1	28 49.7 90 43	126.8	45
6	25 14.3 91 42	127.5	25 41.5 91 42	127.3	26 08.6 91 43	127.0	26 35.8 90 43	126.8	27 02.9 90 43	126.6	27 30.0 90 43	126.3	27 57.1 90 43	126.1	28 24.1 90 43	125.8	6
7	24 48.9 90 43	126.5	25 16.0 90 43	126.3	25 43.1 90 43	126.0	26 10.1 90 43	125.8	26 37.2 90 43	125.6	27 04.2 90 44	125.3	27 31.2 90 44	125.1	27 58.2 90 44	124.8	7
8	24 23.1 90 43	125.5	24 50.2 90 44	125.3	25 17.2 90 44	125.0	25 44.2 90 44	124.8	26 11.2 90 44	124.6	26 38.1 90 44	124.3	27 05.0 90 44	124.1	27 31.9 90 44	123.8	8
9	23 57.1 90 44	124.5	24 24.1 90 44	124.3	24 51.0 90 44	124.0	25 17.9 90 44	123.8	25 44.8 90 44	123.6	26 11.7 90 45	123.3	26 38.5 89 45	123.1	27 05.3 89 45	122.8	9
50	23 30.8 90 44	123.6	23 57.7 90 45	123.3	24 24.5 90 45	123.1	24 51.4 89 45	122.8	25 18.2 89 45	122.6	25 45.0 89 45	122.3	26 11.7 89 45	122.1	26 38.5 89 45	121.8	50
1	23 04.1 89 45	122.6	23 30.9 89 45	122.3	23 57.7 89 45	122.1	24 24.5 89 45	121.8	24 51.2 89 45	121.6	25 18.0 89 46	121.3	25 44.7 89 46	121.1	26 11.3 89 46	120.8	1
2	22 37.2 89 45	121.6	23 03.9 89 46	121.4	23 30.6 89 46	121.1	23 57.3 89 46	120.9	24 24.0 89 46	120.6	24 50.7 89 46	120.4	25 17.3 89 46	120.1	25 43.9 89 46	119.9	2
3	22 10.0 89 46	120.7	22 36.6 89 46	120.4	23 03.3 89 46	120.2	23 29.9 89 46	119.9	23 56.5 89 46	119.7	24 23.1 89 46	119.4	24 49.6 88 46	119.1	25 16.2 88 47	118.9	3
4	21 42.5 89 46	119.7	22 09.1 89 46	119.4	22 35.7 89 46	119.2	23 02.2 88 47	118.9	23 28.8 88 47	118.7	23 55.3 88 47	118.4	24 21.7 88 47	118.2	24 48.2 88 47	117.9	4
55	21 14.7 88 47	118.7	21 41.3 88 47	118.5	22 07.8 88 47	118.2	22 34.3 88 47	118.0	23 00.7 88 47	117.7	23 27.2 88 47	117.5	23 53.6 88 47	117.2	24 20.0 88 47	117.0	55
6	20 46.7 88 47	117.8	21 13.2 88 47	117.6	21 39.7 88 47	117.3	22 06.1 88 47	117.0	22 32.5 88 48	116.8	22 58.9 88 48	116.5	23 25.2 88 48	116.3	23 51.5 88 48	116.0	6
7	20 18.5 88 47	116.9	20 44.9 88 48	116.6	21 11.3 88 48	116.4	21 37.6 88 48	116.1	22 04.0 88 48	115.8	22 30.3 88 48	115.6	22 56.6 88 48	115.3	23 22.8 87 48	115.1	7
8	19 50.0 88 48	115.9	20 16.4 88 48	115.7	20 42.7 88 48	115.4	21 09.0 88 48	115.2	21 35.2 88 48	114.9	22 01.5 87 48	114.6	22 27.7 87 48	114.4	22 53.9 87 49	114.1	8
9	19 21.3 88 48	115.0	19 47.6 88 48	114.7	20 13.8 88 48	114.5	20 40.1 87 48	114.2	21 06.3 87 49	114.0	21 32.5 87 49	113.7	21 58.7 87 49	113.4	22 24.8 87 49	113.2	9
60	18 52.4 87 49	114.1	19 18.6 87 49	113.8	19 44.8 87 49	113.6	20 11.0 87 49	113.3	20 37.1 87 49	113.0	21 03.3 87 49	112.8	21 29.4 87 49	112.5	21 55.5 87 49	112.2	60
1	18 23.2 87 49	113.2	18 49.4 87 49	112.9	19 15.6 87 49	112.6	19 41.7 87 49	112.4	20 07.8 87 49	112.1	20 33.9 87 49	111.9	20 59.9 87 49	111.6	21 25.9 87 50	111.3	1
2	17 53.9 87 49	112.2	18 20.0 87 49	112.0	18 46.1 87 49	111.7	19 12.2 87 49	111.5	19 38.2 87 50	111.2	20 04.3 87 50	110.9	20 30.3 87 50	110.7	20 56.2 87 50	110.4	2
3	17 24.4 87 50	111.3	17 50.5 87 50	111.1	18 16.5 87 50	110.8	18 42.5 87 50	110.5	19 08.5 87 50	110.3	19 34.5 87 50	110.0	20 00.4 86 50	109.8	20 26.4 86 50	109.5	3
4	16 54.7 87 50	110.4	17 20.7 87 50	110.2	17 46.7 87 50	109.9	18 12.6 87 50	109.6	18 38.6 86 50	109.4	19 04.5 86 50	109.1	19 30.4 86 50	108.8	19 56.3 86 50	108.6	4
65	16 24.8 87 50	109.5	16 50.8 86 50	109.3	17 16.7 86 50	109.0	17 42.6 86 50	108.7	18 08.5 86 50	108.5	18 34.4 86 50	108.2	19 00.2 86 51	107.9	19 26.1 86 51	107.7	65
6	15 54.8 86 50	108.6	16 20.7 86 50	108.4	16 46.6 86 50	108.1	17 12.4 86 51	107.8	17 38.3 86 51	107.6	18 04.1 86 51	107.3	18 29.9 86 51	107.0	18 55.7 86 51	106.8	6
7	15 24.5 86 51	107.7	15 50.4 86 51	107.5	16 16.3 86 51	107.2	16 42.1 86 51	106.9	17 07.9 86 51	106.7	17 33.7 86 51	106.4	17 59.4 86 51	106.1	18 25.2 86 51	105.9	7
8	14 54.2 86 51	106.8	15 20.0 86 51	106.6	15 45.8 86 51	106.3	16 11.6 86 51	106.0	16 37.4 86 51	105.8	17 03.1 86 51	105.5	17 28.8 86 51	105.2	17 54.5 86 51	105.0	8
9	14 23.7 86 51	106.0	14 49.5 86 51	105.7	15 15.2 86 51	105.4	15 41.0 86 51	105.2	16 06.7 86 51	104.9	16 32.4 86 51	104.6	16 58.1 86 51	104.4	17 23.8 86 52	104.1	9
70	13 53.0 86 51	105.1	14 18.8 86 51	104.8	14 44.5 86 51	104.5	15 10.2 86 51	104.3	15 35.9 86 52	104.0	16 01.6 86 52	103.7	16 27.2 85 52	103.5	16 52.9 85 52	103.2	70
1	13 22.3 86 51	104.2	13 48.0 86 52	103.9	14 13.7 86 52	103.7	14 39.4 86 52	103.4	15 05.0 85 52	103.1	15 30.6 85 52	102.9	15 56.3 85 52	102.6	16 21.8 85 52	102.3	1
2	12 51.4 86 52	103.3	13 17.1 86 52	103.0	13 42.7 85 52	102.8	14 08.4 85 52	102.5	14 34.0 85 52	102.2	14 59.6 85 52	102.0	15 25.2 85 52	101.7	15 50.7 85 52	101.4	2
3	12 20.4 85 52	102.4	12 46.0 85 52	102.2	13 11.7 85 52	101.9	13 37.3 85 52	101.6	14 02.9 85 52	101.4	14 28.4 85 52	101.1	14 54.0 85 52	100.8	15 19.5 85 53	100.6	3
4	11 49.3 85 53	101.6	12 14.9 85 52	101.3	12 40.5 85 52	101.0	13 06.1 85 52	100.8	13 31.6 85 52	100.5	13 57.2 85 52	100.2	14 22.7 85 53	100.0	14 48.2 85 53	99.7	4
75	11 18.1 85 52	100.7	11 43.7 85 52	100.4	12 09.3 85 52	100.2	12 34.8 85 52	99.9	13 00.3 85 52	99.6	13 25.9 85 52	99.4	13 51.4 85 52	99.1	14 16.8 85 52	98.8	75
6	10 46.8 85 52	99.8	11 12.4 85 52	99.6	11 37.9 85 52	99.3	12 03.4 85 52	99.0	12 29.0 85 52	98.8	12 54.4 85 52	98.5	13 19.9 85 52	98.2	13 45.4 85 53	97.9	6
7	10 15.5 85 52	99.0	10 41.0 85 53	98.7	11 06.5 85 52	98.4	11 32.0 85 52	98.2	11 57.5 85 53	97.9	12 23.0 85 53	97.6	12 48.4 85 53	97.4	13 13.9 85 53	97.1	7
8	9 44.0 85 52	98.1	10 09.5 85 53	97.8	10 35.0 85 53	97.6	11 00.5 85 53	97.3	11 26.0 85 53	97.0	11 51.4 85 53	96.8	12 16.9 85 53	96.5	12 42.3 85 53	96.2	8
9	9 12.5 85 53	97.2	9 38.0 85 53	97.0	10 03.5 85 53	96.7	10 28.9 85 53	96.4	10 54.4 85 53	96.2	11 19.8 85 53	95.9	11 45.2 85 53	95.6	12 10.6 85 53	95.4	9
80	8 40.9 85 53	96.4	9 06.4 85 53	96.1	9 31.9 85 53	95.8	9 57.3 85 53	95.6	10 22.7 85 53	95.3	10 48.2 85 53	95.0	11 13.6 85 53	94.8	11 39.0 85 53	94.5	80
1	8 09.3 85 53	95.5	8 34.8 85 53	95.3	9 00.2 85 53	95.0	9 25.6 85 53	94.7	9 51.1 85 53	94.5	10 16.5 85 53	94.2	10 41.9 85 53	93.9	11 07.3 85 53	93.6	1
2	7 37.6 85 53	94.7	8 03.1 85 53	94.4	8 28.5 85 53	94.1	8 53.9 85 53	93.9	9 19.4 85 53	93.6	9 44.8 85 53	93.3	10 10.1 85 53	93.1	10 35.5 85 53	92.8	2
3	7 05.9 85 53	93.8	7 31.4 85 53	93.6	7 56.8 85 53	93.3	8 22.2 85 53	93.0	8 47.6 85 53	92.7	9 13.0 85 53	92.5	9 38.4 85 53	92.2	10 03.7 85 53	91.9	3
4	6 34.2 85 53	93.0	6 59.6 85 53	92.7	7 25.0 85 53	92.4	7 50.4 85 53	92.2	8 15.8 85 53	91.9	8 41.2 85 53	91.6	9 06.6 85 53	91.4	9 32.0 85 53	91.1	4
85	6 02.4 85 53	92.1	6 27.8 85 53	91.9	6 53.3 85 53	91.6	7 18.7 85 53	91.3	7 44.1 85 53	91.0	8 09.4 85 53	90.8	8 34.8 85 53	90.5	9 00.2 85 53	90.2	85
6	5 30.6 85 53	91.3	5 56.1 85 53	91.0	6 21.5 85 53	90.7	6 46.9 85 53	90.5	7 12.3 85 53	90.2	7 37.6 85 53	89.9	8 03.0 85 53	89.7	8 28.4 85 53	89.4	6
7			5 24.3 85 53	90.2	5 49.7 85 53	89.9	6 15.1 85 53	89.6	6 40.5 85 53	89.4	7 05.8 85 53	89.1	7 31.2 85 53	88.8	7 56.6 85 53	88.5	7
8					5 17.9 85 53	89.0	5 43.3 85 53	88.8	6 08.7 85 53	88.5	6 34.1 85 53	88.2	6 59.4 85 53	88.0	7 24.8 85 53	87.7	8
9							5 11.5 85 53	87.9	5 36.9 85 53	87.7	6 02.3 85 53	87.4	6 27.7 85 53	87.1	6 53.0 85 53	86.9	9
90									5 05.1 85 53	86.8	5 30.5 85 53	86.5	5 55.9 85 53	86.3	6 21.3 85 53	86.0	90

Digitized by Google

Lat. 58°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	28 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	27 00.0	1.0 01	180.0	26 30.0	1.0 00	180.0	26 00.0	1.0 00	180.0	25 30.0	1.0 00	180.0	25 00.0	1.0 00	180.0	24 30.0	1.0 00	180.0	00
1	27 59.7	1.0 02	178.9	27 29.7	1.0 02	178.9	26 59.7	1.0 02	178.9	26 29.7	1.0 02	178.9	25 59.7	1.0 02	178.9	25 29.7	1.0 02	178.9	24 59.7	1.0 02	178.9	24 29.7	1.0 02	178.9	1
2	27 58.7	1.0 03	177.7	27 28.8	1.0 03	177.8	26 58.8	1.0 03	177.8	26 28.8	1.0 03	177.8	25 58.8	1.0 03	177.8	25 28.8	1.0 03	177.8	24 58.8	1.0 03	177.8	24 28.8	1.0 02	177.8	2
3	27 57.2	1.0 04	176.6	27 27.2	1.0 04	176.6	26 57.2	1.0 04	176.6	26 27.2	1.0 04	176.7	25 57.2	1.0 04	176.7	25 27.3	1.0 04	176.7	24 57.3	1.0 04	176.7	24 27.3	1.0 04	176.7	3
4	27 55.0	1.0 05	175.5	27 25.0	1.0 05	175.5	26 55.0	1.0 05	175.5	26 25.1	1.0 05	175.6	25 55.1	1.0 05	175.6	25 25.1	1.0 05	175.6	24 55.1	1.0 05	175.6	24 25.2	1.0 05	175.6	4
05	27 52.2	1.0 06	174.4	27 22.2	1.0 06	174.4	26 52.3	1.0 06	174.4	26 22.3	1.0 06	174.4	25 52.3	1.0 06	174.5	25 22.4	1.0 06	174.5	24 52.4	1.0 06	174.5	24 22.5	1.0 06	174.6	05
6	27 48.7	1.0 07	173.2	27 18.8	1.0 07	173.3	26 48.9	1.0 07	173.3	26 18.9	1.0 07	173.3	25 49.0	1.0 07	173.4	25 19.0	1.0 07	173.4	24 49.1	1.0 07	173.4	24 19.1	1.0 07	173.5	6
7	27 44.7	1.0 08	172.1	27 14.8	1.0 08	172.1	26 44.8	1.0 08	172.2	26 14.9	1.0 08	172.2	25 45.0	1.0 08	172.3	25 15.1	1.0 08	172.3	24 45.1	1.0 08	172.3	24 15.2	1.0 08	172.4	7
8	27 40.0	1.0 09	171.0	27 10.1	1.0 09	171.0	26 40.2	1.0 09	171.1	26 10.3	1.0 09	171.1	25 40.4	1.0 09	171.2	25 10.5	1.0 09	171.2	24 40.6	1.0 09	171.3	24 10.7	1.0 08	171.3	8
9	27 34.7	1.0 10	169.9	27 04.8	1.0 10	169.9	26 35.0	1.0 10	170.0	26 05.1	1.0 10	170.0	25 35.2	1.0 10	170.1	25 05.4	1.0 10	170.1	24 35.5	1.0 10	170.2	24 05.6	1.0 10	170.2	9
10	27 28.8	99 11	168.8	26 59.0	99 11	168.8	26 29.1	99 11	168.9	25 59.3	99 11	168.9	25 29.4	99 11	169.0	24 59.6	99 11	169.0	24 29.8	99 11	169.1	23 59.9	99 10	169.1	10
1	27 22.3	99 12	167.6	26 52.5	99 12	167.7	26 22.7	99 12	167.8	25 52.9	99 12	167.8	25 23.1	99 12	167.9	24 53.2	99 12	167.9	24 23.4	99 12	168.0	23 53.6	99 11	168.1	1
2	27 15.2	99 13	166.5	26 45.4	99 13	166.6	26 15.6	99 13	166.6	25 45.9	99 13	166.7	25 16.1	99 13	166.8	24 46.3	99 13	166.8	24 16.5	99 12	166.9	23 46.7	99 12	167.0	2
3	27 07.5	99 14	165.4	26 37.7	99 14	165.5	26 08.0	99 14	165.5	25 38.3	99 14	165.6	25 08.5	99 14	165.7	24 38.8	99 14	165.8	24 09.0	99 13	165.8	23 39.3	99 13	165.9	3
4	26 59.1	99 15	164.3	26 29.5	99 16	164.4	25 59.8	99 15	164.4	25 30.1	99 15	164.5	25 00.4	99 15	164.6	24 30.7	99 14	164.7	24 01.0	99 14	164.8	23 31.3	99 14	164.8	4
15	26 50.2	99 16	163.2	26 20.6	99 16	163.3	25 50.9	99 16	163.4	25 21.3	99 16	163.4	24 51.6	99 16	163.5	24 22.0	99 15	163.6	23 52.3	99 15	163.7	23 22.7	99 15	163.8	15
6	26 40.7	99 17	162.1	26 11.1	99 17	162.2	25 41.5	99 17	162.3	25 11.9	99 17	162.3	24 42.3	99 16	162.4	24 12.7	99 16	162.5	23 43.1	99 16	162.6	23 13.5	99 16	162.7	6
7	26 30.7	98 18	161.0	26 01.1	99 18	161.1	25 31.6	99 18	161.2	25 02.0	99 18	161.3	24 32.5	99 17	161.4	24 02.9	99 17	161.5	23 33.3	99 17	161.5	23 03.8	99 17	161.6	7
8	26 20.0	98 19	159.9	25 50.5	98 19	160.0	25 21.0	98 18	160.1	24 51.5	98 18	160.2	24 22.0	98 18	160.3	23 52.5	98 18	160.4	23 23.0	98 18	160.5	22 53.5	98 18	160.6	8
9	26 08.8	98 20	158.8	25 39.4	98 20	158.9	25 09.9	98 19	159.0	24 40.5	98 19	159.1	24 11.0	98 19	159.2	23 41.5	98 19	159.3	23 12.1	98 19	159.4	22 42.6	98 19	159.5	9
20	25 57.0	98 21	157.7	25 27.6	98 20	157.8	24 58.2	98 20	157.9	24 28.8	98 20	158.0	23 59.4	98 20	158.1	23 30.0	98 20	158.2	23 00.6	98 20	158.4	22 31.2	98 20	158.5	20
1	25 44.7	98 22	156.6	25 15.3	98 21	156.7	24 46.0	98 21	156.8	24 16.7	98 21	157.0	23 47.3	98 21	157.1	23 18.0	98 21	157.2	22 48.6	98 21	157.3	22 19.3	98 21	157.4	1
2	25 31.8	98 22	155.5	25 02.5	98 22	155.7	24 33.2	98 22	155.8	24 04.0	98 22	155.9	23 34.7	98 22	156.0	23 05.4	98 22	156.1	22 36.1	98 22	156.3	22 06.8	98 22	156.4	2
3	25 18.3	97 23	154.5	24 49.1	97 23	154.6	24 19.9	97 23	154.7	23 50.7	97 23	154.8	23 21.5	97 23	155.0	22 52.3	97 23	155.1	22 23.0	97 23	155.2	21 53.8	97 23	155.3	3
4	25 04.4	97 24	153.4	24 35.2	97 24	153.5	24 06.1	97 24	153.6	23 36.9	97 24	153.8	23 07.8	97 24	153.9	22 38.6	97 24	154.0	22 09.4	97 24	154.2	21 40.2	97 23	154.3	4
25	24 49.9	97 25	152.3	24 20.8	97 25	152.5	23 51.7	97 25	152.6	23 22.6	97 25	152.7	22 53.5	97 25	152.9	22 24.4	97 24	153.0	21 55.3	97 24	153.1	21 26.2	97 24	153.2	25
6	24 34.8	97 26	151.3	24 05.8	97 26	151.4	23 36.8	97 26	151.5	23 07.8	97 26	151.7	22 38.8	97 25	151.8	22 09.7	97 25	151.9	21 40.7	97 25	152.1	21 11.6	97 25	152.2	6
7	24 19.3	96 27	150.2	23 50.3	96 27	150.3	23 21.4	97 27	150.5	22 52.4	97 26	150.6	22 23.5	97 26	150.8	21 54.5	97 26	150.9	21 25.5	97 26	151.0	20 56.5	97 26	151.2	7
8	24 03.2	96 28	149.1	23 34.4	96 28	149.3	23 05.5	96 27	149.4	22 36.6	96 27	149.6	22 07.7	96 27	149.7	21 38.8	96 27	149.9	21 09.9	96 27	150.0	20 41.0	96 27	150.2	8
9	23 46.7	96 28	148.1	23 17.9	96 28	148.2	22 49.1	96 28	148.4	22 20.3	96 28	148.6	21 51.4	96 28	148.7	21 22.6	96 28	148.8	20 53.8	96 28	149.0	20 24.9	96 28	149.1	9
30	23 29.6	96 29	147.1	23 00.9	96 29	147.2	22 32.2	96 29	147.4	22 03.4	96 29	147.5	21 34.7	96 29	147.7	21 05.9	96 29	147.8	20 37.1	96 28	148.0	20 08.4	96 28	148.1	30
1	23 12.1	95 30	146.0	22 43.4	96 30	146.2	22 14.8	96 30	146.3	21 46.1	96 30	146.5	21 17.4	96 30	146.7	20 48.7	96 29	146.8	20 20.0	96 29	147.0	19 51.3	96 29	147.1	1
2	22 54.1	95 31	145.0	22 25.5	95 31	145.1	21 56.9	95 31	145.3	21 28.3	95 30	145.5	20 59.7	95 30	145.6	20 31.1	95 30	145.8	20 02.5	95 30	146.0	19 33.8	95 30	146.1	2
3	22 35.6	95 32	144.0	22 07.1	95 31	144.1	21 38.6	95 31	144.3	21 10.1	95 31	144.5	20 41.5	95 31	144.6	20 13.0	95 31	144.8	19 44.4	95 31	144.9	19 15.9	95 31	145.1	3
4	22 16.7	95 32	142.9	21 48.2	95 32	143.1	21 19.8	95 32	143.3	20 51.4	95 32	143.4	20 22.9	95 32	143.6	19 54.4	95 32	143.8	19 26.0	95 32	143.9	18 57.5	95 31	144.1	4
35	21 57.3	94 33	141.9	21 28.9	95 33	142.1	21 00.6	95 33	142.3	20 32.2	95 33	142.4	20 03.8	95 33	142.6	19 35.4	95 32	142.8	19 07.0	95 32	142.9	18 38.6	95 32	143.1	35
6	21 37.4	94 34	140.9	21 09.2	94 34	141.1	20 40.9	94 34	141.3	20 12.6	94 33	141.4	19 44.3	94 33	141.6	19 16.0	94 33	141.8	18 47.6	94 33	142.0	18 19.3	94 33	142.1	6
7	21 17.2	94 34	139.9	20 49.0	94 34	140.1	20 20.8	94 34	140.3	19 52.5	94 34	140.4	19 24.3	94 34	140.6	18 56.1	94 34	140.8	18 27.8	94 34	141.0	17 59.6	94 34	141.1	7
8	20 56.5	94 35	138.9	20 28.3	94 35	139.1	20 00.2	94 35	139.3	19 32.1	94 35	139.4	19 03.9	94 35	139.6	18 35.8	94 35	139.8	18 07.6	94 34	140.0	17 39.4	94 34	140.2	8
9	20 35.3	93 36	137.9	20 07.3	93 36	138.1	19 39.3	94 36	138.3	19 11.2	94 36	138.5	18 43.1	94 35	138.6	18 15.0	94 35	138.8	17 46.9	94 35	139.0	17 18.8	94 35	139.2	9
40	20 13.8	93 37	136.9	19 45.9	93 36	137.1	19 17.9	93 36	137.3	18 49.9	93 36	137.5	18 21.9	93 36	137.7	17 53.9	93 36	137.8	17 25.9	93 36	138.0	16 57.9	93 36	138.2	40
1	19 51.9	93 37	135.9	19 24.0	93 37	136.1	18 56.1	93 37	136.3	18 28.2	93 37	136.5	18 00.3	93 37	136.7	17 32.4	93 37	136.9	17 04.4	93 36	137.1	16 36.5	93 36	137.3	1
2	19 29.6	93 38	134.9	19 01.8	93 38	135.1	18 34.0	93 38	135.3	18 06.1	93 37	135.5	17 38.3	93 37	135.7	17 10.4	93 37	135.9	16 42.6	93 37	136.1	16 14.7	93 37	136.3	2
3	19 06.9	92 38	133.9	18 39.1	92 38	134.1	18 11.4	92 38	134.3	17 43.7	93 38	134.5	17 15.9	93 38	134.7	16 48.1	93 38	134.9	16 20.3	93 38	135.1	15 52.5	93 38	135.3	3
4	18 43.8	92 39	133.0	18 16.1	92 39	133.2	17 48.5	92 39	133.4	17 20.8	92 39	133.6	16 53.1	92 39	133.8	16 25.4	92 38	134.0	15 57.7	92 38	134.2	15 30.0	92 38	134.4	4
45	18 20.3	92 40	132.0	17 52.8	92 40	132.2	17 25.2	92 39	132.4	16 57.6	92 39	132.6	16 30.0	92 39	132.8	16 02.4	92 39	133.0	15 34.7	92 39	133.2	15 07.1	92 39	133.4	45
6	17 56.5	92 40	131.0	17 29.0	92 40	131.2	17 01.5	92 40	131.5	16 34.0	92 40	131.7	16 06.5	92 40	131.9	15 38.9	92 40	132.1	15 11.4	92 39	132.3	14 43.8	92 39	132.5	6
7	17 32.4	91 41	130.1	17 05.0	91 41	130.3	16 37.5	91 41	130.5	16 10.1	91 40	130.7	15 42.6	92 40	130.9	15 15.2	92 40	131.1	14 47.7	92 40	131.3	14 20.2	92 40	131.5	7
8	17 07.9	91 41	129.1	16 40.5	91 41	129.3	16 13.2	91 41	129.6	15 45.8	91 41	129.8	15 18.4	91 41	130.0	14 51.1	91 41	130.2	14 23.6	91 41	130.4	13 56.2	91 40	130.6	8
9	16 43.1	91 42	128.2	16 15.8	91 42	128.4	15 48.5	91 42	128.6	15 21.2	91 42	128.8	14 53.9	91 41	129.0	14 26.6	91 41	129.3	13 59.3	91 41	129.5	13 31.9	91 41	129.7	9
50	16 17.9	91 42	127.2	15 50.7	91 42	127.5	15 23.5	91 42	127.7	14 56.3	91 42	127.9	14 29.1	91 42	128.1	14 01.8	91 42	128.3	13 34.6	91 42	128.5	13 07.3	91 42	128.8	50
1	15 52.4	90 43	126.3	15 25.3	90 43	126.5	14 58.2	90 43	126.7	14 31.0	91 43	127.0	14 03.9	91 42	127.2	13 36.7	91 42	127.4	13 09.5	91 42	127.6	12 42.3	91 42	127.8	1
2	15 26.7	90 43	125.4	14 59.6	90 43	125.6	14 32.5	90 43	125.8	14 05.5	90 43	126.0	13 38.4	90 43	126.3	13 11.3	90 43	126.5	12 44.2	90 43	126.7	12 17.1	90 43	126.9	2
3	15 00.6	90 44	124.4	14 33.6	90 44	124.7	14 06.6	90 44	124.9	13 39.6	90 44	125.1	13 12.6	90 43	125.3	12 45.6	90 43	125.6	12 18.5	90 43	125.8	11 51.5	90 43	126.0	3
4	14 34.2	90 44	123.5	14 07.3	90 44	123.7	13 40.4	90 44	124.0	13 13.5	90 44	124.2	12 46.5	90 44	124.4	12 19.6	90 44	124.6	11 52.6	90 44	124.9	11 25.6	90 44	125.1	4
55	14 07.5	89 45	122.6	13 40.7	89 45	122.8	13 13.9	90 45	123.0	12 47.0	90 45	123.3	12 20.1	90 44	123.5	11 53.3	90 44	123.7	11 26.4	90 44	124.0	10 59.5	90 44	124.2	55
6	13 40.6	89 45	121.7	13 13.9	89 45	121.9	12 47.1	89 45	122.1	12 20.3	89 45	122.4	11 53.5	89 45	122.6	11 26.7	89 45	122.8	10 59.9	89 45	123.0	10 33.0	89 45	123.3	6
7	13 13.4	89 46	120.7	12 46.7	89 46	121.0	12 20.0	89 46	121.2	11 53.3	89 45	121.4	11 26.6	89 45	121.7	10 59.8	89 45	121.9	10 33.1	89 45	122.1	10 06.3	89 45	122.4	7
8	12 46.0	89 46	119.8	12 19.3	89 46	120.1	11 52.7	89 46	120.3	11 26.0	89 46	120.5	10 59.4	89 46	120.8	10 32.7	89 46	121.0	10 06.0	89 46	121.2	9 39.3	89 45	121.5	8
9	12 18.3	89 47	118.9	11 51.7	89 46	119.2	11 25.1	89 46	119.4	10 58.5	89 46	119.6	10 31.9	89 46	119.9	10 05.3	89 46	120.1	9 38.7	89 46	120.3	9 12.1	89 46	120.6	9
60	11 50.3	88 47	118.0	11 23.8	88 47	118.3	10 57.3	88 47	118.5	10 30.8	88 47	118.7	10 04.2	88 47	119.0	9 37.7	89 46	119.2	9 11.1	89 46	119.5	8 44.6	89 46	119.7	60
1	11 22.1	88 47	117.1	10 55.7	88 47	117.4	10 29.2	88 47	117.6	10 02.8	88 47	117.9	9 36.3	88 47	118.1	9 09.8	88 47	118.3	8 43.3	88 47	118.6	8 16.8	88 47	118.8	1
2	10 53.7	88 48	116.2	10 27.4	88 48	116.5	10 01.0	88 48	116.7	9 34.6	88 47	117.0	9 08.1	88 47	117.2	8 41.7	88 47	117.4	8 15.3	88 47	117.7	7 48.9	88 47	117.9	2
3	10 25.1	88 48	115.3	9 58.8	88 48	115.6	9 32.5	88 48	115.8	9 06.1	88 48	116.1	8 39.8	88 48	116.3	8 13.4	88 48	116.6	7 47.0	88 47	116.8	7 20.6	88 47	117.0	3
4	9 56.3	88 48	114.5	9 30.0	88 48	114.7	9 03.7	88 48	114.9	8 37.4	88 48	115.2	8 11.1	88 48	115.4	7 44.8	88 48	115.7	7 18.5	88 48	115.9	6 52.2	88 48	116.2	4
65	9 27.2	87 49	113.6	9 01.0	87 49	113.8	8 34.8	87 49	114.1	8 08.6	87 48	114.3	7 42.3	87 48	114.6	7 16.1	87 48	114.8	6 49.8	88 48	115.0	6 23.6	88 48	115.3	65
6	8 58.0	87 49	112.7	8 31.8	87 49	112.9	8 05.7	87 49	113.2	7 39.5	87 49	113.4	7 13.3	87 49	113.7	6 47.1	87 49	113.9	6 20.9	87 48	114.2	5 54.7	87 48	114.4	6
7	8 28.6	87 49	111.8	8 02.5	87 49	112.1	7 36.3	87 49	112.3	7 10.2	87 49	112.6	6 44.1	87 49	112.8	6 18.0	87 49	113.1	5 51.8	87 49	113.3	5 25.7	87 49	113.5	7
8	7 59.0	87 50	110.9	7 32.9	87 50	111.2	7 06.8	87 49	111.4	6 40.8	87 49	111.7	6 14.7	87 49	111.9	5 48.6	87 49	112.2	5 22.5	87 49	112.4				8
9	7 29.2	87 50	110.1	7 03.2	87 50	110.3	6 37.2	87 50	110.6	6 11.1	87 50	110.8	5 45.1	87 50	111.1	5 19.1	87 50	111.3							9
70	6 59.2	87 50	109.2	6 33.3	87 50	109.4	6 07.3	87 50	109.7	5 41.3	87 50	109.9	5 15.4	87 50	110.2										70
1	6 29.1	86 50	108.3	6 03.2	86 50	108.6	5 37.3	86 50	108.8	5 11.4	86 50	109.1													1
2	5 58.9	86 51	107.5	5 33.0	86 51	107.7	5 07.1	86 51	108.0																2
3	5 28.5	86 51	106.6	5 02.6	86 51	106.9																			3

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91																			5 24.2	85 53	85.4	5 49.6	85 53	85.2	91
2																						5 18.0	85 53	84.3	2

Digitized by Google

Lat. 58°

H.A.	8° 00′ Alt.	Δd	Δt	Az.	8° 30′ Alt.	Δd	Δt	Az.	9° 00′ Alt.	Δd	Δt	Az.	9° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	40 00.0	1.0	01	180.0	40 30.0	1.0	01	180.0	41 00.0	1.0	01	180.0	41 30.0	1.0	01	180.0	00
1	39 59.6	1.0	02	178.7	40 29.6	1.0	02	178.7	40 59.6	1.0	02	178.7	41 29.6	1.0	02	178.7	1
2	39 58.6	1.0	03	177.4	40 28.6	1.0	03	177.4	40 58.5	1.0	03	177.4	41 28.5	1.0	03	177.4	2
3	39 56.8	1.0	04	176.1	40 26.8	1.0	04	176.1	40 56.7	1.0	04	176.1	41 26.7	1.0	04	176.1	3
4	39 54.3	1.0	05	174.8	40 24.2	1.0	05	174.8	40 54.2	1.0	05	174.8	41 24.2	1.0	05	174.7	4
05	39 51.0	1.0	07	173.5	40 21.0	1.0	07	173.5	40 50.9	1.0	07	173.5	41 20.9	1.0	07	173.4	05
6	39 47.1	1.0	08	172.3	40 17.0	1.0	08	172.2	40 47.0	1.0	08	172.2	41 16.9	1.0	08	172.1	6
7	39 42.5	1.0	09	171.0	40 12.4	1.0	09	170.9	40 42.3	1.0	09	170.9	41 12.2	1.0	09	170.8	7
8	39 37.1	1.0	10	169.7	40 07.0	1.0	10	169.6	40 36.9	1.0	10	169.6	41 06.7	1.0	10	169.5	8
9	39 31.1	99	11	168.4	40 00.9	99	11	168.3	40 30.8	99	11	168.3	41 00.6	99	11	168.2	9
10	39 24.4	99	12	167.1	39 54.2	99	12	167.1	40 23.9	99	13	167.0	40 53.7	99	13	166.9	10
1	39 17.0	99	14	165.9	39 46.7	99	14	165.8	40 16.4	99	14	165.7	40 46.2	99	14	165.6	1
2	39 08.9	99	15	164.6	39 38.6	99	15	164.5	40 08.2	99	15	164.4	40 37.9	99	15	164.3	2
3	39 00.1	99	16	163.3	39 29.7	99	16	163.2	39 59.4	99	16	163.1	40 29.0	99	16	163.0	3
4	38 50.6	99	17	162.1	39 20.2	99	17	162.0	39 49.8	99	17	161.9	40 19.4	99	17	161.8	4
15	38 40.5	98	18	160.8	39 10.0	98	18	160.7	39 39.6	98	18	160.6	40 09.1	98	18	160.5	15
6	38 29.8	98	19	159.6	38 59.2	98	19	159.5	39 28.7	98	19	159.3	39 58.1	98	19	159.2	6
7	38 18.3	98	20	158.3	38 47.8	98	20	158.2	39 17.1	98	20	158.1	39 46.5	98	20	158.0	7
8	38 06.3	98	21	157.1	38 35.6	98	21	157.0	39 05.0	98	21	156.8	39 34.3	98	21	156.7	8
9	37 53.6	98	22	155.9	38 22.9	98	22	155.7	38 52.1	98	22	155.6	39 21.4	97	23	155.5	9
20	37 40.3	97	23	154.7	38 09.5	97	23	154.5	38 38.7	97	23	154.4	39 07.9	97	24	154.2	20
1	37 26.4	97	24	153.5	37 55.5	97	24	153.3	38 24.6	97	24	153.1	38 53.7	97	25	153.0	1
2	37 11.9	97	25	152.2	37 41.0	97	25	152.1	38 10.0	97	25	151.9	38 39.0	97	26	151.8	2
3	36 56.8	97	26	151.0	37 25.8	97	26	150.9	37 54.7	96	26	150.7	38 23.7	96	27	150.5	3
4	36 41.1	96	27	149.9	37 10.0	96	27	149.7	37 38.9	96	27	149.5	38 07.7	96	28	149.3	4
25	36 24.9	96	28	148.7	36 53.7	96	28	148.5	37 22.5	96	28	148.3	37 51.2	96	28	148.1	25
6	36 08.1	96	29	147.5	36 36.8	96	29	147.3	37 05.5	96	29	147.1	37 34.2	96	29	146.9	6
7	35 50.7	95	30	146.3	36 19.3	95	30	146.1	36 48.0	95	30	145.9	37 16.6	95	30	145.8	7
8	35 32.8	95	31	145.2	36 01.3	95	31	145.0	36 29.9	95	31	144.8	36 58.4	95	31	144.6	8
9	35 14.4	95	32	144.0	35 42.8	95	32	143.8	36 11.3	95	32	143.6	36 39.7	95	32	143.4	9
30	34 55.4	95	32	142.9	35 23.8	95	33	142.7	35 52.2	95	33	142.5	36 20.5	94	33	142.2	30
1	34 36.0	94	33	141.7	35 04.3	94	33	141.5	35 32.5	94	34	141.3	36 00.8	94	34	141.1	1
2	34 16.0	94	34	140.6	34 44.2	94	34	140.4	35 12.4	94	34	140.2	35 40.6	94	34	140.0	2
3	33 55.6	94	35	139.5	34 23.7	94	35	139.2	34 51.8	94	35	139.0	35 19.9	94	35	138.8	3
4	33 34.7	93	36	138.3	34 02.7	93	36	138.1	34 30.7	93	36	137.9	34 58.7	93	36	137.7	4
35	33 13.3	93	36	137.2	33 41.3	93	36	137.0	34 09.2	93	37	136.8	34 37.1	93	37	136.6	35
6	32 51.5	93	37	136.1	33 19.4	93	37	135.9	33 47.2	93	37	135.7	34 15.0	93	38	135.5	6
7	32 29.3	93	38	135.0	32 57.0	92	38	134.8	33 24.8	92	38	134.6	33 52.5	92	38	134.4	7
8	32 06.6	92	38	134.0	32 34.3	92	39	133.7	33 01.9	92	39	133.5	33 29.5	92	39	133.3	8
9	31 43.5	92	39	132.9	32 11.1	92	39	132.7	32 38.6	92	39	132.4	33 06.2	92	40	132.2	9
40	31 20.0	92	40	131.8	31 47.5	92	40	131.6	32 15.0	92	40	131.4	32 42.4	91	40	131.1	40
1	30 56.1	91	40	130.8	31 23.5	91	41	130.5	31 50.9	91	41	130.3	32 18.3	91	41	130.0	1
2	30 31.8	91	41	129.7	30 59.2	91	41	129.5	31 26.5	91	41	129.2	31 53.7	91	41	129.0	2
3	30 07.2	91	42	128.7	30 34.4	91	42	128.4	31 01.7	91	42	128.2	31 28.8	91	42	127.9	3
4	29 42.2	91	42	127.6	30 09.4	90	42	127.4	30 36.5	90	43	127.1	31 03.6	90	43	126.9	4
45	29 16.8	90	43	126.6	29 43.9	90	43	126.4	30 11.0	90	43	126.1	30 38.0	90	43	125.9	45
6	28 51.1	90	43	125.6	29 18.1	90	44	125.3	29 45.1	90	44	125.1	30 12.1	90	44	124.8	6
7	28 25.1	90	44	124.6	28 52.0	90	44	124.3	29 18.9	90	44	124.1	29 45.8	89	44	123.8	7
8	27 58.8	90	44	123.6	28 25.6	89	45	123.3	28 52.4	89	45	123.0	29 19.2	89	45	122.8	8
9	27 32.1	89	45	122.6	27 58.9	89	45	122.3	28 25.6	89	45	122.0	28 52.3	89	45	121.8	9
50	27 05.2	89	45	121.6	27 31.9	89	46	121.3	27 58.5	89	46	121.0	28 25.2	89	46	120.8	50
1	26 38.0	89	46	120.6	27 04.6	89	46	120.3	27 31.2	89	46	120.1	27 57.7	88	46	119.8	1
2	26 10.5	89	46	119.6	26 37.0	88	46	119.3	27 03.5	88	47	119.1	27 30.0	88	47	118.8	2
3	25 42.7	88	47	118.6	26 09.1	88	47	118.4	26 35.6	88	47	118.1	27 02.0	88	47	117.8	3
4	25 14.6	88	47	117.7	25 41.0	88	47	117.4	26 07.4	88	47	117.1	26 33.8	88	47	116.9	4
55	24 46.4	88	48	116.7	25 12.7	88	48	116.4	25 39.0	88	48	116.2	26 05.3	88	48	115.9	55
6	24 17.8	88	48	115.7	24 44.1	88	48	115.5	25 10.3	87	48	115.2	25 36.6	87	48	114.9	6
7	23 49.1	87	48	114.8	24 15.3	87	48	114.5	24 41.5	87	48	114.3	25 07.6	87	49	114.0	7
8	23 20.1	87	49	113.9	23 46.2	87	49	113.6	24 12.4	87	49	113.3	24 38.5	87	49	113.0	8
9	22 50.9	87	49	112.9	23 17.0	87	49	112.6	23 43.1	87	49	112.4	24 09.1	87	49	112.1	9
60	22 21.5	87	49	112.0	22 47.6	87	49	111.7	23 13.6	87	49	111.4	23 39.5	87	50	111.2	60
1	21 52.0	87	50	111.1	22 17.9	87	50	110.8	22 43.9	86	50	110.5	23 09.8	86	50	110.2	1
2	21 22.2	86	50	110.1	21 48.1	86	50	109.9	22 14.0	86	50	109.6	22 39.9	86	50	109.3	2
3	20 52.3	86	50	109.2	21 18.1	86	50	108.9	21 44.0	86	50	108.7	22 09.8	86	50	108.4	3
4	20 22.1	86	50	108.3	20 48.0	86	50	108.0	21 13.8	86	51	107.8	21 39.5	86	51	107.5	4
65	19 51.9	86	51	107.4	20 17.7	86	51	107.1	20 43.4	86	51	106.8	21 09.1	86	51	106.6	65
6	19 21.5	86	51	106.5	19 47.2	86	51	106.2	20 12.9	86	51	105.9	20 38.6	86	51	105.7	6
7	18 50.9	86	51	105.6	19 16.6	86	51	105.3	19 42.3	86	51	105.0	20 07.9	85	51	104.8	7
8	18 20.2	86	51	104.7	18 45.9	85	51	104.4	19 11.5	85	51	104.1	19 37.1	85	52	103.9	8
9	17 49.4	85	52	103.8	18 15.0	85	52	103.5	18 40.6	85	52	103.3	19 06.2	85	52	103.0	9
70	17 18.5	85	52	102.9	17 44.1	85	52	102.6	18 09.6	85	52	102.4	18 35.2	85	52	102.1	70
1	16 47.4	85	52	102.0	17 13.0	85	52	101.8	17 38.5	85	52	101.5	18 04.0	85	52	101.2	1
2	16 16.3	85	52	101.2	16 41.8	85	52	100.9	17 07.3	85	52	100.6	17 32.8	85	52	100.3	2
3	15 45.0	85	52	100.3	16 10.5	85	52	100.0	16 36.0	85	52	99.7	17 01.5	85	52	99.5	3
4	15 13.7	85	52	99.4	15 39.2	85	52	99.1	16 04.6	85	52	98.9	16 30.1	85	52	98.6	4
75	14 42.3	85	52	98.5	15 07.8	85	52	98.3	15 33.2	85	53	98.0	15 58.6	85	53	97.7	75
6	14 10.8	85	53	97.7	14 36.3	85	53	97.4	15 01.7	85	53	97.1	15 27.0	85	53	96.8	6
7	13 39.3	85	53	96.8	14 04.7	85	53	96.5	14 30.1	85	53	96.3	14 55.4	85	53	96.0	7
8	13 07.7	85	53	95.9	13 33.1	85	53	95.7	13 58.4	85	53	95.4	14 23.8	84	53	95.1	8
9	12 36.0	85	53	95.1	13 01.4	85	53	94.8	13 26.8	84	53	94.5	13 52.1	84	53	94.3	9
80	12 04.4	85	53	94.2	12 29.7	85	53	94.0	12 55.1	84	53	93.7	13 20.4	84	53	93.4	80
1	11 32.6	85	53	93.4	11 58.0	84	53	93.1	12 23.3	84	53	92.8	12 48.6	84	53	92.5	1
2	11 00.9	85	53	92.5	11 26.2	84	53	92.2	11 51.5	84	53	92.0	12 16.9	84	53	91.7	2
3	10 29.1	84	53	91.7	10 54.4	84	53	91.4	11 19.8	84	53	91.1	11 45.1	84	53	90.8	3
4	9 57.3	84	53	90.8	10 22.6	84	53	90.5	10 48.0	84	53	90.3	11 13.3	84	53	90.0	4
85	9 25.5	84	53	90.0	9 50.9	84	53	89.7	10 16.2	84	53	89.4	10 41.5	84	53	89.2	85
6	8 53.7	84	53	89.1	9 19.1	84	53	88.8	9 44.4	84	53	88.6	10 09.7	84	53	88.3	6
7	8 21.9	84	53	88.3	8 47.3	84	53	88.0	9 12.6	84	53	87.7	9 37.9	84	53	87.5	7
8	7 50.2	85	53	87.4	8 15.5	84	53	87.2	8 40.8	84	53	86.9	9 06.2	84	53	86.6	8
9	7 18.4	85	53	86.6	7 43.8	85	53	86.3	8 09.1	84	53	86.0	8 34.5	84	53	85.8	9
90	6 46.7	85	53	85.7	7 12.1	85	53	85.5	7 37.4	85	53	85.2	8 02.8	84	53	84.9	90

H.A.	10° 00′ Alt.	Δd	Δt	Az.	10° 30′ Alt.	Δd	Δt	Az.	11° 00′ Alt.	Δd	Δt	Az.	11° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	42 00.0	1.0	01	180.0	42 30.0	1.0	01	180.0	43 00.0	1.0	01	180.0	43 30.0	1.0	01	180.0	00
1	41 59.6	1.0	02	178.7	42 29.6	1.0	02	178.7	42 59.6	1.0	02	178.7	43 29.6	1.0	02	178.6	1
2	41 58.5	1.0	03	177.4	42 28.5	1.0	03	177.3	42 58.5	1.0	03	177.3	43 28.5	1.0	03	177.3	2
3	41 56.7	1.0	04	176.0	42 26.7	1.0	04	176.0	42 56.6	1.0	04	176.0	43 26.6	1.0	04	175.9	3
4	41 54.1	1.0	06	174.7	42 24.1	1.0	06	174.7	42 54.0	1.0	06	174.6	43 24.0	1.0	06	174.6	4
05	41 50.8	1.0	07	173.4	42 20.8	1.0	07	173.3	42 50.7	1.0	07	173.3	43 20.6	1.0	07	173.3	05
6	41 46.8	1.0	08	172.1	42 16.7	1.0	08	172.0	42 46.6	1.0	08	172.0	43 16.5	1.0	08	171.9	6
7	41 42.0	1.0	09	170.7	42 11.9	1.0	09	170.7	42 41.8	1.0	09	170.6	43 11.7	1.0	09	170.6	7
8	41 36.6	1.0	10	169.4	42 06.4	1.0	10	169.4	42 36.3	99	10	169.3	43 06.1	99	10	169.2	8
9	41 30.4	99	12	168.1	42 00.2	99	12	168.1	42 30.0	99	12	168.0	42 59.8	99	12	167.9	9
10	41 23.5	99	13	166.8	41 53.3	99	13	166.7	42 23.0	99	13	166.7	42 52.8	99	13	166.6	10
1	41 15.9	99	14	165.5	41 45.6	99	14	165.4	42 15.3	99	14	165.3	42 45.1	99	14	165.2	1
2	41 07.6	99	15	164.2	41 37.3	99	15	164.1	42 06.9	99	15	164.0	42 36.6	99	15	163.9	2
3	40 58.6	99	16	162.9	41 28.2	99	16	162.8	41 57.9	99	16	162.7	42 27.5	99	16	162.6	3
4	40 48.9	99	17	161.7	41 18.5	99	17	161.5	41 48.1	99	17	161.4	42 17.6	98	18	161.3	4
15	40 38.6	98	18	160.4	41 08.1	98	18	160.3	41 37.6	98	19	160.1	42 07.1	98	19	160.0	15
6	40 27.6	98	19	159.1	40 57.0	98	20	159.0	41 26.5	98	20	158.8	41 55.9	98	20	158.7	6
7	40 15.9	98	21	157.8	40 45.3	98	21	157.7	41 14.6	98	21	157.6	41 44.0	98	21	157.4	7
8	40 03.6	98	22	156.6	40 32.9	98	22	156.4	41 02.2	98	22	156.3	41 31.5	98	22	156.1	8
9	39 50.6	97	23	155.3	40 19.9	97	23	155.2	40 49.1	97	23	155.0	41 18.3	97	23	154.9	9
20	39 37.0	97	24	154.1	40 06.2	97	24	153.9	40 35.3	97	24	153.8	41 04.5	97	24	153.6	20
1	39 22.8	97	25	152.8	39 51.9	97	25	152.7	40 21.0	97	25	152.5	40 50.0	97	25	152.3	1
2	39 08.0	97	26	151.6	39 37.0	97	26	151.4	40 06.0	97	26	151.3	40 35.0	97	26	151.1	2
3	38 52.6	96	27	150.4	39 21.5	96	27	150.2	39 50.4	96	27	150.0	40 19.3	96	27	149.9	3
4	38 36.6	96	28	149.2	39 05.4	96	28	149.0	39 34.2	96	28	148.8	40 03.0	96	28	148.6	4
25	38 20.0	96	29	148.0	38 48.7	96	29	147.8	39 17.5	96	29	147.6	39 46.2	96	29	147.4	25
6	38 02.8	96	30	146.8	38 31.5	95	30	146.6	39 00.1	95	30	146.4	39 28.8	95	30	146.2	6
7	37 45.1	95	30	145.6	38 13.7	95	31	145.4	38 42.3	95	31	145.2	39 10.8	95	31	145.0	7
8	37 26.9	95	31	144.4	37 55.4	95	31	144.2	38 23.8	95	32	144.0	38 52.3	95	32	143.8	8
9	37 08.1	95	32	143.2	37 36.5	95	32	143.0	38 04.9	95	32	142.8	38 33.2	94	33	142.6	9
30	36 48.8	94	33	142.0	37 17.1	94	33	141.8	37 45.4	94	33	141.6	38 13.6	94	33	141.4	30
1	36 29.0	94	34	140.9	36 57.2	94	34	140.7	37 25.4	94	34	140.5	37 53.6	94	34	140.2	1
2	36 08.7	94	35	139.7	36 36.8	94	35	139.5	37 04.9	94	35	139.3	37 33.0	94	35	139.1	2
3	35 47.9	93	35	138.6	36 15.9	93	36	138.4	36 43.9	93	36	138.2	37 11.9	93	36	137.9	3
4	35 26.7	93	36	137.5	35 54.6	93	36	137.2	36 22.5	93	37	137.0	36 50.4	93	37	136.8	4
35	35 04.9	93	37	136.3	35 32.8	93	37	136.1	36 00.6	93	37	135.9	36 28.4	93	37	135.7	35
6	34 42.8	93	38	135.2	35 10.5	92	38	135.0	35 38.2	92	38	134.8	36 05.9	92	38	134.5	6
7	34 20.2	92	38	134.1	34 47.8	92	39	133.9	35 15.4	92	39	133.7	35 43.1	92	39	133.4	7
8	33 57.1	92	39	133.0	34 24.7	92	39	132.8	34 52.2	92	39	132.6	35 19.7	92	40	132.3	8
9	33 33.7	92	40	131.9	34 01.2	92	40	131.7	34 28.6	91	40	131.5	34 56.0	91	40	131.2	9
40	33 09.8	91	40	130.9	33 37.2	91	41	130.6	34 04.6	91	41	130.4	34 31.9	91	41	130.1	40
1	32 45.6	91	41	129.8	33 12.9	91	41	129.6	33 40.2	91	41	129.3	34 07.4	91	41	129.0	1
2	32 21.0	91	42	128.7	32 48.2	91	42	128.5	33 15.4	91	42	128.2	33 42.5	90	42	128.0	2
3	31 56.0	90	42	127.7	32 23.1	90	42	127.4	32 50.2	90	43	127.2	33 17.3	90	43	126.9	3
4	31 30.7	90	43	126.6	31 57.7	90	43	126.4	32 24.7	90	43	126.1	32 51.7	90	43	125.9	4
45	31 05.0	90	43	125.6	31 31.9	90	44	125.3	31 58.9	90	44	125.1	32 25.8	90	44	124.8	45
6	30 39.0	90	44	124.6	31 05.8	90	44	124.3	31 32.7	89	44	124.0	31 59.5	89	44	123.8	6
7	30 12.6	89	44	123.5	30 39.4	89	45	123.3	31 06.2	89	45	123.0	31 32.9	89	45	122.8	7
8	29 46.0	89	45	122.5	30 12.7	89	45	122.3	30 39.4	89	45	122.0	31 06.0	89	45	121.7	8
9	29 19.0	89	45	121.5	29 45.7	89	46	121.3	30 12.3	89	46	121.0	30 38.8	89	46	120.7	9
50	28 51.8	89	46	120.5	29 18.3	89	46	120.3	29 44.9	88	46	120.0	30 11.4	88	46	119.7	50
1	28 24.2	88	46	119.5	28 50.7	88	46	119.3	29 17.2	88	47	119.0	29 43.6	88	47	118.7	1
2	27 56.4	88	47	118.5	28 22.9	88	47	118.3	28 49.2	88	47	118.0	29 15.6	88	47	117.7	2
3	27 28.4	88	47	117.6	27 54.7	88	47	117.3	28 21.0	88	47	117.0	28 47.3	88	48	116.8	3
4	27 00.1	88	48	116.6	27 26.4	88	48	116.3	27 52.6	87	48	116.1	28 18.8	87	48	115.8	4
55	26 31.5	87	48	115.6	26 57.7	87	48	115.4	27 23.9	87	48	115.1	27 50.1	87	48	114.8	55
6	26 02.7	87	48	114.7	26 28.9	87	48	114.4	26 55.0	87	49	114.1	27 21.1	87	49	113.8	6
7	25 33.7	87	49	113.7	25 59.8	87	49	113.4	26 25.9	87	49	113.2	26 51.9	87	49	112.9	7
8	25 04.5	87	49	112.8	25 30.6	87	49	112.5	25 56.6	87	49	112.2	26 22.5	87	49	111.9	8
9	24 35.1	87	49	111.8	25 01.1	87	49	111.6	25 27.0	86	50	111.3	25 52.9	86	50	111.0	9
60	24 05.5	86	50	110.9	24 31.4	86	50	110.6	24 57.3	86	50	110.3	25 23.2	86	50	110.1	60
1	23 35.7	86	50	110.0	24 01.6	86	50	109.7	24 27.4	86	50	109.4	24 53.2	86	50	109.1	1
2	23 05.7	86	50	109.0	23 31.5	86	50	108.8	23 57.3	86	50	108.5	24 23.1	86	50	108.2	2
3	22 35.6	86	50	108.1	23 01.4	86	51	107.8	23 27.1	86	51	107.6	23 52.8	86	51	107.3	3
4	22 05.3	86	51	107.2	22 31.0	86	51	106.9	22 56.7	86	51	106.6	23 22.4	85	51	106.4	4
65	21 34.8	86	51	106.3	22 00.5	86	51	106.0	22 26.2	85	51	105.7	22 51.8	85	51	105.5	65
6	21 04.3	85	51	105.4	21 29.9	85	51	105.1	21 55.5	85	51	104.8	22 21.1	85	51	104.6	6
7	20 33.5	85	51	104.5	20 59.1	85	51	104.2	21 24.7	85	52	103.9	21 50.2	85	52	103.7	7
8	20 02.7	85	52	103.6	20 28.3	85	52	103.3	20 53.8	85	52	103.0	21 19.3	85	52	102.8	8
9	19 31.7	85	52	102.7	19 57.3	85	52	102.4	20 22.8	85	52	102.1	20 48.2	85	52	101.9	9
70	19 00.7	85	52	101.8	19 26.2	85	52	101.5	19 51.6	85	52	101.3	20 17.1	85	52	101.0	70
1	18 29.5	85	52	100.9	18 55.0	85	52	100.7	19 20.4	85	52	100.4	19 45.8	85	52	100.1	1
2	17 58.2	85	52	100.1	18 23.7	85	52	99.8	18 49.1	85	52	99.5	19 14.5	85	52	99.2	2
3	17 26.9	85	52	99.2	17 52.3	85	52	98.9	18 17.7	85	52	98.6	18 43.0	84	52	98.3	3
4	16 55.5	85	52	98.3	17 20.8	85	53	98.0	17 46.2	84	53	97.7	18 11.5	84	53	97.5	4
75	16 24.0	85	53	97.4	16 49.3	85	53	97.2	17 14.7	84	53	96.9	17 40.0	84	53	96.6	75
6	15 52.4	85	53	96.6	16 17.7	84	53	96.3	16 43.1	84	53	96.0	17 08.4	84	53	95.7	6
7	15 20.8	84	53	95.7	15 46.1	84	53	95.4	16 11.4	84	53	95.1	16 36.7	84	53	94.9	7
8	14 49.1	84	53	94.8	15 14.4	84	53	94.6	15 39.7	84	53	94.3	16 05.0	84	53	94.0	8
9	14 17.4	84	53	94.0	14 42.7	84	53	93.7	15 08.0	84	53	93.4	15 33.3	84	53	93.1	9
80	13 45.7	84	53	93.1	14 11.0	84	53	92.9	14 36.3	84	53	92.6	15 01.5	84	53	92.3	80
1	13 13.9	84	53	92.3	13 39.2	84	53	92.0	14 04.5	84	53	91.7	14 29.7	84	53	91.4	1
2	12 42.2	84	53	91.4	13 07.4	84	53	91.1	13 32.7	84	53	90.9	13 58.0	84	53	90.6	2
3	12 10.4	84	53	90.6	12 35.7	84	53	90.3	13 00.9	84	53	90.0	13 26.2	84	53	89.7	3
4	11 38.6	84	53	89.7	12 03.9	84	53	89.4	12 29.1	84	53	89.2	12 54.4	84	53	88.9	4
85	11 06.8	84	53	88.9	11 32.1	84	53	88.6	11 57.3	84	53	88.3	12 22.6	84	53	88.1	85
6	10 35.0	84	53	88.0	11 00.3	84	53	87.8	11 25.6	84	53	87.5	11 50.8	84	53	87.2	6
7	10 03.2	84	53	87.2	10 28.5	84	53	86.9	10 53.8	84	53	86.6	11 19.1	84	53	86.4	7
8	9 31.5	84	53	86.3	9 56.8	84	53	86.1	10 22.1	84	53	85.8	10 47.4	84	53	85.5	8
9	8 59.8	84	53	85.5	9 25.1	84	53	85.2	9 50.4	84	53	85.0	10 15.7	84	53	84.7	9
90	8 28.1	84	53	84.7	8 53.4	84	53	84.4	9 18.7	84	53	84.1	9 44.0	84	53	83.8	90

Digitized by Google

Lat. 58°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	24 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0	23 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	00
1	23 59.7	1.0 02	178.9	23 29.7	1.0 02	178.9	22 59.7	1.0 01	178.9	22 29.7	1.0 01	178.9	21 59.7	1.0 01	178.9	21 29.7	1.0 01	178.9	20 59.7	1.0 01	178.9	20 29.7	1.0 01	179.0	1
2	23 58.8	1.0 02	177.8	23 28.8	1.0 02	177.8	22 58.8	1.0 02	177.9	22 28.8	1.0 02	177.9	21 58.8	1.0 02	177.9	21 28.8	1.0 02	177.9	20 58.8	1.0 02	177.9	20 28.8	1.0 02	177.9	2
3	23 57.3	1.0 04	176.7	23 27.3	1.0 03	176.8	22 57.3	1.0 03	176.8	22 27.3	1.0 03	176.8	21 57.3	1.0 03	176.8	21 27.4	1.0 03	176.8	20 57.4	1.0 03	176.8	20 27.4	1.0 03	176.9	3
4	23 55.2	1.0 04	175.7	23 25.2	1.0 04	175.7	22 55.2	1.0 04	175.7	22 25.3	1.0 04	175.7	21 55.3	1.0 04	175.8	21 25.3	1.0 04	175.8	20 55.3	1.0 04	175.8	20 25.4	1.0 04	175.8	4
05	23 52.5	1.0 06	174.6	23 22.5	1.0 05	174.6	22 52.6	1.0 05	174.6	22 22.6	1.0 05	174.7	21 52.6	1.0 05	174.7	21 22.7	1.0 05	174.7	20 52.7	1.0 05	174.7	20 22.8	1.0 05	174.8	05
6	23 49.2	1.0 06	173.5	23 19.2	1.0 06	173.5	22 49.3	1.0 06	173.6	22 19.4	1.0 06	173.6	21 49.4	1.0 06	173.6	21 19.5	1.0 06	173.7	20 49.5	1.0 06	173.7	20 19.6	1.0 06	173.7	6
7	23 45.3	1.0 08	172.4	23 15.4	1.0 07	172.5	22 45.4	1.0 07	172.5	22 15.5	1.0 07	172.5	21 45.6	1.0 07	172.6	21 15.7	1.0 07	172.6	20 45.7	1.0 07	172.6	20 15.8	1.0 07	172.7	7
8	23 40.8	1.0 08	171.3	23 10.9	1.0 08	171.4	22 41.0	1.0 08	171.4	22 11.1	1.0 08	171.5	21 41.2	1.0 08	171.5	21 11.3	1.0 08	171.6	20 41.4	1.0 08	171.6	20 11.5	1.0 08	171.6	8
9	23 35.7	1.0 09	170.3	23 05.8	1.0 09	170.3	22 36.0	1.0 09	170.4	22 06.1	1.0 09	170.4	21 36.2	1.0 09	170.5	21 06.3	1.0 09	170.5	20 36.4	1.0 09	170.6	20 06.6	1.0 09	170.6	9
10	23 30.1	99 10	169.2	23 00.2	99 10	169.2	22 30.4	1.0 10	169.3	22 00.5	1.0 10	169.4	21 30.7	1.0 10	169.4	21 00.8	1.0 10	169.5	20 30.9	1.0 10	169.5	20 01.1	1.0 10	169.6	10
1	23 23.8	99 11	168.1	22 54.0	99 11	168.2	22 24.2	99 11	168.2	21 54.3	99 11	168.3	21 24.5	99 11	168.4	20 54.7	99 11	168.4	20 24.9	99 11	168.5	19 55.0	99 11	168.5	1
2	23 17.0	99 12	167.0	22 47.2	99 12	167.1	22 17.4	99 12	167.2	21 47.6	99 12	167.2	21 17.8	99 12	167.3	20 48.0	99 12	167.4	20 18.2	99 12	167.4	19 48.4	99 12	167.5	2
3	23 09.6	99 13	166.0	22 39.8	99 13	166.0	22 10.1	99 13	166.1	21 40.3	99 13	166.2	21 10.5	99 13	166.3	20 40.8	99 13	166.3	20 11.0	99 13	166.4	19 41.3	99 13	166.5	3
4	23 01.6	99 14	164.9	22 31.9	99 14	165.0	22 02.1	99 14	165.1	21 32.4	99 14	165.1	21 02.7	99 14	165.2	20 33.0	99 14	165.3	20 03.3	99 14	165.4	19 33.6	99 14	165.4	4
15	22 53.0	99 15	163.8	22 23.3	99 15	163.9	21 53.7	99 15	164.0	21 24.0	99 15	164.1	20 54.3	99 15	164.2	20 24.6	99 15	164.2	19 55.0	99 15	164.3	19 25.3	99 15	164.4	15
6	22 43.9	99 16	162.8	22 14.2	99 16	162.9	21 44.6	99 16	163.0	21 15.0	99 16	163.0	20 45.4	99 16	163.1	20 15.7	99 16	163.2	19 46.1	99 16	163.3	19 16.5	99 16	163.4	6
7	22 34.2	99 17	161.7	22 04.6	99 17	161.8	21 35.0	99 17	161.9	21 05.4	99 17	162.0	20 35.9	99 17	162.1	20 06.3	99 17	162.2	19 36.7	99 17	162.3	19 07.1	99 16	162.3	7
8	22 23.9	98 18	160.7	21 54.4	98 18	160.8	21 24.9	98 18	160.9	20 55.3	98 18	161.0	20 25.8	98 18	161.0	19 56.3	98 18	161.1	19 26.7	98 17	161.2	18 57.2	98 17	161.3	8
9	22 13.1	98 19	159.6	21 43.7	98 19	159.7	21 14.2	98 19	159.8	20 44.7	98 19	159.9	20 15.2	98 19	160.0	19 45.7	98 18	160.1	19 16.2	98 18	160.2	18 46.7	98 18	160.3	9
20	22 01.8	98 20	158.6	21 32.4	98 20	158.7	21 02.9	98 20	158.8	20 33.5	98 20	158.9	20 04.1	98 19	159.0	19 34.6	98 19	159.1	19 05.2	98 19	159.2	18 35.8	98 19	159.3	20
1	21 49.9	98 21	157.5	21 20.5	98 21	157.6	20 51.2	98 21	157.7	20 21.8	98 20	157.9	19 52.4	98 20	158.0	19 23.0	98 20	158.1	18 53.6	98 20	158.2	18 24.2	98 20	158.3	1
2	21 37.5	98 22	156.5	21 08.2	98 21	156.6	20 38.9	98 21	156.7	20 09.5	98 21	156.8	19 40.2	98 21	156.9	19 10.9	98 21	157.0	18 41.6	98 21	157.2	18 12.2	98 21	157.3	2
3	21 24.5	97 22	155.4	20 55.3	98 22	155.6	20 26.0	98 22	155.7	19 56.8	98 22	155.8	19 27.5	98 22	155.9	18 58.2	98 22	156.0	18 29.0	98 22	156.1	17 59.7	98 22	156.3	3
4	21 11.1	97 23	154.4	20 41.9	97 23	154.5	20 12.7	97 23	154.7	19 43.5	97 23	154.8	19 14.3	97 23	154.9	18 45.1	97 23	155.0	18 15.8	97 23	155.1	17 46.6	97 23	155.3	4
25	20 57.1	97 24	153.4	20 27.9	97 24	153.5	19 58.8	97 24	153.6	19 29.7	97 24	153.8	19 00.5	97 24	153.9	18 31.4	97 24	154.0	18 02.2	97 24	154.1	17 33.1	97 23	154.3	25
6	20 42.6	97 25	152.3	20 13.5	97 25	152.5	19 44.4	97 25	152.6	19 15.4	97 25	152.7	18 46.3	97 25	152.9	18 17.2	97 24	153.0	17 48.1	97 24	153.1	17 19.0	97 24	153.3	6
7	20 27.6	97 26	151.3	19 58.6	97 26	151.5	19 29.6	97 26	151.6	19 00.5	97 26	151.7	18 31.5	97 25	151.9	18 02.5	97 25	152.0	17 33.5	97 25	152.1	17 04.4	97 25	152.3	7
8	20 12.0	96 27	150.3	19 43.1	96 27	150.4	19 14.2	96 26	150.6	18 45.2	96 26	150.7	18 16.3	97 26	150.9	17 47.3	97 26	151.0	17 18.4	97 26	151.1	16 49.4	97 26	151.3	8
9	19 56.1	96 27	149.3	19 27.2	96 27	149.4	18 58.3	96 27	149.6	18 29.5	96 27	149.7	18 00.6	96 27	149.9	17 31.7	96 27	150.0	17 02.8	96 27	150.1	16 33.9	96 27	150.3	9
30	19 39.6	96 28	148.3	19 10.8	96 28	148.4	18 42.0	96 28	148.6	18 13.2	96 28	148.7	17 44.4	96 28	148.9	17 15.6	96 28	149.0	16 46.7	96 28	149.2	16 17.9	96 27	149.3	30
1	19 22.6	96 29	147.3	18 53.9	96 29	147.4	18 25.2	96 29	147.6	17 56.4	96 29	147.7	17 27.7	96 29	147.9	16 58.9	96 28	148.0	16 30.2	96 28	148.2	16 01.4	96 28	148.3	1
2	19 05.2	95 30	146.3	18 36.6	96 30	146.4	18 07.9	96 30	146.6	17 39.2	96 29	146.7	17 10.6	96 29	146.9	16 41.9	96 29	147.0	16 13.2	96 29	147.2	15 44.5	96 29	147.3	2
3	18 47.3	95 31	145.3	18 18.7	95 30	145.4	17 50.2	95 30	145.6	17 21.6	95 30	145.8	16 53.0	95 30	145.9	16 24.4	95 30	146.1	15 55.7	95 30	146.2	15 27.1	95 30	146.4	3
4	18 29.0	95 31	144.3	18 00.5	95 31	144.4	17 32.0	95 31	144.6	17 03.4	95 31	144.8	16 34.9	95 31	144.9	16 06.4	95 31	145.1	15 37.8	95 31	145.2	15 09.3	95 30	145.4	4
35	18 10.2	95 32	143.3	17 41.8	95 32	143.5	17 13.3	95 32	143.6	16 44.9	95 32	143.8	16 16.4	95 32	144.0	15 48.0	95 31	144.1	15 19.5	95 31	144.3	14 51.0	95 31	144.4	35
6	17 51.0	94 33	142.3	17 22.6	95 33	142.5	16 54.2	95 32	142.6	16 25.9	95 32	142.8	15 57.5	95 32	143.0	15 29.1	95 32	143.2	15 00.7	95 32	143.3	14 32.3	95 32	143.5	6
7	17 31.3	94 33	141.3	17 03.0	94 33	141.5	16 34.7	94 33	141.7	16 06.4	94 33	141.8	15 38.1	94 33	142.0	15 09.8	94 33	142.2	14 41.5	94 33	142.4	14 13.2	94 33	142.5	7
8	17 11.2	94 34	140.3	16 43.0	94 34	140.5	16 14.8	94 34	140.7	15 46.6	94 34	140.9	15 18.4	94 34	141.1	14 50.1	94 34	141.2	14 21.9	94 33	141.4	13 53.6	94 33	141.6	8
9	16 50.7	94 35	139.4	16 22.6	94 35	139.6	15 54.5	94 35	139.7	15 26.3	94 34	139.9	14 58.2	94 34	140.1	14 30.0	94 34	140.3	14 01.8	94 34	140.4	13 33.7	94 34	140.6	9
40	16 29.8	93 36	138.4	16 01.8	94 35	138.6	15 33.7	94 35	138.8	15 05.6	94 35	139.0	14 37.6	94 35	139.1	14 09.5	94 35	139.3	13 41.4	94 35	139.5	13 13.3	94 35	139.7	40
1	16 08.5	93 36	137.4	15 40.5	93 36	137.6	15 12.6	93 36	137.8	14 44.6	93 36	138.0	14 16.6	93 36	138.2	13 48.6	93 36	138.4	13 20.6	93 35	138.6	12 52.5	93 35	138.7	1
2	15 46.8	93 37	136.5	15 18.9	93 37	136.7	14 51.0	93 37	136.9	14 23.1	93 36	137.1	13 55.2	93 36	137.2	13 27.3	93 36	137.4	12 59.3	93 36	137.6	12 31.4	93 36	137.8	2
3	15 24.7	93 37	135.5	14 56.9	93 37	135.7	14 29.1	93 37	135.9	14 01.3	93 37	136.1	13 33.4	93 37	136.3	13 05.6	93 37	136.5	12 37.7	93 37	136.7	12 09.8	93 37	136.9	3
4	15 02.3	92 38	134.6	14 34.5	92 38	134.8	14 06.8	93 38	135.0	13 39.0	93 38	135.2	13 11.3	93 38	135.4	12 43.5	93 37	135.6	12 15.7	93 37	135.7	11 47.9	93 37	135.9	4
45	14 39.4	92 39	133.6	14 11.8	92 39	133.8	13 44.1	92 38	134.0	13 16.4	92 38	134.2	12 48.7	92 38	134.4	12 21.0	92 38	134.6	11 53.3	92 38	134.8	11 25.6	92 38	135.0	45
6	14 16.2	92 39	132.7	13 48.7	92 39	132.9	13 21.1	92 39	133.1	12 53.5	92 39	133.3	12 25.8	92 39	133.5	11 58.2	92 39	133.7	11 30.6	92 38	133.9	11 02.9	92 38	134.1	6
7	13 52.7	92 40	131.8	13 25.2	92 40	132.0	12 57.7	92 40	132.2	12 30.1	92 39	132.4	12 02.6	92 39	132.6	11 35.1	92 39	132.8	11 07.5	92 39	133.0	10 39.9	92 39	133.2	7
8	13 28.8	91 40	130.8	13 01.4	91 40	131.0	12 33.9	91 40	131.2	12 06.5	92 40	131.4	11 39.0	92 40	131.6	11 11.5	92 40	131.9	10 44.1	92 40	132.1	10 16.6	92 40	132.3	8
9	13 04.6	91 41	129.9	12 37.2	91 41	130.1	12 09.9	91 41	130.3	11 42.5	91 41	130.5	11 15.1	91 40	130.7	10 47.7	91 40	130.9	10 20.3	91 40	131.1	9 52.9	91 40	131.3	9
50	12 40.0	91 41	129.0	12 12.7	91 41	129.2	11 45.4	91 41	129.4	11 18.1	91 41	129.6	10 50.8	91 41	129.8	10 23.5	91 41	130.0	9 56.2	91 41	130.2	9 28.8	91 41	130.4	50
1	12 15.1	91 42	128.0	11 47.9	91 42	128.3	11 20.7	91 42	128.5	10 53.5	91 42	128.7	10 26.2	91 42	128.9	9 59.0	91 41	129.1	9 31.7	91 41	129.3	9 04.5	91 41	129.5	1
2	11 49.9	90 42	127.1	11 22.8	90 42	127.3	10 55.7	91 42	127.6	10 28.5	91 42	127.8	10 01.3	91 42	128.0	9 34.2	91 42	128.2	9 07.0	91 42	128.4	8 39.8	91 42	128.6	2
3	11 24.4	90 43	126.2	10 57.4	90 43	126.4	10 30.3	90 43	126.7	10 03.2	90 43	126.9	9 36.1	90 43	127.1	9 09.0	90 42	127.3	8 41.9	90 42	127.5	8 14.8	90 42	127.7	3
4	10 58.6	90 44	125.3	10 31.7	90 43	125.5	10 04.6	90 43	125.7	9 37.6	90 43	126.0	9 10.6	90 43	126.2	8 43.6	90 43	126.4	8 16.6	90 43	126.6	7 49.5	90 43	126.8	4
55	10 32.6	90 44	124.4	10 05.6	90 44	124.6	9 38.7	90 44	124.8	9 11.8	90 44	125.1	8 44.8	90 44	125.3	8 17.9	90 43	125.5	7 50.9	90 43	125.7	7 23.9	90 43	126.0	55
6	10 06.2	89 44	123.5	9 39.3	90 44	123.7	9 12.5	90 44	124.0	8 45.6	90 44	124.2	8 18.7	90 44	124.4	7 51.8	90 44	124.6	7 24.9	90 44	124.8	6 58.0	90 44	125.1	6
7	9 39.5	89 45	122.6	9 12.7	89 45	122.8	8 46.0	89 45	123.1	8 19.2	89 45	123.3	7 52.3	89 44	123.5	7 25.5	89 44	123.7	6 58.7	89 44	124.0	6 31.9	89 44	124.2	7
8	9 12.6	89 45	121.7	8 45.9	89 45	121.9	8 19.2	89 45	122.2	7 52.4	89 45	122.4	7 25.7	89 45	122.6	6 59.0	89 45	122.9	6 32.2	89 45	123.1	6 05.4	89 45	123.3	8
9	8 45.4	89 46	120.8	8 18.8	89 46	121.0	7 52.1	89 46	121.3	7 25.5	89 45	121.5	6 58.8	89 45	121.7	6 32.1	89 45	122.0	6 05.4	89 45	122.2	5 38.7	89 45	122.4	9
60	8 18.0	89 46	119.9	7 51.4	89 46	120.2	7 24.8	89 46	120.4	6 58.2	89 46	120.6	6 31.6	89 46	120.9	6 05.0	89 46	121.1	5 38.4	89 45	121.3	5 11.8	89 45	121.6	60
1	7 50.3	88 47	119.0	7 23.8	88 46	119.3	6 57.3	88 46	119.5	6 30.7	88 46	119.7	6 04.2	88 46	120.0	5 37.7	88 46	120.2	5 11.1	89 46	120.4				1
2	7 22.4	88 47	118.2	6 56.0	88 47	118.4	6 29.5	88 47	118.6	6 03.0	88 47	118.9	5 36.5	88 46	119.1	5 10.1	88 46	119.3							2
3	6 54.3	88 47	117.3	6 27.9	88 47	117.5	6 01.5	88 47	117.8	5 35.1	88 47	118.0	5 08.6	88 47	118.2										3
4	6 25.9	88 48	116.4	5 59.6	88 48	116.6	5 33.2	88 47	116.9	5 06.9	88 47	117.1													4
65	5 57.3	88 48	115.5	5 31.0	88 48	115.8	5 04.8	88 48	116.0																65
6	5 28.5	87 48	114.7	5 02.3	87 48	114.9																			6

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	6 15.0	85 53	84.9	6 40.4	85 53	84.6	7 05.8	85 53	84.4	7 31.1	85 53	84.1	7 56.5	84 53	83.8	8 21.8	84 53	83.6	8 47.1	84 53	83.3	9 12.5	84 53	83.0	91
2	5 43.4	85 53	84.1	6 08.7	85 53	83.8	6 34.1	85 53	83.5	6 59.5	85 53	83.3	7 24.9	85 53	83.0	7 50.2	85 52	82.7	8 15.6	84 52	82.4	8 40.9	84 52	82.2	2
3	5 11.8	85 53	83.2	5 37.2	85 53	82.9	6 02.6	85 52	82.7	6 28.0	85 52	82.4	6 53.4	85 52	82.1	7 18.7	85 52	81.9	7 44.1	85 52	81.6	8 09.5	85 52	81.3	3
4				5 05.6	85 52	82.1	5 31.1	85 52	81.8	5 56.5	85 52	81.6	6 21.9	85 52	81.3	6 47.3	85 52	81.0	7 12.7	85 52	80.8	7 38.1	85 52	80.5	4
95										5 25.1	85 52	80.7	5 50.5	85 52	80.5	6 15.9	85 52	80.2	6 41.3	85 52	79.9	7 06.7	85 52	79.7	95
6													5 19.2	85 52	79.6	5 44.6	85 52	79.4	6 10.1	85 52	79.1	6 35.5	85 52	78.8	6
7																5 13.4	85 52	78.5	5 38.9	85 52	78.3	6 04.4	85 52	78.0	7
8																			5 07.8	85 52	77.4	5 33.3	85 52	77.2	8
9																						5 02.4	85 52	76.3	9

Digitized by Google

La 59

Lat. 58°

H.A.	12° 00′ Alt.	Δd Δt	Az.	12° 30′ Alt.	Δd Δt	Az.	13° 00′ Alt.	Δd Δt	Az.	13° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	44 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0
1	43 59.6	1.0 02	178.6	44 29.6	1.0 02	178.6	44 59.6	1.0 02	178.6	45 29.6	1.0 02	178.6
2	43 58.5	1.0 03	177.3	44 28.5	1.0 03	177.3	44 58.5	1.0 03	177.2	45 28.5	1.0 03	177.2
3	43 56.6	1.0 04	175.9	44 26.6	1.0 04	175.9	44 56.6	1.0 04	175.9	45 26.5	1.0 04	175.8
4	43 54.0	1.0 06	174.6	44 23.9	1.0 06	174.5	44 53.9	1.0 06	174.5	45 23.8	1.0 06	174.5
05	43 50.6	1.0 07	173.2	44 20.5	1.0 07	173.2	44 50.5	1.0 07	173.1	45 20.4	1.0 07	173.1
6	43 46.5	1.0 08	171.9	44 16.4	1.0 08	171.8	44 46.3	1.0 08	171.8	45 16.2	1.0 08	171.7
7	43 41.6	1.0 09	170.5	44 11.5	1.0 09	170.4	44 41.3	1.0 09	170.4	45 11.2	1.0 10	170.3
8	43 36.0	99 11	169.2	44 05.8	99 11	169.1	44 35.7	99 11	169.0	45 05.5	99 11	168.9
9	43 29.6	99 12	167.8	43 59.4	99 12	167.7	44 29.2	99 12	167.7	44 59.0	99 12	167.6
10	43 22.6	99 13	166.5	43 52.3	99 13	166.4	44 22.1	99 13	166.3	44 51.8	99 13	166.2
1	43 14.8	99 14	165.2	43 44.5	99 14	165.1	44 14.2	99 14	165.0	44 43.9	99 14	164.9
2	43 06.3	99 15	163.8	43 35.9	99 15	163.7	44 05.6	99 16	163.6	44 35.2	99 16	163.5
3	42 57.1	99 17	162.5	43 26.7	99 17	162.4	43 56.2	99 17	162.3	44 25.8	99 17	162.2
4	42 47.2	98 18	161.2	43 16.7	98 18	161.1	43 46.2	98 18	160.9	44 15.7	98 18	160.8
15	42 36.6	98 19	159.9	43 06.0	98 19	159.8	43 35.5	98 19	159.6	44 04.9	98 19	159.5
6	42 25.3	98 20	158.6	42 54.7	98 20	158.4	43 24.1	98 20	158.3	43 53.5	98 20	158.2
7	42 13.3	98 21	157.3	42 42.7	98 21	157.1	43 12.0	98 21	157.0	43 41.3	98 21	156.8
8	42 00.7	98 22	156.0	42 30.0	98 22	155.8	42 59.2	97 22	155.7	43 28.5	97 22	155.5
9	41 47.5	97 23	154.7	42 16.7	97 23	154.6	42 45.8	97 23	154.4	43 15.0	97 24	154.2
20	41 33.6	97 24	153.4	42 02.7	97 24	153.3	42 31.8	97 24	153.1	43 00.8	97 25	152.9
1	41 19.0	97 25	152.2	41 48.1	97 25	152.0	42 17.1	97 26	151.8	42 46.1	97 26	151.7
2	41 03.9	96 26	150.9	41 32.8	96 26	150.7	42 01.8	96 27	150.6	42 30.7	96 27	150.4
3	40 48.1	96 27	149.7	41 17.0	96 27	149.5	41 45.8	96 28	149.3	42 14.6	96 28	149.1
4	40 31.8	96 28	148.4	41 00.6	96 28	148.2	41 29.3	96 29	148.1	41 58.0	96 29	147.9
25	40 14.9	96 29	147.2	40 43.5	96 29	147.0	41 12.2	95 29	146.8	41 40.8	95 30	146.6
6	39 57.4	96 30	146.0	40 25.9	95 30	145.8	40 54.5	95 30	145.6	41 23.0	95 31	145.4
7	39 39.3	95 31	144.8	40 07.8	95 31	144.6	40 36.2	95 31	144.4	41 04.7	95 32	144.2
8	39 20.7	95 32	143.6	39 49.1	95 32	143.4	40 17.5	95 32	143.2	40 45.8	94 32	142.9
9	39 01.5	94 33	142.4	39 29.8	94 33	142.2	39 58.1	94 33	141.9	40 26.4	94 33	141.7
30	38 41.9	94 34	141.2	39 10.1	94 34	141.0	39 38.3	94 34	140.8	40 06.4	94 34	140.5
1	38 21.7	94 34	140.0	38 49.8	94 35	139.8	39 17.9	94 35	139.6	39 46.0	93 35	139.3
2	38 01.0	93 35	138.9	38 29.0	93 35	138.6	38 57.0	93 36	138.4	39 25.0	93 36	138.2
3	37 39.9	93 36	137.7	38 07.8	93 36	137.5	38 35.7	93 36	137.2	39 03.5	93 37	137.0
4	37 18.2	93 37	136.6	37 46.1	93 37	136.3	38 13.9	93 37	136.1	38 41.6	93 37	135.8
35	36 56.1	92 38	135.4	37 23.9	92 38	135.2	37 51.6	92 38	134.9	38 19.2	92 38	134.7
6	36 33.6	92 38	134.3	37 01.2	92 38	134.0	37 28.8	92 39	133.8	37 56.4	92 39	133.6
7	36 10.6	92 39	133.2	36 38.2	92 39	132.9	37 05.7	92 39	132.7	37 33.2	92 39	132.4
8	35 47.2	92 40	132.1	36 14.7	91 40	131.8	36 42.1	91 40	131.6	37 09.5	91 40	131.3
9	35 23.4	91 40	131.0	35 50.8	91 40	130.7	36 18.1	91 41	130.5	36 45.4	91 41	130.2
40	34 59.2	91 41	129.9	35 26.5	91 41	129.6	35 53.7	91 41	129.4	36 20.9	91 41	129.1
1	34 34.6	91 42	128.8	35 01.8	91 42	128.5	35 29.0	90 42	128.3	35 56.1	90 42	128.0
2	34 09.7	90 42	127.7	34 36.7	90 42	127.5	35 03.8	90 42	127.2	35 30.8	90 43	126.9
3	33 44.3	90 43	126.7	34 11.3	90 43	126.4	34 38.3	90 43	126.1	35 05.2	90 43	125.9
4	33 18.7	90 43	125.6	33 45.6	90 44	125.3	34 12.4	90 44	125.1	34 39.3	89 44	124.8
45	32 52.6	89 44	124.6	33 19.5	89 44	124.3	33 46.3	89 44	124.0	34 13.0	89 44	123.7
6	32 26.3	89 44	123.5	32 53.0	89 45	123.3	33 19.7	89 45	123.0	33 46.4	89 45	122.7
7	31 59.6	89 45	122.5	32 26.3	89 45	122.2	32 52.9	89 45	121.9	33 19.5	89 45	121.7
8	31 32.7	89 45	121.5	31 59.2	89 46	121.2	32 25.8	88 46	120.9	32 52.3	88 46	120.6
9	31 05.4	88 46	120.5	31 31.9	88 46	120.2	31 58.4	88 46	119.9	32 24.8	88 46	119.6
50	30 37.8	88 46	119.4	31 04.3	88 46	119.2	31 30.7	88 47	118.9	31 57.0	88 47	118.6
1	30 10.0	88 47	118.4	30 36.4	88 47	118.2	31 02.7	88 47	117.9	31 29.0	88 47	117.6
2	29 41.9	88 47	117.5	30 08.2	88 47	117.2	30 34.5	87 47	116.9	31 00.7	87 48	116.6
3	29 13.6	87 48	116.5	29 39.8	87 48	116.2	30 06.0	87 48	115.9	30 32.1	87 48	115.6
4	28 45.0	87 48	115.5	29 11.2	87 48	115.2	29 37.3	87 48	114.9	30 03.4	87 48	114.6
55	28 16.2	87 48	114.5	28 42.3	87 48	114.2	29 08.3	87 49	114.0	29 34.3	87 49	113.7
6	27 47.2	87 49	113.6	28 13.2	87 49	113.3	28 39.2	87 49	113.0	29 05.1	86 49	112.7
7	27 17.9	87 49	112.6	27 43.9	86 49	112.3	28 09.8	86 49	112.0	28 35.7	86 49	111.8
8	26 48.5	86 49	111.7	27 14.4	86 50	111.4	27 40.2	86 50	111.1	28 06.1	86 50	110.8
9	26 18.8	86 50	110.7	26 44.7	86 50	110.4	27 10.5	86 50	110.1	27 36.2	86 50	109.9
60	25 49.0	86 50	109.8	26 14.8	86 50	109.5	26 40.5	86 50	109.2	27 06.3	86 50	108.9
1	25 19.0	86 50	108.8	25 44.7	86 50	108.6	26 10.4	86 50	108.3	26 36.1	86 51	108.0
2	24 48.8	86 51	107.9	25 14.5	86 51	107.6	25 40.2	85 51	107.3	26 05.8	85 51	107.1
3	24 18.5	86 51	107.0	24 44.1	85 51	106.7	25 09.7	85 51	106.4	25 35.3	85 51	106.1
4	23 48.0	85 51	106.1	24 13.6	85 51	105.8	24 39.2	85 51	105.5	25 04.7	85 51	105.2
65	23 17.4	85 51	105.2	23 42.9	85 51	104.9	24 08.5	85 51	104.6	24 34.0	85 51	104.3
6	22 46.6	85 51	104.3	23 12.1	85 52	104.0	23 37.6	85 52	103.7	24 03.1	85 52	103.4
7	22 15.7	85 52	103.4	22 41.2	85 52	103.1	23 06.7	85 52	102.8	23 32.1	85 52	102.5
8	21 44.8	85 52	102.5	22 10.2	85 52	102.2	22 35.6	85 52	101.9	23 01.0	85 52	101.6
9	21 13.7	85 52	101.6	21 39.1	85 52	101.3	22 04.5	85 52	101.0	22 29.8	84 52	100.7
70	20 42.5	85 52	100.7	21 07.8	85 52	100.4	21 33.2	84 52	100.1	21 58.5	84 52	99.8
1	20 11.2	85 52	99.8	20 36.5	84 52	99.5	21 01.9	84 52	99.2	21 27.2	84 52	98.9
2	19 39.8	84 52	98.9	20 05.1	84 52	98.6	20 30.4	84 52	98.4	20 55.7	84 53	98.1
3	19 08.4	84 53	98.1	19 33.7	84 53	97.8	19 58.9	84 53	97.5	20 24.2	84 53	97.2
4	18 36.8	84 53	97.2	19 02.1	84 53	96.9	19 27.4	84 53	96.6	19 52.6	84 53	96.3
75	18 05.3	84 53	96.3	18 30.5	84 53	96.0	18 55.8	84 53	95.7	19 21.0	84 53	95.5
6	17 33.6	84 53	95.4	17 58.9	84 53	95.2	18 24.1	84 53	94.9	18 49.3	84 53	94.6
7	17 02.0	84 53	94.6	17 27.2	84 53	94.3	17 52.4	84 53	94.0	18 17.6	84 53	93.7
8	16 30.3	84 53	93.7	16 55.5	84 53	93.4	17 20.7	84 53	93.2	17 45.9	84 53	92.9
9	15 58.5	84 53	92.9	16 23.7	84 53	92.6	16 48.9	84 53	92.3	17 14.1	84 53	92.0
80	15 26.8	84 53	92.0	15 52.0	84 53	91.7	16 17.2	84 53	91.5	16 42.3	84 53	91.2
1	14 55.0	84 53	91.2	15 20.2	84 53	90.9	15 45.4	84 53	90.6	16 10.5	84 53	90.3
2	14 23.2	84 53	90.3	14 48.4	84 53	90.0	15 13.6	84 53	89.8	15 38.7	84 53	89.5
3	13 51.4	84 53	89.5	14 16.6	84 53	89.2	14 41.8	84 53	88.9	15 06.9	84 53	88.6
4	13 19.6	84 53	88.6	13 44.8	84 53	88.3	14 10.0	84 53	88.1	14 35.2	84 53	87.8
85	12 47.8	84 53	87.8	13 13.0	84 53	87.5	13 38.2	84 53	87.2	14 03.4	84 53	86.9
6	12 16.1	84 53	86.9	12 41.3	84 53	86.7	13 06.5	84 53	86.4	13 31.7	84 53	86.1
7	11 44.3	84 53	86.1	12 09.5	84 53	85.8	12 34.8	84 53	85.5	13 00.0	84 53	85.3
8	11 12.6	84 53	85.3	11 37.9	84 53	85.0	12 03.1	84 53	84.7	12 28.3	84 53	84.4
9	10 40.9	84 53	84.4	11 06.2	84 53	84.1	11 31.4	84 53	83.9	11 56.7	84 53	83.6
90	10 09.3	84 53	83.6	10 34.6	84 53	83.3	10 59.9	84 53	83.0	11 25.1	84 52	82.7

14° 00′ Alt.	Δd Δt	Az.	14° 30′ Alt.	Δd Δt	Az.	15° 00′ Alt.	Δd Δt	Az.	15° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
46 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0	47 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	00
45 59.6	1.0 02	178.6	46 29.6	1.0 02	178.6	46 59.6	1.0 02	178.6	47 29.6	1.0 02	178.6	1
45 58.4	1.0 03	177.2	46 28.4	1.0 03	177.2	46 58.4	1.0 03	177.2	47 28.4	1.0 03	177.1	2
45 56.5	1.0 05	175.8	46 26.5	1.0 05	175.8	46 56.5	1.0 05	175.8	47 26.4	1.0 05	175.7	3
45 53.8	1.0 06	174.4	46 23.8	1.0 06	174.4	46 53.7	1.0 06	174.3	47 23.7	1.0 06	174.3	4
45 50.3	1.0 07	173.0	46 20.3	1.0 07	173.0	46 50.2	1.0 07	172.9	47 20.1	1.0 07	172.9	05
45 46.1	1.0 08	171.6	46 16.0	1.0 08	171.6	46 45.9	1.0 08	171.5	47 15.8	1.0 09	171.5	6
45 41.1	1.0 10	170.3	46 11.0	1.0 10	170.2	46 40.8	1.0 10	170.1	47 10.7	1.0 10	170.1	7
45 35.3	99 11	168.9	46 05.2	99 11	168.8	46 35.0	99 11	168.7	47 04.8	99 11	168.6	8
45 28.8	99 12	167.5	45 58.6	99 12	167.4	46 28.4	99 12	167.3	46 58.2	99 12	167.2	9
45 21.6	99 13	166.1	45 51.3	99 13	166.0	46 21.0	99 14	165.9	46 50.8	99 14	165.8	10
45 13.6	99 15	164.8	45 43.3	99 15	164.7	46 12.9	99 15	164.6	46 42.6	99 15	164.4	1
45 04.9	99 16	163.4	45 34.5	99 16	163.3	46 04.1	99 16	163.2	46 33.7	99 16	163.1	2
44 55.4	99 17	162.0	45 25.0	99 17	161.9	45 54.5	99 17	161.8	46 24.1	98 17	161.7	3
44 45.3	98 18	160.7	45 14.8	98 18	160.6	45 44.2	98 18	160.4	46 13.7	98 18	160.3	4
44 34.4	98 19	159.4	45 03.8	98 19	159.2	45 33.2	98 20	159.1	46 02.7	98 20	158.9	15
44 22.8	98 20	158.0	44 52.2	98 21	157.9	45 21.5	98 21	157.7	45 50.9	98 21	157.6	6
44 10.6	98 22	156.7	44 39.9	98 22	156.5	45 09.2	98 22	156.4	45 38.4	98 22	156.2	7
43 57.7	97 23	155.4	44 26.9	97 23	155.2	44 56.1	97 23	155.1	45 25.3	97 23	154.9	8
43 44.1	97 24	154.1	44 13.2	97 24	153.9	44 42.3	97 24	153.7	45 11.4	97 24	153.6	9
43 29.9	97 25	152.8	43 58.9	97 25	152.6	44 28.0	97 26	152.4	44 57.0	97 25	152.2	20
43 15.0	97 26	151.5	43 44.0	96 26	151.3	44 12.9	96 26	151.1	44 41.8	96 26	150.9	1
42 59.5	96 27	150.2	43 28.4	96 27	150.0	43 57.2	96 27	149.8	44 26.1	96 27	149.6	2
42 43.4	96 28	148.9	43 12.2	96 28	148.7	43 41.0	96 28	148.5	44 09.7	96 28	148.3	3
42 26.7	96 29	147.7	42 55.4	96 29	147.5	43 24.1	95 29	147.3	43 52.7	95 29	147.1	4
42 09.4	95 30	146.4	42 38.0	95 30	146.2	43 06.6	95 30	146.0	43 35.1	95 30	145.8	25
41 51.6	95 31	145.2	42 20.0	95 31	145.0	42 48.5	95 31	144.7	43 17.0	95 31	144.5	6
41 33.1	95 32	143.9	42 01.5	95 32	143.7	42 29.9	95 32	143.5	42 58.2	94 32	143.3	7
41 14.1	94 33	142.7	41 42.4	94 33	142.5	42 10.7	94 33	142.3	42 38.9	94 33	142.0	8
40 54.6	94 33	141.5	41 22.8	94 34	141.3	41 51.0	94 34	141.0	42 19.1	94 34	140.8	9
40 34.5	94 34	140.3	41 02.6	94 34	140.1	41 30.7	94 35	139.8	41 58.8	93 35	139.6	30
40 14.0	93 35	139.1	40 42.0	93 35	138.9	41 10.0	93 35	138.6	41 37.9	93 36	138.4	1
39 52.9	93 36	137.9	40 20.8	93 36	137.7	40 48.7	93 36	137.4	41 16.5	93 36	137.2	2
39 31.4	93 37	136.8	39 59.2	93 37	136.5	40 27.0	93 37	136.3	40 54.7	92 37	136.0	3
39 09.4	92 37	135.6	39 37.1	92 38	135.3	40 04.7	92 38	135.1	40 32.4	92 38	134.8	4
38 46.9	92 38	134.4	39 14.5	92 38	134.2	39 42.1	92 38	133.9	40 09.6	92 39	133.7	35
38 24.0	92 39	133.3	38 51.5	92 39	133.0	39 19.0	92 39	132.8	39 46.4	91 39	132.5	6
38 00.6	91 40	132.2	38 28.0	91 40	131.9	38 55.4	91 40	131.7	39 22.8	91 40	131.4	7
37 36.8	91 40	131.1	38 04.2	91 40	130.8	38 31.4	91 41	130.5	38 58.7	91 41	130.3	8
37 12.7	91 41	129.9	37 39.9	91 41	129.7	38 07.1	91 41	129.4	38 34.2	90 41	129.1	9
36 48.1	91 42	128.8	37 15.2	90 42	128.6	37 42.3	90 42	128.3	38 09.4	90 42	128.0	40
36 23.1	90 42	127.7	36 50.2	90 42	127.5	37 17.2	90 43	127.2	37 44.1	90 43	126.9	1
35 57.8	90 43	126.7	36 24.8	90 43	126.4	36 51.7	90 43	126.1	37 18.5	90 43	125.8	2
35 32.1	90 43	125.6	35 59.0	89 44	125.3	36 25.8	89 44	125.0	36 52.6	89 44	124.8	3
35 06.1	89 44	124.5	35 32.9	89 44	124.3	35 59.6	89 44	124.0	36 26.3	89 44	123.7	4
34 39.7	89 44	123.5	35 06.4	89 45	123.2	35 33.1	89 45	122.9	35 59.7	89 45	122.6	45
34 13.1	89 45	122.4	34 39.7	89 45	122.1	35 06.2	88 45	121.9	35 32.8	88 45	121.6	6
33 46.1	88 45	121.4	34 12.6	88 46	121.1	34 39.1	88 46	120.8	35 05.5	88 46	120.5	7
33 18.8	88 46	120.4	33 45.2	88 46	120.1	34 11.6	88 46	119.8	34 38.0	88 46	119.5	8
32 51.2	88 46	119.3	33 17.6	88 47	119.1	33 43.9	88 47	118.8	34 10.2	88 47	118.5	9
32 23.4	88 47	118.3	32 49.6	88 47	118.0	33 15.9	87 47	117.8	33 42.1	87 47	117.5	50
31 55.2	87 47	117.3	32 21.5	87 47	117.0	32 47.6	87 48	116.7	33 13.8	87 48	116.5	1
31 26.9	87 48	116.3	31 53.0	87 48	116.0	32 19.1	87 48	115.8	32 45.2	87 48	115.5	2
30 58.2	87 48	115.3	31 24.3	87 48	115.1	31 50.4	87 48	114.8	32 16.3	87 48	114.5	3
30 29.4	87 48	114.4	30 55.4	87 49	114.1	31 21.4	86 49	113.8	31 47.3	86 49	113.5	4
30 00.3	87 49	113.4	30 26.3	86 49	113.1	30 52.2	86 49	112.8	31 18.0	86 49	112.5	55
29 31.0	86 49	112.4	29 56.9	86 49	112.1	30 22.8	86 49	111.8	30 48.6	86 49	111.5	6
29 01.5	86 49	111.5	29 27.4	86 50	111.2	29 53.1	86 50	110.9	30 18.9	86 50	110.6	7
28 31.9	86 50	110.5	28 57.6	86 50	110.2	29 23.3	86 50	109.9	29 49.0	86 50	109.6	8
28 02.0	86 50	109.6	28 27.7	86 50	109.3	28 53.4	85 50	109.0	29 19.0	85 50	108.7	9
27 31.9	86 50	108.6	27 57.6	85 50	108.3	28 23.2	85 51	108.0	28 48.8	85 51	107.7	60
27 01.7	85 51	107.7	27 27.3	85 51	107.4	27 52.9	85 51	107.1	28 18.4	85 51	106.8	1
26 31.4	85 51	106.8	26 56.9	85 51	106.5	27 22.4	85 51	106.2	27 47.9	85 51	105.9	2
26 00.9	85 51	105.8	26 26.4	85 51	105.6	26 51.8	85 51	105.3	27 17.3	85 51	105.0	3
25 30.2	85 51	104.9	25 55.7	85 51	104.6	26 21.1	85 51	104.3	26 46.5	85 52	104.0	4
24 59.4	85 52	104.0	25 24.8	85 52	103.7	25 50.2	85 52	103.4	26 15.6	84 52	103.1	65
24 28.5	85 52	103.1	24 53.9	85 52	102.8	25 19.2	84 52	102.5	25 44.6	84 52	102.2	6
23 57.5	85 52	102.2	24 22.8	84 52	101.9	24 48.1	84 52	101.6	25 13.4	84 52	101.3	7
23 26.4	84 52	101.3	23 51.7	84 52	101.0	24 17.0	84 52	100.7	24 42.2	84 52	100.4	8
22 55.1	84 52	100.4	23 20.4	84 52	100.1	23 45.7	84 52	99.8	24 10.9	84 52	99.5	9
22 23.8	84 52	99.5	22 49.1	84 52	99.2	23 14.3	84 52	99.0	23 39.5	84 52	98.7	70
21 52.4	84 52	98.7	22 17.7	84 52	98.4	22 42.9	84 53	98.1	23 08.0	84 53	97.8	1
21 21.0	84 53	97.8	21 46.2	84 53	97.5	22 11.3	84 53	97.2	22 36.5	84 53	96.9	2
20 49.4	84 53	96.9	21 14.6	84 53	96.6	21 39.8	84 53	96.3	22 04.9	84 53	96.0	3
20 17.8	84 53	96.0	20 43.0	84 53	95.7	21 08.1	84 53	95.5	21 33.3	84 53	95.2	4
19 46.2	84 53	95.2	20 11.3	84 53	94.9	20 36.5	84 53	94.6	21 01.6	84 53	94.3	75
19 14.5	84 53	94.3	19 39.6	84 53	94.0	20 04.8	84 53	93.7	20 29.9	84 53	93.4	6
18 42.8	84 53	93.4	19 07.9	84 53	93.2	19 33.0	84 53	92.9	19 58.1	84 53	92.6	7
18 11.0	84 53	92.6	18 36.2	84 53	92.3	19 01.3	84 53	92.0	19 26.3	84 53	91.7	8
17 39.3	84 53	91.7	18 04.4	84 53	91.4	18 29.5	84 53	91.2	18 54.5	84 53	90.9	9
17 07.5	84 53	90.9	17 32.6	84 53	90.6	17 57.7	84 53	90.3	18 22.7	84 53	90.0	80
16 35.7	84 53	90.0	17 00.8	84 53	89.7	17 25.9	84 53	89.5	17 51.0	84 53	89.2	1
16 03.9	84 53	89.2	16 29.0	84 53	88.9	16 54.1	84 53	88.6	17 19.2	84 53	88.3	2
15 32.1	84 53	88.3	15 57.2	84 53	88.1	16 22.3	84 53	87.8	16 47.4	84 53	87.5	3
15 00.3	84 53	87.5	15 25.4	84 53	87.2	15 50.6	84 53	86.9	16 15.6	84 53	86.6	4
14 28.6	84 53	86.7	14 53.7	84 53	86.4	15 18.8	84 53	86.1	15 43.9	84 53	85.8	85
13 56.8	84 53	85.8	14 22.0	84 53	85.5	14 47.1	84 53	85.3	15 12.2	84 53	85.0	6
13 25.1	84 53	85.0	13 50.3	84 53	84.7	14 15.4	84 53	84.4	14 40.6	84 53	84.1	7
12 53.5	84 53	84.1	13 18.7	84 53	83.9	13 43.8	84 53	83.6	14 09.0	84 53	83.3	8
12 21.9	84 53	83.3	12 47.1	84 53	83.0	13 12.3	84 53	82.8	13 37.4	84 52	82.5	9
11 50.3	84 52	82.5	12 15.6	84 52	82.2	12 40.7	84 52	81.9	13 05.9	84 52	81.6	90

Digitized by Google

Lat. 58°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	20 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	19 00.0	1.0 00	180.0	18 30.0	1.0 00	180.0	18 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0	17 00.0	1.0 00	180.0	16 30.0	1.0 00	180.0	00
1	19 59.7	1.0 01	179.0	19 29.7	1.0 01	179.0	18 59.7	1.0 01	179.0	18 29.7	1.0 01	179.0	17 59.7	1.0 01	179.0	17 29.7	1.0 01	179.0	16 59.7	1.0 01	179.0	16 29.7	1.0 01	179.0	1
2	19 58.8	1.0 02	177.9	19 28.9	1.0 02	177.9	18 58.9	1.0 02	177.9	18 28.9	1.0 02	177.9	17 58.9	1.0 02	178.0	17 28.9	1.0 02	178.0	16 58.9	1.0 02	178.0	16 28.9	1.0 02	178.0	2
3	19 57.4	1.0 03	176.9	19 27.4	1.0 03	176.9	18 57.4	1.0 03	176.9	18 27.4	1.0 03	176.9	17 57.5	1.0 03	176.9	17 27.5	1.0 03	177.0	16 57.5	1.0 03	177.0	16 27.5	1.0 03	177.0	3
4	19 55.4	1.0 04	175.8	19 25.4	1.0 04	175.9	18 55.4	1.0 04	175.9	18 25.5	1.0 04	175.9	17 55.5	1.0 04	175.9	17 25.5	1.0 04	175.9	16 55.5	1.0 04	176.0	16 25.5	1.0 04	176.0	4
05	19 52.8	1.0 05	174.8	19 22.8	1.0 05	174.8	18 52.9	1.0 05	174.9	18 22.9	1.0 05	174.9	17 52.9	1.0 05	174.9	17 23.0	1.0 05	174.9	16 53.0	1.0 05	175.0	16 23.0	1.0 05	175.0	05
6	19 49.6	1.0 06	173.8	19 19.7	1.0 06	173.8	18 49.7	1.0 06	173.8	18 19.8	1.0 06	173.9	17 49.8	1.0 06	173.9	17 19.9	1.0 06	173.9	16 49.9	1.0 06	173.9	16 20.0	1.0 06	174.0	6
7	19 45.9	1.0 07	172.7	19 15.9	1.0 07	172.8	18 46.0	1.0 07	172.8	18 16.1	1.0 07	172.8	17 46.2	1.0 07	172.9	17 16.2	1.0 07	172.9	16 46.3	1.0 07	172.9	16 16.4	1.0 07	173.0	7
8	19 41.6	1.0 08	171.7	19 11.7	1.0 08	171.7	18 41.7	1.0 08	171.8	18 11.8	1.0 08	171.8	17 41.9	1.0 08	171.9	17 12.0	1.0 08	171.9	16 42.1	1.0 08	171.9	16 12.2	1.0 08	172.0	8
9	19 36.7	1.0 09	170.7	19 06.8	1.0 09	170.7	18 36.9	1.0 09	170.7	18 07.0	1.0 09	170.8	17 37.1	1.0 09	170.8	17 07.3	1.0 09	170.9	16 37.4	1.0 09	170.9	16 07.5	1.0 09	171.0	9
10	19 31.2	1.0 10	169.6	19 01.4	1.0 10	169.7	18 31.5	1.0 10	169.7	18 01.7	1.0 10	169.8	17 31.8	1.0 10	169.8	17 01.9	1.0 10	169.9	16 32.1	1.0 10	169.9	16 02.2	1.0 10	170.0	10
1	19 25.2	99 11	168.6	18 55.4	99 11	168.6	18 25.6	99 11	168.7	17 55.7	99 11	168.8	17 25.9	99 11	168.8	16 56.1	99 11	168.9	16 26.2	99 11	168.9	15 56.4	99 11	169.0	1
2	19 18.7	99 12	167.6	18 48.9	99 12	167.6	18 19.1	99 12	167.7	17 49.3	99 12	167.7	17 19.5	99 12	167.8	16 49.7	99 12	167.9	16 19.9	99 12	167.9	15 50.1	99 12	168.0	2
3	19 11.5	99 13	166.5	18 41.8	99 13	166.6	18 12.0	99 13	166.7	17 42.2	99 13	166.7	17 12.5	99 13	166.8	16 42.7	99 12	166.9	16 12.9	99 12	166.9	15 43.2	99 12	167.0	3
4	19 03.8	99 14	165.5	18 34.1	99 14	165.6	18 04.4	99 14	165.6	17 34.7	99 14	165.7	17 04.9	99 13	165.8	16 35.2	99 13	165.9	16 05.5	99 13	165.9	15 35.7	99 13	166.0	4
15	18 55.6	99 15	164.5	18 25.9	99 15	164.6	17 56.2	99 14	164.6	17 26.5	99 14	164.7	16 56.9	99 14	164.8	16 27.2	99 14	164.9	15 57.5	99 14	164.9	15 27.8	99 14	165.0	15
6	18 46.8	99 16	163.5	18 17.2	99 15	163.5	17 47.5	99 15	163.6	17 17.9	99 15	163.7	16 48.2	99 15	163.8	16 18.6	99 15	163.9	15 48.9	99 15	163.9	15 19.3	99 15	164.0	6
7	18 37.5	99 16	162.4	18 07.9	99 16	162.5	17 38.3	99 16	162.6	17 08.7	99 16	162.7	16 39.1	99 16	162.8	16 09.5	99 16	162.9	15 39.9	99 16	162.9	15 10.3	99 16	163.0	7
8	18 27.6	98 17	161.4	17 58.1	99 17	161.5	17 28.5	99 17	161.6	16 59.0	99 17	161.7	16 29.4	99 17	161.8	15 59.9	99 17	161.9	15 30.3	99 17	162.0	15 00.7	99 17	162.0	8
9	18 17.2	98 18	160.4	17 47.7	98 18	160.5	17 18.2	98 18	160.6	16 48.7	98 18	160.7	16 19.2	98 18	160.8	15 49.7	98 18	160.9	15 20.2	98 18	161.0	14 50.7	98 18	161.1	9
20	18 06.3	98 19	159.4	17 36.9	98 19	159.5	17 07.4	98 19	159.6	16 37.9	98 19	159.7	16 08.5	98 19	159.8	15 39.0	98 19	159.9	15 09.6	98 19	160.0	14 40.1	98 18	160.1	20
1	17 54.9	98 20	158.4	17 25.5	98 20	158.5	16 56.1	98 20	158.6	16 26.6	98 20	158.7	15 57.2	98 20	158.8	15 27.8	98 20	158.9	14 58.4	98 19	159.0	14 29.0	98 19	159.1	1
2	17 42.9	98 21	157.4	17 13.5	98 21	157.5	16 44.2	98 21	157.6	16 14.8	98 21	157.7	15 45.5	98 20	157.8	15 16.1	98 20	157.9	14 46.8	98 20	158.0	14 17.4	98 20	158.1	2
3	17 30.4	98 22	156.4	17 01.1	98 22	156.5	16 31.8	98 21	156.6	16 02.5	98 21	156.7	15 33.2	98 21	156.8	15 03.9	98 21	156.9	14 34.6	98 21	157.0	14 05.3	98 21	157.2	3
4	17 17.4	97 22	155.4	16 48.2	97 22	155.5	16 18.9	97 22	155.6	15 49.7	97 22	155.7	15 20.5	97 22	155.8	14 51.2	97 22	156.0	14 22.0	97 22	156.1	13 52.7	98 22	156.2	4
25	17 03.9	97 23	154.4	16 34.7	97 23	154.5	16 05.6	97 23	154.6	15 36.4	97 23	154.7	15 07.2	97 23	154.9	14 38.0	97 23	155.0	14 08.8	97 23	155.1	13 39.6	97 23	155.2	25
6	16 49.9	97 24	153.4	16 20.8	97 24	153.5	15 51.7	97 24	153.6	15 22.6	97 24	153.8	14 53.5	97 24	153.9	14 24.3	97 24	154.0	13 55.2	97 24	154.1	13 26.1	97 23	154.3	6
7	16 35.4	97 25	152.4	16 06.4	97 25	152.5	15 37.3	97 25	152.7	15 08.3	97 25	152.8	14 39.2	97 25	152.9	14 10.2	97 24	153.0	13 41.1	97 24	153.2	13 12.0	97 24	153.3	7
8	16 20.4	97 26	151.4	15 51.5	97 26	151.5	15 22.5	97 26	151.7	14 53.5	97 25	151.8	14 24.5	97 25	151.9	13 55.5	97 26	152.1	13 26.5	97 25	152.2	12 57.5	97 25	152.3	8
9	16 05.0	96 27	150.4	15 36.1	96 26	150.6	15 07.2	96 26	150.7	14 38.2	96 26	150.8	14 09.3	96 26	151.0	13 40.4	96 26	151.1	13 11.4	96 26	151.3	12 42.5	96 26	151.4	9
30	15 49.1	96 27	149.4	15 20.2	96 27	149.6	14 51.4	96 27	149.7	14 22.5	96 27	149.9	13 53.7	96 27	150.0	13 24.8	96 27	150.2	12 55.9	96 27	150.3	12 27.1	96 27	150.4	30
1	15 32.7	96 28	148.5	15 03.9	96 28	148.6	14 35.1	96 28	148.8	14 06.3	96 28	148.9	13 37.5	96 28	149.1	13 08.7	96 28	149.2	12 39.9	96 27	149.3	12 11.1	96 27	149.5	1
2	15 15.8	96 29	147.5	14 47.1	96 29	147.7	14 18.4	96 29	147.8	13 49.7	96 28	148.0	13 21.0	96 28	148.1	12 52.2	96 28	148.2	12 23.5	96 28	148.4	11 54.8	96 28	148.5	2
3	14 58.5	95 30	146.5	14 29.9	96 29	146.7	14 01.2	95 29	146.8	13 32.6	96 29	147.0	13 03.9	96 29	147.1	12 35.3	96 29	147.3	12 06.6	96 29	147.4	11 37.9	96 29	147.6	3
4	14 40.7	95 30	145.6	14 12.2	95 30	145.7	13 43.6	95 30	145.9	13 15.0	95 30	146.0	12 46.5	95 30	146.2	12 17.9	95 30	146.4	11 49.3	95 30	146.5	11 20.7	95 30	146.7	4
35	14 22.5	95 31	144.6	13 54.1	95 31	144.8	13 25.6	95 31	144.9	12 57.1	95 31	145.1	12 28.6	95 31	145.3	12 00.0	95 30	145.4	11 31.5	95 30	145.6	11 03.0	95 30	145.7	35
6	14 03.9	95 32	143.6	13 35.5	95 32	143.8	13 07.1	95 32	144.0	12 38.7	95 31	144.1	12 10.2	95 31	144.3	11 41.8	95 31	144.5	11 13.3	95 31	144.6	10 44.9	95 31	144.8	6
7	13 44.9	94 32	142.7	13 16.5	94 32	142.9	12 48.2	95 32	143.0	12 19.8	95 32	143.2	11 51.5	95 32	143.4	11 23.1	95 32	143.5	10 54.7	95 32	143.7	10 26.3	95 32	143.9	7
8	13 25.4	94 33	141.7	12 57.1	94 33	141.9	12 28.8	94 33	142.1	12 00.6	94 33	142.3	11 32.3	94 33	142.4	11 04.0	94 33	142.6	10 35.7	94 32	142.8	10 07.4	94 32	142.9	8
9	13 05.5	94 34	140.8	12 37.3	94 34	141.0	12 09.1	94 34	141.2	11 40.9	94 33	141.3	11 12.7	94 33	141.5	10 44.5	94 33	141.7	10 16.2	94 33	141.8	9 48.0	94 33	142.0	9
40	12 45.2	94 34	139.9	12 17.1	94 34	140.0	11 49.0	94 34	140.2	11 20.8	94 34	140.4	10 52.7	94 34	140.6	10 24.6	94 34	140.7	9 56.4	94 34	140.9	9 28.3	94 34	141.1	40
1	12 24.5	93 35	138.9	11 56.5	93 35	139.1	11 28.4	93 35	139.3	11 00.4	94 35	139.5	10 32.3	94 35	139.6	10 04.2	94 34	139.8	9 36.2	94 34	140.0	9 08.1	94 34	140.2	1
2	12 03.4	93 36	138.0	11 35.4	93 36	138.2	11 07.5	93 36	138.4	10 39.5	93 35	138.5	10 11.5	93 35	138.7	9 43.5	93 35	138.9	9 15.5	93 35	139.1	8 47.5	93 35	139.3	2
3	11 41.9	93 36	137.1	11 14.1	93 36	137.2	10 46.2	93 36	137.4	10 18.3	93 36	137.6	9 50.4	93 36	137.8	9 22.4	93 36	138.0	8 54.5	93 36	138.2	8 26.6	93 36	138.4	3
4	11 20.1	93 37	136.1	10 52.3	93 37	136.3	10 24.5	93 37	136.5	9 56.6	93 37	136.7	9 28.8	93 37	136.9	9 01.0	93 36	137.1	8 33.1	93 36	137.3	8 05.3	93 36	137.5	4
45	10 57.9	92 38	135.2	10 30.1	92 38	135.4	10 02.4	92 37	135.6	9 34.7	92 37	135.8	9 06.9	93 37	136.0	8 39.1	93 37	136.2	8 11.4	93 37	136.4	7 43.6	93 37	136.6	45
6	10 35.3	92 38	134.3	10 07.6	92 38	134.5	9 40.0	92 38	134.7	9 12.3	92 38	134.9	8 44.6	92 38	135.1	8 16.9	92 38	135.3	7 49.3	92 37	135.5	7 21.6	92 37	135.7	6
7	10 12.4	92 39	133.4	9 44.8	92 39	133.6	9 17.2	92 39	133.8	8 49.6	92 38	134.0	8 22.0	92 38	134.2	7 54.4	92 38	134.4	7 26.8	92 38	134.6	6 59.2	92 38	134.8	7
8	9 49.1	92 39	132.5	9 21.6	92 39	132.7	8 54.1	92 39	132.9	8 26.5	92 39	133.1	7 59.0	92 39	133.3	7 31.5	92 39	133.5	7 04.0	92 39	133.7	6 36.4	92 38	133.9	8
9	9 25.4	91 40	131.6	8 58.0	91 40	131.8	8 30.6	91 40	132.0	8 03.1	91 40	132.2	7 35.7	91 39	132.4	7 08.2	92 39	132.6	6 40.8	92 39	132.8	6 13.3	92 39	133.0	9
50	9 01.5	91 40	130.7	8 34.1	91 40	130.9	8 06.8	91 40	131.1	7 39.4	91 40	131.3	7 12.0	91 40	131.5	6 44.7	91 40	131.7	6 17.3	91 40	131.9	5 49.9	91 40	132.1	50
1	8 37.2	91 41	129.7	8 09.9	91 41	130.0	7 42.6	91 41	130.2	7 15.4	91 41	130.4	6 48.1	91 41	130.6	6 20.8	91 40	130.8	5 53.5	91 40	131.0	5 26.1	91 40	131.2	1
2	8 12.6	91 42	128.9	7 45.4	91 41	129.1	7 18.2	91 41	129.3	6 51.0	91 41	129.5	6 23.8	91 41	129.7	5 56.5	91 41	129.9	5 29.3	91 41	130.1	5 02.1	91 41	130.3	2
3	7 47.7	90 42	128.0	7 20.6	90 42	128.2	6 53.4	90 42	128.4	6 26.3	90 42	128.6	5 59.1	90 42	128.8	5 32.0	91 41	129.0	5 04.8	91 41	129.2				3
4	7 22.5	90 43	127.1	6 55.4	90 42	127.3	6 28.3	90 42	127.5	6 01.3	90 42	127.7	5 34.2	90 42	127.9	5 07.1	90 42	128.2							4
55	6 56.9	90 43	126.2	6 30.0	90 43	126.4	6 03.0	90 43	126.6	5 36.0	90 43	126.8	5 09.0	90 42	127.1										55
6	6 31.1	90 43	125.3	6 04.2	90 43	125.5	5 37.3	90 43	125.7	5 10.4	90 43	126.0													6
7	6 05.0	89 44	124.4	5 38.2	89 44	124.6	5 11.4	89 44	124.9																7
8	5 38.7	89 44	123.5	5 11.9	89 44	123.8																			8
9	5 12.0	89 45	122.7																						9

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
91	9 37.8	84 52	82.7	10 03.1	84 52	82.5	10 28.3	84 52	82.2	10 53.6	84 52	81.9	11 18.8	84 52	81.6	11 44.1	84 52	81.4	12 09.3	84 52	81.1	12 34.5	84 52	80.8	91
2	9 06.2	84 52	81.9	9 31.6	84 52	81.6	9 56.9	84 52	81.4	10 22.2	84 52	81.1	10 47.4	84 52	80.8	11 12.7	84 52	80.5	11 37.9	84 52	80.3	12 03.2	84 52	80.0	2
3	8 34.8	84 52	81.1	9 00.1	84 52	80.8	9 25.5	84 52	80.5	9 50.8	84 52	80.2	10 16.1	84 52	80.0	10 41.4	84 52	79.7	11 06.6	84 52	79.4	11 31.9	84 52	79.2	3
4	8 03.4	85 52	80.2	8 28.8	85 52	80.0	8 54.1	84 52	79.7	9 19.5	84 52	79.4	9 44.8	84 52	79.1	10 10.1	84 52	78.9	10 35.4	84 52	78.6	11 00.7	84 52	78.3	4
95	7 32.1	85 52	79.4	7 57.5	85 52	79.1	8 22.9	85 52	78.9	8 48.3	85 52	78.6	9 13.6	84 52	78.3	9 39.0	84 52	78.0	10 04.3	84 52	77.8	10 29.6	84 52	77.5	95
6	7 00.9	85 52	78.6	7 26.3	85 52	78.3	7 51.8	85 52	78.0	8 17.2	85 52	77.8	8 42.5	85 52	77.5	9 07.9	85 52	77.2	9 33.3	85 52	76.9	9 58.6	84 51	76.7	6
7	6 29.8	85 52	77.7	6 55.3	85 52	77.5	7 20.7	85 52	77.2	7 46.1	85 52	76.9	8 11.5	85 51	76.7	8 37.0	85 51	76.4	9 02.4	85 51	76.1	9 27.7	85 51	75.8	7
8	5 58.8	85 52	76.9	6 24.3	85 51	76.6	6 49.7	85 51	76.4	7 15.2	85 51	76.1	7 40.7	85 51	75.8	8 06.1	85 51	75.6	8 31.5	85 51	75.3	8 57.0	85 51	75.0	8
9	5 27.9	85 51	76.1	5 53.4	85 51	75.8	6 18.9	85 51	75.5	6 44.4	85 51	75.3	7 09.9	85 51	75.0	7 35.4	85 51	74.7	8 00.8	85 51	74.5	8 26.3	85 51	74.2	9
100				5 22.6	85 51	75.0	5 48.2	85 51	74.7	6 13.7	85 51	74.4	6 39.2	85 51	74.2	7 04.8	85 51	73.9	7 30.3	85 51	73.6	7 55.8	85 51	73.4	100
1							5 17.6	85 51	73.9	5 43.2	85 51	73.6	6 08.7	85 51	73.3	6 34.3	85 51	73.1	6 59.8	85 50	72.8	7 25.4	85 50	72.5	1
2										5 12.7	85 50	72.8	5 38.3	85 50	72.5	6 03.9	85 50	72.2	6 29.5	85 50	72.0	6 55.1	85 50	71.7	2
3													5 08.1	86 50	71.7	5 33.7	85 50	71.4	5 59.4	85 50	71.1	6 25.0	85 50	70.9	3
4																5 03.7	86 50	70.6	5 29.4	86 50	70.3	5 55.0	86 50	70.1	4
105																						5 25.2	86 49	69.2	105

Lat. 59°

Digitized by Google

Lat. 58°

H.A.	16° 00′ Alt.	Δd Δt	Az.	16° 30′ Alt.	Δd Δt	Az.	17° 00′ Alt.	Δd Δt	Az.	17° 30′ Alt.	Δd Δt	Az.	18° 00′ Alt.	Δd Δt	Az.	18° 30′ Alt.	Δd Δt	Az.	19° 00′ Alt.	Δd Δt	Az.	19° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	48 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0	49 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	00
1	47 59.6	1.0 02	178.6	48 29.6	1.0 02	178.6	48 59.6	1.0 02	178.5	49 29.6	1.0 02	178.5	49 59.6	1.0 02	178.5	50 29.6	1.0 02	178.5	50 59.6	1.0 02	178.5	51 29.6	1.0 02	178.5	1
2	47 58.4	1.0 03	177.1	48 28.4	1.0 03	177.1	48 58.4	1.0 03	177.1	49 28.4	1.0 03	177.1	49 58.4	1.0 03	177.0	50 28.3	1.0 03	177.0	50 58.3	1.0 03	177.0	51 28.3	1.0 04	177.0	2
3	47 56.4	1.0 05	175.7	48 26.4	1.0 05	175.7	48 56.4	1.0 05	175.6	49 26.3	1.0 05	175.6	49 56.3	1.0 05	175.6	50 26.3	1.0 05	175.5	50 56.3	1.0 05	175.5	51 26.2	1.0 05	175.5	3
4	47 53.6	1.0 06	174.3	48 23.6	1.0 06	174.2	48 53.5	1.0 06	174.2	49 23.5	1.0 06	174.1	49 53.4	1.0 06	174.1	50 23.4	1.0 06	174.0	50 53.3	1.0 06	174.0	51 23.3	1.0 06	174.0	4
05	47 50.1	1.0 07	172.8	48 20.0	1.0 07	172.8	48 49.9	1.0 07	172.7	49 19.8	1.0 07	172.7	49 49.8	1.0 08	172.6	50 19.7	1.0 08	172.6	50 49.6	1.0 08	172.5	51 19.5	1.0 08	172.4	05
6	47 45.7	1.0 09	171.4	48 15.6	1.0 09	171.3	48 45.5	1.0 09	171.3	49 15.4	1.0 09	171.2	49 45.3	1.0 09	171.1	50 15.2	1.0 09	171.1	50 45.0	1.0 09	171.0	51 14.9	1.0 09	170.9	6
7	47 40.6	1.0 10	170.0	48 10.4	1.0 10	169.9	48 40.3	1.0 10	169.8	49 10.1	1.0 10	169.8	49 40.0	1.0 10	169.7	50 09.8	99 10	169.6	50 39.7	99 10	169.5	51 09.5	99 10	169.4	7
8	47 34.6	99 11	168.6	48 04.5	99 11	168.5	48 34.3	99 11	168.4	49 04.1	99 11	168.3	49 33.9	99 11	168.2	50 03.7	99 12	168.1	50 33.5	99 12	168.0	51 03.3	99 12	168.0	8
9	47 27.9	99 12	167.1	47 57.7	99 12	167.1	48 27.5	99 13	167.0	48 57.2	99 13	166.9	49 27.0	99 13	166.8	49 56.8	99 13	166.7	50 26.5	99 13	166.6	50 56.2	99 13	166.5	9
10	47 20.5	99 14	165.7	47 50.2	99 14	165.6	48 19.9	99 14	165.5	48 49.6	99 14	165.4	49 19.3	99 14	165.3	49 49.0	99 14	165.2	50 18.7	99 14	165.1	50 48.4	99 14	165.0	10
1	47 12.3	99 15	164.3	47 41.9	99 15	164.2	48 11.6	99 15	164.1	48 41.3	99 15	164.0	49 10.9	99 15	163.9	49 40.5	99 15	163.8	50 10.2	99 16	163.6	50 39.8	99 16	163.5	1
2	47 03.3	99 16	162.9	47 32.9	99 16	162.8	48 02.5	99 16	162.7	48 32.1	99 16	162.6	49 01.7	99 17	162.4	49 31.3	99 17	162.3	50 00.8	99 17	162.2	50 30.4	98 17	162.1	2
3	46 53.6	98 17	161.6	47 23.2	98 18	161.4	47 52.7	98 18	161.3	48 22.2	98 18	161.2	48 51.7	98 18	161.0	49 21.2	98 18	160.9	49 50.7	98 18	160.7	50 20.2	98 18	160.6	3
4	46 43.2	98 19	160.2	47 12.7	98 19	160.0	47 42.1	98 19	159.9	48 11.6	98 19	159.8	48 41.0	98 19	159.6	49 10.4	98 19	159.5	49 39.8	98 19	159.3	50 09.2	98 20	159.2	4
15	46 32.1	98 20	158.8	47 01.5	98 20	158.7	47 30.8	98 20	158.5	48 00.2	98 20	158.4	48 29.6	98 20	158.2	48 58.9	98 20	158.0	49 28.2	98 21	157.9	49 57.6	98 21	157.7	15
6	46 20.2	98 21	157.4	46 49.5	98 21	157.3	47 18.8	98 21	157.1	47 48.1	98 21	157.0	48 17.4	98 21	156.8	48 46.7	98 22	156.6	49 15.9	97 22	156.5	49 45.1	97 22	156.3	6
7	46 07.7	97 22	156.1	46 36.9	97 22	155.9	47 06.1	97 22	155.7	47 35.3	97 22	155.6	48 04.5	97 23	155.4	48 33.7	97 23	155.2	49 02.8	97 23	155.1	49 32.0	97 23	154.9	7
8	45 54.4	97 23	154.7	46 23.6	97 23	154.6	46 52.7	97 23	154.4	47 21.8	97 24	154.2	47 50.9	97 24	154.0	48 20.0	97 24	153.8	48 49.1	97 24	153.7	49 18.1	97 24	153.5	8
9	45 40.5	97 24	153.4	46 09.6	97 24	153.2	46 38.6	97 25	153.0	47 07.7	97 25	152.8	47 36.7	97 25	152.7	48 05.7	97 25	152.5	48 34.6	97 25	152.3	49 03.6	96 25	152.1	9
20	45 26.0	97 25	152.1	45 54.9	97 26	151.9	46 23.9	96 26	151.7	46 52.8	96 26	151.5	47 21.7	96 26	151.3	47 50.6	96 26	151.1	48 19.5	96 26	150.9	48 48.4	96 26	150.7	20
1	45 10.7	96 26	150.7	45 39.6	96 27	150.6	46 08.5	96 27	150.4	46 37.3	96 27	150.2	47 06.1	96 27	150.0	47 34.9	96 27	149.7	48 03.7	96 27	149.5	48 32.5	96 28	149.3	1
2	44 54.9	96 27	149.4	45 23.7	96 28	149.2	45 52.4	96 28	149.0	46 21.2	96 28	148.8	46 49.9	96 28	148.6	47 18.6	96 28	148.4	47 47.3	96 28	148.2	48 15.9	95 29	148.0	2
3	44 38.4	96 28	148.1	45 07.1	96 29	147.9	45 35.8	96 29	147.7	46 04.4	95 29	147.5	46 33.0	95 29	147.3	47 01.6	95 29	147.1	47 30.2	95 30	146.8	47 58.7	95 30	146.6	3
4	44 21.3	95 29	146.9	44 49.9	95 30	146.6	45 18.5	95 30	146.4	45 47.0	95 30	146.2	46 15.5	95 30	146.0	46 44.0	95 30	145.8	47 12.5	95 30	145.5	47 40.9	95 31	145.3	4
25	44 03.6	95 30	145.6	44 32.1	95 31	145.4	45 00.6	95 31	145.1	45 29.0	95 31	144.9	45 57.5	95 31	144.7	46 25.8	95 31	144.4	46 54.2	94 31	144.2	47 22.5	94 32	144.0	25
6	43 45.4	95 31	144.3	44 13.8	95 32	144.1	44 42.1	95 32	143.9	45 10.5	94 32	143.6	45 38.8	94 32	143.4	46 07.1	94 32	143.2	46 35.3	94 32	142.9	47 03.5	94 33	142.7	6
7	43 26.5	94 32	143.1	43 54.8	94 32	142.8	44 23.1	94 33	142.6	44 51.3	94 33	142.4	45 19.5	94 33	142.1	45 47.7	94 33	141.9	46 15.8	94 33	141.6	46 44.0	94 34	141.4	7
8	43 07.2	94 33	141.8	43 35.3	94 33	141.6	44 03.5	94 34	141.3	44 31.6	94 34	141.1	44 59.7	94 34	140.8	45 27.8	93 34	140.6	45 55.8	93 34	140.3	46 23.8	93 34	140.1	8
9	42 47.2	94 34	140.6	43 15.3	94 34	140.3	43 43.4	93 34	140.1	44 11.4	93 35	139.8	44 39.4	93 35	139.6	45 07.3	93 35	139.3	45 35.3	93 35	139.1	46 03.2	93 35	138.8	9
30	42 26.8	93 35	139.4	42 54.8	93 35	139.1	43 22.7	93 35	138.9	43 50.6	93 35	138.6	44 18.5	93 36	138.4	44 46.4	93 36	138.1	45 14.2	93 36	137.8	45 42.0	93 36	137.6	30
1	42 05.8	93 36	138.1	42 33.7	93 36	137.9	43 01.5	93 36	137.6	43 29.4	93 36	137.4	43 57.1	93 36	137.1	44 24.9	92 37	136.9	44 52.6	92 37	136.6	45 20.3	92 37	136.3	1
2	41 44.4	93 37	136.9	42 12.1	93 37	136.7	42 39.9	92 37	136.4	43 07.6	92 37	136.2	43 35.3	92 37	135.9	44 02.9	92 37	135.6	44 30.5	92 38	135.4	44 58.0	92 38	135.1	2
3	41 22.4	92 37	135.8	41 50.1	92 38	135.5	42 17.7	92 38	135.2	42 45.3	92 38	135.0	43 12.9	92 38	134.7	43 40.4	92 38	134.4	44 07.9	92 38	134.2	44 35.4	91 39	133.9	3
4	41 00.0	92 38	134.6	41 27.6	92 38	134.3	41 55.1	92 38	134.1	42 22.6	92 39	133.8	42 50.1	91 39	133.5	43 17.5	91 39	133.2	43 44.9	91 39	133.0	44 12.2	91 39	132.7	4
35	40 37.1	92 39	133.4	41 04.6	92 39	133.2	41 32.0	91 39	132.9	41 59.4	91 39	132.6	42 26.8	91 40	132.3	42 54.1	91 40	132.1	43 21.4	91 40	131.8	43 48.6	91 40	131.5	35
6	40 13.8	91 40	132.3	40 41.2	91 40	132.0	41 08.5	91 40	131.7	41 35.8	91 40	131.4	42 03.1	91 40	131.2	42 30.3	91 40	130.9	42 57.4	90 41	130.6	43 24.6	90 41	130.3	6
7	39 50.1	91 40	131.1	40 17.3	91 40	130.8	40 44.6	91 41	130.6	41 11.8	91 41	130.3	41 38.9	90 41	130.0	42 06.0	90 41	129.7	42 33.1	90 41	129.4	43 00.1	90 41	129.1	7
8	39 25.9	91 41	130.0	39 53.1	91 41	129.7	40 20.2	90 41	129.4	40 47.3	90 41	129.1	41 14.4	90 42	128.9	41 41.4	90 42	128.6	42 08.3	90 42	128.3	42 35.2	90 42	128.0	8
9	39 01.3	90 42	128.9	39 28.4	90 42	128.6	39 55.5	90 42	128.3	40 22.5	90 42	128.0	40 49.4	90 42	127.7	41 16.3	90 42	127.4	41 43.2	89 43	127.1	42 10.0	89 43	126.8	9
40	38 36.4	90 42	127.7	39 03.4	90 42	127.5	39 30.3	90 43	127.2	39 57.2	90 43	126.9	40 24.1	89 43	126.6	40 50.9	89 43	126.3	41 17.6	89 43	126.0	41 44.4	89 43	125.7	40
1	38 11.1	90 43	126.6	38 38.0	90 43	126.4	39 04.8	89 43	126.1	39 31.6	89 43	125.8	39 58.4	89 43	125.5	40 25.1	89 44	125.2	40 51.7	89 44	124.9	41 18.4	89 44	124.6	1
2	37 45.4	89 43	125.6	38 12.2	89 44	125.3	38 38.9	89 44	125.0	39 05.6	89 44	124.7	39 32.3	89 44	124.4	39 58.9	89 44	124.1	40 25.5	88 44	123.8	40 52.0	88 44	123.5	2
3	37 19.3	89 44	124.5	37 46.0	89 44	124.2	38 12.7	89 44	123.9	38 39.3	89 44	123.6	39 05.9	88 45	123.3	39 32.4	88 45	123.0	39 58.9	88 45	122.7	40 25.3	88 45	122.4	3
4	36 53.0	89 45	123.4	37 19.6	89 45	123.1	37 46.1	88 45	122.8	38 12.7	88 45	122.5	38 39.2	88 45	122.2	39 05.6	88 45	121.9	39 32.0	88 45	121.6	39 58.3	88 46	121.3	4
45	36 26.3	88 45	122.3	36 52.8	88 45	122.0	37 19.3	88 45	121.8	37 45.7	88 45	121.5	38 12.1	88 46	121.2	38 38.4	88 46	120.9	39 04.7	88 46	120.5	39 31.0	87 46	120.2	45
6	35 59.2	88 46	121.3	36 25.7	88 46	121.0	36 52.1	88 46	120.7	37 18.4	88 46	120.4	37 44.7	88 46	120.1	38 11.0	87 46	119.8	38 37.2	87 46	119.5	39 03.4	87 46	119.2	6
7	35 31.9	88 46	120.2	35 58.3	88 46	120.0	36 24.6	88 46	119.7	36 50.9	87 46	119.4	37 17.1	87 47	119.0	37 43.3	87 47	118.7	38 09.4	87 47	118.4	38 35.5	87 47	118.1	7
8	35 04.3	88 46	119.2	35 30.6	88 47	118.9	35 56.8	87 47	118.6	36 23.0	87 47	118.3	36 49.2	87 47	118.0	37 15.2	87 47	117.7	37 41.3	87 47	117.4	38 07.3	87 47	117.1	8
9	34 36.4	87 47	118.2	35 02.6	87 47	117.9	35 28.8	87 47	117.6	35 54.9	87 47	117.3	36 20.9	87 47	117.0	36 47.0	87 48	116.7	37 12.9	86 48	116.4	37 38.8	86 48	116.0	9
50	34 08.3	87 47	117.2	34 34.4	87 47	116.9	35 00.5	87 48	116.6	35 26.5	87 48	116.3	35 52.5	87 48	116.0	36 18.4	86 48	115.6	36 44.3	86 48	115.3	37 10.2	86 48	115.0	50
1	33 39.8	87 48	116.2	34 05.9	87 48	115.9	34 31.9	87 48	115.6	34 57.9	86 48	115.3	35 23.8	86 48	114.9	35 49.6	86 48	114.6	36 15.5	86 48	114.3	36 41.2	86 49	114.0	1
2	33 11.2	87 48	115.2	33 37.2	87 48	114.9	34 03.1	86 48	114.6	34 29.0	86 48	114.3	34 54.8	86 49	113.9	35 20.6	86 49	113.6	35 46.4	86 49	113.3	36 12.1	86 49	113.0	2
3	32 42.3	86 49	114.2	33 08.2	86 49	113.9	33 34.1	86 49	113.6	33 59.9	86 49	113.3	34 25.7	86 49	113.0	34 51.4	86 49	112.6	35 17.1	86 49	112.3	35 42.7	85 49	112.0	3
4	32 13.2	86 49	113.2	32 39.0	86 49	112.9	33 04.8	86 49	112.6	33 30.6	86 49	112.3	33 56.3	86 49	112.0	34 21.9	85 49	111.7	34 47.6	85 50	111.3	35 13.1	85 50	111.0	4
55	31 43.8	86 49	112.2	32 09.6	86 49	111.9	32 35.4	86 49	111.6	33 01.0	86 50	111.3	33 26.7	85 50	111.0	33 52.3	85 50	110.7	34 17.8	85 50	110.4	34 43.3	85 50	110.0	55
6	31 14.3	86 50	111.2	31 40.0	86 50	110.9	32 05.7	86 50	110.6	32 31.3	85 50	110.3	32 56.9	85 50	110.0	33 22.4	85 50	109.7	33 47.9	85 50	109.4	34 13.4	85 50	109.1	6
7	30 44.6	86 50	110.3	31 10.2	85 50	110.0	31 35.9	85 50	109.7	32 01.4	85 50	109.4	32 26.9	85 50	109.1	32 52.4	85 50	108.7	33 17.9	85 50	108.4	33 43.2	85 50	108.1	7
8	30 14.7	85 50	109.3	30 40.3	85 50	109.0	31 05.8	85 50	108.7	31 31.3	85 50	108.4	31 56.8	85 50	108.1	32 22.2	85 51	107.8	32 47.6	85 51	107.5	33 12.9	84 51	107.2	8
9	29 44.6	85 50	108.4	30 10.1	85 50	108.1	30 35.6	85 51	107.8	31 01.1	85 51	107.5	31 26.5	85 51	107.2	31 51.9	84 51	106.8	32 17.2	84 51	106.5	32 42.5	84 51	106.2	9
60	29 14.3	85 51	107.4	29 39.8	85 51	107.1	30 05.3	85 51	106.8	30 30.7	85 51	106.5	30 56.0	84 51	106.2	31 21.4	84 51	105.9	31 46.6	84 51	105.6	32 11.9	84 51	105.3	60
1	28 43.9	85 51	106.5	29 09.4	85 51	106.2	29 34.8	85 51	105.9	30 00.1	84 51	105.6	30 25.4	84 51	105.3	30 50.7	84 51	105.0	31 16.0	84 51	104.7	31 41.1	84 51	104.3	1
2	28 13.4	85 51	105.6	28 38.8	85 51	105.3	29 04.1	84 51	105.0	29 29.4	84 51	104.7	29 54.7	84 51	104.4	30 19.9	84 52	104.0	30 45.1	84 52	103.7	31 10.3	84 52	103.4	2
3	27 42.7	85 51	104.7	28 08.0	84 51	104.4	28 33.3	84 52	104.1	28 58.6	84 52	103.7	29 23.8	84 52	103.4	29 49.0	84 52	103.1	30 14.2	84 52	102.8	30 39.3	84 52	102.5	3
4	27 11.8	84 52	103.7	27 37.2	84 52	103.4	28 02.4	84 52	103.1	28 27.7	84 52	102.8	28 52.9	84 52	102.5	29 18.0	84 52	102.2	29 43.1	84 52	101.9	30 08.2	83 52	101.6	4
65	26 40.9	84 52	102.8	27 06.2	84 52	102.5	27 31.4	84 52	102.2	27 56.6	84 52	101.9	28 21.8	84 52	101.6	28 46.9	84 52	101.3	29 12.0	84 52	101.0	29 37.0	83 52	100.7	65
6	26 09.8	84 52	101.9	26 35.1	84 52	101.6	27 00.3	84 52	101.3	27 25.5	84 52	101.0	27 50.6	84 52	100.7	28 15.7	84 52	100.4	28 40.7	83 52	100.1	29 05.7	83 52	99.8	6
7	25 38.7	84 52	101.0	26 03.9	84 52	100.7	26 29.1	84 52	100.4	26 54.2	84 52	100.1	27 19.3	84 52	99.8	27 44.3	83 52	99.5	28 09.4	83 52	99.2	28 34.3	83 52	98.9	7
8	25 07.4	84 52	100.1	25 32.6	84 52	99.8	25 57.7	84 52	99.5	26 22.9	84 52	99.2	26 47.9	83 52	98.9	27 12.9	83 52	98.6	27 37.9	83 52	98.3	28 02.9	83 53	98.0	8
9	24 36.1	84 52	99.2	25 01.2	84 52	98.9	25 26.4	84 52	98.6	25 51.4	84 52	98.3	26 16.5	83 53	98.0	26 41.5	83 53	97.7	27 06.4	83 53	97.4	27 31.4	83 53	97.1	9
70	24 04.7	84 52	98.4	24 29.8	84 52	98.1	24 54.9	84 53	97.8	25 19.9	83 53	97.5	25 45.0	83 53	97.1	26 09.9	83 53	96.8	26 34.9	83 53	96.5	26 59.8	83 53	96.2	70
1	23 33.2	84 53	97.5	23 58.3	84 53	97.2	24 23.3	84 53	96.9	24 48.4	83 53	96.6	25 13.4	83 53	96.3	25 38.3	83 53	96.0	26 03.3	83 53	95.7	26 28.1	83 53	95.3	1
2	23 01.6	84 53	96.6	23 26.7	84 53	96.3	23 51.8	83 53	96.0	24 16.8	83 53	95.7	24 41.7	83 53	95.4	25 06.7	83 53	95.1	25 31.6	83 53	94.8	25 56.5	83 53	94.5	2
3	22 30.0	84 53	95.7	22 55.1	84 53	95.4	23 20.1	83 53	95.1	23 45.1	83 53	94.8	24 10.1	83 53	94.5	24 35.0	83 53	94.2	24 59.9	83 53	93.9	25 24.7	83 53	93.6	3
4	21 58.3	84 53	94.9	22 23.4	83 53	94.6	22 48.4	83 53	94.3	23 13.4	83 53	94.0	23 38.4	83 53	93.7	24 03.3	83 53	93.4	24 28.2	83 53	93.1	24 53.0	83 53	92.7	4
75	21 26.6	84 53	94.0	21 51.7	83 53	93.7	22 16.7	83 53	93.4	22 41.7	83 53	93.1	23 06.6	83 53	92.8	23 31.5	83 53	92.5	23 56.4	83 53	92.2	24 21.2	83 53	91.9	75
6	20 54.9	83 53	93.1	21 19.9	83 53	92.8	21 44.9	83 53	92.5	22 09.9	83 53	92.2	22 34.8	83 53	91.9	22 59.7	83 53	91.6	23 24.6	83 53	91.3	23 49.4	83 53	91.0	6
7	20 23.2	83 53	92.3	20 48.2	83 53	92.0	21 13.2	83 53	91.7	21 38.1	83 53	91.4	22 03.1	83 53	91.1	22 28.0	83 53	90.8	22 52.8	83 53	90.5	23 17.7	83 53	90.2	7
8	19 51.4	83 53	91.4	20 16.4	83 53	91.1	20 41.4	83 53	90.8	21 06.3	83 53	90.5	21 31.3	83 53	90.2	21 56.2	83 53	89.9	22 21.0	83 53	89.6	22 45.9	83 53	89.3	8
9	19 19.6	83 53	90.6	19 44.6	83 53	90.3	20 09.6	83 53	90.0	20 34.5	83 53	89.7	20 59.5	83 53	89.4	21 24.4	83 53	89.1	21 49.2	83 53	88.8	22 14.1	83 53	88.5	9
80	18 47.8	83 53	89.7	19 12.8	83 53	89.4	19 37.8	83 53	89.1	20 02.8	83 53	88.8	20 27.7	83 53	88.6	20 52.6	83 53	88.3	21 17.5	83 53	88.0	21 42.3	83 53	87.7	80
1	18 16.0	83 53	88.9	18 41.0	83 53	88.6	19 06.0	83 53	88.3	19 31.0	83 53	88.0	19 55.9	83 53	87.7	20 20.8	83 53	87.4	20 45.7	83 53	87.1	21 10.5	83 53	86.8	1
2	17 44.2	83 53	88.0	18 09.2	83 53	87.7	18 34.2	83 53	87.5	18 59.2	83 53	87.2	19 24.1	83 53	86.9	19 49.1	83 53	86.6	20 13.9	83 53	86.3	20 38.8	83 53	86.0	2
3	17 12.4	83 53	87.2	17 37.5	83 53	86.9	18 02.5	83 53	86.6	18 27.5	83 53	86.3	18 52.4	83 53	86.0	19 17.3	83 53	85.7	19 42.2	83 53	85.4	20 07.1	83 53	85.1	3
4	16 40.7	84 53	86.4	17 05.7	83 53	86.1	17 30.8	83 53	85.8	17 55.7	83 53	85.5	18 20.7	83 53	85.2	18 45.7	83 53	84.9	19 10.6	83 53	84.6	19 35.4	83 53	84.3	4
85	16 09.0	84 53	85.5	16 34.0	83 53	85.2	16 59.1	83 53	84.9	17 24.1	83 53	84.7	17 49.1	83 53	84.4	18 14.0	83 53	84.1	18 38.9	83 53	83.8	19 03.8	83 53	83.5	85
6	15 37.3	84 53	84.7	16 02.4	84 53	84.4	16 27.4	83 53	84.1	16 52.4	83 53	83.8	17 17.4	83 53	83.5	17 42.4	83 53	83.2	18 07.3	83 53	83.0	18 32.3	83 52	82.7	6
7	15 05.7	84 53	83.9	15 30.8	84 53	83.6	15 55.8	83 53	83.3	16 20.9	83 53	83.0	16 45.9	83 52	82.7	17 10.9	83 52	82.4	17 35.8	83 52	82.1	18 00.8	83 52	81.8	7
8	14 34.1	84 53	83.0	14 59.2	84 52	82.7	15 24.3	84 52	82.5	15 49.3	83 52	82.2	16 14.4	83 52	81.9	16 39.4	83 52	81.6	17 04.4	83 52	81.3	17 29.3	83 52	81.0	8
9	14 02.6	84 52	82.2	14 27.7	84 52	81.9	14 52.8	84 52	81.6	15 17.9	84 52	81.3	15 42.9	83 52	81.1	16 08.0	83 52	80.8	16 33.0	83 52	80.5	16 58.0	83 52	80.2	9
90	13 31.1	84 52	81.4	13 56.2	84 52	81.1	14 21.4	84 52	80.8	14 46.5	84 52	80.5	15 11.5	84 52	80.2	15 36.6	84 52	79.9	16 01.6	83 52	79.7	16 26.7	83 52	79.4	90

Digitized by Google

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 58°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	16 00.0	1.0 00	180.0	15 30.0	1.0 00	180.0	15 00.0	1.0 00	180.0	14 30.0	1.0 00	180.0	14 00.0	1.0 00	180.0	13 30.0	1.0 00	180.0	13 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	00
1	15 59.7	1.0 01	179.0	15 29.7	1.0 01	179.0	14 59.7	1.0 01	179.0	14 29.7	1.0 01	179.0	13 59.7	1.0 01	179.0	13 29.7	1.0 01	179.0	12 59.7	1.0 01	179.0	12 29.7	1.0 01	179.0	1
2	15 58.9	1.0 02	178.0	15 28.9	1.0 02	178.0	14 58.9	1.0 02	178.0	14 28.9	1.0 02	178.0	13 58.9	1.0 02	178.0	13 28.9	1.0 02	178.0	12 58.9	1.0 02	178.1	12 28.9	1.0 02	178.1	2
3	15 57.5	1.0 03	177.0	15 27.5	1.0 03	177.0	14 57.5	1.0 03	177.0	14 27.5	1.0 03	177.0	13 57.6	1.0 03	177.1	13 27.6	1.0 03	177.1	12 57.6	1.0 03	177.1	12 27.6	1.0 03	177.1	3
4	15 55.6	1.0 04	176.0	15 25.6	1.0 04	176.0	14 55.6	1.0 04	176.0	14 25.6	1.0 04	176.1	13 55.7	1.0 04	176.1	13 25.7	1.0 04	176.1	12 55.7	1.0 04	176.1	12 25.7	1.0 04	176.1	4
05	15 53.1	1.0 05	175.0	15 23.1	1.0 05	175.0	14 53.1	1.0 05	175.1	14 23.2	1.0 05	175.1	13 53.2	1.0 05	175.1	13 23.2	1.0 05	175.1	12 53.3	1.0 05	175.2	12 23.3	1.0 05	175.2	05
6	15 50.0	1.0 06	174.0	15 20.1	1.0 06	174.0	14 50.1	1.0 06	174.1	14 20.2	1.0 06	174.1	13 50.2	1.0 06	174.1	13 20.3	1.0 06	174.2	12 50.3	1.0 06	174.2	12 20.4	1.0 06	174.2	6
7	15 46.4	1.0 07	173.0	15 16.5	1.0 07	173.0	14 46.6	1.0 07	173.1	14 16.6	1.0 07	173.1	13 46.7	1.0 07	173.1	13 16.8	1.0 07	173.2	12 46.8	1.0 07	173.2	12 16.9	1.0 07	173.2	7
8	15 42.3	1.0 08	172.0	15 12.4	1.0 08	172.1	14 42.5	1.0 08	172.1	14 12.5	1.0 08	172.1	13 42.6	1.0 08	172.2	13 12.7	1.0 08	172.2	12 42.8	1.0 08	172.2	12 12.9	1.0 08	172.3	8
9	15 37.6	1.0 09	171.0	15 07.7	1.0 09	171.1	14 37.8	1.0 09	171.1	14 07.9	1.0 09	171.2	13 38.0	1.0 09	171.2	13 08.1	1.0 09	171.2	12 38.3	1.0 08	171.3	12 08.4	1.0 08	171.3	9
10	15 32.4	1.0 10	170.0	15 02.5	1.0 10	170.1	14 32.6	1.0 10	170.1	14 02.8	1.0 10	170.2	13 32.9	1.0 09	170.2	13 03.0	1.0 09	170.3	12 33.2	1.0 09	170.3	12 03.3	1.0 09	170.4	10
1	15 26.6	99 11	169.0	14 56.7	99 10	169.1	14 26.9	99 10	169.1	13 57.1	99 10	169.2	13 27.2	99 10	169.2	12 57.4	99 10	169.3	12 27.6	99 10	169.4	11 57.7	99 10	169.4	1
2	15 20.3	99 11	168.0	14 50.5	99 11	168.1	14 20.6	99 11	168.2	13 50.8	99 11	168.2	13 21.0	99 11	168.3	12 51.2	99 11	168.3	12 21.4	99 11	168.4	11 51.6	99 11	168.4	2
3	15 13.4	99 12	167.0	14 43.6	99 12	167.1	14 13.9	99 12	167.2	13 44.1	99 12	167.2	13 14.3	99 12	167.3	12 44.5	99 12	167.4	12 14.8	99 12	167.4	11 45.0	99 12	167.5	3
4	15 06.0	99 13	166.1	14 36.3	99 13	166.1	14 06.5	99 13	166.2	13 36.8	99 13	166.3	13 07.1	99 13	166.3	12 37.3	99 13	166.4	12 07.6	99 13	166.5	11 37.8	99 13	166.5	4
15	14 58.1	99 14	165.1	14 28.4	99 14	165.1	13 58.7	99 14	165.2	13 29.0	99 14	165.3	12 59.3	99 14	165.4	12 29.6	99 14	165.4	11 59.9	99 14	165.5	11 30.2	99 14	165.6	15
6	14 49.6	99 15	164.1	14 20.0	99 15	164.2	13 50.3	99 15	164.2	13 20.7	99 15	164.3	12 51.0	99 15	164.4	12 21.3	99 15	164.5	11 51.7	99 15	164.6	11 22.0	99 14	164.6	6
7	14 40.7	99 16	163.1	14 11.0	99 16	163.2	13 41.4	99 16	163.3	13 11.8	99 16	163.4	12 42.2	99 16	163.4	12 12.6	99 15	163.5	11 42.9	99 15	163.6	11 13.3	99 15	163.7	7
8	14 31.2	99 17	162.1	14 01.6	99 17	162.2	13 32.0	99 17	162.3	13 02.4	99 16	162.4	12 32.9	99 16	162.5	12 03.3	99 16	162.6	11 33.7	99 16	162.6	11 04.1	99 16	162.7	8
9	14 21.1	98 18	161.2	13 51.6	98 17	161.2	13 22.1	98 17	161.3	12 52.6	98 17	161.4	12 23.0	98 17	161.5	11 53.5	98 17	161.6	11 24.0	98 17	161.7	10 54.5	98 17	161.8	9
20	14 10.6	98 18	160.2	13 41.1	98 18	160.3	13 11.7	98 18	160.4	12 42.2	98 18	160.5	12 12.7	98 18	160.6	11 43.2	98 18	160.7	11 13.8	98 18	160.7	10 44.3	98 18	160.8	20
1	13 59.6	98 19	159.2	13 30.2	98 19	159.3	13 00.7	98 19	159.4	12 31.3	98 19	159.5	12 01.9	98 19	159.6	11 32.5	98 19	159.7	11 03.0	98 19	159.8	10 33.6	98 19	159.9	1
2	13 48.0	98 20	158.2	13 18.7	98 20	158.3	12 49.3	98 20	158.4	12 19.9	98 20	158.5	11 50.6	98 20	158.7	11 21.2	98 20	158.8	10 51.8	98 20	158.9	10 22.4	98 19	159.0	2
3	13 36.0	98 21	157.3	13 06.7	98 21	157.4	12 37.4	98 21	157.5	12 08.1	98 21	157.6	11 38.7	98 20	157.7	11 09.4	98 20	157.8	10 40.1	98 20	157.9	10 10.8	98 20	158.0	3
4	13 23.5	98 22	156.3	12 54.2	98 22	156.4	12 25.0	98 22	156.5	11 55.7	98 21	156.6	11 26.4	98 21	156.8	10 57.2	98 21	156.9	10 27.9	98 21	157.0	9 58.6	98 21	157.1	4
25	13 10.4	97 23	155.3	12 41.3	97 22	155.5	12 12.1	97 22	155.6	11 42.8	97 22	155.7	11 13.6	97 22	155.8	10 44.4	97 22	155.9	10 15.2	97 22	156.0	9 46.0	97 22	156.2	25
6	12 56.9	97 23	154.4	12 27.8	97 23	154.5	11 58.7	97 23	154.6	11 29.5	97 23	154.7	11 00.4	97 23	154.9	10 31.2	97 23	155.0	10 02.1	97 23	155.1	9 32.9	97 23	155.2	6
7	12 43.0	97 24	153.4	12 13.9	97 24	153.6	11 44.8	97 24	153.7	11 15.7	97 24	153.8	10 46.6	97 24	153.9	10 17.5	97 24	154.1	9 48.5	97 23	154.2	9 19.4	97 23	154.3	7
8	12 28.5	97 25	152.5	11 59.5	97 25	152.6	11 30.5	97 25	152.7	11 01.4	97 25	152.9	10 32.4	97 24	153.0	10 03.4	97 24	153.1	9 34.4	97 24	153.2	9 05.3	97 24	153.4	8
9	12 13.6	96 26	151.5	11 44.6	96 26	151.7	11 15.7	97 25	151.8	10 46.7	97 25	151.9	10 17.8	97 25	152.1	9 48.8	97 25	152.2	9 19.8	97 25	152.3	8 50.9	97 25	152.5	9
30	11 58.2	96 26	150.6	11 29.3	96 26	150.7	11 00.4	96 26	150.8	10 31.5	96 26	151.0	10 02.6	96 26	151.1	9 33.7	96 26	151.3	9 04.8	96 26	151.4	8 35.9	96 26	151.5	30
1	11 42.3	96 27	149.6	11 13.5	96 27	149.8	10 44.7	96 27	149.9	10 15.9	96 27	150.1	9 47.0	96 27	150.2	9 18.2	96 27	150.3	8 49.4	96 26	150.5	8 20.6	96 26	150.6	1
2	11 26.0	96 28	148.7	10 57.3	96 28	148.8	10 28.5	96 28	149.0	9 59.8	96 28	149.1	9 31.0	96 27	149.3	9 02.3	96 27	149.4	8 33.5	96 27	149.6	8 04.7	96 27	149.7	2
3	11 09.3	96 29	147.8	10 40.6	96 29	147.9	10 11.9	96 28	148.0	9 43.2	96 28	148.2	9 14.6	96 28	148.3	8 45.9	96 28	148.5	8 17.2	96 28	148.6	7 48.5	96 28	148.8	3
4	10 52.1	95 29	146.8	10 23.5	95 29	147.0	9 54.9	95 29	147.1	9 26.3	95 29	147.3	8 57.7	95 29	147.4	8 29.0	95 29	147.6	8 00.4	95 29	147.7	7 31.8	95 29	147.9	4
35	10 34.5	95 30	145.9	10 05.9	95 30	146.0	9 37.4	95 30	146.2	9 08.9	95 30	146.4	8 40.3	95 30	146.5	8 11.8	95 29	146.7	7 43.2	95 29	146.8	7 14.7	95 29	147.0	35
6	10 16.4	95 31	145.0	9 48.0	95 31	145.1	9 19.5	95 31	145.3	8 51.0	95 30	145.4	8 22.6	95 30	145.6	7 54.1	95 30	145.8	7 25.6	95 30	145.9	6 57.1	95 30	146.1	6
7	9 58.0	95 31	144.0	9 29.6	95 31	144.2	9 01.2	95 31	144.4	8 32.8	95 31	144.5	8 04.4	95 31	144.7	7 36.0	95 31	144.8	7 07.6	95 31	145.0	6 39.2	95 31	145.2	7
8	9 39.1	94 32	143.1	9 10.8	94 32	143.3	8 42.5	94 32	143.4	8 14.1	94 32	143.6	7 45.8	94 32	143.8	7 17.5	94 32	143.9	6 49.1	94 31	144.1	6 20.8	94 31	144.3	8
9	9 19.8	94 33	142.2	8 51.6	94 33	142.4	8 23.3	94 33	142.5	7 55.1	94 32	142.7	7 26.8	94 32	142.9	6 58.6	94 32	143.0	6 30.3	94 32	143.2	6 02.0	94 32	143.4	9
40	9 00.1	94 33	141.3	8 31.9	94 33	141.4	8 03.8	94 33	141.6	7 35.6	94 33	141.8	7 07.4	94 33	142.0	6 39.2	94 33	142.1	6 11.1	94 33	142.3	5 42.9	94 33	142.5	40
1	8 40.0	94 34	140.4	8 11.9	94 34	140.5	7 43.8	94 34	140.7	7 15.7	94 34	140.9	6 47.6	94 34	141.1	6 19.5	94 34	141.2	5 51.4	94 33	141.4	5 23.3	94 33	141.6	1
2	8 19.5	93 35	139.5	7 51.5	93 35	139.6	7 23.5	93 35	139.8	6 55.5	93 34	140.0	6 27.5	93 34	140.2	5 59.4	93 34	140.4	5 31.4	93 34	140.5	5 03.4	93 34	140.7	2
3	7 58.7	93 35	138.5	7 30.7	93 35	138.7	7 02.8	93 35	138.9	6 34.9	93 35	139.1	6 06.9	93 35	139.3	5 39.0	93 35	139.5	5 11.0	93 35	139.6				3
4	7 37.4	93 36	137.6	7 09.6	93 36	137.8	6 41.7	93 36	138.0	6 13.9	93 36	138.2	5 46.0	93 36	138.4	5 18.1	93 35	138.6							4
45	7 15.8	93 37	136.7	6 48.1	93 36	136.9	6 20.3	93 36	137.1	5 52.5	93 36	137.3	5 24.7	93 36	137.5										45
6	6 53.9	92 37	135.9	6 26.2	92 37	136.0	5 58.5	92 37	136.2	5 30.7	92 37	136.4	5 03.0	92 37	136.6										6
7	6 31.5	92 38	135.0	6 03.9	92 38	135.2	5 36.3	92 38	135.4	5 08.7	92 37	135.5													7
8	6 08.9	92 38	134.1	5 41.3	92 38	134.3	5 13.8	92 38	134.5																8
9	5 45.9	92 39	133.2	5 18.4	92 39	133.4																			9
50	5 22.5	91 40	132.3																						50

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	12 59.7	84 52	80.5	13 24.9	84 52	80.3	13 50.0	84 52	80.0	14 15.1	84 52	79.7	14 40.3	84 52	79.4	15 05.3	84 52	79.1	15 30.4	84 52	78.8	15 55.5	83 52	78.6	91
2	12 28.4	84 52	79.7	12 53.6	84 52	79.4	13 18.7	84 52	79.1	13 43.9	84 52	78.9	14 09.0	84 52	78.6	14 34.2	84 52	78.3	14 59.3	84 52	78.0	15 24.3	84 52	77.7	2
3	11 57.1	84 52	78.9	12 22.4	84 52	78.6	12 47.6	84 52	78.3	13 12.7	84 52	78.0	13 37.9	84 52	77.8	14 03.1	84 52	77.5	14 28.2	84 52	77.2	14 53.3	84 52	76.9	3
4	11 26.0	84 52	78.1	11 51.2	84 52	77.8	12 16.5	84 52	77.5	12 41.7	84 52	77.2	13 06.9	84 52	76.9	13 32.1	84 51	76.7	13 57.3	84 51	76.4	14 22.4	84 51	76.1	4
95	10 54.9	84 52	77.2	11 20.2	84 52	77.0	11 45.5	84 51	76.7	12 10.7	84 51	76.4	12 36.0	84 51	76.1	13 01.2	84 51	75.8	13 26.4	84 51	75.6	13 51.6	84 51	75.3	95
6	10 24.0	84 51	76.4	10 49.3	84 51	76.1	11 14.6	84 51	75.9	11 39.9	84 51	75.6	12 05.2	84 51	75.3	12 30.4	84 51	75.0	12 55.7	84 51	74.8	13 20.9	84 51	74.5	6
7	9 53.1	85 51	75.6	10 18.5	85 51	75.3	10 43.8	84 51	75.0	11 09.2	84 51	74.8	11 34.5	84 51	74.5	11 59.8	84 51	74.2	12 25.1	84 51	73.9	12 50.3	84 51	73.7	7
8	9 22.4	85 51	74.7	9 47.8	85 51	74.5	10 13.2	85 51	74.2	10 38.5	85 51	73.9	11 03.9	85 51	73.7	11 29.2	84 51	73.4	11 54.6	84 51	73.1	12 19.9	84 51	72.8	8
9	8 51.8	85 51	73.9	9 17.2	85 51	73.7	9 42.6	85 51	73.4	10 08.0	85 51	73.1	10 33.4	85 51	72.8	10 58.8	85 50	72.6	11 24.2	85 50	72.3	11 49.6	85 50	72.0	9
100	8 21.3	85 51	73.1	8 46.8	85 50	72.8	9 12.2	85 50	72.6	9 37.7	85 50	72.3	10 03.1	85 50	72.0	10 28.6	85 50	71.8	10 54.0	85 50	71.5	11 19.4	85 50	71.2	100
1	7 50.9	85 50	72.3	8 16.4	85 50	72.0	8 42.0	85 50	71.7	9 07.5	85 50	71.5	9 33.0	85 50	71.2	9 58.4	85 50	70.9	10 23.9	85 50	70.7	10 49.4	85 50	70.4	1
2	7 20.7	85 50	71.4	7 46.3	85 50	71.2	8 11.8	85 50	70.9	8 37.4	85 50	70.7	9 02.9	85 50	70.4	9 28.5	85 50	70.1	9 54.0	85 50	69.9	10 19.5	85 50	69.6	2
3	6 50.6	85 50	70.6	7 16.3	85 50	70.4	7 41.9	85 50	70.1	8 07.5	85 50	69.8	8 33.1	85 50	69.6	8 58.6	85 49	69.3	9 24.2	85 49	69.0	9 49.8	85 49	68.8	3
4	6 20.7	86 50	69.8	6 46.4	86 50	69.5	7 12.1	86 49	69.3	7 37.7	85 49	69.0	8 03.3	85 49	68.7	8 29.0	85 49	68.5	8 54.6	85 49	68.2	9 20.2	85 49	68.0	4
105	5 51.0	86 49	69.0	6 16.7	86 49	68.7	6 42.4	86 49	68.4	7 08.1	86 49	68.2	7 33.8	86 49	67.9	7 59.5	86 49	67.7	8 25.2	86 49	67.4	8 50.8	86 49	67.1	105
6	5 21.4	86 49	68.1	5 47.1	86 49	67.9	6 12.9	86 49	67.6	6 38.7	86 49	67.4	7 04.4	86 49	67.1	7 30.2	86 49	66.8	7 55.9	86 48	66.6	8 21.6	86 48	66.3	6
7				5 17.8	86 49	67.1	5 43.6	86 49	66.8	6 09.4	86 48	66.5	6 35.2	86 48	66.3	7 01.0	86 48	66.0	7 26.8	86 48	65.8	7 52.6	86 48	65.5	7
8							5 14.5	86 48	66.0	5 40.3	86 48	65.7	6 06.2	86 48	65.5	6 32.1	86 48	65.2	6 57.9	86 48	64.9	7 23.7	86 48	64.7	8
9										5 11.4	86 48	64.9	5 37.4	86 48	64.6	6 03.3	86 48	64.4	6 29.2	86 48	64.1	6 55.1	86 47	63.9	9
110													5 08.7	87 47	63.8	5 34.7	87 47	63.6	6 00.7	87 47	63.3	6 26.7	87 47	63.1	110
1																5 06.4	87 47	62.7	5 32.4	87 47	62.5	5 58.4	87 47	62.2	1
2																			5 04.3	87 46	61.7	5 30.4	87 46	61.4	2
3																						5 02.6	87 46	60.6	3

Digitized by Google

La 59

Lat. 58°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	52 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0
1	51 59.6	1.0 02	178.5	52 29.6	1.0 02	178.5	52 59.6	1.0 02	178.4	53 29.6	1.0 02	178.4
2	51 58.3	1.0 04	176.9	52 28.3	1.0 04	176.9	52 58.3	1.0 04	176.9	53 28.3	1.0 04	176.9
3	51 56.2	1.0 05	175.4	52 26.2	1.0 05	175.4	52 56.1	1.0 05	175.4	53 26.1	1.0 05	175.3
4	51 53.2	1.0 06	173.9	52 23.2	1.0 06	173.9	52 53.1	1.0 06	173.8	53 23.1	1.0 06	173.8
05	51 49.4	1.0 08	172.4	52 19.4	1.0 08	172.3	52 49.3	1.0 08	172.3	53 19.2	1.0 08	172.2
6	51 44.8	1.0 09	170.9	52 14.7	1.0 09	170.8	52 44.6	1.0 09	170.7	53 14.4	1.0 09	170.6
7	51 39.4	99 10	169.4	52 09.2	99 11	169.3	52 39.0	99 11	169.2	53 08.8	99 11	169.1
8	51 33.1	99 12	167.9	52 02.9	99 12	167.8	52 32.6	99 12	167.7	53 02.4	99 12	167.6
9	51 26.0	99 13	166.4	51 55.7	99 13	166.3	52 25.4	99 13	166.1	52 55.2	99 13	166.0
10	51 18.1	99 14	164.9	51 47.8	99 15	164.8	52 17.4	99 15	164.6	52 47.1	99 15	164.5
1	51 09.4	99 16	163.4	51 39.0	99 16	163.3	52 08.6	99 16	163.1	52 38.2	99 16	163.0
2	50 59.9	98 17	161.9	51 29.4	98 17	161.8	51 59.0	98 17	161.6	52 28.5	98 17	161.5
3	50 49.7	98 18	160.4	51 19.1	98 18	160.3	51 48.6	98 19	160.1	52 18.0	98 19	160.0
4	50 38.6	98 20	159.0	51 08.0	98 20	158.8	51 37.4	98 20	158.7	52 06.7	98 20	158.5
15	50 26.9	98 21	157.5	50 56.1	98 21	157.4	51 25.4	98 21	157.2	51 54.7	97 21	157.0
6	50 14.3	97 22	156.1	50 43.5	97 22	155.9	51 12.7	97 22	155.7	51 41.9	97 23	155.6
7	50 01.1	97 23	154.7	50 30.2	97 23	154.5	50 59.3	97 24	154.3	51 28.4	97 24	154.1
8	49 47.2	97 24	153.3	50 16.2	97 25	153.1	50 45.2	97 25	152.9	51 14.1	97 25	152.7
9	49 32.5	96 26	151.9	50 01.4	96 26	151.7	50 30.3	96 26	151.5	50 59.2	96 26	151.2
20	49 17.2	96 27	150.5	49 46.0	96 27	150.3	50 14.8	96 27	150.0	50 43.5	96 27	149.8
1	49 01.2	96 28	149.1	49 29.9	96 28	148.9	49 58.6	96 28	148.7	50 27.2	95 28	148.4
2	48 44.5	95 29	147.7	49 13.1	95 29	147.5	49 41.7	95 29	147.3	50 10.2	95 29	147.0
3	48 27.2	95 30	146.4	48 55.7	95 30	146.1	49 24.2	95 30	145.9	49 52.6	95 30	145.7
4	48 09.3	95 31	145.0	48 37.7	95 31	144.8	49 06.1	94 31	144.6	49 34.4	94 31	144.3
25	47 50.8	94 32	143.7	48 19.1	94 32	143.5	48 47.3	94 32	143.2	49 15.5	94 32	143.0
6	47 31.7	94 33	142.4	47 59.9	94 33	142.1	48 28.0	94 33	141.9	48 56.1	94 33	141.6
7	47 12.0	94 34	141.1	47 40.1	93 34	140.8	48 08.1	93 34	140.6	48 36.0	93 34	140.3
8	46 51.8	93 35	139.8	47 19.7	93 35	139.6	47 47.6	93 35	139.3	48 15.4	93 35	139.0
9	46 31.0	93 36	138.5	46 58.8	93 36	138.3	47 26.6	93 36	138.0	47 54.3	92 36	137.7
30	46 09.7	92 36	137.3	46 37.4	92 37	137.0	47 05.1	92 37	136.7	47 32.7	92 37	136.4
1	45 47.9	92 37	136.0	46 15.5	92 37	135.8	46 43.0	92 38	135.5	47 10.5	92 38	135.2
2	45 25.6	92 38	134.8	45 53.0	92 38	134.5	46 20.5	91 38	134.2	46 47.8	91 39	133.9
3	45 02.8	91 39	133.6	45 30.1	91 39	133.3	45 57.4	91 39	133.0	46 24.7	91 39	132.7
4	44 39.5	91 40	132.4	45 06.8	91 40	132.1	45 34.0	91 40	131.8	46 01.1	90 40	131.5
35	44 15.8	91 40	131.2	44 42.9	90 40	130.9	45 10.0	90 41	130.6	45 37.1	90 41	130.3
6	43 51.6	90 41	130.0	44 18.7	90 41	129.7	44 45.7	90 41	129.4	45 12.6	90 41	129.1
7	43 27.1	90 42	128.8	43 54.0	90 42	128.5	44 20.9	90 42	128.2	44 47.7	89 42	127.9
8	43 02.1	89 42	127.7	43 28.9	89 42	127.4	43 55.7	89 43	127.1	44 22.4	89 43	126.7
9	42 36.8	89 43	126.5	43 03.5	89 43	126.2	43 30.1	89 43	125.9	43 56.8	89 43	125.6
40	42 11.0	89 43	125.4	42 37.6	89 44	125.1	43 04.2	88 44	124.8	43 30.7	88 44	124.4
1	41 44.9	88 44	124.3	42 11.4	88 44	124.0	42 37.9	88 44	123.6	43 04.3	88 45	123.3
2	41 18.5	88 45	123.2	41 44.9	88 45	122.9	42 11.3	88 45	122.5	42 37.6	88 45	122.2
3	40 51.7	88 45	122.1	41 18.0	88 45	121.8	41 44.3	87 45	121.4	42 10.5	87 46	121.1
4	40 24.6	88 46	121.0	40 50.8	87 46	120.7	41 17.0	87 46	120.3	41 43.1	87 46	120.0
45	39 57.2	87 46	119.9	40 23.3	87 46	119.6	40 49.4	87 46	119.3	41 15.5	87 47	118.9
6	39 29.5	87 47	118.8	39 55.5	87 47	118.5	40 21.5	87 47	118.2	40 47.5	86 47	117.9
7	39 01.5	87 47	117.8	39 27.5	86 47	117.5	39 53.4	86 47	117.1	40 19.3	86 48	116.8
8	38 33.2	86 48	116.8	38 59.1	86 48	116.4	39 25.0	86 48	116.1	39 50.7	86 48	115.8
9	38 04.7	86 48	115.7	38 30.5	86 48	115.4	38 56.3	86 48	115.1	39 22.0	86 48	114.7
50	37 35.9	86 48	114.7	38 01.7	86 48	114.4	38 27.4	86 49	114.0	38 53.0	85 49	113.7
1	37 06.9	86 49	113.7	37 32.6	85 49	113.4	37 58.2	85 49	113.0	38 23.8	85 49	112.7
2	36 37.7	85 49	112.7	37 03.3	85 49	112.4	37 28.8	85 49	112.0	37 54.3	85 49	111.7
3	36 08.3	85 49	111.7	36 33.8	85 50	111.4	36 59.3	85 50	111.0	37 24.7	85 50	110.7
4	35 38.6	85 50	110.7	36 04.1	85 50	110.4	36 29.5	85 50	110.0	36 54.8	84 50	109.7
55	35 08.8	85 50	109.7	35 34.2	85 50	109.4	35 59.5	84 50	109.1	36 24.8	84 50	108.7
6	34 38.8	85 50	108.7	35 04.1	84 50	108.4	35 29.4	84 50	108.1	35 54.6	84 51	107.8
7	34 08.6	84 51	107.8	34 33.9	84 51	107.5	34 59.1	84 51	107.1	35 24.3	84 51	106.8
8	33 38.2	84 51	106.8	34 03.4	84 51	106.5	34 28.6	84 51	106.2	34 53.7	84 51	105.8
9	33 07.7	84 51	105.9	33 32.9	84 51	105.6	33 58.0	84 51	105.2	34 23.1	83 51	104.9
60	32 37.1	84 51	104.9	33 02.2	84 51	104.6	33 27.3	84 51	104.3	33 52.3	83 52	104.0
1	32 06.3	84 52	104.0	32 31.4	84 52	103.7	32 56.4	83 52	103.4	33 21.4	83 52	103.0
2	31 35.4	84 52	103.1	32 00.4	83 52	102.8	32 25.4	83 52	102.4	32 50.3	83 52	102.1
3	31 04.3	83 52	102.2	31 29.3	83 52	101.8	31 54.3	83 52	101.5	32 19.2	83 52	101.2
4	30 33.2	83 52	101.3	30 58.2	83 52	100.9	31 23.1	83 52	100.6	31 48.0	83 52	100.3
65	30 02.0	83 52	100.4	30 26.9	83 52	100.0	30 51.8	83 52	99.7	31 16.6	83 52	99.4
6	29 30.7	83 52	99.4	29 55.6	83 52	99.1	30 20.4	83 52	98.8	30 45.2	83 52	98.5
7	28 59.2	83 52	98.6	29 24.1	83 52	98.2	29 49.0	83 53	97.9	30 13.7	83 53	97.6
8	28 27.8	83 53	97.7	28 52.6	83 53	97.3	29 17.4	83 53	97.0	29 42.2	82 53	96.7
9	27 56.2	83 53	96.8	28 21.1	83 53	96.5	28 45.9	83 53	96.1	29 10.6	82 53	95.8
70	27 24.6	83 53	95.9	27 49.4	83 53	95.6	28 14.2	82 53	95.3	28 38.9	82 53	94.9
1	26 53.0	83 53	95.0	27 17.8	83 53	94.7	27 42.5	82 53	94.4	28 07.2	82 53	94.1
2	26 21.3	83 53	94.2	26 46.1	83 53	93.8	27 10.8	82 53	93.5	27 35.5	82 53	93.2
3	25 49.6	83 53	93.3	26 14.3	83 53	93.0	26 39.1	82 53	92.7	27 03.8	82 53	92.3
4	25 17.8	83 53	92.4	25 42.6	82 53	92.1	26 07.3	82 53	91.8	26 32.0	82 53	91.5
75	24 46.0	83 53	91.6	25 10.8	82 53	91.3	25 35.5	82 53	91.0	26 00.2	82 53	90.6
6	24 14.2	83 53	90.7	24 39.0	82 53	90.4	25 03.7	82 53	90.1	25 28.4	82 53	89.8
7	23 42.4	83 53	89.9	24 07.2	82 53	89.6	24 31.9	82 53	89.3	24 56.6	82 53	88.9
8	23 10.7	83 53	89.0	23 35.4	82 53	88.7	24 00.1	82 53	88.4	24 24.8	82 53	88.1
9	22 38.9	83 53	88.2	23 03.6	82 53	87.9	23 28.4	82 53	87.6	23 53.0	82 53	87.3
80	22 07.1	83 53	87.3	22 31.9	83 53	87.0	22 56.6	82 53	86.7	23 21.3	82 53	86.4
1	21 35.3	83 53	86.5	22 00.1	83 53	86.2	22 24.9	82 53	85.9	22 49.6	82 53	85.6
2	21 03.6	83 53	85.7	21 28.4	83 53	85.4	21 53.2	82 53	85.1	22 17.9	82 53	84.8
3	20 31.9	83 53	84.8	20 56.7	83 53	84.5	21 21.5	83 53	84.2	21 46.3	82 53	83.9
4	20 00.3	83 53	84.0	20 25.1	83 53	83.7	20 49.9	83 53	83.4	21 14.7	82 53	83.1
85	19 28.7	83 53	83.2	19 53.5	83 52	82.9	20 18.4	83 52	82.6	20 43.1	83 52	82.3
6	18 57.2	83 52	82.4	19 22.0	83 52	82.1	19 46.9	83 52	81.8	20 11.7	83 52	81.5
7	18 25.7	83 52	81.5	18 50.6	83 52	81.2	19 15.4	83 52	81.0	19 40.2	83 52	80.7
8	17 54.3	83 52	80.7	18 19.2	83 52	80.4	18 44.1	83 52	80.1	19 08.9	83 52	79.8
9	17 22.9	83 52	79.9	17 47.9	83 52	79.6	18 12.8	83 52	79.3	18 37.7	83 52	79.0
90	16 51.7	83 52	79.1	17 16.6	83 52	78.8	17 41.6	83 52	78.5	18 06.5	83 52	78.2

H.A.	22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	54 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0
1	53 59.6	1.0 02	178.4	54 29.6	1.0 02	178.4	54 59.6	1.0 02	178.4	55 29.6	1.0 02	178.4
2	53 58.2	1.0 04	176.8	54 28.2	1.0 04	176.8	54 58.2	1.0 04	176.8	55 28.2	1.0 04	176.8
3	53 56.1	1.0 05	175.3	54 26.0	1.0 05	175.2	54 56.0	1.0 05	175.2	55 26.0	1.0 05	175.1
4	53 53.0	1.0 07	173.7	54 22.9	1.0 07	173.6	54 52.9	1.0 07	173.6	55 22.8	1.0 07	173.5
05	53 49.1	1.0 08	172.1	54 19.0	1.0 08	172.1	54 48.9	1.0 08	172.0	55 18.8	1.0 08	171.9
6	53 44.3	1.0 09	170.6	54 14.2	1.0 09	170.5	54 44.0	1.0 10	170.4	55 13.9	1.0 10	170.3
7	53 38.7	99 11	169.0	54 08.5	99 11	168.9	54 38.3	99 11	168.8	55 08.1	99 11	168.7
8	53 32.2	99 12	167.5	54 02.0	99 12	167.4	54 31.7	99 12	167.2	55 01.5	99 12	167.1
9	53 24.9	99 14	165.9	53 54.6	99 14	165.8	54 24.3	99 14	165.7	54 54.0	99 14	165.6
10	53 16.7	99 15	164.4	53 46.4	99 15	164.2	54 16.0	99 15	164.1	54 45.6	99 15	164.0
1	53 07.7	99 16	162.9	53 37.3	99 16	162.7	54 06.9	99 17	162.6	54 36.4	98 17	162.4
2	52 58.0	98 18	161.3	53 27.5	98 18	161.2	53 56.9	98 18	161.0	54 26.4	98 18	160.9
3	52 47.4	98 19	159.8	53 16.8	98 19	159.7	53 46.2	98 19	159.5	54 15.6	98 19	159.3
4	52 36.0	98 20	158.3	53 05.4	98 20	158.2	53 34.7	98 21	158.0	54 03.9	98 21	157.8
15	52 23.9	97 21	156.8	52 53.1	97 22	156.7	53 22.3	97 22	156.5	53 51.5	97 22	156.3
6	52 11.0	97 23	155.4	52 40.2	97 23	155.2	53 09.3	97 23	155.0	53 38.4	97 23	154.8
7	51 57.4	97 24	153.9	52 26.4	97 24	153.7	52 55.4	97 24	153.5	53 24.4	97 24	153.3
8	51 43.1	96 25	152.5	52 12.0	96 25	152.2	52 40.9	96 25	152.0	53 09.8	96 26	151.8
9	51 28.0	96 26	151.0	51 56.8	96 26	150.8	52 25.6	96 27	150.6	52 54.4	96 27	150.3
20	51 12.3	96 27	149.6	51 41.0	96 28	149.4	52 09.6	96 28	149.1	52 38.3	95 28	148.9
1	50 55.8	95 28	148.2	51 24.4	95 29	147.9	51 53.0	95 29	147.7	52 21.5	95 29	147.4
2	50 38.7	95 30	146.8	51 07.2	95 30	146.5	51 35.7	95 30	146.3	52 04.1	95 30	146.0
3	50 21.0	95 31	145.4	50 49.4	94 31	145.1	51 17.7	94 31	144.9	51 46.0	94 31	144.6
4	50 02.6	94 32	144.0	50 30.9	94 32	143.8	50 59.1	94 32	143.5	51 27.3	94 32	143.2
25	49 43.7	94 33	142.7	50 11.8	94 33	142.4	50 39.9	94 33	142.1	51 07.9	93 33	141.9
6	49 24.1	93 34	141.3	49 52.1	93 34	141.1	50 20.1	93 34	140.8	50 48.0	93 34	140.5
7	49 04.0	93 35	140.0	49 31.8	93 35	139.7	49 59.7	93 35	139.5	50 27.5	93 35	139.2
8	48 43.3	93 35	138.7	49 11.0	92 36	138.4	49 38.7	92 36	138.1	50 06.4	92 36	137.8
9	48 22.0	92 36	137.4	48 49.7	92 36	137.1	49 17.3	92 37	136.8	49 44.8	92 37	136.5
30	48 00.2	92 37	136.1	48 27.8	92 37	135.8	48 55.2	92 38	135.5	49 22.7	91 38	135.2
1	47 38.0	91 38	134.9	48 05.4	91 38	134.6	48 32.7	91 38	134.3	49 00.0	91 39	134.0
2	47 15.2	91 39	133.6	47 42.5	91 39	133.3	48 09.7	91 39	133.0	48 36.9	91 39	132.7
3	46 51.9	91 40	132.4	47 19.1	90 40	132.1	47 46.2	90 40	131.8	48 13.3	90 40	131.4
4	46 28.2	90 40	131.2	46 55.3	90 40	130.9	47 22.3	90 41	130.5	47 49.2	90 41	130.2
35	46 04.1	90 41	130.0	46 31.0	90 41	129.6	46 57.9	90 41	129.3	47 24.7	89 42	129.0
6	45 39.5	90 42	128.8	46 06.3	89 42	128.4	46 33.1	89 42	128.1	46 59.8	89 42	127.8
7	45 14.5	89 42	127.6	45 41.2	89 42	127.3	46 07.9	89 43	126.9	46 34.5	89 43	126.6
8	44 49.1	89 43	126.4	45 15.7	89 43	126.1	45 42.3	88 43	125.8	46 08.8	88 44	125.4
9	44 23.3	88 44	125.3	44 49.8	88 44	124.9	45 16.3	88 44	124.6	45 42.7	88 44	124.3
40	43 57.2	88 44	124.1	44 23.6	88 44	123.8	44 49.9	88 44	123.5	45 16.2	88 45	123.1
1	43 30.7	88 45	123.0	43 57.0	88 45	122.7	44 23.2	87 45	122.3	44 49.4	87 45	122.0
2	43 03.8	87 45	121.9	43 30.0	87 45	121.5	43 56.2	87 46	121.2	44 22.3	87 46	120.9
3	42 36.7	87 46	120.8	43 02.8	87 46	120.4	43 28.8	87 46	120.1	43 54.8	87 46	119.8
4	42 09.2	87 46	119.7	42 35.2	87 46	119.3	43 01.2	86 47	119.0	43 27.1	86 47	118.7
45	41 41.4	86 47	118.6	42 07.4	86 47	118.3	42 33.2	86 47	117.9	42 59.0	86 47	117.6
6	41 13.4	86 47	117.5	41 39.2	86 47	117.2	42 05.0	86 48	116.9	42 30.7	86 48	116.5
7	40 45.1	86 48	116.5	41 10.8	86 48	116.1	41 36.5	86 48	115.8	42 02.1	85 48	115.4
8	40 16.5	86 48	115.4	40 42.1	85 48	115.1	41 07.7	85 48	114.7	41 33.3	85 48	114.4
9	39 47.6	85 48	114.4	40 13.2	85 49	114.1	40 38.7	85 49	113.7	41 04.2	85 49	113.4
50	39 18.6	85 49	113.4	39 44.1	85 49	113.0	40 09.5	85 49	112.7	40 34.9	85 49	112.3
1	38 49.3	85 49	112.4	39 14.7	85 49	112.0	39 40.1	84 49	111.7	40 05.4	84 50	111.3
2	38 19.8	85 50	111.3	38 45.1	84 50	111.0	39 10.4	84 50	110.7	39 35.7	84 50	110.3
3	37 50.0	84 50	110.4	38 15.3	84 50	110.0	38 40.6	84 50	109.7	39 05.8	84 50	109.3
4	37 20.1	84 50	109.4	37 45.4	84 50	109.0	38 10.5	84 50	108.7	38 35.7	84 50	108.3
55	36 50.1	84 50	108.4	37 15.2	84 51	108.0	37 40.3	84 51	107.7	38 05.4	83 51	107.4
6	36 19.8	84 51	107.4	36 44.9	84 51	107.1	37 10.0	83 51	106.7	37 35.0	83 51	106.4
7	35 49.4	84 51	106.5	36 14.4	83 51	106.1	36 39.4	83 51	105.8	37 04.4	83 51	105.4
8	35 18.8	83 51	105.5	35 43.8	83 51	105.2	36 08.8	83 51	104.8	36 33.7	83 51	104.5
9	34 48.1	83 51	104.6	35 13.1	83 51	104.2	35 38.0	83 52	103.9	36 02.8	83 52	103.5
60	34 17.3	83 52	103.6	34 42.2	83 52	103.3	35 07.1	83 52	102.9	35 31.9	83 52	102.6
1	33 46.3	83 52	102.7	34 11.2	83 52	102.4	34 36.0	83 52	102.0	35 00.8	82 52	101.7
2	33 15.2	83 52	101.8	33 40.1	83 52	101.4	34 04.9	83 52	101.1	34 29.6	82 52	100.8
3	32 44.1	83 52	100.9	33 08.9	83 52	100.5	33 33.6	82 52	100.2	33 58.3	82 52	99.8
4	32 12.8	83 52	99.9	32 37.6	82 52	99.6	33 02.3	82 52	99.3	33 26.9	82 52	98.9
65	31 41.4	83 52	99.0	32 06.2	82 52	98.7	32 30.9	82 52	98.4	32 55.5	82 53	98.0
6	31 10.0	82 53	98.1	31 34.7	82 53	97.8	31 59.4	82 53	97.5	32 24.0	82 53	97.1
7	30 38.5	82 53	97.3	31 03.2	82 53	96.9	31 27.8	82 53	96.6	31 52.4	82 53	96.3
8	30 06.9	82 53	96.4	30 31.6	82 53	96.0	30 56.2	82 53	95.7	31 20.8	82 53	95.4
9	29 35.3	82 53	95.5	29 59.9	82 53	95.2	30 24.5	82 53	94.8	30 49.1	82 53	94.5
70	29 03.6	82 53	94.6	29 28.3	82 53	94.3	29 52.8	82 53	94.0	30 17.4	82 53	93.6
1	28 31.9	82 53	93.8	28 56.5	82 53	93.4	29 21.1	82 53	93.1	29 45.6	82 53	92.8
2	28 00.2	82 53	92.9	28 24.8	82 53	92.6	28 49.3	82 53	92.2	29 13.9	82 53	91.9
3	27 28.4	82 53	92.0	27 53.0	82 53	91.7	28 17.6	82 53	91.4	28 42.1	82 53	91.1
4	26 56.6	82 53	91.2	27 21.2	82 53	90.8	27 45.8	82 53	90.5	28 10.3	82 53	90.2
75	26 24.8	82 53	90.3	26 49.4	82 53	90.0	27 14.0	82 53	89.7	27 38.5	82 53	89.4
6	25 53.0	82 53	89.5	26 17.6	82 53	89.2	26 42.2	82 53	88.8	27 06.7	82 53	88.5
7	25 21.2	82 53	88.6	25 45.8	82 53	88.3	26 10.4	82 53	88.0	26 34.9	82 53	87.7
8	24 49.5	82 53	87.8	25 14.1	82 53	87.5	25 38.6	82 53	87.2	26 03.2	82 53	86.8
9	24 17.7	82 53	87.0	24 42.3	82 53	86.6	25 06.9	82 53	86.3	25 31.4	82 53	86.0
80	23 46.0	82 53	86.1	24 10.6	82 53	85.8	24 35.2	82 53	85.5	24 59.7	82 53	85.2
1	23 14.3	82 53	85.3	23 38.9	82 53	85.0	24 03.5	82 53	84.7	24 28.1	82 53	84.3
2	22 42.6	82 53	84.5	23 07.2	82 53	84.1	23 31.9	82 53	83.8	23 56.4	82 53	83.5
3	22 11.0	82 53	83.6	22 35.6	82 53	83.3	23 00.3	82 53	83.0	23 24.9	82 53	82.7
4	21 39.4	82 53	82.8	22 04.1	82 52	82.5	22 28.7	82 52	82.2	22 53.4	82 52	81.9
85	21 07.9	82 52	82.0	21 32.6	82 52	81.7	21 57.3	82 52	81.4	22 21.9	82 52	81.1
6	20 36.4	83 52	81.2	21 01.2	82 52	80.9	21 25.9	82 52	80.6	21 50.6	82 52	80.3
7	20 05.0	83 52	80.4	20 29.8	83 52	80.1	20 54.6	82 52	79.8	21 19.3	82 52	79.4
8	19 33.7	83 52	79.5	19 58.5	83 52	79.2	20 23.3	83 52	78.9	20 48.0	82 52	78.6
9	19 02.5	83 52	78.7	19 27.3	83 52	78.4	19 52.1	83 52	78.1	20 16.9	83 52	77.8
90	18 31.4	83 52	77.9	18 56.2	83 52	77.6	19 21.1	82 52	77.3	19 45.9	83 52	77.0

Digitized by Google

Lat. 58°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0	00
1	11 59.7	1.0 01	179.0	11 29.7	1.0 01	179.0	10 59.7	1.0 01	179.0	10 29.7	1.0 01	179.1	9 59.7	1.0 01	179.1	9 29.7	1.0 01	179.1	8 59.7	1.0 01	179.1	8 29.7	1.0 01	179.1	1
2	11 58.9	1.0 02	178.1	11 28.9	1.0 02	178.1	10 58.9	1.0 02	178.1	10 28.9	1.0 02	178.1	9 59.0	1.0 02	178.1	9 29.0	1.0 02	178.1	8 59.0	1.0 02	178.1	8 29.0	1.0 02	178.1	2
3	11 57.6	1.0 03	177.1	11 27.6	1.0 03	177.1	10 57.6	1.0 03	177.1	10 27.6	1.0 03	177.2	9 57.6	1.0 03	177.2	9 27.7	1.0 03	177.2	8 57.7	1.0 03	177.2	8 27.7	1.0 03	177.2	3
4	11 55.7	1.0 04	176.2	11 25.8	1.0 04	176.2	10 55.8	1.0 04	176.2	10 25.8	1.0 04	176.2	9 55.8	1.0 04	176.2	9 25.8	1.0 04	176.3	8 55.9	1.0 04	176.3	8 25.9	1.0 04	176.3	4
05	11 53.3	1.0 05	175.2	11 23.4	1.0 05	175.2	10 53.4	1.0 05	175.2	10 23.4	1.0 05	175.3	9 53.5	1.0 05	175.3	9 23.5	1.0 05	175.3	8 53.5	1.0 05	175.3	8 23.6	1.0 05	175.4	05
6	11 50.4	1.0 06	174.2	11 20.5	1.0 06	174.3	10 50.5	1.0 06	174.3	10 20.6	1.0 06	174.3	9 50.6	1.0 06	174.4	9 20.7	1.0 06	174.4	8 50.7	1.0 06	174.4	8 20.7	1.0 06	174.4	6
7	11 47.0	1.0 07	173.3	11 17.0	1.0 07	173.3	10 47.1	1.0 07	173.3	10 17.2	1.0 07	173.4	9 47.2	1.0 06	173.4	9 17.3	1.0 06	173.4	8 47.3	1.0 06	173.5	8 17.4	1.0 06	173.5	7
8	11 43.0	1.0 08	172.3	11 13.1	1.0 08	172.4	10 43.1	1.0 07	172.4	10 13.2	1.0 07	172.4	9 43.3	1.0 07	172.5	9 13.4	1.0 07	172.5	8 43.5	1.0 07	172.6	8 13.6	1.0 07	172.6	8
9	11 38.5	1.0 08	171.4	11 08.6	1.0 08	171.4	10 38.7	1.0 08	171.5	10 08.8	1.0 08	171.5	9 38.9	1.0 08	171.5	9 09.0	1.0 08	171.6	8 39.1	1.0 08	171.6	8 09.2	1.0 08	171.7	9
10	11 33.4	1.0 09	170.4	11 03.6	1.0 09	170.5	10 33.7	1.0 09	170.5	10 03.8	1.0 09	170.6	9 34.0	1.0 09	170.6	9 04.1	1.0 09	170.7	8 34.2	1.0 09	170.7	8 04.4	1.0 09	170.7	10
1	11 27.9	99 10	169.5	10 58.0	99 10	169.5	10 28.2	99 10	169.6	9 58.4	99 10	169.6	9 28.5	99 10	169.7	8 58.7	99 10	169.7	8 28.8	99 10	169.8	7 59.0	99 10	169.8	1
2	11 21.8	99 11	168.5	10 52.0	99 11	168.6	10 22.2	99 11	168.6	9 52.4	99 11	168.7	9 22.6	99 11	168.7	8 52.7	99 11	168.8	8 22.9	99 11	168.8	7 53.1	99 11	168.9	2
3	11 15.2	99 12	167.6	10 45.4	99 12	167.6	10 15.6	99 12	167.7	9 45.9	99 12	167.7	9 16.1	99 12	167.8	8 46.3	99 12	167.9	8 16.5	99 12	167.9	7 46.7	99 11	168.0	3
4	11 08.1	99 13	166.6	10 38.4	99 13	166.7	10 08.6	99 13	166.7	9 38.9	99 13	166.8	9 09.1	99 12	166.9	8 39.4	99 12	166.9	8 09.6	99 12	167.0	7 39.9	99 12	167.1	4
15	11 00.5	99 14	165.7	10 30.8	99 14	165.7	10 01.1	99 13	165.8	9 31.4	99 13	165.9	9 01.6	99 13	165.9	8 31.9	99 13	166.0	8 02.2	99 13	166.1	7 32.5	99 13	166.1	15
6	10 52.3	99 14	164.7	10 22.7	99 14	164.8	9 53.0	99 14	164.9	9 23.3	99 14	164.9	8 53.7	99 14	165.0	8 24.0	99 14	165.1	7 54.3	99 14	165.2	7 24.7	99 14	165.2	6
7	10 43.7	99 15	163.8	10 14.1	99 15	163.8	9 44.5	99 15	163.9	9 14.8	99 15	164.0	8 45.2	99 15	164.1	8 15.6	99 15	164.2	7 45.9	99 15	164.2	7 16.3	99 15	164.3	7
8	10 34.6	99 16	162.8	10 05.0	99 16	162.9	9 35.4	99 16	163.0	9 05.8	99 16	163.1	8 36.2	99 16	163.2	8 06.6	99 16	163.2	7 37.1	99 16	163.3	7 07.5	99 16	163.4	8
9	10 24.9	98 17	161.9	9 55.4	98 17	162.0	9 25.8	98 17	162.1	8 56.3	98 17	162.1	8 26.8	98 17	162.2	7 57.2	98 16	162.3	7 27.7	98 16	162.4	6 58.1	98 16	162.5	9
20	10 14.8	98 18	160.9	9 45.3	98 18	161.0	9 15.8	98 18	161.1	8 46.3	98 17	161.2	8 16.8	98 17	161.3	7 47.3	98 17	161.4	7 17.8	98 17	161.5	6 48.3	98 17	161.6	20
1	10 04.2	98 19	160.0	9 34.7	98 18	160.1	9 05.3	98 18	160.2	8 35.8	98 18	160.3	8 06.4	98 18	160.4	7 36.9	98 18	160.5	7 07.5	98 18	160.6	6 38.1	98 18	160.7	1
2	9 53.0	98 19	159.1	9 23.6	98 19	159.2	8 54.3	98 19	159.3	8 24.9	98 19	159.4	7 55.5	98 19	159.5	7 26.1	98 19	159.6	6 56.7	98 19	159.7	6 27.3	98 19	159.8	2
3	9 41.4	98 20	158.1	9 12.1	98 20	158.2	8 42.8	98 20	158.3	8 13.4	98 20	158.4	7 44.1	98 20	158.6	7 14.8	98 20	158.7	6 45.4	98 20	158.8	6 16.1	98 19	158.9	3
4	9 29.3	98 21	157.2	9 00.1	98 21	157.3	8 30.8	98 21	157.4	8 01.5	98 21	157.5	7 32.2	98 21	157.6	7 03.0	98 20	157.8	6 33.7	98 20	157.9	6 04.4	98 20	158.0	4
25	9 16.8	97 22	156.3	8 47.6	97 22	156.4	8 18.4	97 22	156.5	7 49.1	97 21	156.6	7 19.9	97 21	156.7	6 50.7	97 21	156.8	6 21.5	97 21	157.0	5 52.2	97 21	157.1	25
6	9 03.8	97 22	155.3	8 34.6	97 22	155.5	8 05.4	97 22	155.6	7 36.3	97 22	155.7	7 07.1	97 22	155.8	6 37.9	97 22	155.9	6 08.8	97 22	156.1	5 39.6	97 22	156.2	6
7	8 50.3	97 23	154.4	8 21.2	97 23	154.5	7 52.1	97 23	154.7	7 23.0	97 23	154.8	6 53.9	97 23	154.9	6 24.8	97 23	155.0	5 55.6	97 23	155.2	5 26.5	97 23	155.3	7
8	8 36.3	97 24	153.5	8 07.3	97 24	153.6	7 38.2	97 24	153.8	7 09.2	97 24	153.9	6 40.2	97 24	154.0	6 11.1	97 23	154.1	5 42.1	97 23	154.3	5 13.0	97 23	154.4	8
9	8 21.9	97 25	152.6	7 52.9	97 25	152.7	7 23.9	97 25	152.8	6 55.0	97 24	153.0	6 26.0	97 24	153.1	5 57.0	97 24	153.2	5 28.0	97 24	153.4				9
30	8 07.0	96 26	151.7	7 38.1	96 25	151.8	7 09.2	96 25	151.9	6 40.3	96 25	152.1	6 11.4	96 25	152.2	5 42.5	96 25	152.3	5 13.6	96 25	152.5				30
1	7 51.7	96 26	150.8	7 22.9	96 26	150.9	6 54.0	96 26	151.0	6 25.2	96 26	151.2	5 56.3	96 26	151.3	5 27.5	96 26	151.4							1
2	7 36.0	96 27	149.8	7 07.2	96 27	150.0	6 38.4	96 27	150.1	6 09.6	96 27	150.3	5 40.9	96 26	150.4	5 12.1	96 26	150.6							2
3	7 19.8	96 28	148.9	6 51.1	96 28	149.1	6 22.4	96 27	149.2	5 53.7	96 27	149.4	5 24.9	96 27	149.5										3
4	7 03.2	95 28	148.0	6 34.5	95 28	148.2	6 05.9	95 28	148.3	5 37.2	95 28	148.5	5 08.6	95 28	148.6										4
35	6 46.1	95 29	147.1	6 17.5	95 29	147.3	5 49.0	95 29	147.4	5 20.4	95 29	147.6													35
6	6 28.6	95 30	146.2	6 00.1	95 30	146.4	5 31.7	95 30	146.5	5 03.2	95 29	146.7													6
7	6 10.8	95 30	145.3	5 42.3	95 30	145.5	5 13.9	95 30	145.7																7
8	5 52.5	94 31	144.4	5 24.1	94 31	144.6																			8
9	5 33.8	94 32	143.5	5 05.5	94 32	143.7																			9
40	5 14.7	94 32	142.7																						40

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	16 20.5	83 52	78.3	16 45.5	83 52	78.0	17 10.5	83 52	77.7	17 35.4	83 52	77.4	18 00.3	83 52	77.1	18 25.2	83 52	76.8	18 50.1	83 51	76.5	19 15.0	83 51	76.2	91
2	15 49.4	83 52	77.5	16 14.4	83 52	77.2	16 39.4	83 52	76.9	17 04.4	83 51	76.6	17 29.4	83 51	76.3	17 54.3	83 51	76.0	18 19.2	83 51	75.7	18 44.1	83 51	75.4	2
3	15 18.4	84 51	76.6	15 43.5	84 51	76.4	16 08.5	83 51	76.1	16 33.6	83 51	75.8	16 58.6	83 51	75.5	17 23.5	83 51	75.2	17 48.5	83 51	74.9	18 13.4	83 51	74.6	3
4	14 47.5	84 51	75.8	15 12.6	84 51	75.5	15 37.7	84 51	75.3	16 02.8	84 51	75.0	16 27.8	83 51	74.7	16 52.9	83 51	74.4	17 17.8	83 51	74.1	17 42.8	83 51	73.8	4
95	14 16.8	84 51	75.0	14 41.9	84 51	74.7	15 07.0	84 51	74.4	15 32.1	84 51	74.2	15 57.2	84 51	73.9	16 22.3	84 51	73.6	16 47.3	83 51	73.3	17 12.3	83 51	73.0	95
6	13 46.1	84 51	74.2	14 11.3	84 51	73.9	14 36.5	84 51	73.6	15 01.6	84 51	73.4	15 26.7	84 51	73.1	15 51.9	84 50	72.8	16 16.9	84 50	72.5	16 42.0	84 50	72.2	6
7	13 15.6	84 51	73.4	13 40.8	84 51	73.1	14 06.0	84 50	72.8	14 31.2	84 50	72.5	14 56.4	84 50	72.3	15 21.6	84 50	72.0	15 46.7	84 50	71.7	16 11.8	84 50	71.4	7
8	12 45.2	84 50	72.6	13 10.5	84 50	72.3	13 35.7	84 50	72.0	14 01.0	84 50	71.7	14 26.2	84 50	71.5	14 51.4	84 50	71.2	15 16.6	84 50	70.9	15 41.7	84 50	70.6	8
9	12 14.9	84 50	71.8	12 40.2	84 50	71.5	13 05.5	84 50	71.2	13 30.8	84 50	70.9	13 56.1	84 50	70.7	14 21.4	84 50	70.4	14 46.6	84 50	70.1	15 11.8	84 50	69.8	9
100	11 44.8	85 50	70.9	12 10.2	85 50	70.7	12 35.5	85 50	70.4	13 00.9	84 50	70.1	13 26.2	84 50	69.8	13 51.5	84 50	69.6	14 16.8	84 49	69.3	14 42.0	84 49	69.0	100
1	11 14.8	85 50	70.1	11 40.2	85 50	69.9	12 05.6	85 50	69.6	12 31.0	85 49	69.3	12 56.4	85 49	69.0	13 21.8	85 49	68.8	13 47.1	84 49	68.5	14 12.4	84 49	68.2	1
2	10 45.0	85 49	69.3	11 10.5	85 49	69.1	11 35.9	85 49	68.8	12 01.4	85 49	68.5	12 26.8	85 49	68.2	12 52.2	85 49	68.0	13 17.6	85 49	67.7	13 43.0	85 49	67.4	2
3	10 15.3	85 49	68.5	10 40.8	85 49	68.2	11 06.4	85 49	68.0	11 31.9	85 49	67.7	11 57.4	85 49	67.4	12 22.8	85 49	67.2	12 48.3	85 49	66.9	13 13.7	85 48	66.6	3
4	9 45.8	85 49	67.7	10 11.4	85 49	67.4	10 37.0	85 49	67.2	11 02.5	85 49	66.9	11 28.1	85 48	66.6	11 53.6	85 48	66.4	12 19.1	85 48	66.1	12 44.6	85 48	65.8	4
105	9 16.5	85 49	66.9	9 42.1	85 48	66.6	10 07.8	85 48	66.4	10 33.4	85 48	66.1	10 59.0	85 48	65.8	11 24.6	85 48	65.6	11 50.2	85 48	65.3	12 15.7	85 48	65.0	105
6	8 47.3	86 48	66.1	9 13.0	86 48	65.8	9 38.7	86 48	65.5	10 04.4	86 48	65.3	10 30.1	86 48	65.0	10 55.7	85 48	64.8	11 21.4	85 48	64.5	11 47.0	85 48	64.2	6
7	8 18.4	86 48	65.3	8 44.1	86 48	65.0	9 09.9	86 48	64.7	9 35.6	86 48	64.5	10 01.3	86 48	64.2	10 27.1	86 47	64.0	10 52.8	86 47	63.7	11 18.5	86 47	63.4	7
8	7 49.6	86 48	64.4	8 15.4	86 48	64.2	8 41.2	86 47	63.9	9 07.0	86 47	63.7	9 32.8	86 47	63.4	9 58.6	86 47	63.1	10 24.4	86 47	62.9	10 50.1	86 47	62.6	8
9	7 21.0	86 47	63.6	7 46.9	86 47	63.4	8 12.8	86 47	63.1	8 38.6	86 47	62.9	9 04.5	86 47	62.6	9 30.3	86 47	62.3	9 56.2	86 47	62.1	10 22.0	86 47	61.8	9
110	6 52.6	87 47	62.8	7 18.6	86 47	62.5	7 44.5	86 47	62.3	8 10.4	86 47	62.0	8 36.4	86 47	61.8	9 02.3	86 46	61.5	9 28.2	86 46	61.3	9 54.1	86 46	61.0	110
1	6 24.4	87 47	62.0	6 50.5	87 46	61.7	7 16.5	87 46	61.5	7 42.5	87 46	61.2	8 08.4	87 46	61.0	8 34.4	87 46	60.7	9 00.4	87 46	60.5	9 26.4	87 46	60.2	1
2	5 56.5	87 46	61.2	6 22.6	87 46	60.9	6 48.6	87 46	60.7	7 14.7	87 46	60.4	7 40.8	87 46	60.2	8 06.8	87 46	59.9	8 32.8	87 46	59.7	8 58.9	87 45	59.4	2
3	5 28.7	87 46	60.3	5 54.9	87 46	60.1	6 21.0	87 46	59.8	6 47.2	87 46	59.6	7 13.3	87 45	59.4	7 39.4	87 45	59.1	8 05.5	87 45	58.9	8 31.6	87 45	58.6	3
4	5 01.2	87 46	59.5	5 27.4	87 45	59.3	5 53.7	87 45	59.0	6 19.9	87 45	58.8	6 46.1	87 45	58.5	7 12.2	87 45	58.3	7 38.4	87 45	58.0	8 04.6	87 45	57.8	4
115				5 00.2	88 45	58.4	5 26.5	88 45	58.2	5 52.8	88 45	58.0	6 19.1	88 45	57.7	6 45.3	88 44	57.5	7 11.6	88 44	57.2	7 37.8	87 44	57.0	115
6										5 26.0	88 44	57.1	5 52.3	88 44	56.9	6 18.6	88 44	56.7	6 45.0	88 44	56.4	7 11.3	88 44	56.2	6
7													5 25.8	88 44	56.1	5 52.2	88 44	55.8	6 18.6	88 44	55.6	6 45.0	88 43	55.4	7
8																5 26.0	88 43	55.0	5 52.5	88 43	54.8	6 19.0	88 43	54.6	8
9																5 00.1	89 43	54.2	5 26.6	89 43	54.0	5 53.2	88 42	53.7	9
120																			5 01.1	89 42	53.2	5 27.7	89 42	52.9	120
1																						5 02.5	89 42	52.1	1

Digitized by Google

La 59

Lat. 58°

H.A.	24° 00′ Alt. (° ′)	Δd Δt	Az. (°)	24° 30′ Alt. (° ′)	Δd Δt	Az. (°)	25° 00′ Alt. (° ′)	Δd Δt	Az. (°)	25° 30′ Alt. (° ′)	Δd Δt	Az. (°)
00	56 00.0	1.0 01	180.0	56 30.0	1.0 01	180.0	57 00.0	1.0 01	180.0	57 30.0	1.0 01	180.0
1	55 59.5	1.0 02	178.4	56 29.5	1.0 02	178.4	56 59.5	1.0 02	178.3	57 29.5	1.0 02	178.3
2	55 58.2	1.0 04	176.7	56 28.2	1.0 04	176.7	56 58.2	1.0 04	176.7	57 28.1	1.0 04	176.6
3	55 55.9	1.0 06	175.1	56 25.9	1.0 05	175.1	56 55.8	1.0 05	175.0	57 25.8	1.0 05	175.0
4	55 52.8	1.0 07	173.5	56 22.7	1.0 07	173.4	56 52.6	1.0 07	173.4	57 22.6	1.0 07	173.3
05	55 48.7	1.0 08	171.9	56 18.6	1.0 08	171.8	56 48.5	1.0 08	171.7	57 18.4	1.0 08	171.6
6	55 43.8	1.0 10	170.2	56 13.6	1.0 10	170.1	56 43.5	99 10	170.1	57 13.3	99 10	170.0
7	55 37.9	99 11	168.6	56 07.7	99 11	168.5	56 37.5	99 11	168.4	57 07.3	99 11	168.3
8	55 31.2	99 13	167.0	56 01.0	99 13	166.9	56 30.7	99 13	166.8	57 00.4	99 13	166.7
9	55 23.6	99 14	165.4	55 53.3	99 14	165.3	56 23.0	99 14	165.2	56 52.6	99 14	165.0
10	55 15.2	99 15	163.8	55 44.8	99 16	163.7	56 14.4	99 16	163.5	56 44.0	99 16	163.4
1	55 05.9	98 17	162.3	55 35.5	98 17	162.1	56 05.0	98 17	161.9	56 34.5	98 17	161.8
2	54 55.8	98 18	160.7	55 25.3	98 18	160.5	55 54.7	98 18	160.4	56 24.1	98 19	160.2
3	54 44.9	98 20	159.1	55 14.3	98 20	159.0	55 43.6	98 20	158.8	56 12.9	98 20	158.6
4	54 33.2	98 21	157.6	55 02.5	97 21	157.4	55 31.7	97 21	157.2	56 00.9	97 21	157.0
15	54 20.7	97 22	156.1	54 49.8	97 22	155.9	55 19.0	97 22	155.7	55 48.1	97 23	155.4
6	54 07.4	97 23	154.6	54 36.5	97 24	154.3	55 05.5	97 24	154.1	55 34.5	97 24	153.9
7	53 53.4	96 25	153.1	54 22.3	96 25	152.8	54 51.2	96 25	152.6	55 20.1	96 25	152.4
8	53 38.6	96 26	151.6	54 07.4	96 26	151.3	54 36.2	96 26	151.1	55 05.0	96 26	150.8
9	53 23.1	96 27	150.1	53 51.8	96 27	149.8	54 20.5	96 27	149.6	54 49.1	95 28	149.3
20	53 06.9	95 28	148.6	53 35.5	95 28	148.4	54 04.0	95 29	148.1	54 32.6	95 29	147.8
1	52 50.0	95 29	147.2	53 18.5	95 29	146.9	53 46.9	95 30	146.7	54 15.3	95 30	146.4
2	52 32.4	95 30	145.8	53 00.8	94 31	145.5	53 29.1	94 31	145.2	53 57.4	94 31	144.9
3	52 14.2	94 31	144.3	52 42.4	94 32	144.1	53 10.6	94 32	143.8	53 38.8	94 32	143.5
4	51 55.4	94 32	143.0	52 23.5	94 33	142.7	52 51.5	93 33	142.4	53 19.5	93 33	142.1
25	51 35.9	93 33	141.6	52 03.9	93 34	141.3	52 31.8	93 34	141.0	52 59.7	93 34	140.7
6	51 15.9	93 34	140.2	51 43.7	93 35	139.9	52 11.5	93 35	139.6	52 39.2	92 35	139.3
7	50 55.2	92 35	138.9	51 22.9	92 36	138.6	51 50.6	92 36	138.2	52 18.2	92 36	137.9
8	50 34.0	92 36	137.5	51 01.6	92 36	137.2	51 29.1	92 37	136.9	51 56.6	91 37	136.6
9	50 12.3	92 37	136.2	50 39.8	91 37	135.9	51 07.2	91 38	135.6	51 34.5	91 38	135.2
30	49 50.0	91 38	134.9	50 17.4	91 38	134.6	50 44.6	91 38	134.3	51 11.9	91 39	133.9
1	49 27.3	91 39	133.6	49 54.5	91 39	133.3	50 21.6	90 39	133.0	50 48.7	90 39	132.6
2	49 04.0	90 40	132.4	49 31.1	90 40	132.0	49 58.1	90 40	131.7	50 25.1	90 40	131.4
3	48 40.3	90 40	131.1	49 07.3	90 40	130.8	49 34.1	90 41	130.4	50 01.0	89 41	130.1
4	48 16.1	90 41	129.9	48 43.0	89 41	129.5	49 09.7	89 41	129.2	49 36.4	89 42	128.8
35	47 51.5	89 42	128.7	48 18.2	89 42	128.3	48 44.9	89 42	128.0	49 11.5	89 42	127.6
6	47 26.5	89 42	127.4	47 53.1	89 43	127.1	48 19.6	88 43	126.8	48 46.1	88 43	126.4
7	47 01.0	88 43	126.3	47 27.5	88 43	125.9	47 53.9	88 43	125.6	48 20.3	88 44	125.2
8	46 35.2	88 44	125.1	47 01.6	88 44	124.7	47 27.9	88 44	124.4	47 54.1	87 44	124.0
9	46 09.0	88 44	123.9	46 35.2	87 44	123.6	47 01.4	87 45	123.2	47 27.6	87 45	122.8
40	45 42.4	87 45	122.8	46 08.6	87 45	122.4	46 34.7	87 45	122.1	47 00.7	87 45	121.7
1	45 15.5	87 45	121.6	45 41.6	87 46	121.3	46 07.6	87 46	120.9	46 33.5	86 46	120.6
2	44 48.3	87 46	120.5	45 14.2	86 46	120.2	45 40.1	86 46	119.8	46 05.9	86 46	119.4
3	44 20.7	86 46	119.4	44 46.6	86 47	119.0	45 12.4	86 47	118.7	45 38.1	86 47	118.3
4	43 52.9	86 47	118.3	44 18.6	86 47	117.9	44 44.3	86 47	117.6	45 10.0	85 47	117.2
45	43 24.8	86 47	117.2	43 50.4	85 48	116.9	44 16.0	85 48	116.5	44 41.5	85 48	116.1
6	42 56.3	85 48	116.2	43 21.9	85 48	115.8	43 47.4	85 48	115.4	44 12.9	85 48	115.1
7	42 27.7	85 48	115.1	42 53.2	85 48	114.7	43 18.6	85 48	114.4	43 43.9	84 49	114.0
8	41 58.8	85 49	114.0	42 24.2	85 49	113.7	42 49.5	84 49	113.3	43 14.8	84 49	113.0
9	41 29.6	85 49	113.0	41 54.9	84 49	112.6	42 20.2	84 49	112.3	42 45.4	84 49	111.9
50	41 00.2	84 49	112.0	41 25.5	84 49	111.6	41 50.7	84 50	111.3	42 15.8	84 50	110.9
1	40 30.6	84 50	111.0	40 55.8	84 50	110.6	41 20.9	84 50	110.2	41 46.0	83 50	109.9
2	40 00.9	84 50	110.0	40 26.0	84 50	109.6	40 51.0	83 50	109.2	41 16.0	83 50	108.9
3	39 30.9	84 50	109.0	39 55.9	83 50	108.6	40 20.9	83 50	108.2	40 45.8	83 51	107.9
4	39 00.7	83 51	108.0	39 25.7	83 51	107.6	39 50.6	83 51	107.3	40 15.5	83 51	106.9
55	38 30.4	83 51	107.0	38 55.3	83 51	106.6	39 20.2	83 51	106.3	39 45.0	83 51	105.9
6	37 59.9	83 51	106.0	38 24.8	83 51	105.7	38 49.6	83 51	105.3	39 14.3	82 51	105.0
7	37 29.3	83 51	105.1	37 54.1	83 51	104.7	38 18.9	82 51	104.4	38 43.5	82 52	104.0
8	36 58.5	83 52	104.1	37 23.3	82 52	103.8	37 48.0	82 52	103.4	38 12.6	82 52	103.1
9	36 27.6	83 52	103.2	36 52.3	82 52	102.8	37 17.0	82 52	102.5	37 41.6	82 52	102.1
60	35 56.6	82 52	102.3	36 21.3	82 52	101.9	36 45.9	82 52	101.5	37 10.5	82 52	101.2
1	35 25.5	82 52	101.3	35 50.1	82 52	101.0	36 14.7	82 52	100.6	36 39.2	82 52	100.3
2	34 54.3	82 52	100.4	35 18.9	82 52	100.1	35 43.4	82 52	99.7	36 07.9	82 52	99.3
3	34 22.9	82 52	99.5	34 47.5	82 52	99.1	35 12.0	82 52	98.8	35 36.5	81 52	98.4
4	33 51.5	82 52	98.6	34 16.1	82 52	98.2	34 40.6	82 53	97.9	35 05.0	81 53	97.5
65	33 20.1	82 53	97.7	33 44.6	82 53	97.3	34 09.0	81 53	97.0	34 33.4	81 53	96.6
6	32 48.5	82 53	96.8	33 13.0	82 53	96.5	33 37.5	81 53	96.1	34 01.8	81 53	95.8
7	32 16.9	82 53	95.9	32 41.4	81 53	95.6	33 05.8	81 53	95.2	33 30.2	81 53	94.9
8	31 45.3	82 53	95.0	32 09.7	81 53	94.7	32 34.1	81 53	94.4	32 58.5	81 53	94.0
9	31 13.6	82 53	94.2	31 38.0	81 53	93.8	32 02.4	81 53	93.5	32 26.7	81 53	93.1
70	30 41.9	82 53	93.3	31 06.3	81 53	93.0	31 30.7	81 53	92.6	31 55.0	81 53	92.3
1	30 10.1	81 53	92.4	30 34.5	81 53	92.1	30 58.9	81 53	91.8	31 23.2	81 53	91.4
2	29 38.3	81 53	91.6	30 02.7	81 53	91.2	30 27.1	81 53	90.9	30 51.4	81 53	90.6
3	29 06.5	81 53	90.7	29 30.9	81 53	90.4	29 55.3	81 53	90.1	30 19.6	81 53	89.7
4	28 34.7	81 53	89.9	28 59.2	81 53	89.5	29 23.5	81 53	89.2	29 47.8	81 53	88.9
75	28 02.9	81 53	89.0	28 27.4	81 53	88.7	28 51.7	81 53	88.4	29 16.0	81 53	88.0
6	27 31.2	81 53	88.2	27 55.6	81 53	87.9	28 20.0	81 53	87.5	28 44.3	81 53	87.2
7	26 59.4	82 53	87.3	27 23.8	81 53	87.0	27 48.2	81 53	86.7	28 12.5	81 53	86.4
8	26 27.6	82 53	86.5	26 52.1	81 53	86.2	27 16.5	81 53	85.9	27 40.8	81 53	85.5
9	25 55.9	82 53	85.7	26 20.4	81 53	85.4	26 44.8	81 53	85.0	27 09.1	81 53	84.7
80	25 24.2	82 53	84.9	25 48.7	81 53	84.5	26 13.1	81 53	84.2	26 37.5	81 53	83.9
1	24 52.6	82 53	84.0	25 17.1	82 53	83.7	25 41.5	81 53	83.4	26 05.9	81 53	83.1
2	24 21.0	82 53	83.2	24 45.5	82 53	82.9	25 10.0	81 52	82.6	25 34.4	81 52	82.3
3	23 49.4	82 52	82.4	24 14.0	82 52	82.1	24 38.5	82 52	81.8	25 02.9	81 52	81.4
4	23 18.0	82 52	81.6	23 42.5	82 52	81.3	24 07.0	82 52	80.9	24 31.5	82 52	80.6
85	22 46.5	82 52	80.8	23 11.1	82 52	80.5	23 35.7	82 52	80.1	24 00.2	82 52	79.8
6	22 15.2	82 52	80.0	22 39.8	82 52	79.6	23 04.4	82 52	79.3	23 28.9	82 52	79.0
7	21 43.9	82 52	79.1	22 08.6	82 52	78.8	22 33.2	82 52	78.5	22 57.7	82 52	78.2
8	21 12.7	82 52	78.3	21 37.4	82 52	78.0	22 02.1	82 52	77.7	22 26.7	82 52	77.4
9	20 41.7	82 52	77.5	21 06.4	82 52	77.2	21 31.0	82 52	76.9	21 55.7	82 51	76.6
90	20 10.7	83 52	76.7	20 35.4	82 51	76.4	21 00.1	82 51	76.1	21 24.8	82 51	75.8

H.A.	26° 00′ Alt. (° ′)	Δd Δt	Az. (°)	26° 30′ Alt. (° ′)	Δd Δt	Az. (°)	27° 00′ Alt. (° ′)	Δd Δt	Az. (°)	27° 30′ Alt. (° ′)	Δd Δt	Az. (°)	H.A.
00	58 00.0	1.0 01	180.0	58 30.0	1.0 01	180.0	59 00.0	1.0 01	180.0	59 30.0	1.0 01	180.0	00
1	57 59.5	1.0 02	178.3	58 29.5	1.0 02	178.3	58 59.5	1.0 02	178.3	59 29.5	1.0 02	178.3	1
2	57 58.1	1.0 04	176.6	58 28.1	1.0 04	176.6	58 58.1	1.0 04	176.5	59 28.1	1.0 04	176.5	2
3	57 55.8	1.0 05	174.9	58 25.7	1.0 06	174.9	58 55.7	1.0 06	174.8	59 25.6	1.0 06	174.8	3
4	57 52.5	1.0 07	173.2	58 22.4	1.0 07	173.2	58 52.3	1.0 07	173.1	59 22.3	1.0 07	173.0	4
05	57 48.3	1.0 09	171.5	58 18.2	1.0 09	171.5	58 48.0	1.0 09	171.4	59 17.9	1.0 09	171.3	05
6	57 43.1	99 10	169.9	58 13.0	99 10	169.8	58 42.8	99 10	169.7	59 12.6	99 10	169.6	6
7	57 37.1	99 12	168.2	58 06.9	99 12	168.1	58 36.6	99 12	168.0	59 06.4	99 12	167.8	7
8	57 30.1	99 13	166.5	57 59.8	99 13	166.4	58 29.6	99 13	166.3	58 59.2	99 13	166.1	8
9	57 22.3	99 15	164.9	57 51.9	99 15	164.7	58 21.6	99 15	164.6	58 51.2	99 15	164.4	9
10	57 13.6	99 16	163.2	57 43.1	99 16	163.1	58 12.7	98 16	162.9	58 42.2	98 16	162.8	10
1	57 04.0	98 17	161.6	57 33.4	98 18	161.4	58 02.9	98 18	161.3	58 32.3	98 18	161.1	1
2	56 53.5	98 19	160.0	57 22.9	98 19	159.8	57 52.2	98 19	159.6	58 21.6	98 19	159.4	2
3	56 42.2	98 20	158.4	57 11.5	98 20	158.2	57 40.7	97 21	158.0	58 10.0	97 21	157.8	3
4	56 30.1	97 22	156.8	56 59.3	97 22	156.6	57 28.4	97 22	156.4	57 57.5	97 22	156.1	4
15	56 17.2	97 23	155.2	56 46.2	97 23	155.0	57 15.3	97 23	154.8	57 44.3	97 23	154.5	15
6	56 03.4	97 24	153.7	56 32.4	96 24	153.4	57 01.3	96 25	153.2	57 30.2	96 25	152.9	6
7	55 49.0	96 25	152.1	56 17.8	96 26	151.9	56 46.6	96 26	151.6	57 15.3	96 26	151.4	7
8	55 33.7	96 27	150.6	56 02.4	96 27	150.3	56 31.1	95 27	150.1	56 59.7	95 27	149.8	8
9	55 17.7	95 28	149.1	55 46.3	96 28	148.8	56 14.8	95 28	148.5	56 43.3	95 28	148.2	9
20	55 01.0	95 29	147.6	55 29.5	95 29	147.3	55 57.9	95 29	147.0	56 26.2	94 30	146.7	20
1	54 43.6	94 30	146.1	55 12.0	94 30	145.8	55 40.2	94 31	145.5	56 08.4	94 31	145.2	1
2	54 25.6	94 31	144.6	54 53.7	94 31	144.3	55 21.9	94 32	144.0	55 50.0	94 32	143.7	2
3	54 06.8	94 32	143.2	54 34.9	93 32	142.9	55 02.9	93 33	142.6	55 30.8	93 33	142.3	3
4	53 47.5	93 33	141.8	54 15.4	93 34	141.5	54 43.2	93 34	141.1	55 11.1	93 34	140.8	4
25	53 27.5	93 34	140.4	53 55.3	92 35	140.0	54 23.0	92 35	139.7	54 50.7	92 35	139.4	25
6	53 06.9	92 35	139.0	53 34.6	92 35	138.6	54 02.1	92 36	138.3	54 29.7	92 36	138.0	6
7	52 45.8	92 36	137.6	53 13.3	92 36	137.3	53 40.7	91 37	136.9	54 08.1	91 37	136.6	7
8	52 24.0	91 37	136.2	52 51.4	91 37	135.9	53 18.7	91 38	135.6	53 46.0	91 38	135.2	8
9	52 01.8	91 38	134.9	52 29.0	91 38	134.6	52 56.2	90 38	134.2	53 23.3	90 39	133.9	9
30	51 39.0	90 39	133.6	52 06.1	90 39	133.2	52 33.1	90 39	132.9	53 00.1	90 39	132.5	30
1	51 15.7	90 40	132.3	51 42.7	90 40	131.9	52 09.6	90 40	131.6	52 36.4	89 40	131.2	1
2	50 52.0	90 40	131.0	51 18.8	89 41	130.6	51 45.6	89 41	130.3	52 12.3	89 41	129.9	2
3	50 27.8	89 41	129.7	50 54.5	89 41	129.4	51 21.1	89 42	129.0	51 47.7	88 42	128.6	3
4	50 03.1	89 42	128.5	50 29.7	88 42	128.1	50 56.2	88 42	127.8	51 22.6	88 42	127.4	4
35	49 38.0	88 43	127.3	50 04.4	88 43	126.9	50 30.8	88 43	126.5	50 57.1	88 43	126.1	35
6	49 12.5	88 43	126.0	49 38.8	88 43	125.7	50 05.1	87 44	125.3	50 31.3	87 44	124.9	6
7	48 46.6	88 44	124.8	49 12.8	87 44	124.5	49 38.9	87 44	124.1	50 05.0	87 44	123.7	7
8	48 20.3	87 44	123.6	48 46.4	87 45	123.3	49 12.4	87 45	122.9	49 38.4	86 45	122.5	8
9	47 53.6	87 45	122.5	48 19.6	87 45	122.1	48 45.5	86 45	121.7	49 11.4	86 46	121.3	9
40	47 26.6	86 46	121.3	47 52.5	86 46	120.9	48 18.3	86 46	120.6	48 44.1	86 46	120.2	40
1	46 59.3	86 46	120.2	47 25.1	86 46	119.8	47 50.8	86 46	119.4	48 16.4	85 47	119.0	1
2	46 31.7	86 47	119.1	46 57.4	85 47	118.7	47 22.9	85 47	118.3	47 48.5	85 47	117.9	2
3	46 03.7	85 47	117.9	46 29.3	85 47	117.6	46 54.8	85 47	117.2	47 20.2	85 48	116.8	3
4	45 35.5	85 48	116.8	46 01.0	85 48	116.5	46 26.4	85 48	116.1	46 51.7	84 48	115.7	4
45	45 07.0	85 48	115.8	45 32.4	84 48	115.4	45 57.7	84 48	115.0	46 22.9	84 48	114.6	45
6	44 38.2	84 48	114.7	45 03.5	84 48	114.3	45 28.8	84 49	113.9	45 53.9	84 49	113.5	6
7	44 09.2	84 49	113.6	44 34.4	84 49	113.2	44 59.6	84 49	112.9	45 24.6	83 49	112.5	7
8	43 40.0	84 49	112.6	44 05.1	84 49	112.2	44 30.2	83 49	111.8	44 55.1	83 50	111.4	8
9	43 10.5	84 49	111.5	43 35.6	83 50	111.2	44 00.5	83 50	110.8	44 25.4	83 50	110.4	9
50	42 40.8	83 50	110.5	43 05.8	83 50	110.1	43 30.7	83 50	109.8	43 55.5	83 50	109.4	50
1	42 11.0	83 50	109.5	42 35.9	83 50	109.1	43 00.7	83 50	108.7	43 25.4	82 50	108.4	1
2	41 40.9	83 50	108.5	42 05.7	83 50	108.1	42 30.5	82 51	107.7	42 55.2	82 51	107.4	2
3	41 10.7	83 51	107.5	41 35.4	82 51	107.1	42 00.1	82 51	106.7	42 24.8	82 51	106.4	3
4	40 40.3	82 51	106.5	41 05.0	82 51	106.1	41 29.6	82 51	105.8	41 54.2	82 51	105.4	4
55	40 09.7	82 51	105.6	40 34.4	82 51	105.2	40 58.9	82 51	104.8	41 23.4	82 51	104.4	55
6	39 39.0	82 51	104.6	40 03.6	82 51	104.2	40 28.1	82 52	103.8	40 52.6	81 52	103.5	6
7	39 08.2	82 52	103.6	39 32.7	82 52	103.3	39 57.2	81 52	102.9	40 21.6	81 52	102.5	7
8	38 37.2	82 52	102.7	39 01.7	82 52	102.3	39 26.1	81 52	101.9	39 50.5	81 52	101.6	8
9	38 06.1	82 52	101.8	38 30.6	81 52	101.4	38 55.0	81 52	101.0	39 19.3	81 52	100.6	9
60	37 35.0	82 52	100.8	37 59.4	81 52	100.5	38 23.7	81 52	100.1	38 48.0	81 52	99.7	60
1	37 03.7	81 52	99.9	37 28.1	81 52	99.5	37 52.4	81 52	99.2	38 16.6	81 52	98.8	1
2	36 32.3	81 52	99.0	36 56.7	81 52	98.6	37 21.0	81 52	98.3	37 45.2	81 53	97.9	2
3	36 00.9	81 53	98.1	36 25.2	81 53	97.7	36 49.5	81 53	97.4	37 13.6	81 53	97.0	3
4	35 29.4	81 53	97.2	35 53.7	81 53	96.8	36 17.9	81 53	96.5	36 42.1	80 53	96.1	4
65	34 57.8	81 53	96.3	35 22.1	81 53	95.9	35 46.3	81 53	95.6	36 10.4	80 53	95.2	65
6	34 26.2	81 53	95.4	34 50.4	81 53	95.0	35 14.6	81 53	94.7	35 38.7	80 53	94.3	6
7	33 54.5	81 53	94.5	34 18.7	81 53	94.2	34 42.9	80 53	93.8	35 07.0	80 53	93.5	7
8	33 22.8	81 53	93.7	33 47.0	81 53	93.3	34 11.2	80 53	92.9	34 35.3	80 53	92.6	8
9	32 51.0	81 53	92.8	33 15.2	81 53	92.4	33 39.4	80 53	92.1	34 03.5	80 53	91.7	9
70	32 19.3	81 53	91.9	32 43.5	81 53	91.6	33 07.6	80 53	91.2	33 31.7	80 53	90.9	70
1	31 47.5	81 53	91.1	32 11.7	81 53	90.7	32 35.8	80 53	90.4	32 59.9	80 53	90.0	1
2	31 15.7	81 53	90.2	31 39.9	81 53	89.9	32 04.0	80 53	89.5	32 28.1	80 53	89.2	2
3	30 43.9	81 53	89.4	31 08.1	81 53	89.0	31 32.2	80 53	88.7	31 56.3	80 53	88.3	3
4	30 12.1	81 53	88.5	30 36.3	81 53	88.2	31 00.5	80 53	87.8	31 24.6	80 53	87.5	4
75	29 40.3	81 53	87.7	30 04.5	81 53	87.3	30 28.7	80 53	87.0	30 52.8	80 53	86.7	75
6	29 08.6	81 53	86.9	29 32.8	81 53	86.5	29 57.0	80 53	86.2	30 21.1	80 53	85.8	6
7	28 36.8	81 53	86.0	29 01.1	81 53	85.7	29 25.2	81 53	85.4	29 49.4	80 53	85.0	7
8	28 05.1	81 53	85.2	28 29.4	81 53	84.9	28 53.6	81 53	84.5	29 17.7	80 53	84.2	8
9	27 33.5	81 53	84.4	27 57.7	81 53	84.0	28 21.9	81 53	83.7	28 46.1	80 53	83.4	9
80	27 01.8	81 53	83.6	27 26.1	81 53	83.2	27 50.4	81 53	82.9	78 14.6	81 52	82.6	80
1	26 30.3	81 53	82.7	26 54.6	81 52	82.4	27 18.8	81 52	82.1	27 43.1	81 52	81.8	1
2	25 58.8	81 52	81.9	26 23.1	81 52	81.6	26 47.4	81 52	81.3	27 11.6	81 52	80.9	2
3	25 27.3	81 52	81.1	25 51.7	81 52	80.8	26 16.0	81 52	80.5	26 40.3	81 52	80.1	3
4	24 55.9	81 52	80.3	25 20.3	81 52	80.0	25 44.7	81 52	79.7	26 09.0	81 52	79.3	4
85	24 24.6	81 52	79.5	24 49.1	81 52	79.2	25 13.4	81 52	78.9	25 37.8	81 52	78.5	85
6	23 53.4	82 52	78.7	24 17.9	81 52	78.4	24 42.3	81 52	78.1	25 06.7	81 52	77.7	6
7	23 22.3	82 52	77.9	23 46.8	82 52	77.6	24 11.2	81 52	77.3	24 35.6	81 52	76.9	7
8	22 51.2	82 52	77.1	23 15.8	82 52	76.8	23 40.3	82 51	76.5	24 04.7	81 51	76.2	8
9	22 20.3	82 51	76.3	22 44.9	82 51	76.0	23 09.4	82 51	75.7	23 33.9	82 51	75.4	9
90	21 49.5	82 51	75.5	22 14.1	82 51	75.2	22 38.6	82 51	74.9	23 03.2	82 51	74.6	90

Digitized by Google

Lat. 58°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	8 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0	5 00.0	1.0 00	180.0				00
1	7 59.7	1.0 01	179.1	7 29.7	1.0 01	179.1	6 59.7	1.0 01	179.1	6 29.7	1.0 01	179.1	5 59.7	1.0 01	179.1	5 29.8	1.0 01	179.1							1
2	7 59.0	1.0 02	178 2	7 29.0	1.0 02	178.2	6 59.0	1.0 02	178.2	6 29.0	1.0 02	178.2	5 59.0	1.0 02	178.2	5 29.0	1.0 02	178.2							2
3	7 57.7	1.0 03	177.2	7 27.7	1.0 03	177.2	6 57.7	1.0 03	177.3	6 27.7	1.0 03	177.3	5 57.7	1.0 03	177.3	5 27.8	1.0 03	177.3							3
4	7 55.9	1.0 04	176.3	7 25.9	1.0 04	176.3	6 55.9	1.0 04	176.3	6 26.0	1.0 04	176.4	5 56.0	1.0 04	176.4	5 26.0	1.0 04	176.4							4
05	7 53.6	1.0 05	175.4	7 23.6	1.0 05	175.4	6 53.7	1.0 05	175.4	6 23.7	1.0 05	175.5	5 53.7	1.0 05	175.5	5 23.8	1.0 05	175.5							05
6	7 50.8	1.0 06	174.5	7 20.8	1.0 06	174.5	6 50.9	1.0 05	174.5	6 20.9	1.0 05	174.6	5 51.0	1.0 05	174.6	5 21.0	1.0 05	174.6							6
7	7 47.5	1.0 06	173.5	7 17.5	1.0 06	173.6	6 47.6	1.0 06	173.6	6 17.7	1.0 06	173.6	5 47.7	1.0 06	173.7	5 17.8	1.0 06	173.7							7
8	7 43.6	1.0 07	172.6	7 13.7	1.0 07	172.7	6 43.8	1.0 07	172.7	6 13.9	1.0 07	172.7	5 44.0	1.0 07	172.8	5 14.1	1.0 07	172.8							8
9	7 39.3	1.0 08	171.7	7 09.4	1.0 08	171.8	6 39.5	1.0 08	171.8	6 09.6	1.0 08	171.8	5 39.7	1.0 08	171.9	5 09.8	1.0 08	171.9							9
10	7 34.5	1.0 09	170.8	7 04.6	1.0 09	170.8	6 34.7	1.0 09	170.9	6 04.9	1.0 09	170.9	5 35.0	1.0 09	171.0	5 05.1	1.0 09	171.0							10
1	7 29.1	99 10	169.9	6 59.3	99 10	169.9	6 29.5	99 10	170.0	5 59.6	99 10	170.0	5 29.8	99 10	170.1										1
2	7 23.3	99 11	169.0	6 53.5	99 10	169.0	6 23.7	99 10	169.1	5 53.9	99 10	169.1	5 24.0	99 10	169.2										2
3	7 17.0	99 11	168.0	6 47.2	99 11	168.1	6 17.4	99 11	168.2	5 47.6	99 11	168.2	5 17.8	99 11	168.3										3
4	7 10.1	99 12	167.1	6 40.4	99 12	167.2	6 10.6	99 12	167.3	5 40.9	99 12	167.3	5 11.1	99 12	167.4										4
15	7 02.8	99 13	166.2	6 33.1	99 13	166.3	6 03.4	99 13	166.4	5 33.7	99 13	166.4	5 03.9	99 13	166.5										15
6	6 55.0	99 14	165.3	6 25.3	99 14	165.4	5 55.6	99 14	165.5	5 26.0	99 14	165.5													6
7	6 46.7	99 15	164.4	6 17.0	99 15	164.5	5 47.4	99 14	164.6	5 17.8	99 14	164.6													7
8	6 37.9	99 15	163.5	6 08.3	99 15	163.6	5 38.7	99 15	163.7	5 09.1	99 15	163.7													8
9	6 28.6	98 16	162.6	5 59.1	98 16	162.7	5 29.5	98 16	162.8																9
20	6 18.8	98 17	161.7	5 49.3	98 17	161.8	5 19.8	98 17	161.9																20
1	6 08.6	98 18	160.8	5 39.2	98 18	160.9	5 09.7	98 18	161.0																1
2	5 57.9	98 19	159.9	5 28.5	98 19	160.0																			2
3	5 46.7	98 19	159.0	5 17.4	98 19	159.1																			3
4	5 35.1	98 20	158.1	5 05.8	98 20	158.2																			4
25	5 23.0	97 21	157.2																						25
6	5 10.4	97 22	156.3																						6

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	19 39.8	83 51	75.9	20 04.6	83 51	75.6	20 29.3	82 51	75.3	20 54.0	82 51	75.0	21 18.7	82 51	74.7	21 43.4	82 51	74.4	22 08.0	82 51	74.1	22 32.6	82 51	73.8	91
2	19 09.0	83 51	75.1	19 33.8	83 51	74.8	19 58.6	83 51	74.5	20 23.4	83 51	74.2	20 48.1	82 51	73.9	21 12.8	82 51	73.6	21 37.5	82 51	73.3	22 02.1	82 51	73.0	2
3	18 38.3	83 51	74.3	19 03.2	83 51	74.0	19 28.0	83 51	73.7	19 52.8	83 51	73.4	20 17.6	83 51	73.1	20 42.4	82 51	72.8	21 07.1	82 50	72.5	21 31.8	82 50	72.2	3
4	18 07.8	83 51	73.5	18 32.7	83 51	73.2	18 57.6	83 51	72.9	19 22.4	83 50	72.6	19 47.3	83 50	72.3	20 12.1	83 50	72.0	20 36.8	83 50	71.7	21 01.6	82 50	71.4	4
95	17 37.3	83 50	72.7	18 02.3	83 50	72.4	18 27.2	83 50	72.1	18 52.1	83 50	71.8	19 17.0	83 50	71.5	19 41.9	83 50	71.3	20 06.7	83 50	71.0	20 31.5	83 50	70.7	95
6	17 07.0	83 50	71.9	17 32.1	83 50	71.6	17 57.0	83 50	71.3	18 22.0	83 50	71.1	18 46.9	83 50	70.8	19 11.8	83 50	70.5	19 36.7	83 50	70.2	20 01.6	83 50	69.9	6
7	16 36.9	84 50	71.1	17 01.9	84 50	70.8	17 27.0	83 50	70.6	17 52.0	83 50	70.3	18 17.0	83 50	70.0	18 42.0	83 50	69.7	19 06.9	83 49	69.4	19 31.8	83 49	69.1	7
8	16 06.9	84 50	70.3	16 32.0	84 50	70.0	16 57.1	84 50	69.8	17 22.2	84 50	69.5	17 47.2	83 49	69.2	18 12.2	83 49	68.9	18 37.2	83 49	68.6	19 02.2	83 49	68.3	8
9	15 37.0	84 50	69.5	16 02.2	84 49	69.3	16 27.3	84 49	69.0	16 52.5	84 49	68.7	17 17.6	84 49	68.4	17 42.6	84 49	68.1	18 07.7	83 49	67.8	18 32.7	83 49	67.5	9
100	15 07.3	84 49	68.7	15 32.5	84 49	68.5	15 57.7	84 49	68.2	16 22.9	84 49	67.9	16 48.1	84 49	67.6	17 13.2	84 49	67.3	17 38.3	84 49	67.0	18 03.4	84 49	66.7	100
1	14 37.7	84 49	67.9	15 03.0	84 49	67.7	15 28.3	84 49	67.4	15 53.5	84 49	67.1	16 18.8	84 49	66.8	16 44.0	84 48	66.5	17 09.1	84 48	66.3	17 34.3	84 48	66.0	1
2	14 08.4	85 49	67.1	14 33.7	84 49	66.9	14 59.0	84 48	66.6	15 24.3	84 48	66.3	15 49.6	84 48	66.0	16 14.9	84 48	65.8	16 40.1	84 48	65.5	17 05.3	84 48	65.2	2
3	13 39.1	85 48	66.4	14 04.6	85 48	66.1	14 29.9	85 48	65.8	14 55.3	85 48	65.5	15 20.7	84 48	65.2	15 46.0	84 48	65.0	16 11.3	84 48	64.7	16 36.6	84 48	64.4	3
4	13 10.1	85 48	65.6	13 35.6	85 48	65.3	14 01.0	85 48	65.0	14 26.5	85 48	64.7	14 51.9	85 48	64.5	15 17.3	85 48	64.2	15 42.6	85 47	63.9	16 08.0	84 47	63.6	4
105	12 41.3	85 48	64.8	13 06.8	85 48	64.5	13 32.3	85 48	64.2	13 57.8	85 47	63.9	14 23.3	85 47	63.7	14 48.7	85 47	63.4	15 14.2	85 47	63.1	15 39.6	85 47	62.8	105
6	12 12.6	85 47	64.0	12 38.2	85 47	63.7	13 03.8	85 47	63.4	13 29.3	85 47	63.2	13 54.9	85 47	62.9	14 20.4	85 47	62.6	14 45.9	85 47	62.3	15 11.4	85 47	62.1	6
7	11 44.1	86 47	63.2	12 09.8	86 47	62.9	12 35.4	85 47	62.6	13 01.1	85 47	62.4	13 26.7	85 47	62.1	13 52.3	85 47	61.8	14 17.9	85 46	61.6	14 43.4	85 46	61.3	7
8	11 15.9	86 47	62.4	11 41.6	86 47	62.1	12 07.3	86 47	61.8	12 33.0	86 46	61.6	12 58.7	86 46	61.3	13 24.4	86 46	61.0	13 50.0	85 46	60.8	14 15.6	85 46	60.5	8
9	10 47.8	86 46	61.6	11 13.6	86 46	61.3	11 39.4	86 46	61.0	12 05.1	86 46	60.8	12 30.9	86 46	60.5	12 56.6	86 46	60.3	13 22.4	86 46	60.0	13 48.1	86 46	59.7	9
110	10 19.9	86 46	60.8	10 45.8	86 46	60.5	11 11.7	86 46	60.2	11 37.5	86 46	60.0	12 03.3	86 46	59.7	12 29.1	86 45	59.5	12 54.9	86 45	59.2	13 20.7	86 45	58.9	110
1	9 52.3	86 46	60.0	10 18.2	86 46	59.7	10 44.2	86 45	59.4	11 10.1	86 45	59.2	11 36.0	86 45	58.9	12 01.9	86 45	58.7	12 27.7	86 45	58.4	12 53.6	86 45	58.2	1
2	9 24.9	87 45	59.2	9 50.9	87 45	58.9	10 16.9	87 45	58.7	10 42.9	87 45	58.4	11 08.9	87 45	58.1	11 34.8	87 45	57.9	12 00.8	86 45	57.6	12 26.7	86 44	57.4	2
3	8 57.7	87 45	58.4	9 23.8	87 45	58.1	9 49.9	87 45	57.9	10 15.9	87 45	57.6	10 42.0	87 44	57.4	11 08.0	87 44	57.1	11 34.0	87 44	56.8	12 00.0	87 44	56.6	3
4	8 30.8	87 45	57.6	8 56.9	87 44	57.3	9 23.1	87 44	57.1	9 49.2	87 44	56.8	10 15.3	87 44	56.6	10 41.4	87 44	56.3	11 07.5	87 44	56.1	11 33.6	87 44	55.8	4
115	8 04.1	87 44	56.7	8 30.3	87 44	56.5	8 56.5	87 44	56.3	9 22.7	87 44	56.0	9 48.9	87 44	55.8	10 15.1	87 43	55.5	10 41.3	87 43	55.3	11 07.4	87 43	55.0	115
6	7 37.6	88 44	55.9	8 03.9	88 44	55.7	8 30.2	88 43	55.5	8 56.5	88 43	55.2	9 22.8	88 43	55.0	9 49.0	88 43	54.7	10 15.3	88 43	54.5	10 41.5	87 43	54.2	6
7	7 11.4	88 43	55.1	7 37.8	88 43	54.9	8 04.1	88 43	54.6	8 30.5	88 43	54.4	8 56.9	88 43	54.2	9 23.2	88 43	53.9	9 49.5	88 42	53.7	10 15.9	88 42	53.4	7
8	6 45.4	88 43	54.3	7 11.9	88 43	54.1	7 38.3	88 43	53.8	8 04.8	88 42	53.6	8 31.2	88 42	53.4	8 57.6	88 42	53.1	9 24.0	88 42	52.9	9 50.5	88 42	52.6	8
9	6 19.7	88 42	53.5	6 46.3	88 42	53.3	7 12.8	88 42	53.0	7 39.3	88 42	52.8	8 05.8	88 42	52.6	8 32.3	88 42	52.3	8 58.8	88 42	52.1	9 25.3	88 41	51.9	9
120	5 54.3	89 42	52.7	6 20.9	89 42	52.5	6 47.5	89 42	52.2	7 14.1	89 42	52.0	7 40.7	89 41	51.8	8 07.3	89 41	51.5	8 33.9	89 41	51.3	9 00.4	89 41	51.1	120
1	5 29.2	89 41	51.9	5 55.8	89 41	51.6	6 22.5	89 41	51.4	6 49.2	89 41	51.2	7 15.9	89 41	51.0	7 42.5	89 41	50.7	8 09.2	89 41	50.5	8 35.9	89 40	50.3	1
2	5 04.3	89 41	51.1	5 31.0	89 41	50.8	5 57.8	89 41	50.6	6 24.6	89 41	50.4	6 51.3	89 40	50.1	7 18.1	89 40	49.9	7 44.8	89 40	49.7	8 11.6	89 40	49.5	2
3				5 06.5	89 40	50.0	5 33.4	89 40	49.8	6 00.2	89 40	49.6	6 27.1	89 40	49.3	6 53.9	89 40	49.1	7 20.7	89 40	48.9	7 47.5	89 40	48.7	3
4							5 09.3	90 40	49.0	5 36.2	90 40	48.8	6 03.1	90 39	48.5	6 30.0	90 39	48.3	6 56.9	90 39	48.1	7 23.8	90 39	47.9	4
125										5 12.4	90 39	47.9	5 39.4	90 39	47.7	6 06.4	90 39	47.5	6 33.4	90 39	47.3	7 00.4	90 39	47.1	125
6													5 16.0	90 38	46.9	5 43.1	90 38	46.7	6 10.2	90 38	46.5	6 37.3	90 38	46.3	6
7																5 20.1	91 38	45.9	5 47.3	91 38	45.7	6 14.4	90 38	45.4	7
8																			5 24.7	91 37	44.9	5 51.9	91 37	44.6	8
9																			5 02.4	91 37	44.0	5 29.8	91 36	43.8	9
130																						5 07.9	91 36	43.0	130

Digitized by Google

Lat. 58°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	60 00.0	1.0 01	180.0	60 30.0	1.0 01	180.0	61 00.0	1.0 01	180.0	62 00.0	1.0 01	180.0
1	59 59.5	1.0 02	178.2	60 29.5	1.0 02	178.2	60 59.5	1.0 02	178.2	61 59.5	1.0 03	178.2
2	59 58.0	1.0 04	176.5	60 28.0	1.0 04	176.4	60 58.0	1.0 04	176.4	61 58.0	1.0 04	176.3
3	59 55.6	1.0 06	174.7	60 25.6	1.0 06	174.7	60 55.5	1.0 06	174.6	61 55.4	1.0 06	174.5
4	59 52.2	1.0 07	173.0	60 22.1	1.0 07	172.9	60 52.0	1.0 07	172.8	61 51.8	1.0 08	172.6
05	59 47.8	1.0 09	171.2	60 17.7	1.0 09	171.1	60 47.5	1.0 09	171.0	61 47.3	1.0 09	170.8
6	59 42.5	99 10	169.5	60 12.3	99 11	169.3	60 42.1	99 11	169.2	61 41.7	99 11	169.0
7	59 36.2	99 12	167.7	60 05.9	99 12	167.6	60 35.7	99 12	167.5	61 35.1	99 13	167.2
8	59 28.9	99 14	166.0	59 58.6	99 14	165.9	60 28.3	99 14	165.7	61 27.6	99 14	165.4
9	59 20.8	99 15	164.3	59 50.4	99 15	164.1	60 20.0	99 15	164.0	61 19.1	98 16	163.6
10	59 11.7	98 17	162.6	59 41.2	98 17	162.4	60 10.7	98 17	162.2	61 09.6	98 17	161.8
1	59 01.7	98 18	160.9	59 31.2	98 18	160.7	60 00.5	98 18	160.5	60 59.3	98 19	160.1
2	58 50.9	98 20	159.2	59 20.2	98 20	159.0	59 49.5	98 20	158.8	60 48.0	97 20	158.3
3	58 39.2	97 21	157.6	59 08.4	97 21	157.3	59 37.5	97 21	157.1	60 35.8	97 22	156.6
4	58 26.6	97 22	155.9	58 55.7	97 23	155.7	59 24.7	97 23	155.4	60 22.8	97 23	154.9
15	58 13.2	97 24	154.3	58 42.2	96 24	154.0	59 11.1	96 24	153.8	60 08.9	96 25	153.2
6	57 59.0	96 25	152.7	58 27.9	96 25	152.4	58 56.7	96 25	152.1	59 54.1	96 26	151.6
7	57 44.1	96 26	151.1	58 12.7	96 26	150.8	58 41.4	95 27	150.5	59 38.6	95 27	149.9
8	57 28.3	95 28	149.5	57 56.9	95 28	149.2	58 25.4	95 28	148.9	59 22.3	95 28	148.3
9	57 11.8	95 29	148.0	57 40.2	95 29	147.7	58 08.6	95 29	147.4	59 05.2	94 30	146.7
20	56 54.6	94 30	146.4	57 22.8	94 30	146.1	57 51.1	94 30	145.8	58 47.4	94 31	145.1
1	56 36.6	94 31	144.9	57 04.8	94 31	144.6	57 32.8	94 32	144.3	58 28.9	93 32	143.6
2	56 18.0	93 32	143.4	56 46.0	93 32	143.1	57 13.9	93 33	142.7	58 09.6	93 33	142.1
3	55 58.7	93 33	141.9	56 26.6	93 33	141.6	56 54.4	93 34	141.3	57 49.8	92 34	140.5
4	55 38.8	92 34	140.5	56 06.5	92 34	140.1	56 34.1	92 35	139.8	57 29.2	92 35	139.1
25	55 18.3	92 35	139.0	55 45.8	92 35	138.7	56 13.3	92 36	138.3	57 08.1	91 36	137.6
6	54 57.1	91 36	137.6	55 24.5	91 36	137.3	55 51.9	91 37	136.9	56 46.4	91 37	136.1
7	54 35.4	91 37	136.2	55 02.7	91 37	135.9	55 29.9	91 38	135.5	56 24.0	90 38	134.7
8	54 13.1	90 38	134.9	54 40.3	90 38	134.5	55 07.3	90 38	134.1	56 01.2	90 39	133.3
9	53 50.3	90 39	133.5	54 17.3	90 39	133.1	54 44.2	90 39	132.7	55 37.8	89 40	132.0
30	53 27.0	90 40	132.2	53 53.8	89 40	131.8	54 20.6	89 40	131.4	55 13.9	89 41	130.6
1	53 03.2	89 40	130.8	53 29.9	89 41	130.5	53 56.5	89 41	130.1	54 49.5	88 41	129.3
2	52 38.9	89 41	129.5	53 05.5	88 41	129.2	53 31.9	88 42	128.8	54 24.7	88 42	127.9
3	52 14.2	88 42	128.3	52 40.6	88 42	127.9	53 06.9	88 42	127.5	53 59.4	87 43	126.7
4	51 49.0	88 43	127.0	52 15.3	88 43	126.6	52 41.5	87 43	126.2	53 33.7	87 44	125.4
35	51 23.4	87 43	125.8	51 49.5	87 44	125.4	52 15.6	87 44	125.0	53 07.5	86 44	124.1
6	50 57.4	87 44	124.5	51 23.4	87 44	124.1	51 49.4	86 44	123.7	52 41.0	86 45	122.9
7	50 31.0	87 45	123.3	50 56.9	86 45	122.9	51 22.7	86 45	122.5	52 14.1	85 45	121.7
8	50 04.2	86 45	122.1	50 30.0	86 45	121.7	50 55.8	86 46	121.3	51 46.9	85 46	120.5
9	49 37.1	86 46	120.9	50 02.8	85 46	120.5	50 28.4	85 46	120.1	51 19.3	85 46	119.3
40	49 09.7	85 46	119.8	49 35.3	85 46	119.4	50 00.8	85 47	119.0	50 51.5	84 47	118.1
1	48 42.0	85 47	118.6	49 07.4	85 47	118.2	49 32.8	84 47	117.8	50 23.3	84 47	117.0
2	48 13.9	85 47	117.5	48 39.3	84 47	117.1	49 04.5	84 48	116.7	49 54.8	83 48	115.9
3	47 45.6	84 48	116.4	48 10.8	84 48	116.0	48 36.0	84 48	115.6	49 26.1	83 48	114.7
4	47 16.9	84 48	115.3	47 42.1	84 48	114.9	48 07.2	83 48	114.5	48 57.0	83 49	113.6
45	46 48.1	84 49	114.2	47 13.1	83 49	113.8	47 38.1	83 49	113.4	48 27.8	83 49	112.6
6	46 19.0	83 49	113.1	46 43.9	83 49	112.7	47 08.8	83 49	112.3	47 58.3	82 50	111.5
7	45 49.6	83 49	112.1	46 14.5	83 49	111.7	46 39.3	83 50	111.3	47 28.6	82 50	110.4
8	45 20.0	83 50	111.0	45 44.8	83 50	110.6	46 09.6	82 50	110.2	46 58.7	82 50	109.4
9	44 50.2	83 50	110.0	45 15.0	82 50	109.6	45 39.6	82 50	109.2	46 28.7	81 50	108.4
50	44 20.3	82 50	109.0	44 44.9	82 50	108.6	45 09.5	82 50	108.2	45 58.4	81 51	107.3
1	43 50.1	82 51	108.0	44 14.7	82 51	107.6	44 39.2	82 51	107.2	45 28.0	81 51	106.3
2	43 19.8	82 51	107.0	43 44.3	82 51	106.6	44 08.8	81 51	106.2	44 57.4	81 51	105.3
3	42 49.3	82 51	106.0	43 13.8	81 51	105.6	43 38.1	81 51	105.2	44 26.6	81 51	104.4
4	42 18.7	81 51	105.0	42 43.1	81 51	104.6	43 07.4	81 51	104.2	43 55.8	80 52	103.4
55	41 47.9	81 52	104.0	42 12.2	81 52	103.6	42 36.5	81 52	103.2	43 24.8	80 52	102.4
6	41 17.0	81 52	103.1	41 41.3	81 52	102.7	42 05.5	81 52	102.3	42 53.7	80 52	101.5
7	40 45.9	81 52	102.1	41 10.2	81 52	101.7	41 34.4	80 52	101.3	42 22.5	80 52	100.5
8	40 14.8	81 52	101.2	40 39.0	81 52	100.8	41 03.1	80 52	100.4	41 51.2	80 52	99.6
9	39 43.6	81 52	100.3	40 07.7	80 52	99.9	40 31.8	80 52	99.5	41 19.8	80 52	98.7
60	39 12.2	81 52	99.3	39 36.4	80 52	98.9	40 00.4	80 52	98.6	40 48.3	80 53	97.8
1	38 40.8	80 52	98.4	39 04.9	80 53	98.0	39 28.9	80 53	97.6	40 16.8	79 53	96.9
2	38 09.3	80 53	97.5	38 33.4	80 53	97.1	38 57.4	80 53	96.7	39 45.2	79 53	96.0
3	37 37.8	80 53	96.6	38 01.8	80 53	96.2	38 25.8	80 53	95.8	39 13.5	79 53	95.1
4	37 06.2	80 53	95.7	37 30.2	80 53	95.3	37 54.1	80 53	95.0	38 41.8	79 53	94.2
65	36 34.5	80 53	94.8	36 58.5	80 53	94.5	37 22.4	80 53	94.1	38 10.1	79 53	93.3
6	36 02.8	80 53	94.0	36 26.8	80 53	93.6	36 50.7	80 53	93.2	37 38.3	79 53	92.4
7	35 31.1	80 53	93.1	35 55.0	80 53	92.7	36 19.0	80 53	92.3	37 06.6	79 53	91.6
8	34 59.3	80 53	92.2	35 23.3	80 53	91.9	35 47.2	80 53	91.5	36 34.8	79 53	90.7
9	34 27.5	80 53	91.4	34 51.5	80 53	91.0	35 15.4	80 53	90.6	36 03.0	79 53	89.9
70	33 55.7	80 53	90.5	34 19.7	80 53	90.1	34 43.6	80 53	89.8	35 31.2	79 53	89.0
1	33 23.9	80 53	89.7	33 47.9	80 53	89.3	34 11.8	80 53	88.9	34 59.4	79 53	88.2
2	32 52.1	80 53	88.8	33 16.1	80 53	88.5	33 40.0	80 53	88.1	34 27.6	79 53	87.4
3	32 20.4	80 53	88.0	32 44.3	80 53	87.6	33 08.2	80 53	87.3	33 55.9	79 53	86.5
4	31 48.6	80 53	87.1	32 12.6	80 53	86.8	32 36.5	80 53	86.4	33 24.2	79 53	85.7
75	31 16.9	80 53	86.3	31 40.8	80 53	86.0	32 04.8	80 53	85.6	32 52.5	79 53	84.9
6	30 45.1	80 53	85.5	31 09.1	80 53	85.1	31 33.1	80 53	84.8	32 20.8	79 53	84.1
7	30 13.5	80 53	84.7	30 37.5	80 53	84.3	31 01.5	80 53	84.0	31 49.2	79 53	83.3
8	29 41.8	80 53	83.8	30 05.9	80 53	83.5	30 29.9	80 53	83.2	31 17.7	80 52	82.5
9	29 10.2	80 53	83.0	29 34.3	80 52	82.7	29 58.3	80 52	82.3	30 46.2	80 52	81.6
80	28 38.7	80 52	82.2	29 02.8	80 52	81.9	29 26.8	80 52	81.5	30 14.8	80 52	80.8
1	28 07.2	80 52	81.4	28 31.4	80 52	81.1	28 55.4	80 52	80.7	29 43.4	80 52	80.0
2	27 35.8	81 52	80.6	28 00.0	80 52	80.3	28 24.1	80 52	79.9	29 12.1	80 52	79.3
3	27 04.5	81 52	79.8	27 28.7	81 52	79.5	27 52.8	80 52	79.1	28 40.9	80 52	78.5
4	26 33.2	81 52	79.0	26 57.5	81 52	78.7	27 21.6	80 52	78.3	28 09.8	80 52	77.7
85	26 02.1	81 52	78.2	26 26.3	81 52	77.9	26 50.5	81 52	77.6	27 38.8	80 52	76.9
6	25 31.0	81 52	77.4	25 55.3	81 52	77.1	26 19.5	81 52	76.8	27 07.9	80 51	76.1
7	25 00.0	81 51	76.6	25 24.3	81 51	76.3	25 48.6	81 51	76.0	26 37.1	81 51	75.3
8	24 29.1	81 51	75.8	24 53.5	81 51	75.5	25 17.8	81 51	75.2	26 06.4	81 51	74.5
9	23 58.4	81 51	75.1	24 22.8	81 51	74.7	24 47.2	81 51	74.4	25 35.8	81 51	73.8
90	23 27.7	82 51	74.3	23 52.2	81 51	73.9	24 16.6	81 51	73.6	25 05.3	81 51	73.0

H.A.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	64 00.0	1.0 01	180.0	66 00.0	1.0 01	180.0	66 30.0	1.0 01	180.0	67 30.0	1.0 01	180.0
1	63 59.5	1.0 03	178.1	65 59.4	1.0 03	178.0	66 29.4	1.0 03	177.9	67 29.4	1.0 03	177.9
2	63 57.9	1.0 04	176.1	65 57.7	1.0 05	175.9	66 27.7	1.0 05	175.9	67 27.6	1.0 05	175.7
3	63 55.2	1.0 06	174.2	65 54.9	1.0 07	173.9	66 24.8	1.0 07	173.8	67 24.7	1.0 07	173.6
4	63 51.4	1.0 08	172.3	65 51.0	1.0 08	171.9	66 20.9	1.0 09	171.8	67 20.6	1.0 09	171.5
05	63 46.6	99 10	170.4	65 45.9	99 10	169.9	66 15.7	99 10	169.7	67 15.3	99 11	169.4
6	63 40.8	99 11	168.5	65 39.8	99 12	167.9	66 09.5	99 12	167.7	67 08.9	99 13	167.3
7	63 33.9	99 13	166.6	65 32.6	99 14	165.9	66 02.2	99 14	165.7	67 01.4	99 14	165.3
8	63 26.0	99 15	164.7	65 24.3	98 16	163.9	65 53.8	98 16	163.7	66 52.8	98 16	163.2
9	63 17.2	98 16	162.8	65 14.9	98 17	162.0	65 44.3	98 17	161.7	66 43.1	98 18	161.2
10	63 07.3	98 18	161.0	65 04.6	98 19	160.0	65 33.9	97 19	159.8	66 32.3	97 20	159.2
1	62 56.4	97 20	159.2	64 53.2	97 21	158.1	65 22.4	97 21	157.8	66 20.5	97 21	157.2
2	62 44.7	97 21	157.4	64 40.9	97 22	156.2	65 09.9	96 22	155.9	66 07.7	96 23	155.3
3	62 32.0	97 23	155.6	64 27.6	96 24	154.4	64 56.4	96 24	154.0	65 53.9	96 25	153.4
4	62 18.4	96 24	153.8	64 13.4	96 25	152.5	64 42.0	95 25	152.2	65 39.2	95 26	151.5
15	62 03.9	96 26	152.1	63 58.3	95 27	150.7	64 26.8	95 27	150.4	65 23.5	94 28	149.6
6	61 48.6	95 27	150.3	63 42.3	94 28	148.9	64 10.6	94 28	148.6	65 07.0	94 29	147.8
7	61 32.5	95 28	148.6	63 25.5	94 29	147.2	63 53.6	94 30	146.8	64 49.6	93 30	146.0
8	61 15.5	94 30	147.0	63 07.9	93 31	145.5	63 35.8	93 31	145.1	64 31.4	92 32	144.2
9	60 57.8	93 31	145.3	62 49.5	93 32	143.8	63 17.2	92 32	143.4	64 12.4	92 33	142.5
20	60 39.4	93 32	143.7	62 30.3	92 33	142.1	62 57.9	92 33	141.7	63 52.7	91 34	140.8
1	60 20.2	92 33	142.1	62 10.4	91 34	140.5	62 37.8	91 35	140.0	63 32.2	90 35	139.1
2	60 00.3	92 34	140.5	61 49.8	91 35	138.9	62 17.0	90 36	138.4	63 11.1	90 36	137.5
3	59 39.8	91 35	139.0	61 28.6	90 36	137.3	61 55.6	90 37	136.8	62 49.3	89 37	135.9
4	59 18.6	91 36	137.5	61 06.7	89 38	135.7	61 33.5	89 38	135.3	62 26.8	88 38	134.3
25	58 56.8	90 37	136.0	60 44.2	89 38	134.2	61 10.8	89 39	133.7	62 03.8	88 39	132.7
6	58 34.4	90 38	134.5	60 21.1	88 39	132.7	60 47.6	88 40	132.2	61 40.1	87 40	131.2
7	58 11.5	89 39	133.1	59 57.5	88 40	131.3	60 23.8	87 41	130.8	61 15.9	87 41	129.8
8	57 48.0	88 40	131.7	59 33.3	87 41	129.8	59 59.4	87 41	129.3	60 51.2	86 42	128.3
9	57 24.0	88 41	130.3	59 08.7	87 42	128.4	59 34.6	86 42	127.9	60 26.0	85 43	126.9
30	56 59.5	87 42	128.9	58 43.5	86 43	127.0	59 09.3	86 43	126.5	60 00.4	85 44	125.5
1	56 34.5	87 42	127.5	58 17.9	85 43	125.7	58 43.5	85 44	125.2	59 34.3	84 44	124.1
2	56 09.1	86 43	126.2	57 51.9	85 44	124.3	58 17.3	85 44	123.8	59 07.7	84 45	122.8
3	55 43.2	86 44	124.9	57 25.4	84 45	123.0	57 50.7	84 45	122.5	58 40.8	83 46	121.5
4	55 16.9	85 44	123.6	56 58.5	84 45	121.7	57 23.6	84 46	121.2	58 13.5	83 46	120.2
35	54 50.2	85 45	122.4	56 31.3	83 46	120.5	56 56.3	83 46	119.9	57 45.8	82 47	118.9
6	54 23.2	84 46	121.1	56 03.7	83 47	119.2	56 28.6	83 47	118.7	57 17.8	82 47	117.7
7	53 55.8	84 46	119.9	55 35.8	83 47	118.0	56 00.5	82 47	117.5	56 49.5	81 48	116.4
8	53 28.1	84 47	118.7	55 07.6	82 48	116.8	55 32.1	82 48	116.3	56 20.9	81 48	115.2
9	53 00.0	83 47	117.5	54 39.0	82 48	115.6	55 03.5	81 48	115.1	55 52.0	80 49	114.1
40	52 31.7	83 48	116.4	54 10.2	81 48	114.4	54 34.6	81 49	113.9	55 22.9	80 49	112.9
1	52 03.1	82 48	115.2	53 41.2	81 49	113.3	54 05.4	81 49	112.8	54 53.4	80 49	111.8
2	51 34.2	82 49	114.1	53 11.8	81 49	112.2	53 36.0	80 49	111.7	54 23.8	79 50	110.7
3	51 05.0	82 49	113.0	52 42.3	80 50	111.1	53 06.3	80 50	110.6	53 54.0	79 50	109.6
4	50 35.6	81 49	111.9	52 12.5	80 50	110.0	52 36.4	80 50	109.5	53 23.9	79 50	108.5
45	50 06.0	81 50	110.8	51 42.5	80 50	108.9	52 06.4	79 50	108.4	52 53.6	78 51	107.4
6	49 36.2	81 50	109.7	51 12.4	79 51	107.9	51 36.1	79 51	107.4	52 23.2	78 51	106.4
7	49 06.2	81 50	108.7	50 42.0	79 51	106.8	51 05.7	79 51	106.3	51 52.6	78 51	105.3
8	48 36.0	80 51	107.6	50 11.5	79 51	105.8	50 35.1	78 51	105.3	51 21.9	78 51	104.3
9	48 05.6	80 51	106.6	49 40.8	79 51	104.8	50 04.3	78 51	104.3	50 51.0	77 52	103.3
50	47 35.0	80 51	105.6	49 10.0	78 52	103.8	49 33.5	78 52	103.3	50 20.0	77 52	102.3
1	47 04.3	80 51	104.6	48 39.0	78 52	102.8	49 02.4	78 52	102.3	49 48.9	77 52	101.3
2	46 33.5	79 52	103.6	48 08.0	78 52	101.8	48 31.3	78 52	101.3	49 17.7	77 52	100.4
3	46 02.5	79 52	102.6	47 36.8	78 52	100.8	48 00.1	77 52	100.4	48 46.3	77 52	99.4
4	45 31.4	79 52	101.7	47 05.5	78 52	99.9	47 28.8	77 52	99.4	48 14.9	77 52	98.5
55	45 00.3	79 52	100.7	46 34.2	78 52	98.9	46 57.4	77 52	98.5	47 43.4	76 53	97.5
6	44 29.0	79 52	99.8	46 02.7	77 53	98.0	46 25.9	77 53	97.6	47 11.9	76 53	96.6
7	43 57.6	79 52	98.9	45 31.2	77 53	97.1	45 54.3	77 53	96.6	46 40.3	76 53	95.7
8	43 26.1	79 53	97.9	44 59.6	77 53	96.2	45 22.7	77 53	95.7	46 08.6	76 53	94.8
9	42 54.6	78 53	97.0	44 28.0	77 53	95.3	44 51.1	77 53	94.8	45 36.9	76 53	93.9
60	42 23.0	78 53	96.1	43 56.3	77 53	94.4	44 19.4	77 53	94.0	45 05.2	76 53	93.0
1	41 51.4	78 53	95.2	43 24.6	77 53	93.5	43 47.6	77 53	93.1	44 33.4	76 53	92.2
2	41 19.7	78 53	94.3	42 52.8	77 53	92.6	43 15.9	77 53	92.2	44 01.6	76 53	91.3
3	40 48.0	78 53	93.5	42 21.1	77 53	91.8	42 44.1	77 53	91.3	43 29.8	76 53	90.5
4	40 16.2	78 53	92.6	41 49.3	77 53	90.9	42 12.3	77 53	90.5	42 58.1	76 53	89.6
65	39 44.5	78 53	91.7	41 17.5	77 53	90.1	41 40.5	77 53	89.6	42 26.3	76 53	88.8
6	39 12.7	78 53	90.9	40 45.7	77 53	89.2	41 08.7	77 53	88.8	41 54.5	76 53	87.9
7	38 40.9	78 53	90.0	40 13.9	77 53	88.4	40 36.9	77 53	88.0	41 22.7	76 53	87.1
8	38 09.1	78 53	89.2	39 42.1	77 53	87.5	40 05.2	77 53	87.1	40 51.0	76 53	86.3
9	37 37.3	78 53	88.3	39 10.4	77 53	86.7	39 33.4	77 53	86.3	40 19.3	76 53	85.5
70	37 05.5	78 53	87.5	38 38.6	77 53	85.9	39 01.7	77 53	85.5	39 47.6	76 53	84.7
1	36 33.8	78 53	86.7	38 06.9	77 53	85.1	38 30.0	77 53	84.7	39 16.0	76 53	83.8
2	36 02.1	78 53	85.8	37 35.3	77 53	84.3	37 58.4	77 53	83.9	38 44.4	76 53	83.1
3	35 30.4	78 53	85.0	37 03.7	77 53	83.5	37 26.8	77 53	83.1	38 12.8	76 52	82.3
4	34 58.7	78 53	84.2	36 32.1	77 53	82.7	36 55.3	77 52	82.3	37 41.4	77 52	81.5
75	34 27.1	78 53	83.4	36 00.6	77 52	81.9	36 23.8	77 52	81.5	37 09.9	77 52	80.7
6	33 55.5	78 52	82.6	35 29.2	78 52	81.1	35 52.4	77 52	80.7	36 38.6	77 52	79.9
7	33 24.0	79 52	81.8	34 57.8	78 52	80.3	35 21.0	77 52	79.9	36 07.3	77 52	79.1
8	32 52.6	79 52	81.0	34 26.5	78 52	79.5	34 49.8	78 52	79.1	35 36.2	77 52	78.4
9	32 21.2	79 52	80.2	33 55.3	78 52	78.7	34 18.6	78 52	78.4	35 05.1	77 52	77.6
80	31 49.9	79 52	79.4	33 24.1	78 52	78.0	33 47.5	78 52	77.6	34 34.1	77 52	76.8
1	31 18.7	79 52	78.6	32 53.1	78 52	77.2	33 16.5	78 52	76.8	34 03.2	78 51	76.1
2	30 47.6	79 52	77.9	32 22.1	78 51	76.4	32 45.6	78 51	76.0	33 32.3	78 51	75.3
3	30 16.6	79 52	77.1	31 51.3	79 51	75.6	32 14.8	78 51	75.3	33 01.6	78 51	74.5
4	29 45.6	79 51	76.3	31 20.5	79 51	74.9	31 44.1	78 51	74.5	32 31.1	78 51	73.8
85	29 14.8	80 51	75.5	30 49.9	79 51	74.1	31 13.5	79 51	73.8	32 00.6	78 51	73.0
6	28 44.0	80 51	74.7	30 19.4	79 51	73.4	30 43.0	79 51	73.0	31 30.2	78 50	72.3
7	28 13.4	80 51	74.0	29 49.0	79 50	72.6	30 12.7	79 50	72.2	31 00.0	79 50	71.5
8	27 42.9	80 51	73.2	29 18.7	79 50	71.8	29 42.5	79 50	71.5	30 29.9	79 50	70.8
9	27 12.5	80 50	72.4	28 48.5	80 50	71.1	29 12.4	79 50	70.7	30 00.0	79 50	70.0
90	26 42.3	81 50	71.7	28 18.5	80 50	70.3	28 42.5	80 50	70.0	29 30.2	79 49	69.3

Digitized by Google

Lat. 58°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	22 57.2	82	51	73.5	23 21.7	82	51	73.2	23 46.2	82	51	72.9	24 35.0	81	50	72.2	26 12.2	81	50	70.9	27 48.7	80	50	69.6	28 12.7	80	49	69.2	29 00.5	80	49	68.6	91
2	22 26.7	82	50	72.7	22 51.3	82	50	72.4	23 15.8	82	50	72.1	24 04.8	81	50	71.4	25 42.2	81	50	70.2	27 18.9	80	49	68.8	27 43.0	80	49	68.5	28 31.0	80	49	67.8	2
3	21 56.4	82	50	71.9	22 21.1	82	50	71.6	22 45.6	82	50	71.3	23 34.7	82	50	70.7	25 12.4	81	49	69.4	26 49.4	81	49	68.1	27 13.5	80	49	67.7	28 01.6	80	49	67.1	3
4	21 26.3	82	50	71.1	21 51.0	82	50	70.8	22 15.6	82	50	70.5	23 04.8	82	50	69.9	24 42.7	81	49	68.6	26 19.9	81	49	67.3	26 44.1	81	49	67.0	27 32.4	80	48	66.3	4
95	20 56.3	82	50	70.4	21 21.0	82	50	70.0	21 45.7	82	50	69.7	22 35.0	82	49	69.1	24 13.2	82	49	67.9	25 50.7	81	48	66.6	26 15.0	81	48	66.3	27 03.4	81	48	65.6	95
6	20 26.4	83	50	69.6	20 51.2	83	49	69.3	21 15.9	82	49	69.0	22 05.4	82	49	68.4	23 43.8	82	49	67.1	25 21.6	81	48	65.8	25 45.9	81	48	65.5	26 34.5	81	48	64.9	6
7	19 56.7	83	49	68.8	20 21.5	83	49	68.5	20 46.3	83	49	68.2	21 35.9	82	49	67.6	23 14.6	82	48	66.4	24 52.7	81	48	65.1	25 17.1	81	48	64.8	26 05.8	81	48	64.1	7
8	19 27.1	83	49	68.0	19 52.0	83	49	67.7	20 16.9	83	49	67.4	21 06.6	83	49	66.8	22 45.5	82	48	65.6	24 23.9	82	48	64.4	24 48.4	82	48	64.0	25 37.3	81	47	63.4	8
9	18 57.7	83	49	67.2	19 22.7	83	49	66.9	19 47.6	83	48	66.6	20 37.4	83	48	66.1	22 16.7	82	48	64.8	23 55.3	82	47	63.6	24 19.9	82	47	63.3	25 08.9	82	47	62.7	9
100	18 28.5	84	48	66.5	18 53.5	83	48	66.2	19 18.5	83	48	65.9	20 08.5	83	48	65.3	21 48.0	83	48	64.1	23 26.9	82	47	62.9	23 51.6	82	47	62.6	24 40.8	82	47	61.9	100
1	17 59.4	84	48	65.7	18 24.5	84	48	65.4	18 49.6	84	48	65.1	19 39.7	83	48	64.5	21 19.5	83	47	63.3	22 58.7	83	47	62.1	23 23.5	82	47	61.8	24 12.8	82	46	61.2	1
2	17 30.5	84	48	64.9	17 55.7	84	48	64.6	18 20.8	84	48	64.3	19 11.1	84	47	63.8	20 51.1	83	47	62.6	22 30.7	83	46	61.4	22 55.6	83	46	61.1	23 45.1	82	46	60.5	2
3	17 01.8	84	48	64.1	17 27.1	84	47	63.8	17 52.3	84	47	63.6	18 42.6	84	47	63.0	20 23.0	83	47	61.8	22 02.9	83	46	60.6	22 27.8	83	46	60.3	23 17.5	83	46	59.7	3
4	16 33.3	84	47	63.4	16 58.6	84	47	63.1	17 23.9	84	47	62.8	18 14.4	84	47	62.2	19 55.1	84	46	61.1	21 35.3	83	46	59.9	22 00.3	83	46	59.6	22 50.2	83	45	59.0	4
105	16 05.0	85	47	62.6	16 30.4	85	47	62.3	16 55.7	84	47	62.0	17 46.4	84	46	61.5	19 27.4	84	46	60.3	21 07.9	84	45	59.2	21 33.0	83	45	58.9	22 23.0	83	45	58.3	105
6	15 36.9	85	47	61.8	16 02.3	85	46	61.5	16 27.8	85	46	61.2	17 18.6	85	46	60.7	18 59.8	84	46	59.6	20 40.7	84	45	58.4	21 05.9	84	45	58.1	21 56.1	84	45	57.5	6
7	15 09.0	85	46	61.0	15 34.5	85	46	60.7	16 00.0	85	46	60.5	16 50.9	85	46	59.9	18 32.5	85	45	58.8	20 13.8	84	45	57.7	20 39.0	84	44	57.4	21 29.4	84	44	56.8	7
8	14 41.3	85	46	60.2	15 06.9	85	46	60.0	15 32.4	85	46	59.7	16 23.5	85	45	59.2	18 05.5	85	45	58.0	19 47.0	84	44	56.9	20 12.3	84	44	56.6	21 02.9	84	44	56.1	8
9	14 13.8	86	45	59.5	14 39.4	86	45	59.2	15 05.1	85	45	58.9	15 56.3	85	45	58.4	17 38.6	85	44	57.3	19 20.5	85	44	56.2	19 45.9	85	44	55.9	20 36.6	84	43	55.3	9
110	13 46.5	86	45	58.7	14 12.2	86	45	58.4	14 38.0	86	45	58.1	15 29.4	86	45	57.6	17 12.0	85	44	56.5	18 54.2	85	43	55.4	19 19.7	85	43	55.2	20 10.6	85	43	54.6	110
1	13 19.4	86	45	57.9	13 45.3	86	45	57.6	14 11.1	86	44	57.4	15 02.6	86	44	56.8	16 45.5	86	44	55.8	18 28.1	85	43	54.7	18 53.7	85	43	54.4	19 44.8	85	43	53.9	1
2	12 52.6	86	44	57.1	13 18.5	86	44	56.9	13 44.4	86	44	56.6	14 36.1	86	44	56.1	16 19.4	86	43	55.0	18 02.3	86	43	53.9	18 28.0	86	42	53.7	19 19.2	85	42	53.1	2
3	12 26.0	87	44	56.3	12 52.0	87	44	56.1	13 18.0	87	44	55.8	14 09.9	86	43	55.3	15 53.4	86	43	54.3	17 36.7	86	42	53.2	18 02.5	86	42	52.9	18 53.9	86	42	52.4	3
4	11 59.7	87	44	55.6	12 25.8	87	43	55.3	12 51.8	87	43	55.0	13 43.9	87	43	54.5	15 27.8	86	42	53.5	17 11.4	86	42	52.4	17 37.2	86	42	52.2	18 28.9	86	41	51.6	4
115	11 33.6	87	43	54.8	11 59.7	87	43	54.5	12 25.9	87	43	54.3	13 18.1	87	43	53.8	15 02.3	87	42	52.7	16 46.3	87	41	51.7	17 12.2	86	41	51.4	18 04.1	86	41	50.9	115
6	11 07.8	87	43	54.0	11 34.0	87	42	53.7	12 00.2	87	42	53.5	12 52.6	87	42	53.0	14 37.2	87	42	52.0	16 21.5	87	41	50.9	16 47.5	87	41	50.7	17 39.5	87	40	50.2	6
7	10 42.2	88	42	53.2	11 08.5	88	42	52.9	11 34.8	88	42	52.7	12 27.3	88	42	52.2	14 12.2	87	41	51.2	15 56.9	87	40	50.2	16 23.0	87	40	49.9	17 15.2	87	40	49.4	7
8	10 16.8	88	42	52.4	10 43.2	88	42	52.2	11 09.6	88	41	51.9	12 02.3	88	41	51.4	13 47.6	88	41	50.4	15 32.6	87	40	49.4	15 58.8	87	40	49.2	16 51.2	87	40	48.7	8
9	9 51.8	88	41	51.6	10 18.3	88	41	51.4	10 44.7	88	41	51.1	11 37.6	88	41	50.7	13 23.2	88	40	49.7	15 08.6	88	40	48.7	15 34.9	88	39	48.4	16 27.5	88	39	47.9	9
120	9 27.0	89	41	50.8	9 53.6	88	41	50.6	10 20.1	88	41	50.3	11 13.1	88	40	49.9	12 59.1	88	40	48.9	14 44.9	88	39	47.9	15 11.3	88	39	47.7	16 04.0	88	39	47.2	120
1	9 02.5	89	40	50.0	9 29.1	89	40	49.8	9 55.8	89	40	49.6	10 49.0	89	40	49.1	12 35.3	89	39	48.1	14 21.4	88	39	47.2	14 47.9	88	38	46.9	15 40.8	88	38	46.5	1
2	8 38.3	89	40	49.2	9 05.0	89	40	49.0	9 31.7	89	40	48.8	10 25.1	89	39	48.3	12 11.7	89	39	47.4	13 58.2	89	38	46.4	14 24.8	89	38	46.2	15 17.9	88	38	45.7	2
3	8 14.3	89	39	48.4	8 41.1	89	39	48.2	9 07.9	89	39	48.0	10 01.5	89	39	47.5	11 48.5	89	38	46.6	13 35.3	89	38	45.7	14 02.0	89	38	45.4	14 55.3	89	37	45.0	3
4	7 50.7	90	39	47.6	8 17.6	90	39	47.4	8 44.5	90	39	47.2	9 38.2	90	38	46.7	11 25.5	89	38	45.8	13 12.7	89	37	44.9	13 39.5	89	37	44.7	14 33.0	89	37	44.2	4
125	7 27.4	90	38	46.8	7 54.3	90	38	46.6	8 21.3	90	38	46.4	9 15.2	90	38	46.0	11 02.9	90	37	45.1	12 50.4	90	37	44.1	13 17.3	90	36	43.9	14 11.0	89	36	43.5	125
6	7 04.3	90	38	46.0	7 31.4	90	38	45.8	7 58.4	90	38	45.6	8 52.5	90	37	45.2	10 40.5	90	37	44.3	12 28.4	90	36	43.4	12 55.4	90	36	43.2	13 49.2	90	36	42.7	6
7	6 41.6	90	37	45.2	7 08.7	90	37	45.0	7 35.9	90	37	44.8	8 30.1	90	37	44.4	10 18.5	90	36	43.5	12 06.7	90	36	42.6	12 33.8	90	35	42.4	13 27.8	90	35	42.0	7
8	6 19.2	91	37	44.4	6 46.4	91	37	44.2	7 13.6	91	37	44.0	8 08.0	91	36	43.6	9 56.8	91	36	42.7	11 45.4	90	35	41.9	12 12.5	90	35	41.6	13 06.7	90	35	41.2	8
9	5 57.1	91	36	43.6	6 24.4	91	36	43.4	6 51.7	91	36	43.2	7 46.3	91	36	42.8	9 35.4	91	35	41.9	11 24.3	91	35	41.1	11 51.5	91	34	40.9	12 45.9	91	34	40.4	9
130	5 35.3	91	36	42.8	6 02.7	91	36	42.6	6 30.1	91	35	42.4	7 24.8	91	35	42.0	9 14.3	91	35	41.2	11 03.6	91	34	40.3	11 30.9	91	34	40.1	12 25.5	91	34	39.7	130
1	5 13.9	92	35	42.0	5 41.3	92	35	41.8	6 08.8	92	35	41.6	7 03.7	92	35	41.2	8 53.5	91	34	40.4	10 43.2	91	33	39.6	11 10.6	91	33	39.3	12 05.3	91	33	38.9	1
2					5 20.3	92	34	41.0	5 47.9	92	34	40.8	6 42.9	92	34	40.4	8 33.1	92	34	39.6	10 23.1	92	33	38.8	10 50.6	92	33	38.6	11 45.5	92	32	38.2	2
3									5 27.3	92	34	40.0	6 22.5	92	34	39.6	8 13.0	92	33	38.8	10 03.3	92	32	38.0	10 30.9	92	32	37.8	11 26.0	92	32	37.4	3
4									5 07.0	92	33	39.2	6 02.4	92	33	38.8	7 53.2	92	32	38.0	9 43.9	92	32	37.2	10 11.6	92	32	37.0	11 06.9	92	31	36.6	4
135													5 42.7	93	32	38.0	7 33.8	93	32	37.2	9 24.9	93	31	36.5	9 52.6	92	31	36.3	10 48.1	92	31	35.9	135
6													5 23.3	93	32	37.2	7 14.8	93	31	36.4	9 06.1	93	31	35.7	9 34.0	93	30	35.5	10 29.6	93	30	35.1	6
7													5 04.3	93	31	36.4	6 56.1	93	31	35.6	8 47.8	93	30	34.9	9 15.7	93	30	34.7	10 11.5	93	30	34.3	7
8																	6 37.7	93	30	34.8	8 29.8	93	29	34.1	8 57.8	93	29	33.9	9 53.8	93	29	33.6	8
9																	6 19.7	94	29	34.0	8 12.1	94	29	33.3	8 40.2	94	29	33.2	9 36.4	94	28	32.8	9
140																	6 02.1	94	29	33.2	7 54.8	94	28	32.5	8 23.0	94	28	32.4	9 19.3	94	28	32.0	140
1																	5 44.9	94	28	32.4	7 37.9	94	28	31.8	8 06.1	94	27	31.6	9 02.6	94	27	31.3	1
2																	5 28.0	94	27	31.6	7 21.4	94	27	31.0	7 49.7	94	27	30.8	8 46.3	94	27	30.5	2
3																	5 11.5	95	27	30.8	7 05.2	95	26	30.2	7 33.6	95	26	30.0	8 30.4	95	26	29.7	3
4																					6 49.4	95	26	29.4	7 17.9	95	26	29.2	8 14.8	95	25	28.9	4
145																					6 34.0	95	25	28.6	7 02.5	95	25	28.4	7 59.6	95	25	28.1	145
6																					6 18.9	95	24	27.8	6 47.6	95	24	27.7	7 44.8	95	24	27.4	6
7																					6 04.3	96	24	27.0	6 33.0	96	24	26.9	7 30.4	96	23	26.6	7
8																					5 50.1	96	23	26.2	6 18.8	96	23	26.1	7 16.4	96	23	25.8	8
9																					5 36.2	96	22	25.4	6 05.1	96	22	25.3	7 02.8	96	22	25.0	9
150																					5 22.8	96	22	24.6	5 51.7	96	22	24.5	6 49.5	96	21	24.2	150
1																					5 09.8	97	21	23.8	5 38.7	97	21	23.7	6 36.7	97	21	23.4	1
2																									5 26.2	97	20	22.9	6 24.3	97	20	22.6	2
3																									5 14.0	97	20	22.1	6 12.2	97	19	21.8	3
4																									5 02.3	97	19	21.3	6 00.6	97	19	21.0	4
155																													5 49.4	97	18	20.2	155
6																													5 38.6	98	17	19.4	6
7																													5 28.3	98	17	18.6	7
8																													5 18.3	98	16	17.8	8
9																													5 08.8	98	15	17.0	9

Digitized by Google

Lat. 58°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	°
00	68 00.0	1.0 01	180.0	69 00.0	1.0 01	180.0	70 30.0	1.0 01	180.0	72 00.0	1.0 01	180.0	74 00.0	1.0 01	180.0	74 30.0	1.0 01	180.0	75 00.0	1.0 01	180.0	77 00.0	1.0 01	180.0	00
1	67 59.4	1.0 03	177.8	68 59.4	1.0 03	177.8	70 29.3	1.0 03	177.7	71 59.3	1.0 03	177.5	73 59.2	1.0 04	177.3	74 29.2	1.0 04	177.2	74 59.2	1.0 04	177.2	76 59.1	1.0 04	176.9	1
2	67 57.6	1.0 05	175.7	68 57.5	1.0 06	175.5	70 27.4	1.0 05	175.3	71 57.3	1.0 06	175.0	73 57.0	1.0 06	174.6	74 26.9	1.0 06	174.5	74 56.9	1.0 06	174.4	76 56.5	1.0 07	173.7	2
3	67 54.6	1.0 07	173.5	68 54.4	1.0 07	173.3	70 24.2	1.0 08	173.0	71 53.8	1.0 08	172.6	73 53.3	99 09	171.9	74 23.1	99 09	171.8	74 53.0	99 09	171.6	76 52.2	99 10	170.6	3
4	67 50.4	1.0 09	171.4	68 50.1	99 09	171.1	70 19.6	99 10	170.7	71 49.1	99 10	170.1	73 48.1	99 11	169.3	74 17.8	99 11	169.0	74 47.5	99 12	168.8	76 46.2	99 13	167.6	4
05	67 45.1	99 11	169.3	68 44.6	99 11	168.9	70 13.9	99 12	168.4	71 42.9	99 12	167.7	73 41.5	99 13	166.7	74 11.1	99 14	166.4	74 40.6	98 14	166.0	76 38.5	98 15	164.5	05
6	67 38.6	99 13	167.2	68 37.9	99 13	166.8	70 06.8	99 14	166.1	71 35.5	98 14	165.3	73 33.4	98 16	164.1	74 02.9	98 16	163.7	74 32.2	98 16	163.3	76 29.2	97 18	161.6	6
7	67 31.0	99 15	165.1	68 30.1	98 15	164.6	69 58.6	98 16	163.8	71 26.8	98 17	162.9	73 24.0	97 18	161.5	73 53.2	97 18	161.1	74 22.4	97 19	160.7	76 18.4	96 20	158.7	7
8	67 22.2	98 16	163.0	68 21.1	98 17	162.5	69 49.1	98 18	161.6	71 16.9	97 19	160.6	73 13.3	97 20	159.0	73 42.3	96 20	158.5	74 11.2	96 21	158.1	76 06.1	96 23	155.8	8
9	67 12.4	98 18	160.9	68 10.9	97 19	160.4	69 38.5	97 20	159.4	71 05.7	97 21	158.3	73 01.3	96 22	156.5	73 30.0	96 23	156.0	73 58.7	96 23	155.5	75 52.4	94 25	153.1	9
10	67 01.5	97 20	158.9	67 59.7	97 20	158.3	69 26.8	97 21	157.2	70 53.4	96 22	156.0	72 48.0	95 24	154.1	73 16.5	95 25	153.6	73 44.9	94 25	153.0	75 37.3	93 27	150.4	10
1	66 49.5	97 22	156.9	67 47.4	96 22	156.2	69 13.9	96 23	155.1	70 39.9	95 24	153.8	72 33.5	94 26	151.8	73 01.7	94 26	151.2	73 29.8	93 27	150.6	75 21.0	92 29	147.8	1
2	66 36.5	96 23	154.9	67 34.1	96 24	154.2	69 00.0	95 25	153.0	70 25.3	94 26	151.6	72 17.9	93 28	149.5	72 45.8	93 28	148.8	73 13.6	92 29	148.2	75 03.4	90 31	145.2	2
3	66 22.6	95 25	153.0	67 19.7	95 26	152.2	68 45.0	94 27	150.9	70 09.7	94 28	149.5	72 01.2	92 30	147.2	72 28.9	92 30	146.6	72 56.3	91 31	145.9	74 44.7	89 33	142.8	3
4	66 07.7	95 26	151.1	67 04.4	94 27	150.3	68 29.1	94 28	148.9	69 53.0	93 29	147.4	71 43.5	91 31	145.0	72 10.8	91 32	144.3	72 38.0	90 32	143.6	74 25.0	88 35	140.4	4
15	65 51.8	94 28	149.2	66 48.2	94 29	148.3	68 12.2	93 30	146.9	69 35.4	92 31	145.4	71 24.8	90 33	142.9	71 51.8	90 33	142.2	72 18.7	89 34	141.5	74 04.3	87 36	138.2	15
6	65 35.1	94 29	147.4	66 31.1	93 30	146.5	67 54.4	92 31	145.0	69 16.9	91 32	143.4	71 05.2	89 34	140.8	71 31.9	89 35	140.1	71 58.4	88 35	139.4	73 42.6	85 38	136.0	6
7	65 17.5	93 31	145.5	66 13.1	92 31	144.6	67 35.8	91 32	143.1	68 57.5	90 34	141.4	70 44.6	88 36	138.8	71 11.0	88 36	138.1	71 37.3	87 37	137.3	73 20.1	84 39	133.9	7
8	64 59.1	92 32	143.8	65 54.3	92 33	142.8	67 16.3	91 34	141.2	68 37.2	89 35	139.5	70 23.3	87 37	136.8	70 49.4	87 37	136.1	71 15.3	86 38	135.3	72 56.8	83 40	131.8	8
9	64 39.9	92 33	142.0	65 34.7	91 34	141.0	66 56.0	90 35	139.4	68 16.2	88 36	137.7	70 01.1	86 38	134.9	70 26.9	86 39	134.2	70 52.6	85 39	133.4	72 32.7	82 41	129.9	9
20	64 20.0	91 34	140.3	65 14.3	90 35	139.3	66 34.9	89 36	137.7	67 54.4	88 38	135.8	69 38.3	85 39	133.1	70 03.8	85 40	132.3	70 29.1	84 40	131.5	72 08.0	81 42	128.0	20
1	63 59.3	90 36	138.6	64 53.2	89 36	137.6	66 13.2	88 37	135.9	67 31.9	87 39	134.1	69 14.7	84 40	131.3	69 39.9	84 41	130.5	70 05.0	83 41	129.7	71 42.6	80 43	126.1	1
2	63 38.0	89 37	137.0	64 31.4	89 37	135.9	65 50.7	87 38	134.2	67 08.8	86 40	132.4	68 50.5	84 41	129.5	69 15.4	83 42	128.8	69 40.2	82 42	127.9	71 16.7	79 44	124.4	2
3	63 16.0	89 38	135.4	64 09.0	88 38	134.3	65 27.6	87 40	132.6	66 45.0	85 41	130.7	68 25.7	83 42	127.8	68 50.4	82 43	127.1	69 14.8	81 43	126.2	70 50.2	78 45	122.7	3
4	62 53.3	88 39	133.8	63 45.9	87 39	132.7	65 03.9	86 40	131.0	66 20.6	84 42	129.1	68 00.3	82 43	126.2	68 24.7	81 44	125.4	68 48.9	80 44	124.6	70 23.2	77 46	121.0	4
25	62 30.0	87 40	132.2	63 22.3	87 40	131.1	64 39.6	85 41	129.4	65 55.6	84 42	127.5	67 34.4	81 44	124.6	67 58.5	80 44	123.8	68 22.5	79 45	123.0	69 55.7	76 46	119.5	25
6	62 06.2	87 41	130.7	62 58.1	86 41	129.6	64 14.8	85 42	127.9	65 30.1	83 43	125.9	67 08.0	80 45	123.0	67 31.9	79 45	122.3	67 55.6	79 46	121.4	69 27.8	75 47	117.9	6
7	61 41.8	86 41	129.2	62 33.3	85 42	128.1	63 49.4	84 43	126.4	65 04.1	82 44	124.4	66 41.1	79 46	121.5	67 04.8	79 46	120.7	67 28.2	78 46	119.9	68 59.5	74 48	116.4	7
8	61 17.0	86 42	127.8	62 08.0	85 43	126.7	63 23.6	83 44	124.9	64 37.6	81 45	122.9	66 13.8	79 46	120.1	66 37.2	78 47	119.3	67 00.5	77 47	118.5	68 30.9	73 48	115.0	8
9	60 51.6	85 43	126.3	61 42.3	84 44	125.2	62 57.3	83 45	123.4	64 10.7	81 46	121.5	65 46.0	78 47	118.6	66 09.3	77 47	117.8	66 32.4	76 48	117.1	68 01.9	73 49	113.6	9
30	60 25.8	84 44	124.9	61 16.1	83 44	123.8	62 30.5	82 45	122.0	63 43.4	80 46	120.1	65 17.9	77 47	117.2	65 41.0	77 48	116.5	66 03.9	76 48	115.7	67 32.6	72 49	112.2	30
1	59 59.5	84 44	123.6	60 49.5	83 45	122.5	62 03.4	81 46	120.7	63 15.7	79 47	118.7	64 49.5	77 48	115.9	65 12.4	76 48	115.1	65 35.1	75 49	114.3	67 03.0	71 50	110.9	1
2	59 32.8	83 45	122.2	60 22.5	82 46	121.1	61 35.8	81 46	119.3	62 47.7	79 47	117.4	64 20.7	76 48	114.5	64 43.5	75 49	113.8	65 05.9	75 49	113.0	66 33.2	71 50	109.7	2
3	59 05.7	83 46	120.9	59 55.0	82 46	119.8	61 07.9	80 47	118.0	62 19.3	78 48	116.1	63 51.7	76 49	113.3	64 14.2	75 49	112.5	64 36.5	74 49	111.7	66 03.2	70 50	108.4	3
4	58 38.2	82 46	119.6	59 27.3	81 47	118.5	60 39.7	80 48	116.7	61 50.6	78 48	114.8	63 22.3	75 49	112.0	63 44.7	74 50	111.3	64 06.9	73 50	110.5	65 32.9	70 51	107.2	4
35	58 10.4	82 47	118.4	58 59.2	81 47	117.2	60 11.1	79 48	115.5	61 21.6	77 49	113.6	62 52.7	75 50	110.8	63 15.0	74 50	110.0	63 37.0	73 50	109.3	65 02.4	69 51	106.0	35
6	57 42.3	81 47	117.1	58 30.8	80 48	116.0	59 42.3	79 49	114.2	60 52.3	77 49	112.3	62 22.9	74 50	109.6	62 45.0	73 50	108.8	63 06.8	72 51	108.1	64 31.8	69 51	104.9	6
7	57 13.8	81 48	115.9	58 02.0	80 48	114.8	59 13.2	78 49	113.0	60 22.7	76 50	111.1	61 52.8	74 50	108.4	62 14.8	73 51	107.7	62 36.5	72 51	106.9	64 01.0	69 52	103.8	7
8	56 45.1	80 48	114.7	57 33.0	79 49	113.6	58 43.8	78 49	111.8	59 53.0	76 50	110.0	61 22.5	73 51	107.2	61 44.4	72 51	106.5	62 06.0	72 51	105.8	63 30.0	68 52	102.7	8
9	56 16.1	80 49	113.5	57 03.8	79 49	112.4	58 14.1	77 50	110.7	59 23.0	76 50	108.8	60 52.1	73 51	106.1	61 13.8	72 51	105.4	61 35.3	71 51	104.7	62 58.9	68 52	101.6	9
40	55 46.8	80 49	112.4	56 34.2	79 50	111.3	57 44.3	77 50	109.5	58 52.8	75 51	107.7	60 21.4	73 51	105.0	60 43.1	72 51	104.3	61 04.5	71 52	103.6	62 27.7	68 52	100.6	40
1	55 17.3	79 50	111.2	56 04.5	78 50	110.1	57 14.2	77 50	108.4	58 22.4	75 51	106.6	59 50.7	72 52	103.9	60 12.2	71 52	103.2	60 33.5	71 52	102.5	61 56.4	67 52	99.5	1
2	54 47.5	79 50	110.1	55 34.6	78 50	109.0	56 44.0	76 51	107.3	57 51.8	75 51	105.5	59 19.7	72 52	102.9	59 41.2	71 52	102.2	60 02.4	70 52	101.5	61 25.0	67 52	98.5	2
3	54 17.6	79 50	109.0	55 04.4	78 51	107.9	56 13.5	76 51	106.2	57 21.1	74 51	104.4	58 48.7	72 52	101.8	59 10.1	71 52	101.2	59 31.2	70 52	100.5	60 53.5	67 53	97.5	3
4	53 47.4	78 51	107.9	54 34.1	77 51	106.9	55 42.9	76 51	105.2	56 50.3	74 52	103.4	58 17.5	71 52	100.8	58 38.8	71 52	100.2	58 59.9	70 52	99.5	60 22.0	67 53	96.6	4
45	53 17.1	78 51	106.9	54 03.6	77 51	105.8	55 12.1	75 52	104.1	56 19.3	74 52	102.4	57 46.2	71 52	99.8	58 07.5	70 52	99.2	58 28.5	70 52	98.5	59 50.4	67 53	95.6	45
6	52 46.6	78 51	105.8	53 32.9	77 51	104.8	54 41.2	75 52	103.1	55 48.2	73 52	101.4	57 14.9	71 52	98.8	57 36.0	70 52	98.2	57 57.0	70 53	97.5	59 18.7	66 53	94.7	6
7	52 15.9	77 51	104.8	53 02.1	76 52	103.8	54 10.2	75 52	102.1	55 16.9	73 52	100.4	56 43.4	71 53	97.9	57 04.5	70 53	97.2	57 25.5	69 53	96.6	58 47.0	66 53	93.8	7
8	51 45.1	77 52	103.8	52 31.1	76 52	102.7	53 39.1	75 52	101.1	54 45.6	73 52	99.4	56 11.9	71 53	96.9	56 33.0	70 53	96.3	56 53.8	69 53	95.6	58 15.2	66 53	92.9	8
9	51 14.2	77 52	102.8	52 00.1	76 52	101.8	53 07.8	75 52	100.1	54 14.2	73 52	98.4	55 40.3	71 53	96.0	56 01.3	70 53	95.4	56 22.2	69 53	94.7	57 43.5	66 53	92.0	9
50	50 43.1	77 52	101.8	51 28.9	76 52	100.8	52 36.5	74 52	99.2	53 42.7	73 53	97.5	55 08.6	70 53	95.1	55 29.6	70 53	94.4	55 50.5	69 53	93.8	57 11.7	66 53	91.1	50
1	50 11.9	77 52	100.8	50 57.6	76 52	99.8	52 05.0	74 53	98.2	53 11.1	73 53	96.5	54 36.9	70 53	94.2	54 57.9	70 53	93.5	55 18.7	69 53	92.9	56 39.9	66 53	90.3	1
2	49 40.6	76 52	99.9	50 26.2	76 52	98.9	51 33.5	74 53	97.3	52 39.5	73 53	95.6	54 05.2	70 53	93.3	54 26.2	70 53	92.7	54 47.0	69 53	92.0	56 08.1	66 53	89.4	2
3	49 09.3	76 52	98.9	49 54.8	75 53	97.9	51 02.0	74 53	96.3	52 07.9	72 53	94.7	53 33.5	70 53	92.4	53 54.4	70 53	91.8	54 15.2	69 53	91.2	55 36.3	66 53	88.6	3
4	48 37.8	76 53	98.0	49 23.2	75 53	97.0	50 30.3	74 53	95.4	51 36.2	72 53	93.8	53 01.7	70 53	91.5	53 22.6	70 53	90.9	53 43.4	69 53	90.3	55 04.5	66 53	87.8	4
55	48 06.3	76 53	97.1	48 51.6	75 53	96.1	49 58.7	74 53	94.5	51 04.4	72 53	92.9	52 29.9	70 53	90.6	52 50.8	70 53	90.1	53 11.6	69 53	89.5	54 32.8	66 53	87.0	55
6	47 34.7	76 53	96.1	48 20.0	75 53	95.2	49 27.0	74 53	93.6	50 32.6	72 53	92.0	51 58.1	70 53	89.8	52 19.0	70 53	89.2	52 39.8	69 53	88.6	54 01.0	66 53	86.2	6
7	47 03.1	76 53	95.2	47 48.3	75 53	94.3	48 55.2	74 53	92.8	50 00.9	72 53	91.2	51 26.3	70 53	89.0	51 47.3	70 53	88.4	52 08.0	69 53	87.8	53 29.3	66 53	85.4	7
8	46 31.4	76 53	94.3	47 16.6	75 53	93.4	48 23.4	74 53	91.9	49 29.1	72 53	90.3	50 54.5	70 53	88.1	51 15.5	70 53	87.6	51 36.3	69 53	87.0	52 57.7	67 53	84.6	8
9	45 59.7	76 53	93.5	46 44.8	75 53	92.5	47 51.7	74 53	91.0	48 57.3	72 53	89.5	50 22.7	70 53	87.3	50 43.7	70 53	86.7	51 04.5	69 53	86.2	52 26.0	67 53	83.8	9
60	45 27.9	76 53	92.6	46 13.1	75 53	91.6	47 19.9	74 53	90.2	48 25.5	72 53	88.6	49 51.0	70 53	86.5	50 12.0	70 53	85.9	50 32.8	69 53	85.4	51 54.4	67 53	83.0	60
1	44 56.2	76 53	91.7	45 41.3	75 53	90.8	46 48.1	74 53	89.3	47 53.7	72 53	87.8	49 19.3	70 53	85.7	49 40.3	70 53	85.1	50 01.2	69 53	84.6	51 22.9	67 52	82.3	1
2	44 24.4	76 53	90.9	45 09.5	75 53	89.9	46 16.3	74 53	88.5	47 21.9	72 53	87.0	48 47.6	70 53	84.9	49 08.6	70 53	84.3	49 29.5	69 53	83.8	50 51.4	67 52	81.5	2
3	43 52.6	76 53	90.0	44 37.7	75 53	89.1	45 44.5	74 53	87.7	46 50.2	72 53	86.2	48 15.9	70 53	84.1	48 37.0	70 53	83.6	48 57.9	69 53	83.0	50 20.0	67 52	80.8	3
4	43 20.8	76 53	89.2	44 05.9	75 53	88.2	45 12.7	74 53	86.8	46 18.5	72 53	85.4	47 44.3	71 53	83.3	48 05.4	70 53	82.8	48 26.4	70 52	82.2	49 48.7	67 52	80.0	4
65	42 49.0	76 53	88.3	43 34.1	75 53	87.4	44 41.0	74 53	86.0	45 46.8	73 53	84.6	47 12.8	71 52	82.5	47 33.9	70 52	82.0	47 54.9	70 52	81.5	49 17.4	68 52	79.3	65
6	42 17.2	76 53	87.5	43 02.4	75 53	86.6	44 09.3	74 53	85.2	45 15.2	73 53	83.8	46 41.3	71 52	81.8	47 02.5	70 52	81.2	47 23.5	70 52	80.7	48 46.2	68 52	78.6	6
7	41 45.5	76 53	86.7	42 30.7	75 53	85.8	43 37.6	74 53	84.4	44 43.6	73 53	83.0	46 09.9	71 52	81.0	46 31.1	71 52	80.5	46 52.2	70 52	80.0	48 15.1	68 52	77.8	7
8	41 13.7	76 53	85.8	41 59.0	75 53	85.0	43 06.0	74 53	83.6	44 12.1	73 52	82.2	45 38.5	71 52	80.2	45 59.8	71 52	79.7	46 20.9	70 52	79.2	47 44.0	68 52	77.1	8
9	40 42.0	76 53	85.0	41 27.3	75 53	84.2	42 34.5	74 53	82.8	43 40.6	73 52	81.4	45 07.2	71 52	79.5	45 28.5	71 52	79.0	45 49.7	70 52	78.5	47 13.1	69 51	76.4	9
70	40 10.4	76 53	84.2	40 55.7	75 53	83.4	42 02.9	74 52	82.0	43 09.2	73 52	80.7	44 36.0	71 52	78.7	44 57.3	71 52	78.2	45 18.6	71 52	77.7	46 42.2	69 51	75.7	70
1	39 38.8	76 53	83.4	40 24.1	75 52	82.6	41 31.5	74 52	81.3	42 37.9	73 52	79.9	44 04.8	72 52	78.0	44 26.3	71 52	77.5	44 47.6	71 52	77.0	46 11.5	69 51	75.0	1
2	39 07.2	76 52	82.6	39 52.6	75 52	81.8	41 00.1	74 52	80.5	42 06.6	73 52	79.1	43 33.8	72 52	77.3	43 55.3	71 52	76.8	44 16.6	71 51	76.3	45 40.8	69 51	74.3	2
3	38 35.7	76 52	81.8	39 21.2	76 52	81.0	40 28.8	75 52	79.7	41 35.4	74 52	78.4	43 02.8	72 51	76.5	43 24.4	72 51	76.0	43 45.8	71 51	75.6	45 10.3	70 51	73.6	3
4	38 04.3	76 52	81.1	38 49.8	76 52	80.2	39 57.5	75 52	78.9	41 04.3	74 52	77.6	42 31.9	72 51	75.8	42 53.5	72 51	75.3	43 15.0	71 51	74.8	44 39.8	70 51	72.9	4
75	37 32.9	76 52	80.3	38 18.5	76 52	79.5	39 26.4	75 52	78.2	40 33.3	74 52	76.9	42 01.2	72 51	75.1	42 22.8	72 51	74.6	42 44.4	72 51	74.1	44 09.5	70 50	72.2	75
6	37 01.6	76 52	79.5	37 47.3	76 52	78.7	38 55.3	75 52	77.4	40 02.4	74 51	76.1	41 30.5	73 51	74.3	41 52.2	72 51	73.9	42 13.9	72 51	73.4	43 39.3	70 50	71.5	6
7	36 30.4	77 52	78.7	37 16.2	76 52	77.9	38 24.3	75 51	76.7	39 31.6	74 51	75.4	40 59.9	73 51	73.6	41 21.8	73 51	73.2	41 43.5	72 50	72.7	43 09.2	71 50	70.8	7
8	35 59.2	77 52	78.0	36 45.1	76 52	77.2	37 53.4	75 51	75.9	39 00.9	74 51	74.7	40 29.5	73 51	72.9	40 51.4	73 50	72.5	41 13.2	72 50	72.0	42 39.2	71 50	70.1	8
9	35 28.2	77 52	77.2	36 14.2	76 51	76.4	37 22.6	76 51	75.2	38 30.3	75 51	73.9	39 59.1	73 50	72.2	40 21.1	73 50	71.7	40 43.0	73 50	71.3	42 09.4	71 50	69.4	9
80	34 57.2	77 51	76.4	35 43.3	77 51	75.6	36 51.9	76 51	74.4	37 59.8	75 51	73.2	39 28.9	74 50	71.5	39 51.0	73 50	71.0	40 12.9	73 50	70.6	41 39.7	72 49	68.8	80
1	34 26.4	77 51	75.7	35 12.6	77 51	74.9	36 21.4	76 51	73.7	37 29.4	75 50	72.5	38 58.8	74 50	70.8	39 21.0	74 50	70.3	39 43.0	73 50	69.9	41 10.1	72 49	68.1	1
2	33 55.6	77 51	74.9	34 42.0	77 51	74.1	35 50.9	76 51	73.0	36 59.1	75 50	71.7	38 28.9	74 50	70.1	38 51.1	74 50	69.6	39 13.2	74 49	69.2	40 40.7	72 49	67.4	2
3	33 25.0	78 51	74.2	34 11.4	77 51	73.4	35 20.6	76 50	72.2	36 29.0	76 50	71.0	37 59.1	74 49	69.4	38 21.4	74 49	68.9	38 43.6	74 49	68.5	40 11.4	73 49	66.7	3
4	32 54.4	78 51	73.4	33 41.0	77 50	72.7	34 50.3	77 50	71.5	35 59.0	76 50	70.3	37 29.4	75 49	68.7	37 51.8	74 49	68.2	38 14.1	74 49	67.8	39 42.3	73 48	66.1	4
85	32 24.0	78 50	72.7	33 10.7	78 50	71.9	34 20.3	77 50	70.8	35 29.1	76 50	69.6	36 59.8	75 49	68.0	37 22.3	75 49	67.5	37 46.7	74 49	67.1	39 13.3	73 48	65.4	85
6	31 53.7	78 50	71.9	32 40.6	78 50	71.2	33 50.3	77 50	70.0	34 59.4	76 49	68.9	36 30.4	75 49	67.3	36 53.0	75 49	66.9	37 15.5	75 48	66.4	38 44.5	74 48	64.7	6
7	31 23.6	78 50	71.2	32 10.5	78 50	70.4	33 20.5	77 49	69.3	34 29.8	77 49	68.2	36 01.2	76 48	66.6	36 23.8	75 48	66.2	36 46.4	75 48	65.8	38 15.8	74 48	64.1	7
8	30 53.6	79 50	70.4	31 40.7	78 50	69.7	32 50.8	78 49	68.6	34 00.4	77 49	67.4	35 32.1	76 48	65.9	35 54.8	76 48	65.5	36 17.5	75 48	65.1	37 47.3	74 47	63.4	8
9	30 23.7	79 50	69.7	31 10.9	79 49	69.0	32 21.3	78 49	67.9	33 31.1	77 49	66.7	35 03.2	76 48	65.2	35 26.0	76 48	64.8	35 48.7	76 48	64.4	37 18.9	75 47	62.7	9
90	29 53.9	79 49	68.9	30 41.3	79 49	68.2	31 51.9	78 49	67.1	33 02.0	77 48	66.0	34 34.4	77 48	64.5	34 57.3	76 48	64.1	35 20.1	76 47	63.7	36 50.7	75 47	62.1	90

Lat. 58°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	29 24.3	79 49	68.2	30 11.8	79 49	67.5	31 22.7	78 48	66.4	32 33.0	78 48	65.3	34 05.8	77 47	63.8	34 28.8	77 47	63.4	34 51.7	76 47	63.0	36 22.7	75 46	61.4	91
2	28 54.9	80 49	67.5	29 42.6	79 49	66.8	30 53.6	79 48	65.7	32 04.2	78 48	64.6	33 37.3	77 47	63.1	34 00.4	77 47	62.7	34 23.5	77 47	62.3	35 54.9	76 46	60.8	2
3	28 25.6	80 49	66.7	29 13.4	80 48	66.0	30 24.7	79 48	65.0	31 35.5	78 47	63.9	33 09.0	77 47	62.4	33 32.3	77 47	62.0	33 55.4	77 46	61.7	35 27.2	76 46	60.1	3
4	27 56.5	80 48	66.0	28 44.4	80 48	65.3	29 56.0	79 48	64.3	31 07.1	79 47	63.2	32 41.0	78 47	61.7	33 04.3	78 46	61.4	33 27.5	77 46	61.0	34 59.8	76 45	59.4	4
95	27 27.5	80 48	65.3	28 15.6	80 48	64.6	29 27.4	80 47	63.6	30 38.8	79 47	62.5	32 13.0	78 46	61.1	32 36.5	78 46	60.7	32 59.8	78 46	60.3	34 32.5	77 45	58.8	95
6	26 58.7	81 48	64.5	27 47.0	80 47	63.9	28 59.1	80 47	62.8	30 10.7	79 47	61.8	31 45.3	78 46	60.4	32 08.8	78 46	60.0	32 32.3	78 46	59.6	34 05.4	77 45	58.1	6
7	26 30.1	81 47	63.8	27 18.5	81 47	63.1	28 30.9	80 47	62.1	29 42.7	80 46	61.1	31 17.8	79 46	59.7	31 41.4	79 45	59.3	32 04.9	78 45	59.0	33 38.5	78 44	57.5	7
8	26 01.7	81 47	63.1	26 50.3	81 47	62.4	28 02.9	80 46	61.4	29 15.0	80 46	60.4	30 50.4	79 45	59.0	31 14.1	79 45	58.6	31 37.8	79 45	58.3	33 11.8	78 44	56.8	8
9	25 33.4	81 47	62.3	26 22.2	81 46	61.7	27 35.0	81 46	60.7	28 47.4	80 46	59.7	30 23.3	79 45	58.3	30 47.1	79 45	58.0	31 10.8	79 45	57.6	32 45.3	78 44	56.1	9
100	25 05.3	82 46	61.6	25 54.3	81 46	61.0	27 07.4	81 46	60.0	28 20.1	81 45	59.0	29 56.3	80 45	57.6	30 20.2	80 44	57.3	30 44.1	79 44	56.9	32 19.0	79 44	55.5	100
1	24 37.5	82 46	60.9	25 26.6	82 46	60.2	26 40.0	81 45	59.3	27 52.9	81 45	58.3	29 29.6	80 44	56.9	29 53.6	80 44	56.6	30 17.6	80 44	56.2	31 52.9	79 43	54.8	1
2	24 09.8	82 46	60.2	24 59.1	82 46	59.5	26 12.7	82 45	58.6	27 26.0	81 45	57.6	29 03.0	81 44	56.3	29 27.2	80 44	55.9	29 51.2	80 44	55.6	31 27.0	79 43	54.2	2
3	23 42.3	83 45	59.4	24 31.8	82 45	58.8	25 45.7	82 45	57.9	26 59.3	82 44	56.9	28 36.7	81 44	55.6	29 00.9	81 43	55.2	29 25.1	81 43	54.9	31 01.3	80 42	53.5	3
4	23 15.0	83 45	58.7	24 04.7	83 45	58.1	25 18.9	82 44	57.1	26 32.7	82 44	56.2	28 10.6	81 43	54.9	28 34.9	81 43	54.6	28 59.2	81 43	54.2	30 35.9	80 42	52.9	4
105	22 48.0	83 45	58.0	23 37.8	83 44	57.4	24 52.3	83 44	56.4	26 06.4	82 43	55.5	27 44.7	82 43	54.2	28 09.1	81 43	53.9	28 33.5	81 42	53.5	30 10.6	81 42	52.2	105
6	22 21.1	83 44	57.2	23 11.2	83 44	56.6	24 25.9	83 44	55.7	25 40.3	82 43	54.8	27 19.0	82 42	53.5	27 43.6	82 42	53.2	28 08.1	82 42	52.9	29 45.6	81 41	51.5	6
7	21 54.5	84 44	56.5	22 44.7	84 44	55.9	23 59.8	83 43	55.0	25 14.5	83 43	54.1	26 53.5	82 42	52.8	27 18.2	82 42	52.5	27 42.8	82 42	52.2	29 20.9	81 41	50.9	7
8	21 28.1	84 44	55.8	22 18.5	84 43	55.2	23 33.8	84 43	54.3	24 48.8	83 42	53.4	26 28.3	83 42	52.1	26 53.1	83 41	51.8	27 17.8	82 41	51.5	28 56.3	82 41	50.2	8
9	21 01.9	84 43	55.0	21 52.5	84 43	54.5	23 08.1	84 42	53.6	24 23.4	84 42	52.7	26 03.3	83 41	51.5	26 28.2	83 41	51.1	26 53.1	83 41	50.8	28 32.0	82 40	49.6	9
110	20 36.0	85 43	54.3	21 26.7	84 43	53.7	22 42.6	84 42	52.9	23 58.3	84 42	52.0	25 38.6	83 41	50.8	26 03.6	83 41	50.5	26 28.5	83 40	50.2	28 07.9	83 40	48.9	110
1	20 10.3	85 42	53.6	21 01.2	85 42	53.0	22 17.4	85 42	52.2	23 33.3	84 41	51.3	25 14.1	84 40	50.1	25 39.2	84 40	49.8	26 04.2	83 40	49.5	27 44.1	83 39	48.2	1
2	19 44.8	85 42	52.8	20 36.0	85 42	52.3	21 52.4	85 41	51.4	23 08.7	85 41	50.6	24 49.8	84 40	49.4	25 15.0	84 40	49.1	25 40.2	84 40	48.8	27 20.5	83 39	47.6	2
3	19 19.6	86 42	52.1	20 10.9	85 41	51.6	21 27.7	85 41	50.7	22 44.2	85 40	49.9	24 25.8	84 40	48.7	24 51.1	84 39	48.4	25 16.4	84 39	48.1	26 57.1	84 38	46.9	3
4	18 54.7	86 41	51.4	19 46.2	86 41	50.8	21 03.2	85 40	50.0	22 20.0	85 40	49.2	24 02.0	85 39	48.0	24 27.5	85 39	47.7	24 52.9	85 39	47.4	26 34.1	84 38	46.2	4
115	18 29.9	86 41	50.6	19 21.6	86 40	50.1	20 39.0	86 40	49.3	21 56.1	86 39	48.5	23 38.5	85 39	47.3	24 04.1	85 39	47.0	24 29.6	85 38	46.8	26 11.2	84 38	45.6	115
6	18 05.5	87 40	49.9	18 57.4	86 40	49.4	20 15.0	86 40	48.6	21 32.4	86 39	47.8	23 15.3	86 38	46.6	23 40.9	85 38	46.4	24 06.5	85 38	46.1	25 48.6	85 37	44.9	6
7	17 41.3	87 40	49.2	18 33.4	87 40	48.6	19 51.3	86 39	47.8	21 09.0	86 39	47.0	22 52.3	86 38	45.9	23 18.1	86 38	45.7	23 43.8	86 38	45.4	25 26.3	85 37	44.2	7
8	17 17.4	87 39	48.4	18 09.6	87 39	47.9	19 27.9	87 39	47.1	20 45.9	87 38	46.3	22 29.6	86 37	45.2	22 55.4	86 37	45.0	23 21.3	86 37	44.7	25 04.3	86 36	43.6	8
9	16 53.7	87 39	47.7	17 46.2	87 39	47.2	19 04.7	87 38	46.4	20 23.0	87 38	45.6	22 07.1	87 37	44.6	22 33.1	86 37	44.3	22 59.0	86 37	44.0	24 42.5	86 36	42.9	9
120	16 30.4	88 38	46.9	17 23.0	88 38	46.4	18 41.8	87 38	45.7	20 00.5	87 37	44.9	21 45.0	87 36	43.9	22 11.0	87 36	43.6	22 37.1	87 36	43.3	24 21.0	86 35	42.2	120
1	16 07.3	88 38	46.2	17 00.1	88 38	45.7	18 19.2	88 37	45.0	19 38.1	88 37	44.2	21 23.1	87 36	43.2	21 49.3	87 36	42.9	22 15.4	87 36	42.6	23 59.8	87 35	41.6	1
2	15 44.4	88 38	45.5	16 37.5	88 37	45.0	17 56.9	88 37	44.2	19 16.1	88 36	43.5	21 01.5	88 36	42.5	21 27.8	88 35	42.2	21 54.0	87 35	41.9	23 38.8	87 34	40.9	2
3	15 21.9	89 37	44.7	16 15.1	89 37	44.2	17 34.8	88 36	43.5	18 54.4	88 36	42.8	20 40.2	88 35	41.8	21 06.5	88 35	41.5	21 32.9	88 35	41.3	23 18.1	88 34	40.2	3
4	14 59.7	89 37	44.0	15 53.1	89 36	43.5	17 13.1	89 36	42.8	18 32.9	89 35	42.1	20 19.1	88 35	41.1	20 45.6	88 34	40.8	21 12.1	88 34	40.6	22 57.7	88 33	39.5	4
125	14 37.8	89 36	43.2	15 31.4	89 36	42.8	16 51.7	89 35	42.1	18 11.8	89 35	41.3	19 58.4	89 34	40.4	20 25.0	89 34	40.1	20 51.6	89 34	39.9	22 37.6	88 33	38.9	125
6	14 16.2	90 36	42.5	15 09.9	90 35	42.0	16 30.5	89 35	41.3	17 50.9	89 34	40.6	19 37.9	89 34	39.7	20 04.6	89 33	39.4	20 31.3	89 33	39.2	22 17.8	89 32	38.2	6
7	13 54.8	90 35	41.7	14 48.8	90 35	41.3	16 09.7	90 34	40.6	17 30.4	90 34	39.9	19 17.8	89 33	39.0	19 44.6	89 33	38.7	20 11.4	89 33	38.5	21 58.3	89 32	37.5	7
8	13 33.8	90 34	41.0	14 28.0	90 34	40.5	15 49.1	90 34	39.9	17 10.1	90 33	39.2	18 57.9	90 33	38.3	19 24.9	90 32	38.0	19 51.7	90 32	37.8	21 39.1	89 32	36.8	8
9	13 13.1	91 34	40.2	14 07.5	91 34	39.8	15 28.9	90 33	39.1	16 50.2	90 33	38.5	18 38.4	90 32	37.6	19 05.4	90 32	37.3	19 32.4	90 32	37.1	21 20.2	90 31	36.2	9
130	12 52.8	91 33	39.5	13 47.3	91 33	39.0	15 09.0	91 33	38.4	16 30.6	91 32	37.7	18 19.2	90 32	36.8	18 46.3	90 31	36.6	19 13.4	90 31	36.4	21 01.6	90 30	35.5	130
1	12 32.7	91 33	38.7	13 27.4	91 33	38.3	14 49.4	91 32	37.7	16 11.3	91 32	37.0	18 00.3	91 31	36.1	18 27.5	91 31	35.9	18 54.7	91 31	35.7	20 43.3	90 30	34.8	1
2	12 13.0	92 32	38.0	13 07.9	91 32	37.5	14 30.1	91 32	36.9	15 52.3	91 31	36.3	17 41.7	91 30	35.4	18 09.0	91 30	35.2	18 36.3	91 30	35.0	20 25.3	91 29	34.1	2
3	11 53.6	92 32	37.2	12 48.7	92 31	36.8	14 11.2	92 31	36.2	15 33.7	92 31	35.6	17 23.4	91 30	34.7	17 50.8	91 30	34.5	18 18.2	91 30	34.3	20 07.6	91 29	33.4	3
4	11 34.5	92 31	36.4	12 29.8	92 31	36.0	13 52.6	92 30	35.4	15 15.3	92 30	34.8	17 05.5	92 29	34.0	17 33.0	92 29	33.8	18 00.5	92 29	33.6	19 50.3	91 28	32.7	4
135	11 15.8	92 31	35.7	12 11.3	92 30	35.3	13 34.3	92 30	34.7	14 57.3	92 29	34.1	16 47.9	92 29	33.3	17 15.5	92 29	33.1	17 43.0	92 28	32.9	19 33.3	92 28	32.0	135
6	10 57.4	93 30	34.9	11 53.1	93 30	34.5	13 16.4	93 29	34.0	14 39.7	92 29	33.4	16 30.6	92 28	32.6	16 58.3	92 28	32.4	17 25.9	92 28	32.2	19 16.6	92 27	31.4	6
7	10 39.4	93 29	34.2	11 35.2	93 29	33.8	12 58.8	93 29	33.2	14 22.4	93 28	32.6	16 13.6	93 28	31.9	16 41.4	93 28	31.7	17 09.2	93 27	31.5	19 00.2	92 27	30.7	7
8	10 21.7	93 29	33.4	11 17.7	93 29	33.0	12 41.6	93 28	32.5	14 05.4	93 28	31.9	15 57.0	93 27	31.1	16 24.9	93 27	31.0	16 52.8	93 27	30.8	18 44.1	93 26	30.0	8
9	10 04.4	94 28	32.6	11 00.5	94 28	32.3	12 24.7	93 28	31.7	13 48.8	93 27	31.2	15 40.7	93 27	30.4	16 08.7	93 26	30.2	16 36.7	93 26	30.0	18 28.4	93 26	29.3	9
140	9 47.5	94 28	31.9	10 43.8	94 27	31.5	12 08.1	94 27	31.0	13 32.5	94 27	30.4	15 24.8	94 26	29.7	15 52.9	94 26	29.5	16 20.9	93 26	29.3	18 13.0	93 25	28.6	140
1	9 30.9	94 27	31.1	10 27.3	94 27	30.7	11 52.0	94 26	30.2	13 16.5	94 26	29.7	15 09.2	94 25	29.0	15 37.4	94 25	28.8	16 05.5	94 25	28.6	17 58.0	94 24	27.9	1
2	9 14.6	94 26	30.3	10 11.3	94 26	30.0	11 36.1	94 26	29.5	13 01.0	94 25	29.0	14 54.0	94 25	28.3	15 22.2	94 25	28.1	15 50.5	94 24	27.9	17 43.3	94 24	27.2	2
3	8 58.8	95 26	29.5	9 55.6	95 26	29.2	11 20.7	95 25	28.7	12 45.8	95 25	28.2	14 39.1	94 24	27.5	15 07.4	94 24	27.4	15 35.7	94 24	27.2	17 28.9	94 23	26.5	3
4	8 43.3	95 25	28.8	9 40.2	95 25	28.4	11 05.6	95 25	28.0	12 30.9	95 24	27.5	14 24.6	95 24	26.8	14 53.0	95 23	26.6	15 21.4	95 23	26.5	17 14.9	95 23	25.8	4
145	8 28.2	95 25	28.0	9 25.3	95 24	27.7	10 50.9	95 24	27.2	12 16.4	95 24	26.7	14 10.4	95 23	26.1	14 38.9	95 23	25.9	15 07.4	95 23	25.8	17 01.2	95 22	25.1	145
6	8 13.5	95 24	27.2	9 10.7	95 24	26.9	10 36.5	95 23	26.4	12 02.3	95 23	26.0	13 56.6	95 22	25.4	14 25.2	95 22	25.2	14 53.8	95 22	25.0	16 47.9	95 22	24.4	6
7	7 59.1	96 23	26.4	8 56.5	96 23	26.1	10 22.6	96 23	25.7	11 48.6	96 22	25.2	13 43.2	95 22	24.6	14 11.9	95 22	24.5	14 40.5	95 22	24.3	16 35.0	95 21	23.7	7
8	7 45.2	96 23	25.6	8 42.7	96 22	25.4	10 09.0	96 22	24.9	11 35.2	96 22	24.5	13 30.2	96 21	23.9	13 58.9	96 21	23.7	14 27.6	96 21	23.6	16 22.4	96 20	23.0	8
9	7 31.6	96 22	24.9	8 29.3	96 22	24.6	9 55.8	96 21	24.2	11 22.2	96 21	23.7	13 17.5	96 21	23.2	13 46.3	96 20	23.0	14 15.0	96 20	22.9	16 10.1	96 20	22.3	9
150	7 18.4	96 21	24.1	8 16.3	96 21	23.8	9 43.0	96 21	23.4	11 09.6	96 20	23.0	13 05.1	96 20	22.4	13 34.0	96 20	22.3	14 02.9	96 20	22.1	15 58.3	96 19	21.6	150
1	7 05.7	97 21	23.3	8 03.6	97 20	23.0	9 30.5	97 20	22.6	10 57.4	97 20	22.2	12 53.2	96 19	21.7	13 22.1	96 19	21.6	13 51.1	96 19	21.4	15 46.8	96 19	20.9	1
2	6 53.3	97 20	22.5	7 51.4	97 20	22.2	9 18.5	97 19	21.9	10 45.6	97 19	21.5	12 41.6	97 19	21.0	13 10.6	97 19	20.8	13 39.6	97 18	20.7	15 35.6	97 18	20.2	2
3	6 41.4	97 19	21.7	7 39.6	97 19	21.5	9 06.9	97 19	21.1	10 34.1	97 18	20.7	12 30.5	97 18	20.2	12 59.5	97 18	20.1	13 28.6	97 18	20.0	15 24.8	97 17	19.5	3
4	6 29.8	97 19	20.9	7 28.1	97 18	20.7	8 55.6	97 18	20.3	10 23.1	97 18	20.0	12 19.7	97 17	19.5	12 48.8	97 17	19.4	13 17.9	97 17	19.2	15 14.4	97 17	18.7	4
155	6 18.7	97 18	20.1	7 17.1	97 18	19.9	8 44.8	97 17	19.6	10 12.4	97 17	19.2	12 09.3	97 17	18.7	12 38.5	97 17	18.6	13 07.7	97 16	18.5	15 04.4	97 16	18.0	155
6	6 07.9	98 17	19.3	7 06.5	98 17	19.1	8 34.3	98 17	18.8	10 02.2	98 16	18.4	11 59.2	98 16	18.0	12 28.5	98 16	17.9	12 57.8	98 16	17.8	14 54.8	97 15	17.3	6
7	5 57.6	98 16	18.5	6 56.3	98 16	18.3	8 24.3	98 16	18.0	9 52.3	98 16	17.7	11 49.6	98 15	17.3	12 18.9	98 15	17.1	12 48.2	98 15	17.0	14 45.5	98 15	16.6	7
8	5 47.7	98 16	17.7	6 46.5	98 16	17.5	8 14.7	98 15	17.2	9 42.8	98 15	16.9	11 40.4	98 15	16.5	12 09.7	98 15	16.4	12 39.1	98 15	16.3	14 36.6	98 14	15.9	8
9	5 38.2	98 15	16.9	6 37.1	98 15	16.7	8 05.5	98 15	16.5	9 33.8	98 14	16.2	11 31.5	98 14	15.8	12 01.0	98 14	15.7	12 30.4	98 14	15.6	14 28.1	98 14	15.2	9
160	5 29.2	98 14	16.1	6 28.2	98 14	16.0	7 56.7	98 14	15.7	9 25.1	98 14	15.4	11 23.1	98 13	15.0	11 52.6	98 13	14.9	12 22.1	98 13	14.8	14 20.0	98 13	14.5	160
1	5 20.6	98 14	15.3	6 19.7	98 14	15.2	7 48.3	98 13	14.9	9 16.9	98 13	14.6	11 15.0	98 13	14.3	11 44.6	98 13	14.2	12 14.1	98 13	14.1	14 12.2	98 12	13.7	1
2	5 12.4	99 13	14.5	6 11.6	99 13	14.4	7 40.3	99 13	14.1	9 09.1	99 12	13.9	11 07.4	99 12	13.5	11 37.0	99 12	13.4	12 06.6	99 12	13.4	14 04.9	99 12	13.0	2
3	5 04.6	99 12	13.7	6 03.9	99 12	13.6	7 32.8	99 12	13.3	9 01.7	99 12	13.1	11 00.2	99 11	12.8	11 29.8	99 11	12.7	11 59.4	99 11	12.6	13 57.9	99 11	12.3	3
4				5 56.6	99 11	12.8	7 25.6	99 11	12.6	8 54.7	99 11	12.3	10 53.3	99 11	12.0	11 23.0	99 11	12.0	11 52.7	99 11	11.9	13 51.3	99 10	11.6	4
165				5 49.8	99 11	12.0	7 18.9	99 10	11.8	8 48.1	99 10	11.6	10 46.9	99 10	11.3	11 16.6	99 10	11.2	11 46.3	99 10	11.1	13 45.1	99 10	10.9	165
6				5 43.4	99 10	11.2	7 12.7	99 10	11.0	8 41.9	99 10	10.8	10 40.9	99 09	10.5	11 10.6	99 09	10.5	11 40.4	99 09	10.4	13 39.3	99 09	10.1	6
7				5 37.5	99 09	10.4	7 06.8	99 09	10.2	8 36.1	99 09	10.0	10 35.3	99 09	09.8	11 05.0	99 09	09.7	11 34.8	99 09	09.7	13 33.9	99 08	09.4	7
8				5 31.9	99 08	09.6	7 01.4	99 08	09.4	8 30.8	99 08	09.3	10 30.1	99 08	09.0	10 59.9	99 08	09.0	11 29.7	99 08	08.9	13 28.9	99 08	08.7	8
9				5 26.8	99 08	08.8	6 56.4	99 08	08.7	8 25.9	99 07	08.5	10 25.3	99 07	08.3	10 55.1	99 07	08.2	11 25.0	99 07	08.2	13 24.3	99 07	08.0	9
170				5 22.2	1.0 07	08.0	6 51.8	1.0 07	07.9	8 21.4	1.0 07	07.7	10 20.9	1.0 07	07.5	10 50.8	1.0 07	07.5	11 20.6	1.0 07	07.4	13 20.1	1.0 06	07.2	170
1				5 18.0	1.0 06	07.2	6 47.7	1.0 06	07.1	8 17.4	1.0 06	07.0	10 16.9	1.0 06	06.8	10 46.8	1.0 06	06.7	11 16.7	1.0 06	06.7	13 16.3	1.0 06	06.5	1
2				5 14.2	1.0 06	06.4	6 44.0	1.0 05	06.3	8 13.7	1.0 05	06.2	10 13.4	1.0 05	06.0	10 43.3	1.0 05	06.0	11 13.2	1.0 05	06.0	13 12.9	1.0 05	05.8	2
3				5 10.9	1.0 05	05.6	6 40.7	1.0 05	05.5	8 10.5	1.0 05	05.4	10 10.2	1.0 05	05.3	10 40.2	1.0 04	05.2	11 10.1	1.0 04	05.2	13 09.9	1.0 04	05.1	3
4				5 08.0	1.0 04	04.8	6 37.9	1.0 04	04.7	8 07.7	1.0 04	04.6	10 07.5	1.0 04	04.5	10 37.5	1.0 04	04.5	11 07.4	1.0 04	04.5	13 07.2	1.0 04	04.4	4
175				5 05.6	1.0 03	04.0	6 35.5	1.0 03	03.9	8 05.4	1.0 03	03.9	10 05.2	1.0 03	03.8	10 35.2	1.0 03	03.7	11 05.2	1.0 03	03.7	13 05.0	1.0 03	03.6	175
6				5 03.6	1.0 03	03.2	6 33.5	1.0 03	03.2	8 03.4	1.0 02	03.1	10 03.3	1.0 02	03.0	10 33.3	1.0 02	03.0	11 03.3	1.0 02	03.0	13 03.2	1.0 02	02.9	6
7				5 02.0	1.0 02	02.4	6 32.0	1.0 02	02.4	8 01.9	1.0 02	02.3	10 01.9	1.0 02	02.3	10 31.9	1.0 02	02.2	11 01.9	1.0 02	02.2	13 01.8	1.0 02	02.2	7
8				5 00.9	1.0 01	01.6	6 30.9	1.0 01	01.6	8 00.9	1.0 01	01.5	10 00.8	1.0 01	01.5	10 30.8	1.0 01	01.5	11 00.8	1.0 01	01.5	13 00.8	1.0 01	01.5	8
9				5 00.2	1.0 00	00.8	6 30.2	1.0 00	00.8	8 00.2	1.0 00	00.8	10 00.2	1.0 00	00.8	10 30.2	1.0 00	00.8	11 00.2	1.0 00	00.7	13 00.2	1.0 00	00.7	9
180				5 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	8 00.0	1.0 00	00.0	10 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	11 00.0	1.0 00	00.0	13 00.0	1.0 00	00.0	180

La 59

Lat. 58°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	78 00.0	1.0 02	180.0	79 00.0	1.0 02	180.0	80 30.0	1.0 02	180.0	81 30.0	1.0 02	180.0	82 30.0	1.0 02	180.0	83 30.0	1.0 03	180.0	84 30.0	1.0 03	180.0	86 00.0	1.0 04	180.0	00
1	77 59.1	1.0 05	176.7	78 59.0	1.0 05	176.4	80 28.9	1.0 06	176.0	81 28.8	1.0 06	175.6	82 28.6	1.0 07	175.1	83 28.5	1.0 08	174.5	84 28.2	1.0 09	173.7	85 57.7	99 11	171.6	1
2	77 56.3	1.0 08	173.3	78 56.0	1.0 08	172.9	80 25.6	99 09	172.0	81 25.2	99 10	171.3	82 24.6	99 11	170.3	83 23.9	99 12	169.1	84 23.0	98 14	167.5	85 59.8	97 18	163.5	2
3	77 51.7	99 11	170.0	78 51.1	99 11	169.4	80 20.1	99 13	168.1	81 19.1	98 14	167.0	82 18.0	98 15	165.6	83 16.5	97 17	163.8	84 14.5	96 19	161.5	85 39.8	93 24	156.0	3
4	77 45.3	98 14	166.8	78 44.3	98 14	165.9	80 12.4	98 16	164.2	81 10.9	97 17	162.8	82 08.9	96 19	161.0	83 06.3	95 21	158.8	84 02.9	93 24	155.8	85 25.1	89 30	149.1	4
05	77 37.2	98 16	163.6	78 35.7	97 17	162.5	80 02.8	96 19	160.5	81 00.4	96 21	158.8	81 57.4	94 23	156.7	82 53.6	93 25	154.0	83 48.6	90 28	150.5	85 07.4	84 34	143.0	05
6	77 27.4	97 19	160.5	78 25.2	96 20	159.2	79 51.2	95 22	156.8	80 47.9	94 24	154.9	81 43.7	92 26	152.5	82 38.5	90 29	149.5	83 31.7	87 32	145.6	84 47.0	79 37	137.5	6
7	77 16.0	96 22	157.4	78 13.1	95 23	156.0	79 37.8	93 25	153.3	80 33.4	92 27	151.2	81 28.1	90 29	148.5	82 21.3	87 32	145.2	83 12.8	84 35	141.1	84 24.5	75 40	132.7	7
8	77 03.0	94 24	154.4	77 59.4	94 25	152.9	79 22.8	92 28	150.0	80 17.2	90 30	147.6	81 10.6	88 32	144.8	82 02.3	85 34	141.3	82 51.9	80 37	137.0	84 00.4	71 43	128.4	8
9	76 48.6	93 26	151.6	77 44.1	92 28	149.9	79 06.1	90 30	146.8	79 59.4	88 32	144.2	80 51.4	85 34	141.2	81 41.6	82 37	137.6	82 29.5	77 40	133.2	83 34.8	67 44	124.7	9
10	76 32.7	92 29	148.8	77 27.5	91 30	147.0	78 47.9	88 32	143.7	79 40.1	86 34	141.0	80 30.8	83 37	137.9	81 19.5	79 39	134.2	82 05.6	74 42	129.8	83 08.1	64 46	121.4	10
1	76 15.6	90 31	146.1	77 09.5	89 32	144.2	78 28.4	86 35	140.7	79 19.5	84 36	138.0	80 08.9	81 39	134.8	80 56.1	77 41	131.1	81 40.7	72 43	126.6	82 40.6	61 47	118.4	1
2	75 57.3	89 32	143.5	76 50.3	88 34	141.5	78 07.7	84 36	138.0	78 57.6	82 38	135.2	79 45.7	78 40	131.9	80 31.6	74 42	128.2	81 14.7	69 45	123.7	82 12.2	58 48	115.7	2
3	75 37.8	88 34	141.0	76 29.9	86 36	138.9	77 45.9	83 38	135.3	78 34.7	80 40	132.5	79 21.6	76 42	129.2	80 06.2	72 44	125.4	80 47.8	67 46	121.1	81 43.3	56 49	113.3	3
4	75 17.3	86 36	138.6	76 08.5	84 37	136.5	77 23.0	81 40	132.8	78 10.8	78 41	129.9	78 56.5	74 43	126.7	79 39.8	70 45	122.9	80 20.2	65 47	118.7	81 13.9	54 50	111.1	4
15	74 55.7	85 37	136.3	75 46.1	83 39	134.1	76 59.2	79 41	130.4	77 45.9	76 43	127.5	78 30.6	73 44	124.3	79 12.8	68 46	120.6	79 52.1	63 48	116.4	80 44.0	52 50	109.1	15
6	74 33.3	84 39	134.0	75 22.9	82 40	131.9	76 34.6	78 42	128.1	77 20.3	75 44	125.2	78 04.0	71 45	122.0	78 45.1	66 47	118.4	79 23.3	61 49	114.3	80 13.8	51 51	107.3	6
7	74 10.0	82 40	131.9	74 58.8	80 41	129.7	76 09.2	76 43	125.9	76 54.0	73 45	123.1	77 36.7	69 46	119.9	78 16.9	65 48	116.3	78 54.1	59 49	112.4	79 43.3	50 51	105.6	7
8	73 46.0	81 41	129.8	74 34.0	79 42	127.6	75 43.2	75 44	123.9	76 27.1	72 46	121.1	77 08.9	68 47	117.9	77 48.2	63 49	114.4	78 24.5	58 50	110.6	79 12.6	48 52	104.0	8
9	73 21.2	80 42	127.9	74 08.5	78 44	125.7	75 16.5	73 45	121.9	75 59.6	70 47	119.1	76 40.5	66 48	116.0	77 19.0	62 49	112.6	77 54.6	57 50	108.9	78 41.6	47 52	102.6	9
20	72 55.8	79 43	126.0	73 42.3	76 44	123.8	74 49.2	72 46	120.1	75 31.6	69 47	117.3	76 11.8	65 49	114.2	76 49.5	61 50	110.9	77 24.4	56 51	107.3	78 10.5	47 52	101.2	20
1	72 29.8	78 44	124.1	73 15.6	75 45	121.9	74 21.5	71 47	118.3	75 03.1	68 48	115.5	75 42.6	64 49	112.6	76 19.6	60 50	109.3	76 53.9	55 51	105.8	77 39.3	46 52	99.9	1
2	72 03.2	76 45	122.4	72 48.4	74 46	120.2	73 53.2	70 48	116.6	74 34.2	67 49	113.9	75 13.0	63 50	111.0	75 49.5	59 51	107.8	76 23.2	54 52	104.3	77 07.9	45 52	98.6	2
3	71 36.1	75 46	120.7	72 20.7	73 47	118.5	73 24.6	69 48	114.9	74 04.9	66 49	112.3	74 43.2	62 50	109.4	75 19.1	58 51	106.3	75 52.3	53 52	103.0	76 36.4	45 53	97.5	3
4	71 08.5	75 47	119.1	71 52.5	72 48	116.9	72 55.6	68 49	113.4	73 35.4	65 50	110.8	74 13.1	61 51	108.0	74 48.5	57 51	104.9	75 21.2	52 52	101.7	76 04.8	44 53	96.4	4
25	70 40.5	74 47	117.5	71 24.0	71 48	115.4	72 26.2	67 49	111.9	73 05.5	64 50	109.3	73 42.7	60 51	106.6	74 17.7	56 52	103.6	74 50.0	52 52	100.5	75 33.2	44 53	95.3	25
6	70 12.1	73 48	116.0	70 55.1	70 49	113.9	71 56.6	66 50	110.4	72 35.4	63 51	107.9	73 12.1	59 51	105.2	73 46.7	55 52	102.4	74 18.7	51 52	99.3	75 01.5	44 53	94.3	6
7	69 43.4	72 48	114.5	70 25.8	70 49	112.4	71 26.7	65 50	109.0	72 05.0	62 51	106.6	72 41.4	59 52	104.0	73 15.5	55 52	101.1	73 47.3	51 53	98.1	74 29.8	44 53	93.3	7
8	69 14.3	71 49	113.1	69 56.3	69 50	111.0	70 56.5	65 51	107.7	71 34.4	62 51	105.3	72 10.4	58 52	102.7	72 44.3	55 52	100.0	73 15.8	50 53	97.1	73 58.0	43 53	92.4	8
9	68 44.9	71 49	111.7	69 26.5	68 50	109.7	70 26.1	64 51	106.4	71 03.7	61 52	104.0	71 39.3	58 52	101.5	72 12.9	54 52	98.9	72 44.2	50 53	96.0	73 26.3	43 53	91.5	9
30	68 15.2	70 50	110.4	68 56.4	68 50	108.4	69 55.5	64 51	105.2	70 32.7	61 52	102.8	71 08.1	57 52	100.4	71 41.5	54 53	97.8	72 12.5	50 53	95.0	72 54.5	43 53	90.6	30
1	67 45.3	69 50	109.1	68 26.2	67 51	107.1	69 24.7	63 52	104.0	70 01.7	60 52	101.7	70 36.8	57 52	99.3	71 09.9	53 53	96.7	71 40.8	50 53	94.0	72 22.7	43 53	89.7	1
2	67 15.1	69 51	107.8	67 55.7	66 51	105.9	68 53.8	63 52	102.8	69 30.5	60 52	100.6	70 05.4	57 53	98.2	70 38.3	53 53	95.7	71 09.1	49 53	93.1	71 50.9	43 53	88.9	2
3	66 44.7	68 51	106.6	67 25.0	66 51	104.7	68 22.7	62 52	101.6	68 59.2	59 52	99.5	69 33.9	56 53	97.2	70 06.6	53 53	94.7	70 37.3	49 53	92.2	71 19.1	43 53	88.1	3
4	66 14.2	68 51	105.4	66 54.2	66 52	103.6	67 51.5	62 52	100.5	68 27.8	59 52	98.4	69 02.3	56 53	96.1	69 34.9	53 53	93.8	70 05.6	49 53	91.3	70 47.3	43 53	87.3	4
35	65 43.4	67 51	104.3	66 23.2	65 52	102.4	67 20.2	61 52	99.5	67 56.3	59 53	97.4	68 30.6	56 53	95.2	69 03.2	53 53	92.8	69 33.8	49 53	90.4	70 15.6	44 53	86.5	35
6	65 12.5	67 52	103.2	65 52.1	65 52	101.3	66 48.8	61 52	98.4	67 24.7	59 53	96.4	67 59.0	56 53	94.2	68 31.4	53 53	91.9	69 02.0	49 53	89.6	69 43.9	44 53	85.8	6
7	64 41.5	67 52	102.1	65 20.8	64 52	100.3	66 17.3	61 53	97.4	66 53.1	58 53	95.4	67 27.2	56 53	93.3	67 59.6	52 53	91.1	68 30.2	49 53	88.7	69 12.2	44 53	85.1	7
8	64 10.4	66 52	101.0	64 49.5	64 52	99.2	65 45.7	61 53	96.4	66 21.4	58 53	94.4	66 55.5	55 53	92.4	67 27.9	52 53	90.2	67 58.4	49 53	87.9	68 40.5	44 53	84.3	8
9	63 39.1	66 52	99.9	64 18.1	64 53	98.2	65 14.1	61 53	95.5	65 49.7	58 53	93.5	66 23.7	55 53	91.5	66 56.1	52 53	89.3	67 26.6	49 53	87.1	68 08.9	44 53	83.6	9
40	63 07.7	66 52	98.9	63 46.6	64 53	97.2	64 42.4	60 53	94.5	65 17.9	58 53	92.6	65 51.9	55 53	90.6	66 24.3	53 53	88.5	66 54.9	50 53	86.4	67 37.3	45 53	82.9	40
1	62 36.3	66 53	97.9	63 15.0	64 53	96.2	64 10.7	60 53	93.6	64 46.2	58 53	91.7	65 20.1	55 53	89.8	65 52.5	53 53	87.7	66 23.2	50 53	85.6	67 05.8	45 52	82.2	1
2	62 04.8	65 53	96.9	62 43.4	63 53	95.3	63 39.0	60 53	92.7	64 14.4	58 53	90.8	64 48.3	55 53	88.9	65 20.7	53 53	86.9	65 51.5	50 53	84.8	66 34.3	45 52	81.6	2
3	61 33.2	65 53	96.0	62 11.7	63 53	94.4	63 07.2	60 53	91.8	63 42.6	58 53	90.0	64 16.5	55 53	88.1	64 49.0	53 53	86.1	65 19.8	50 53	84.1	66 02.9	46 52	80.9	3
4	61 01.5	65 53	95.0	61 40.0	63 53	93.4	62 35.4	60 53	90.9	63 10.8	58 53	89.1	63 44.8	55 53	87.3	64 17.3	53 53	85.4	64 48.2	50 53	83.4	65 31.5	46 52	80.3	4
45	60 29.8	65 53	94.1	61 08.2	63 53	92.5	62 03.6	60 53	90.1	62 39.0	58 53	88.3	63 13.0	56 53	86.5	63 45.6	53 53	84.6	64 16.7	50 53	82.7	65 00.2	46 52	79.6	45
6	59 58.1	65 53	93.2	60 36.4	63 53	91.7	61 31.8	60 53	89.2	62 07.2	58 53	87.5	62 41.3	56 53	85.7	63 14.0	53 53	83.9	63 45.2	51 52	82.0	64 29.0	47 52	79.0	6
7	59 26.3	65 53	92.3	60 04.6	63 53	90.8	61 00.0	60 53	88.4	61 35.5	58 53	86.7	62 09.6	56 53	85.0	62 42.4	53 53	83.2	63 13.7	51 52	81.3	63 57.8	47 52	78.3	7
8	58 54.6	65 53	91.4	59 32.8	63 53	89.9	60 28.3	60 53	87.6	61 03.7	58 53	85.9	61 38.0	56 53	84.2	62 10.8	54 52	82.4	62 42.3	51 52	80.6	63 26.7	47 52	77.7	8
9	58 22.8	65 53	90.6	59 01.1	63 53	89.1	59 56.5	60 53	86.8	60 32.0	58 53	85.1	61 06.3	56 53	83.5	61 39.4	54 52	81.7	62 11.0	52 52	79.9	62 55.7	48 52	77.1	9
50	57 51.0	65 53	89.7	58 29.3	63 53	88.3	59 24.8	60 53	86.0	60 00.4	58 53	84.4	60 34.8	56 53	82.7	61 07.9	54 52	81.0	61 39.7	52 52	79.2	62 24.7	48 51	76.5	50
1	57 19.2	65 53	88.9	57 57.5	63 53	87.5	58 53.1	60 53	85.2	59 28.8	59 53	83.6	60 03.3	57 52	82.0	60 36.5	54 52	80.3	61 08.5	52 52	78.6	61 53.8	49 51	75.9	1
2	56 47.4	65 53	88.1	57 25.7	63 53	86.6	58 21.4	61 53	84.4	58 57.2	59 53	82.9	59 31.8	57 52	81.3	60 05.2	55 52	79.6	60 37.4	52 52	77.9	61 23.1	49 51	75.3	2
3	56 15.6	65 53	87.2	56 54.0	63 53	85.9	57 49.8	61 53	83.7	58 25.7	59 52	82.2	59 00.4	57 52	80.6	59 34.0	55 52	79.0	60 06.3	53 52	77.3	60 52.3	49 51	74.7	3
4	55 43.9	65 53	86.4	56 22.3	63 53	85.1	57 18.2	61 53	82.9	57 54.2	59 52	81.4	58 29.1	57 52	79.9	59 02.8	55 52	78.3	59 35.4	53 51	76.6	60 21.7	50 51	74.1	4
55	55 12.2	65 53	85.6	55 50.7	63 53	84.3	56 46.7	61 52	82.2	57 22.8	59 52	80.7	57 57.8	57 52	79.2	58 31.7	56 52	77.6	59 04.5	54 51	76.0	59 51.2	50 51	73.5	55
6	54 40.5	65 53	84.9	55 19.0	64 53	83.5	56 15.2	61 52	81.4	56 51.4	60 52	80.0	57 26.6	58 52	78.5	58 00.7	56 52	77.0	58 33.6	54 51	75.4	59 20.8	51 51	72.9	6
7	54 08.8	65 53	84.1	54 47.5	64 53	82.8	55 43.8	61 52	80.7	56 20.2	60 52	79.3	56 55.5	58 52	77.8	57 29.8	56 51	76.3	58 02.9	54 51	74.7	58 50.4	51 50	72.3	7
8	53 37.2	65 53	83.3	54 16.0	64 52	82.0	55 12.4	62 52	80.0	55 48.9	60 52	78.6	56 24.5	58 52	77.2	56 58.9	57 51	75.7	57 32.3	55 51	74.1	58 20.2	52 50	71.7	8
9	53 05.7	65 52	82.6	53 44.5	64 52	81.3	54 41.2	62 52	79.3	55 17.8	60 52	77.9	55 53.5	59 51	76.5	56 28.2	57 51	75.0	57 01.8	55 51	73.5	57 50.0	52 50	71.2	9
60	52 34.2	66 52	81.8	53 13.1	64 52	80.5	54 10.0	62 52	78.6	54 46.8	61 52	77.2	55 22.6	59 51	75.8	55 57.5	57 51	74.4	56 31.3	55 51	72.9	57 20.0	53 50	70.6	60
1	52 02.7	66 52	81.1	52 41.8	64 52	79.8	53 38.8	62 52	77.9	54 15.8	61 51	76.5	54 51.8	59 51	75.2	55 26.9	58 51	73.7	56 01.0	56 50	72.3	56 50.1	53 50	70.0	1
2	51 31.4	66 52	80.3	52 10.5	65 52	79.1	53 07.8	63 52	77.2	53 44.9	61 51	75.9	54 21.2	60 51	74.5	54 56.5	58 51	73.1	55 30.8	56 50	71.7	56 20.2	54 50	69.4	2
3	51 00.0	66 52	79.6	51 39.3	65 52	78.4	52 36.8	63 51	76.5	53 14.1	61 51	75.2	53 50.6	60 51	73.9	54 26.1	58 50	72.5	55 00.6	57 50	71.1	55 50.5	54 49	68.9	3
4	50 28.8	66 52	78.9	51 08.2	65 52	77.7	52 06.0	63 51	75.8	52 43.4	62 51	74.5	53 20.1	60 51	73.2	53 55.8	59 50	71.9	54 30.6	57 50	70.5	55 20.9	55 49	68.3	4
65	49 57.7	67 52	78.1	50 37.2	65 52	77.0	51 35.2	63 51	75.1	52 12.9	62 51	73.9	52 49.7	61 50	72.6	53 25.7	59 50	71.2	54 00.7	58 50	69.9	54 51.4	55 49	67.7	65
6	49 26.6	67 52	77.4	50 06.3	66 51	76.3	51 04.5	64 51	74.5	51 42.4	62 51	73.2	52 19.4	61 50	71.9	52 55.6	60 50	70.6	53 30.9	58 49	69.3	54 22.1	56 49	67.2	6
7	48 55.6	67 52	76.7	49 35.5	66 51	75.6	50 33.9	64 51	73.8	51 12.0	63 50	72.6	51 49.2	61 50	71.3	52 25.7	60 50	70.0	53 01.2	59 49	68.7	53 52.8	56 49	66.6	7
8	48 24.7	67 51	76.0	49 04.7	66 51	74.9	50 03.4	64 51	73.1	50 41.7	63 50	71.9	51 19.2	62 50	70.7	51 55.8	60 50	69.4	52 31.7	59 49	68.1	53 23.7	57 48	66.1	8
9	47 53.9	67 51	75.3	48 34.1	66 51	74.2	49 33.1	65 50	72.5	50 11.5	63 50	71.3	50 49.2	62 50	70.0	51 26.1	61 49	68.8	52 02.2	59 49	67.5	52 54.7	57 48	65.5	9
70	47 23.2	68 51	74.6	48 03.5	67 51	73.5	49 02.8	65 50	71.8	49 41.5	64 50	70.6	50 19.4	63 50	69.4	50 56.6	61 49	68.2	51 32.9	60 49	66.9	52 25.8	58 48	64.9	70
1	46 52.6	68 51	73.9	47 33.1	67 51	72.8	48 32.7	65 50	71.1	49 11.5	64 50	70.0	49 49.7	63 49	68.8	50 27.1	62 49	67.6	51 03.7	60 48	66.3	51 57.1	58 48	64.4	1
2	46 22.1	68 51	73.2	47 02.8	67 50	72.2	48 02.6	66 50	70.5	48 41.7	65 49	69.4	49 20.1	63 49	68.2	49 57.8	62 49	67.0	50 34.7	61 48	65.7	51 28.5	59 47	63.8	2
3	45 51.7	69 50	72.5	46 32.6	68 50	71.5	47 32.7	66 50	69.8	48 12.0	65 49	68.7	48 50.7	64 49	67.6	49 28.6	63 48	66.4	50 05.8	61 48	65.2	51 00.0	59 47	63.3	3
4	45 21.4	69 50	71.9	46 02.5	68 50	70.8	47 02.9	66 49	69.2	47 42.5	65 49	68.1	48 21.3	64 49	66.9	48 59.5	63 48	65.8	49 37.0	62 48	64.6	50 31.7	60 47	62.7	4
75	44 51.3	69 50	71.2	45 32.5	68 50	70.1	46 33.3	67 49	68.6	47 13.0	66 49	67.5	47 52.1	65 48	66.3	48 30.6	63 48	65.2	49 08.3	62 48	64.0	50 03.5	60 47	62.2	75
6	44 21.2	69 50	70.5	45 02.7	69 50	69.5	46 03.8	67 49	67.9	46 43.7	66 49	66.8	47 23.1	65 48	65.7	48 01.8	64 48	64.6	48 39.8	63 47	63.4	49 35.5	61 46	61.6	6
7	43 51.3	70 50	69.8	44 33.0	69 49	68.8	45 34.4	68 49	67.3	46 14.6	67 48	66.2	46 54.2	65 48	65.1	47 33.2	64 48	64.0	48 11.5	63 47	62.8	49 07.6	61 46	61.1	7
8	43 21.6	70 49	69.2	44 03.4	69 49	68.2	45 05.1	68 49	66.6	45 45.6	67 48	65.6	46 25.4	66 48	64.5	47 04.7	65 47	63.4	47 43.2	64 47	62.3	48 39.8	62 46	60.5	8
9	42 51.9	70 49	68.5	43 33.9	70 49	67.5	44 36.0	68 48	66.0	45 16.7	67 48	65.0	45 56.8	66 47	63.9	46 36.3	65 47	62.8	47 15.2	64 47	61.7	48 12.2	63 46	60.0	9
80	42 22.4	71 49	67.8	43 04.6	70 49	66.9	44 07.0	69 48	65.4	44 47.9	68 48	64.3	45 28.3	67 47	63.3	46 08.1	66 47	62.2	46 47.3	65 46	61.1	47 44.8	63 45	59.4	80
1	41 53.0	71 49	67.2	42 35.5	70 48	66.2	43 38.2	69 48	64.7	44 19.4	68 47	63.7	45 00.0	67 47	62.7	45 40.0	66 46	61.6	46 19.5	65 46	60.5	47 17.5	64 45	58.9	1
2	41 23.8	71 48	66.5	42 06.4	71 48	65.6	43 09.5	69 48	64.1	43 50.9	69 47	63.1	44 31.8	68 47	62.1	45 12.1	67 46	61.0	45 51.9	66 46	60.0	46 50.3	64 45	58.3	2
3	40 54.7	72 48	65.8	41 37.6	71 48	64.9	42 41.0	70 47	63.5	43 22.7	69 47	62.5	44 03.8	68 46	61.5	44 44.4	67 46	60.4	45 24.4	66 45	59.4	46 23.4	65 45	57.8	3
4	40 25.8	72 48	65.2	41 08.9	71 48	64.3	42 12.6	70 47	62.8	42 54.5	69 47	61.9	43 35.9	69 46	60.9	44 16.8	68 46	59.9	44 57.2	67 45	58.8	45 56.6	65 44	57.2	4
85	39 57.0	73 48	64.5	40 40.3	72 47	63.6	41 44.4	71 47	62.2	42 26.6	70 46	61.2	43 08.3	69 46	60.3	43 49.4	68 45	59.3	44 30.0	67 45	58.2	45 29.9	66 44	56.7	85
6	39 28.4	73 47	63.9	40 11.9	72 47	63.0	41 16.4	71 46	61.6	41 58.8	70 46	60.6	42 40.7	69 46	59.7	43 22.2	69 45	58.7	44 03.1	68 45	57.7	45 03.4	66 44	56.1	6
7	38 59.9	73 47	63.2	39 43.7	73 47	62.3	40 48.5	71 46	61.0	41 31.2	71 46	60.0	42 13.4	70 45	59.1	42 55.1	69 45	58.1	43 36.3	68 44	57.1	44 37.1	67 44	55.6	7
8	38 31.6	74 47	62.5	39 15.6	73 46	61.7	40 20.8	72 46	60.3	41 03.7	71 45	59.4	41 46.2	70 45	58.5	42 28.2	70 45	57.5	43 09.7	69 44	56.5	44 11.0	67 43	55.0	8
9	38 03.5	74 47	61.9	38 47.7	73 46	61.0	39 53.2	72 46	59.7	40 36.4	72 45	58.8	41 19.2	71 45	57.9	42 01.5	70 44	56.9	42 43.3	69 44	55.9	43 45.0	68 43	54.4	9
90	37 35.5	74 46	61.2	38 19.9	74 46	60.4	39 25.9	73 45	59.1	40 09.3	72 45	58.2	40 52.3	71 44	57.3	41 34.9	71 44	56.3	42 17.0	70 43	55.4	43 19.3	69 43	53.9	90

Lat. 58°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	37 07.7	75 46	60.6	37 52.4	74 46	59.8	38 58.7	73 45	58.5	39 42.4	73 45	57.6	40 25.7	72 44	56.7	41 08.5	71 44	55.7	41 50.9	70 43	54.8	42 53.7	69 42	53.3	91
2	36 40.1	75 46	59.9	37 25.0	75 45	59.1	38 31.7	74 45	57.8	39 15.6	73 44	57.0	39 59.2	72 44	56.1	40 42.4	72 43	55.2	41 25.1	71 43	54.2	42 28.3	70 42	52.8	2
3	36 12.7	75 45	59.3	36 57.8	75 45	58.5	38 04.9	74 44	57.2	38 49.1	73 44	56.3	39 32.9	73 43	55.5	40 16.4	72 43	54.6	40 59.4	71 43	53.6	42 03.0	70 42	52.2	3
4	35 45.5	76 45	58.6	36 30.8	75 45	57.8	37 38.2	74 44	56.6	38 22.7	74 44	55.7	39 06.8	73 43	54.9	39 50.5	73 43	54.0	40 33.8	72 42	53.1	41 38.0	71 41	51.7	4
95	35 18.4	76 45	58.0	36 04.0	76 44	57.2	37 11.8	75 44	56.0	37 56.5	74 43	55.1	38 40.9	74 43	54.3	39 24.9	73 42	53.4	40 08.5	72 42	52.5	41 13.1	71 41	51.1	95
6	34 51.5	77 44	57.3	35 37.4	76 44	56.6	36 45.5	75 43	55.3	37 30.5	75 43	54.5	38 15.2	74 42	53.7	38 59.5	74 42	52.8	39 43.4	73 42	51.9	40 48.5	72 41	50.6	6
7	34 24.9	77 44	56.7	35 10.9	77 44	55.9	36 19.5	76 43	54.7	37 04.8	75 43	53.9	37 49.7	75 42	53.1	38 34.3	74 42	52.2	39 18.5	73 41	51.3	40 24.0	72 40	50.0	7
8	33 58.4	77 44	56.0	34 44.7	77 43	55.3	35 53.6	76 43	54.1	36 39.2	76 42	53.3	37 24.4	75 42	52.5	38 09.2	74 41	51.6	38 53.7	74 41	50.8	39 59.8	73 40	49.4	8
9	33 32.1	78 43	55.4	34 18.7	77 43	54.6	35 28.0	77 42	53.5	36 13.8	76 42	52.7	36 59.3	76 42	51.9	37 44.4	75 41	51.0	38 29.2	74 41	50.2	39 35.7	73 40	48.9	9
100	33 06.0	78 43	54.7	33 52.8	78 43	54.0	35 02.5	77 42	52.8	35 48.6	77 42	52.1	36 34.4	76 41	51.3	37 19.8	75 41	50.4	38 04.9	75 40	49.6	39 11.9	74 39	48.3	100
1	32 40.2	79 43	54.1	33 27.2	78 42	53.4	34 37.3	77 42	52.2	35 23.6	77 41	51.4	36 09.7	76 41	50.7	36 55.4	76 40	49.9	37 40.8	75 40	49.0	38 48.2	74 39	47.8	1
2	32 14.5	79 42	53.5	33 01.8	79 42	52.7	34 12.3	78 41	51.6	34 58.9	77 41	50.8	35 45.2	77 40	50.1	36 31.2	76 40	49.3	37 16.9	76 39	48.4	38 24.8	75 39	47.2	2
3	31 49.1	79 42	52.8	32 36.6	79 42	52.1	33 47.4	78 41	51.0	34 34.3	78 41	50.2	35 20.9	77 40	49.5	36 07.2	77 40	48.7	36 53.2	76 39	47.9	38 01.6	76 38	46.6	3
4	31 23.9	80 42	52.2	32 11.7	79 41	51.4	33 22.9	79 41	50.4	34 10.0	78 40	49.6	34 56.9	78 40	48.8	35 43.4	77 39	48.1	36 29.7	77 39	47.3	37 38.5	76 38	46.1	4
105	30 58.9	80 41	51.5	31 46.9	80 41	50.8	32 58.5	79 40	49.7	33 45.9	79 40	49.0	34 33.0	78 39	48.2	35 19.9	78 39	47.5	36 06.5	77 38	46.7	37 15.8	77 38	45.5	105
6	30 34.1	81 41	50.9	31 22.4	80 40	50.2	32 34.3	80 40	49.1	33 22.0	79 39	48.4	34 09.4	79 39	47.6	34 56.6	78 38	46.9	35 43.4	78 38	46.1	36 53.2	77 37	44.9	6
7	30 09.6	81 40	50.2	30 58.1	81 40	49.5	32 10.4	80 40	48.5	32 58.4	80 39	47.8	33 46.1	79 39	47.0	34 33.5	79 38	46.3	35 20.6	78 38	45.5	36 30.8	78 37	44.4	7
8	29 45.3	81 40	49.6	30 34.0	81 40	48.9	31 46.7	81 39	47.8	32 34.9	80 39	47.1	33 22.9	80 38	46.4	34 10.6	79 38	45.7	34 58.1	79 37	45.0	36 08.7	78 36	43.8	8
9	29 21.2	82 40	48.9	30 10.2	81 39	48.2	31 23.3	81 39	47.2	32 11.8	81 38	46.5	33 00.0	80 38	45.8	33 48.0	80 37	45.1	34 35.7	79 37	44.4	35 46.8	79 36	43.2	9
110	28 57.3	82 39	48.2	29 46.6	82 39	47.6	31 00.1	81 38	46.6	31 48.8	81 38	45.9	32 37.3	81 37	45.2	33 25.6	80 37	44.5	34 13.6	80 36	43.8	35 25.1	79 36	42.7	110
1	28 33.7	83 39	47.6	29 23.2	82 39	46.9	30 37.1	82 38	46.0	31 26.1	81 37	45.3	32 14.9	81 37	44.6	33 03.4	81 37	43.9	33 51.7	80 36	43.2	35 03.7	80 35	42.1	1
2	28 10.4	83 38	46.9	29 00.1	83 38	46.3	30 14.4	82 38	45.3	31 03.6	82 37	44.7	31 52.7	82 37	44.0	32 41.5	81 36	43.3	33 30.1	81 36	42.6	34 42.5	80 35	41.5	2
3	27 47.3	83 38	46.3	28 37.3	83 38	45.7	29 51.9	83 37	44.7	30 41.4	82 37	44.0	31 30.7	82 36	43.4	32 19.8	82 36	42.7	33 08.7	81 35	42.0	34 21.6	81 35	41.0	3
4	27 24.4	84 38	45.6	28 14.6	84 37	45.0	29 29.6	83 37	44.1	30 19.4	83 36	43.4	31 09.0	82 36	42.8	31 58.4	82 35	42.1	32 47.5	82 35	41.4	34 00.8	81 34	40.4	4
115	27 01.8	84 37	45.0	27 52.3	84 37	44.4	29 07.6	84 36	43.4	29 57.7	83 36	42.8	30 47.5	83 35	42.2	31 37.2	83 35	41.5	32 26.6	82 34	40.8	33 40.4	82 34	39.8	115
6	26 39.5	85 37	44.3	27 30.2	84 36	43.7	28 45.9	84 36	42.8	29 36.2	84 35	42.2	30 26.3	83 35	41.5	31 16.2	83 34	40.9	32 05.9	83 34	40.2	33 20.1	82 33	39.2	6
7	26 17.4	85 36	43.7	27 08.3	85 36	43.1	28 24.4	84 35	42.2	29 15.0	84 35	41.5	30 05.4	84 34	40.9	30 55.5	83 34	40.3	31 45.5	83 34	39.6	33 00.2	83 33	38.6	7
8	25 55.6	85 36	43.0	26 46.8	85 36	42.4	28 03.2	85 35	41.5	28 54.0	85 34	40.9	29 44.7	84 34	40.3	30 35.1	84 34	39.7	31 25.4	84 33	39.0	32 40.4	83 32	38.1	8
9	25 34.0	86 35	42.3	26 25.4	86 35	41.8	27 42.3	85 34	40.9	28 33.3	85 34	40.3	29 24.2	85 34	39.7	30 14.9	84 33	39.1	31 05.5	84 33	38.4	32 20.9	84 32	37.5	9
120	25 12.8	86 35	41.7	26 04.4	86 35	41.1	27 21.6	86 34	40.3	28 12.9	85 34	39.7	29 04.1	85 33	39.1	29 55.0	85 33	38.5	30 45.8	85 32	37.8	32 01.7	84 32	36.9	120
1	24 51.8	87 35	41.0	25 43.6	86 34	40.5	27 01.2	86 34	39.6	27 52.7	86 33	39.0	28 44.1	86 33	38.4	29 35.4	85 32	37.9	30 26.5	85 32	37.2	31 42.8	85 31	36.3	1
2	24 31.0	87 34	40.4	25 23.1	87 34	39.8	26 41.1	86 33	39.0	27 32.9	86 33	38.4	28 24.5	86 32	37.8	29 16.0	86 32	37.2	30 07.4	85 31	36.6	31 24.1	85 31	35.7	2
3	24 10.6	87 34	39.7	25 02.9	87 33	39.1	26 21.2	87 33	38.3	27 13.2	87 32	37.8	28 05.1	86 32	37.2	28 56.9	86 31	36.6	29 48.5	86 31	36.0	31 05.6	85 30	35.1	3
4	23 50.4	88 33	39.0	24 43.0	88 33	38.5	26 01.6	87 32	37.7	26 53.9	87 32	37.1	27 46.1	87 31	36.6	28 38.1	87 31	36.0	29 29.9	86 30	35.4	30 47.5	86 30	34.6	4
125	23 30.5	88 33	38.4	24 23.3	88 32	37.8	25 42.3	88 32	37.0	26 34.9	87 31	36.5	27 27.3	87 31	36.0	28 19.5	87 30	35.4	29 11.6	87 30	34.8	30 29.6	86 29	34.0	125
6	23 11.0	88 32	37.7	24 04.0	88 32	37.2	25 23.3	88 31	36.4	26 16.1	88 31	35.9	27 08.7	88 30	35.3	28 01.2	87 30	34.8	28 53.6	87 30	34.2	30 11.9	87 29	33.4	6
7	22 51.7	89 32	37.0	23 44.9	89 31	36.5	25 04.6	88 31	35.8	25 57.6	88 30	35.2	26 50.5	88 30	34.7	27 43.2	88 30	34.2	28 35.9	88 29	33.6	29 54.6	87 28	32.8	7
8	22 32.7	89 31	36.3	23 26.1	89 31	35.9	24 46.2	89 30	35.1	25 39.4	89 30	34.6	26 32.5	88 29	34.1	27 25.5	88 29	33.5	28 18.4	88 29	33.0	29 37.5	88 28	32.2	8
9	22 14.0	90 31	35.7	23 07.7	89 30	35.2	24 28.0	89 30	34.5	25 21.5	89 29	34.0	26 14.9	89 29	33.4	27 08.1	89 29	32.9	28 01.2	88 28	32.4	29 20.7	88 28	31.6	9
130	21 55.6	90 30	35.0	22 49.5	90 30	34.5	24 10.2	90 29	33.8	25 03.9	89 29	33.3	25 57.5	89 28	32.8	26 51.0	89 28	32.3	27 44.3	89 28	31.8	29 04.2	89 27	31.0	130
1	21 37.5	90 30	34.3	22 31.6	90 29	33.9	23 52.7	90 29	33.2	24 46.6	90 28	32.7	25 40.4	90 28	32.2	26 34.1	89 28	31.7	27 27.7	89 27	31.2	28 47.9	89 27	30.4	1
2	21 19.7	91 29	33.7	22 14.1	90 29	33.2	23 35.4	90 28	32.5	24 29.6	90 28	32.0	25 23.6	90 27	31.6	26 17.6	90 27	31.1	27 11.4	90 27	30.6	28 32.0	89 26	29.8	2
3	21 02.3	91 29	33.0	21 56.8	91 28	32.5	23 18.5	91 28	31.8	24 12.8	91 27	31.4	25 07.1	90 27	30.9	26 01.3	90 27	30.4	26 55.4	90 26	30.0	28 16.3	90 26	29.2	3
4	20 45.1	91 28	32.3	21 39.9	91 28	31.9	23 01.9	91 27	31.2	23 56.4	91 27	30.7	24 50.9	91 26	30.3	25 45.3	91 26	29.8	26 39.7	90 26	29.3	28 00.9	90 25	28.6	4
135	20 28.3	92 28	31.6	21 23.2	92 27	31.2	22 45.6	91 27	30.5	23 40.3	91 26	30.1	24 35.1	91 26	29.6	25 29.7	91 26	29.2	26 24.2	91 25	28.7	27 45.9	91 25	28.0	135
6	20 11.8	92 27	30.9	21 06.9	92 27	30.5	22 29.6	92 26	29.9	23 24.6	92 26	29.4	24 19.5	91 25	29.0	25 14.3	91 25	28.6	26 09.1	91 25	28.1	27 31.1	91 24	27.4	6
7	19 55.6	92 26	30.3	20 51.0	92 26	29.8	22 13.9	92 26	29.2	23 09.1	92 25	28.8	24 04.2	92 25	28.4	24 59.3	92 25	27.9	25 54.3	92 24	27.5	27 16.6	91 24	26.8	7
8	19 39.7	93 26	29.6	20 35.3	93 26	29.2	21 58.5	92 25	28.6	22 53.9	92 25	28.1	23 49.3	92 24	27.7	24 44.5	92 24	27.3	25 39.7	92 24	26.9	27 02.4	92 23	26.2	8
9	19 24.2	93 25	28.9	20 20.0	93 25	28.5	21 43.5	93 24	27.9	22 39.1	93 24	27.5	23 34.6	93 24	27.1	24 30.1	92 24	26.7	25 25.5	92 23	26.2	26 48.5	92 23	25.6	9
140	19 09.0	93 25	28.2	20 04.9	93 24	27.8	21 28.8	93 24	27.2	22 24.6	93 24	26.8	23 20.3	93 23	26.4	24 16.0	93 23	26.0	25 11.6	93 23	25.6	26 34.9	92 22	25.0	140
1	18 54.1	94 24	27.5	19 50.3	94 24	27.1	21 14.4	93 23	26.6	22 10.4	93 23	26.2	23 06.3	93 23	25.8	24 02.2	93 22	25.4	24 58.0	93 22	25.0	26 21.6	93 22	24.4	1
2	18 39.6	94 24	26.8	19 35.9	94 23	26.5	21 00.3	94 23	25.9	21 56.5	94 23	25.5	22 52.6	94 22	25.2	23 48.7	93 22	24.8	24 44.8	93 22	24.4	26 08.7	93 21	23.8	2
3	18 25.4	94 23	26.1	19 21.9	94 23	25.8	20 46.6	94 22	25.2	21 43.0	94 22	24.9	22 39.3	94 22	24.5	23 35.6	94 21	24.1	24 31.8	94 21	23.7	25 56.0	94 21	23.2	3
4	18 11.6	94 22	25.5	19 08.3	94 22	25.1	20 33.2	94 22	24.6	21 29.7	94 21	24.2	22 26.3	94 21	23.9	23 22.7	94 21	23.5	24 19.1	94 21	23.1	25 43.7	94 20	22.6	4
145	17 58.1	95 22	24.8	18 54.9	95 22	24.4	20 20.1	95 21	23.9	21 16.9	95 21	23.6	22 13.6	94 21	23.2	23 10.2	94 20	22.9	24 06.8	94 20	22.5	25 31.6	94 20	21.9	145
6	17 45.0	95 21	24.1	18 42.0	95 21	23.7	20 07.4	95 21	23.2	21 04.3	95 20	22.9	22 01.2	95 20	22.6	22 58.0	95 20	22.2	23 54.8	95 19	21.9	25 19.9	94 19	21.3	6
7	17 32.2	95 21	23.4	18 29.3	95 20	23.1	19 55.0	95 20	22.6	20 52.1	95 20	22.2	21 49.2	95 20	21.9	22 46.2	95 19	21.6	23 43.1	95 19	21.2	25 08.5	95 18	20.7	7
8	17 19.7	96 20	22.7	18 17.1	96 20	22.4	19 43.0	95 19	21.9	20 40.3	95 19	21.6	21 37.5	95 19	21.3	22 34.7	95 19	20.9	23 31.8	95 18	20.6	24 57.4	95 18	20.1	8
9	17 07.7	96 20	22.0	18 05.1	96 19	21.7	19 31.3	96 19	21.2	20 28.7	96 19	20.9	21 26.1	96 18	20.6	22 23.5	96 18	20.3	23 20.8	95 18	20.0	24 46.7	95 17	19.5	9
150	16 55.9	96 19	21.3	17 53.6	96 19	21.0	19 20.0	96 18	20.6	20 17.6	96 18	20.3	21 15.1	96 18	20.0	22 12.6	96 18	19.6	23 10.1	96 17	19.3	24 36.2	96 17	18.9	150
1	16 44.6	96 18	20.6	17 42.4	96 18	20.3	19 09.0	96 18	19.9	20 06.7	96 17	19.6	21 04.4	96 17	19.3	22 02.1	96 17	19.0	22 59.7	96 17	18.7	24 26.1	96 16	18.2	1
2	16 33.6	97 18	19.9	17 31.5	97 18	19.6	18 58.4	96 17	19.2	19 56.2	96 17	18.9	20 54.1	96 17	18.6	21 51.9	96 16	18.4	22 49.7	96 16	18.1	24 16.3	96 16	17.6	2
3	16 22.9	97 17	19.2	17 21.0	97 17	18.9	18 48.1	97 17	18.5	19 46.1	97 16	18.3	20 44.1	97 16	18.0	21 42.1	97 16	17.7	22 40.0	97 16	17.4	24 06.8	96 15	17.0	3
4	16 12.7	97 16	18.5	17 10.9	97 16	18.2	18 38.2	97 16	17.9	19 36.3	97 16	17.6	20 34.4	97 16	17.3	21 32.6	97 15	17.1	22 30.6	97 15	16.8	23 57.7	97 15	16.4	4
155	16 02.8	97 16	17.8	17 01.1	97 16	17.5	18 28.6	97 15	17.2	19 26.9	97 15	16.9	20 25.1	97 15	16.7	21 23.4	97 15	16.4	22 21.6	97 14	16.2	23 48.9	97 14	15.8	155
6	15 53.2	97 15	17.1	16 51.7	97 15	16.8	18 19.4	97 15	16.5	19 17.8	97 15	16.3	20 16.2	97 14	16.0	21 14.6	97 14	15.8	22 13.0	97 14	15.5	23 40.5	97 14	15.1	6
7	15 44.1	98 15	16.4	16 42.7	98 14	16.2	18 10.5	98 14	15.8	19 09.1	98 14	15.6	20 07.6	98 14	15.3	21 06.1	98 14	15.1	22 04.6	97 13	14.9	23 32.3	97 13	14.5	7
8	15 35.3	98 14	15.7	16 34.0	98 14	15.5	18 02.0	98 14	15.1	19 00.7	98 13	14.9	19 59.4	98 13	14.7	20 58.0	98 13	14.5	21 56.6	98 13	14.2	23 24.5	98 12	13.9	8
9	15 26.9	98 13	15.0	16 25.7	98 13	14.8	17 53.9	98 13	14.5	18 52.7	98 13	14.2	19 51.5	98 13	14.0	20 50.2	98 12	13.8	21 49.0	98 12	13.6	23 17.1	98 12	13.3	9
160	15 18.9	98 13	14.3	16 17.8	98 13	14.1	17 46.2	98 12	13.8	18 45.1	98 12	13.6	19 44.0	98 12	13.4	20 42.8	98 12	13.2	21 41.7	98 12	12.9	23 09.9	98 11	12.6	160
1	15 11.2	98 12	13.6	16 10.3	98 12	13.4	17 38.8	98 12	13.1	18 37.8	98 12	12.9	19 36.8	98 11	12.7	20 35.8	98 11	12.5	21 34.7	98 11	12.3	23 03.2	98 11	12.0	1
2	15 04.0	99 11	12.8	16 03.1	99 11	12.7	17 31.8	99 11	12.4	18 30.9	98 11	12.2	19 30.0	98 11	12.0	20 29.1	98 11	11.9	21 28.1	98 10	11.7	22 56.7	98 10	11.4	2
3	14 57.1	99 11	12.1	15 56.3	99 11	12.0	17 25.1	99 10	11.7	18 24.3	99 10	11.5	19 23.5	99 10	11.4	20 22.7	99 10	11.2	21 21.9	99 10	11.0	22 50.6	99 10	10.7	3
4	14 50.6	99 10	11.4	15 49.9	99 10	11.3	17 18.9	99 10	11.0	18 18.2	99 10	10.9	19 17.4	99 10	10.7	20 16.7	99 09	10.5	21 16.0	99 09	10.4	22 44.9	99 09	10.1	4
165	14 44.5	99 10	10.7	15 43.9	99 09	10.6	17 13.0	99 09	10.3	18 12.4	99 09	10.2	19 11.7	99 09	10.0	20 11.1	99 09	09.9	21 10.4	99 09	09.7	22 39.4	99 08	09.5	165
6	14 38.8	99 09	10.0	15 38.3	99 09	09.9	17 07.5	99 09	09.7	18 06.9	99 08	09.5	19 06.4	99 08	09.4	20 05.8	99 08	09.2	21 05.2	99 08	09.1	22 34.4	99 08	08.9	6
7	14 33.5	99 08	09.3	15 33.0	99 08	09.2	17 02.3	99 08	09.0	18 01.8	99 08	08.8	19 01.4	99 08	08.7	20 00.9	99 08	08.6	21 00.4	99 07	08.4	22 29.7	99 07	08.2	7
8	14 28.5	99 08	08.6	15 28.1	99 07	08.5	16 57.5	99 07	08.3	17 57.1	99 07	08.2	18 56.7	99 07	08.0	19 56.3	99 07	07.9	20 55.9	99 07	07.8	22 25.3	99 07	07.6	8
9	14 24.0	99 07	07.9	15 23.7	99 07	07.8	16 53.2	99 07	07.6	17 52.8	99 07	07.5	18 52.5	99 06	07.4	19 52.1	99 06	07.3	20 51.8	99 06	07.1	22 21.2	99 06	07.0	9
170	14 19.8	1.0 06	07.2	15 19.6	1.0 06	07.1	16 49.1	1.0 06	06.9	17 48.9	1.0 06	06.8	18 48.6	1.0 06	06.7	19 48.3	1.0 06	06.6	20 48.0	1.0 06	06.5	22 17.6	1.0 06	06.3	170
1	14 16.1	1.0 06	06.4	15 15.8	1.0 06	06.3	16 45.5	1.0 05	06.2	17 45.3	1.0 05	06.1	18 45.1	1.0 05	06.0	19 44.8	1.0 05	05.9	20 44.6	1.0 05	05.8	22 14.2	1.0 05	05.7	1
2	14 12.7	1.0 05	05.7	15 12.5	1.0 05	05.6	16 42.3	1.0 05	05.5	17 42.1	1.0 05	05.4	18 41.9	1.0 05	05.4	19 41.7	1.0 05	05.3	20 41.5	1.0 04	05.2	22 11.2	1.0 04	05.1	2
3	14 09.7	1.0 04	05.0	15 09.6	1.0 04	04.9	16 39.4	1.0 04	04.8	17 39.3	1.0 04	04.8	18 39.1	1.0 04	04.7	19 39.0	1.0 04	04.6	20 38.8	1.0 04	04.5	22 08.6	1.0 04	04.4	3
4	14 07.1	1.0 04	04.3	15 07.0	1.0 04	04.2	16 36.9	1.0 04	04.1	17 36.8	1.0 03	04.1	18 36.7	1.0 03	04.0	19 36.6	1.0 03	04.0	20 36.5	1.0 03	03.9	22 06.3	1.0 03	03.8	4
175	14 05.0	1.0 03	03.6	15 04.9	1.0 03	03.5	16 34.8	1.0 03	03.5	17 34.7	1.0 03	03.4	18 34.7	1.0 03	03.4	19 34.6	1.0 03	03.3	20 34.5	1.0 03	03.2	22 04.4	1.0 03	03.2	175
6	14 03.2	1.0 02	02.9	15 03.1	1.0 02	02.8	16 33.1	1.0 02	02.8	17 33.0	1.0 02	02.7	18 33.0	1.0 02	02.7	19 32.9	1.0 02	02.6	20 32.9	1.0 02	02.6	22 02.8	1.0 02	02.5	6
7	14 01.8	1.0 02	02.1	15 01.8	1.0 02	02.1	16 31.7	1.0 02	02.1	17 31.7	1.0 02	02.0	18 31.7	1.0 02	02.0	19 31.6	1.0 02	02.0	20 31.6	1.0 02	01.9	22 01.6	1.0 01	01.9	7
8	14 00.8	1.0 01	01.4	15 00.8	1.0 01	01.4	16 30.8	1.0 01	01.4	17 30.8	1.0 01	01.4	18 30.7	1.0 01	01.3	19 30.7	1.0 01	01.3	20 30.7	1.0 01	01.3	22 00.7	1.0 01	01.3	8
9	14 00.2	1.0 00	00.7	15 00.2	1.0 00	00.7	16 30.2	1.0 00	00.7	17 30.2	1.0 00	00.7	18 30.2	1.0 00	00.7	19 30.2	1.0 00	00.7	20 30.2	1.0 00	00.6	22 00.2	1.0 00	00.6	9
180	14 00.0	1.0 00	00.0	15 00.0	1.0 00	00.0	16 30.0	1.0 00	00.0	17 30.0	1.0 00	00.0	18 30.0	1.0 00	00.0	19 30.0	1.0 00	00.0	20 30.0	1.0 00	00.0	22 00.0	1.0 00	00.0	180

Lat. 58°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	86 30.0	1.0 04	180.0	87 00.0	1.0 05	180.0	88 00.0	1.0 07	180.0	88 30.0	1.0 09	180.0	89 00.0	1.0 14	180.0	89 30.0	1.0 23	180.0	89 00.0	1.0 13	00.0	88 30.0	1.0 09	00.0	00
1	86 27.4	99 13	170.6	86 57.0	98 15	169.2	87 55.6	97 20	164.3	88 24.3	94 26	159.7	88 51.9	88 35	151.3	89 16.1	69 45	132.7	88 52.3	88 32	27.2	88 24.8	94 24	18.7	1
2	86 19.7	96 20	161.6	86 48.2	94 23	159.0	87 43.4	89 30	150.6	88 09.0	82 36	143.4	88 31.9	69 43	132.1	88 49.3	44 50	114.3	88 33.2	68 41	45.4	88 10.6	81 34	33.8	2
3	86 07.5	91 27	153.3	86 34.4	89 30	149.8	87 25.1	79 37	139.5	87 47.4	69 42	131.5	88 06.2	55 47	120.5	88 19.4	32 51	106.1	88 08.4	52 46	56.2	87 50.3	68 40	44.8	3
4	85 51.3	86 32	145.9	86 16.6	82 35	142.0	87 02.6	70 42	130.9	87 22.1	59 46	123.0	87 37.8	45 50	113.3	87 48.5	26 52	101.5	87 41.0	40 48	62.7	87 26.4	56 44	52.4	4
05	85 32.0	81 36	139.5	85 55.6	76 39	135.3	86 37.4	62 45	124.2	86 54.5	52 48	116.9	87 08.0	38 51	108.3	87 17.2	22 53	98.5	87 12.2	32 49	66.9	87 00.3	47 46	57.8	05
6	85 10.2	75 40	133.9	85 32.1	70 42	129.6	86 10.2	56 47	118.9	86 25.6	46 50	112.3	86 37.6	34 52	104.7	86 45.6	20 53	96.3	86 42.6	26 50	69.8	86 32.8	39 47	61.7	6
7	84 46.4	71 42	129.0	85 06.8	65 45	124.9	85 41.9	51 49	114.7	85 55.8	42 51	108.6	86 06.6	31 52	101.9	86 14.0	18 53	94.7	86 12.6	21 51	71.7	86 04.4	33 48	64.6	7
8	84 20.9	66 44	124.8	84 40.8	61 46	120.8	85 12.6	47 50	111.3	85 25.4	38 51	105.7	85 35.4	28 52	99.7	85 42.3	17 53	93.3	85 42.3	17 51	73.2	85 35.4	28 49	66.7	8
9	83 54.3	62 46	121.2	84 12.2	57 48	117.3	84 42.7	44 51	108.4	84 54.6	36 52	103.3	85 04.0	27 53	97.9	85 10.5	17 53	92.1	85 11.8	14 51	74.2	85 06.0	24 50	68.4	9
10	83 26.6	59 47	118.0	83 43.6	54 49	114.3	84 12.3	41 51	105.9	84 23.5	34 52	101.3	84 32.4	25 53	96.3	84 38.7	17 53	91.1	84 41.1	11 51	74.9	84 36.3	20 50	69.6	10
1	82 58.2	56 48	115.1	83 14.3	51 50	111.6	83 41.6	39 52	103.8	83 52.2	32 52	99.5	84 00.8	25 53	94.9	84 06.9	17 53	90.2	84 10.4	09 51	75.5	84 06.4	17 50	70.6	1
2	82 29.1	54 49	112.6	82 44.5	49 50	109.3	83 10.6	37 52	101.9	83 20.8	31 53	97.9	83 29.1	24 53	93.7	83 35.1	17 53	89.4	83 39.6	07 51	75.8	83 36.4	15 50	71.4	2
3	81 59.5	52 50	110.3	82 14.3	47 51	107.2	82 39.3	36 52	100.2	82 49.3	30 53	96.5	82 57.3	24 53	92.6	83 03.4	17 53	88.6	83 08.7	05 51	76.1	83 06.2	12 50	71.9	3
4	81 29.5	50 51	108.3	81 43.8	45 51	105.3	82 08.0	35 52	98.7	82 17.6	29 53	95.3	82 25.5	23 53	91.6	82 31.6	17 53	87.9	82 37.8	03 51	76.3	82 35.9	10 51	72.4	4
15	80 59.1	48 51	106.4	81 13.0	44 52	103.5	81 36.5	34 53	97.4	81 46.0	29 53	94.1	81 53.7	23 53	90.7	81 59.8	17 53	87.2	82 07.0	01 51	76.4	82 05.6	08 51	72.7	15
6	80 28.5	47 51	104.7	80 42.0	43 52	102.0	81 04.9	33 53	96.1	81 14.2	28 53	93.0	81 22.0	23 53	89.8	81 28.1	18 53	86.6	81 36.1	00 52	76.4	81 35.2	06 51	73.0	6
7	79 57.6	46 52	103.1	80 10.8	42 52	100.5	80 33.3	33 53	95.0	80 42.5	28 53	92.0	80 50.2	23 53	89.0	80 56.3	18 53	85.9	81 05.2	02 51	76.4	81 04.8	04 51	73.1	7
8	79 26.6	45 52	101.6	79 39.5	41 52	99.1	80 01.6	33 53	93.9	80 10.7	28 53	91.1	80 18.4	23 53	88.2	80 24.6	18 53	85.3	80 34.3	03 51	76.3	80 34.4	02 51	73.2	8
9	78 55.4	44 52	100.3	79 08.0	40 53	97.9	79 29.8	32 53	92.8	79 38.9	28 53	90.2	79 46.6	23 53	87.5	79 53.0	19 53	84.7	80 03.4	04 51	76.2	80 03.9	01 51	73.3	9
20	78 24.0	43 52	99.0	78 36.5	40 53	96.7	78 58.1	32 53	91.9	79 07.1	28 53	89.4	79 14.8	24 53	86.8	79 21.3	19 53	84.2	79 32.5	05 51	76.0	79 33.4	01 51	73.3	20
1	77 52.6	43 53	97.8	78 04.9	39 53	95.6	78 26.3	32 53	91.0	78 35.3	28 53	88.6	78 43.1	24 53	86.1	78 49.7	20 53	83.6	79 01.7	07 51	75.9	79 03.0	02 51	73.2	1
2	77 21.0	42 53	96.6	77 33.2	39 53	94.5	77 54.5	32 53	90.1	78 03.5	28 53	87.8	78 11.4	24 53	85.5	78 18.1	20 53	83.1	78 30.9	08 51	75.7	78 32.6	04 51	73.2	2
3	76 49.4	42 53	95.5	77 01.5	39 53	93.5	77 22.7	32 53	89.3	77 31.8	28 53	87.1	77 39.7	25 53	84.8	77 46.6	21 52	82.5	78 00.1	09 51	75.5	78 02.1	05 51	73.1	3
4	76 17.7	42 53	94.5	76 29.7	38 53	92.5	76 50.9	32 53	88.5	77 00.0	29 53	86.4	77 08.1	25 53	84.2	77 15.1	21 52	82.0	77 29.3	10 51	75.2	77 31.7	06 51	72.9	4
25	75 46.0	41 53	93.5	75 58.0	38 53	91.6	76 19.1	32 53	87.7	76 28.3	29 53	85.7	76 36.5	26 53	83.6	76 43.6	22 52	81.5	76 58.6	11 51	75.0	77 01.4	07 51	72.8	25
6	75 14.3	41 53	92.5	75 26.2	38 53	90.7	75 47.4	32 53	86.9	75 56.6	29 53	85.0	76 04.9	26 53	83.0	76 12.2	23 52	81.0	76 27.9	12 51	74.7	76 31.0	09 51	72.6	6
7	74 42.5	41 53	91.6	74 54.4	38 53	89.9	75 15.6	33 53	86.2	75 24.9	30 53	84.3	75 33.3	26 52	82.4	75 40.8	23 52	80.5	75 57.2	13 51	74.5	76 00.7	10 50	72.4	7
8	74 10.7	41 53	90.7	74 22.6	38 53	89.0	74 43.9	33 53	85.5	74 53.3	30 53	83.7	75 01.8	27 52	81.9	75 09.5	24 52	80.0	75 26.6	14 51	74.2	75 30.4	11 50	72.2	8
9	73 38.9	41 53	89.9	73 50.8	38 53	88.2	74 12.2	33 53	84.8	74 21.7	30 53	83.1	74 30.4	27 52	81.3	74 38.2	24 52	79.5	74 56.0	15 51	73.9	75 00.1	12 50	72.0	9
30	73 07.1	41 53	89.0	73 19.0	38 53	87.4	73 40.6	33 53	84.2	73 50.2	31 52	82.5	73 59.0	28 52	80.7	74 06.9	25 52	79.0	74 25.5	16 51	73.6	74 29.9	13 50	71.7	30
1	72 35.3	41 53	88.2	72 47.3	39 53	86.7	73 09.0	34 53	83.5	73 18.7	31 52	81.9	73 27.6	28 52	80.2	73 35.8	26 52	78.5	73 55.1	17 51	73.2	73 59.8	14 50	71.5	1
2	72 03.6	41 53	87.4	72 15.5	39 53	85.9	72 37.4	34 53	82.9	72 47.3	32 52	81.3	72 56.3	29 52	79.6	73 04.6	26 52	78.0	73 24.6	18 51	72.9	73 29.6	15 50	71.2	2
3	71 31.8	41 53	86.7	71 43.8	39 53	85.2	72 05.9	34 52	82.2	72 15.9	32 52	80.7	72 25.1	30 52	79.1	72 33.6	27 52	77.5	72 54.3	19 50	72.6	72 59.6	16 50	70.9	3
4	71 00.1	41 53	85.9	71 12.2	39 53	84.5	71 34.4	35 52	81.6	71 44.5	32 52	80.1	71 53.9	30 52	78.6	72 02.5	28 52	77.0	72 24.0	20 50	72.3	72 29.5	17 50	70.6	4
35	70 28.4	42 53	85.2	70 49.5	40 53	83.8	71 03.0	35 52	81.0	71 13.2	33 52	79.5	71 22.7	31 52	78.1	71 31.6	28 51	76.6	71 53.7	21 50	71.9	71 59.6	18 50	70.3	35
6	69 56.7	42 53	84.5	70 09.0	40 53	83.1	70 31.6	36 52	80.4	70 42.0	33 52	79.0	70 51.7	31 52	77.5	71 00.7	29 51	76.1	71 23.5	22 50	71.6	71 29.7	19 50	70.0	6
7	69 25.1	42 53	83.8	69 37.4	40 52	82.5	70 00.3	36 52	79.8	70 10.8	34 52	78.4	70 20.7	32 52	77.0	70 29.9	30 51	75.6	70 53.4	23 50	71.2	70 59.8	20 50	69.7	7
8	68 53.5	42 53	83.1	69 05.9	40 52	81.8	69 29.0	37 52	79.2	69 39.7	34 52	77.9	69 49.7	32 52	76.5	69 59.1	30 51	75.1	70 23.3	23 50	70.9	70 30.0	21 50	69.4	8
9	68 22.0	43 52	82.4	68 34.5	41 52	81.2	68 57.8	37 52	78.6	69 08.6	35 52	77.3	69 18.8	33 51	76.0	69 28.4	31 51	74.7	69 53.3	24 50	70.5	70 00.3	22 49	69.1	9
40	67 50.5	43 52	81.7	68 03.1	41 52	80.5	68 26.7	37 52	78.1	68 37.6	36 52	76.8	68 48.0	34 51	75.5	68 57.8	32 51	74.2	69 23.4	25 50	70.1	69 30.6	23 49	68.7	40
1	67 19.0	43 52	81.1	67 31.7	42 52	79.9	67 55.6	38 52	77.5	68 06.7	36 51	76.2	68 17.3	34 51	75.0	68 27.2	32 51	73.7	68 53.5	26 50	69.8	69 01.0	24 49	68.4	1
2	66 47.6	44 52	80.4	67 00.5	42 52	79.3	67 24.6	38 52	76.9	67 35.9	37 51	75.7	67 46.6	35 51	74.5	67 56.7	33 51	73.2	68 23.7	27 50	69.4	68 31.5	25 49	68.1	2
3	66 16.3	44 52	79.8	66 29.3	42 52	78.7	66 53.7	39 51	76.4	67 05.1	37 51	75.2	67 16.0	35 51	74.0	67 26.3	34 51	72.8	67 54.0	28 49	69.0	68 02.0	26 49	67.7	3
4	65 45.1	44 52	79.2	65 58.1	43 52	78.1	66 22.8	39 51	75.8	66 34.4	38 51	74.7	66 45.5	36 51	73.5	66 56.0	34 50	72.3	67 24.3	29 49	68.6	67 32.6	27 49	67.4	4
45	65 13.9	45 52	78.5	65 27.0	43 52	77.5	65 52.0	40 51	75.3	66 03.8	38 51	74.1	66 15.0	37 51	73.0	66 25.8	35 50	71.8	66 54.8	29 49	68.2	67 03.3	28 49	67.0	45
6	64 42.7	45 52	77.9	64 56.0	44 52	76.9	65 21.3	41 51	74.7	65 33.2	39 51	73.6	65 44.7	37 50	72.5	65 55.6	36 50	71.4	66 25.3	30 49	67.8	66 34.1	28 49	66.7	6
7	64 11.7	46 52	77.3	64 25.1	44 51	76.3	64 50.7	41 51	74.2	65 02.8	40 51	73.1	65 14.4	38 50	72.0	65 25.5	36 50	70.9	65 55.9	31 49	67.5	66 04.9	29 48	66.3	7
8	63 40.7	46 52	76.7	63 54.3	45 51	75.7	64 20.1	42 51	73.6	64 32.4	40 50	72.6	64 44.2	39 50	71.5	64 55.5	37 50	70.4	65 26.5	32 49	67.1	65 35.9	30 48	65.9	8
9	63 09.8	46 51	76.1	63 23.5	45 51	75.1	63 49.7	42 51	73.1	64 02.1	41 50	72.1	64 14.1	39 50	71.0	64 25.6	38 50	70.0	64 57.3	33 49	66.7	65 06.9	31 48	65.5	9
50	62 39.0	47 51	75.5	62 52.8	45 51	74.6	63 19.3	43 50	72.6	63 31.9	41 50	71.6	63 44.1	40 50	70.5	63 55.8	38 50	69.5	64 28.2	34 48	66.3	64 38.0	32 48	65.2	50
1	62 08.2	47 51	74.9	62 22.2	46 51	74.0	62 49.0	43 50	72.0	63 01.8	42 50	71.0	63 14.1	40 50	70.0	63 26.0	39 49	69.0	63 59.1	34 48	65.9	64 09.2	33 48	64.8	1
2	61 37.6	48 51	74.3	61 51.7	46 51	73.4	62 18.8	44 50	71.5	62 31.7	42 50	70.5	62 44.3	41 50	69.5	62 56.4	40 49	68.5	63 30.1	35 48	65.5	63 40.5	34 48	64.4	2
3	61 07.0	48 51	73.8	61 21.3	47 51	72.9	61 48.7	44 50	71.0	62 01.8	43 50	70.0	62 14.5	42 49	69.1	62 26.9	40 49	68.1	63 01.2	36 48	65.0	63 11.8	35 48	64.0	3
4	60 36.5	49 51	73.2	60 50.9	47 50	72.3	61 18.7	45 50	70.5	61 32.0	44 50	69.5	61 44.9	42 49	68.6	61 57.4	41 49	67.6	62 32.5	37 48	64.6	62 43.3	35 47	63.6	4
55	60 06.1	49 50	72.6	60 20.7	48 50	71.7	60 48.8	46 50	69.9	61 02.2	44 49	69.0	61 15.3	43 49	68.1	61 28.1	42 49	67.1	62 03.8	38 48	64.2	62 14.9	36 47	63.2	55
6	59 35.8	50 50	72.0	59 50.5	49 50	71.2	60 18.9	46 50	69.4	60 32.6	45 49	68.5	60 45.9	44 49	67.6	60 58.8	42 49	66.7	61 35.2	38 47	63.8	61 46.5	37 47	62.8	6
7	59 05.6	50 50	71.5	59 20.5	49 50	70.6	59 49.2	47 49	68.9	60 03.1	46 49	68.0	60 16.6	44 49	67.1	60 29.7	43 48	66.2	61 06.7	39 47	63.4	61 18.3	38 47	62.4	7
8	58 35.5	51 50	70.9	58 50.6	50 50	70.1	59 19.6	47 49	68.4	59 33.6	46 49	67.5	59 47.3	45 49	66.6	60 00.6	44 48	65.7	60 38.4	40 47	63.0	60 50.2	39 47	62.0	8
9	58 05.5	51 50	70.3	58 20.7	50 50	69.5	58 50.1	48 49	67.9	59 04.3	47 49	67.0	59 18.2	46 48	66.1	59 31.7	44 48	65.3	60 10.1	41 47	62.6	60 22.1	39 47	61.6	9
60	57 35.6	52 50	69.8	57 51.0	51 49	69.0	58 20.7	49 49	67.3	58 35.1	47 48	66.5	58 49.2	46 48	65.6	59 02.9	45 48	64.8	59 41.9	42 47	62.1	59 54.2	40 46	61.2	60
1	57 05.9	52 49	69.2	57 21.4	51 49	68.4	57 51.4	49 49	66.8	58 06.0	48 48	66.0	58 20.3	47 48	65.2	58 34.2	46 48	64.3	59 13.9	42 47	61.7	59 26.4	41 46	60.8	1
2	56 36.2	53 49	68.7	56 51.8	52 49	67.9	57 22.3	50 48	66.3	57 37.0	49 48	65.5	57 51.5	48 48	64.7	58 05.6	47 47	63.8	58 45.9	43 46	61.3	58 58.7	42 46	60.4	2
3	56 06.6	53 49	68.1	56 22.4	52 49	67.4	56 53.2	50 48	65.8	57 08.2	49 48	65.0	57 22.8	48 48	64.2	57 37.1	47 47	63.4	58 18.1	44 46	60.9	58 31.1	43 46	60.0	3
4	55 37.2	54 49	67.6	55 53.2	53 49	66.8	56 24.3	51 48	65.3	56 39.4	50 48	64.5	56 54.2	49 47	63.7	57 08.7	48 47	62.9	57 50.4	45 46	60.4	58 03.6	44 46	59.6	4
65	55 07.8	54 49	67.0	55 24.0	53 48	66.3	55 55.5	52 48	64.8	56 10.8	51 48	64.0	56 25.8	50 47	63.2	56 40.5	49 47	62.4	57 22.8	45 46	60.0	57 36.3	44 45	59.2	65
6	54 38.6	55 48	66.5	54 54.9	54 48	65.7	55 26.8	52 48	64.2	55 42.2	51 47	63.5	55 57.5	50 47	62.7	56 12.4	49 47	61.9	56 55.3	46 46	59.6	57 09.0	45 45	58.7	6
7	54 09.6	55 48	65.9	54 26.0	54 48	65.2	54 58.2	53 47	63.7	55 13.9	52 47	63.0	55 29.3	51 47	62.2	55 44.4	50 46	61.5	56 28.0	47 45	59.1	56 41.9	46 45	58.3	7
8	53 40.6	56 48	65.4	53 57.2	55 48	64.7	54 29.7	53 47	63.2	54 45.6	52 47	62.5	55 01.2	52 47	61.7	55 16.5	51 46	61.0	56 00.8	48 45	58.7	56 14.9	47 45	57.9	8
9	53 11.8	56 48	64.8	53 28.6	56 48	64.1	54 01.4	54 47	62.7	54 17.5	53 47	62.0	54 33.2	52 46	61.3	54 48.8	51 46	60.5	55 33.7	48 45	58.2	55 48.0	47 45	57.5	9
70	52 43.0	57 48	64.3	53 00.0	56 47	63.6	53 33.2	55 47	62.2	53 49.5	54 46	61.5	54 05.4	53 46	60.8	54 21.2	52 46	60.0	55 06.7	49 45	57.8	55 21.3	48 44	57.0	70
1	52 14.5	57 47	63.7	52 31.6	57 47	63.1	53 05.2	55 47	61.7	53 21.6	54 46	61.0	53 37.8	53 46	60.3	53 53.7	53 46	59.6	54 39.8	50 44	57.4	54 54.7	49 44	56.6	1
2	51 46.0	58 47	63.2	52 03.3	57 47	62.5	52 37.2	56 46	61.2	52 53.8	55 46	60.5	53 10.2	54 46	59.8	53 26.3	53 45	59.1	54 13.1	51 44	56.9	54 28.2	50 44	56.2	2
3	51 17.7	59 47	62.6	51 35.2	58 47	62.0	52 09.5	56 46	60.7	52 26.2	56 46	60.0	52 42.8	55 45	59.3	52 59.1	54 45	58.6	53 46.6	51 44	56.5	54 01.9	51 44	55.7	3
4	50 49.6	59 47	62.1	51 07.2	58 46	61.4	51 41.8	57 46	60.1	51 58.8	56 46	59.5	52 15.5	55 45	58.8	52 32.1	55 45	58.1	53 20.1	52 44	56.0	53 35.7	51 43	55.3	4
75	50 21.5	60 46	61.5	50 39.3	59 46	60.9	51 14.3	58 46	59.6	51 31.5	57 45	59.0	51 48.4	56 45	58.3	52 05.1	55 45	57.6	52 53.9	53 44	55.6	53 09.6	52 43	54.8	75
6	49 53.6	60 46	61.0	50 11.6	60 46	60.4	50 47.0	58 45	59.1	51 04.3	57 45	58.5	51 21.4	57 45	57.8	51 38.3	56 44	57.1	52 27.7	54 43	55.1	52 43.7	53 43	54.4	6
7	49 25.9	61 46	60.5	49 44.1	60 46	59.8	50 19.7	59 45	58.6	50 37.3	58 45	58.0	50 54.6	57 44	57.3	51 11.7	57 44	56.7	52 01.7	54 43	54.6	52 17.9	54 43	54.0	7
8	48 58.3	61 46	59.9	49 16.6	61 45	59.3	49 52.7	59 45	58.1	50 10.4	59 45	57.5	50 27.9	58 44	56.8	50 45.2	57 44	56.2	51 35.8	55 43	54.2	51 52.3	54 42	53.5	8
9	48 30.9	62 45	59.4	48 49.4	61 45	58.8	49 25.8	60 45	57.6	49 43.7	59 44	56.9	50 01.4	59 44	56.3	50 18.9	58 44	55.7	51 10.1	56 43	53.7	51 26.8	55 42	53.1	9
80	48 03.6	62 45	58.8	48 22.3	62 45	58.2	48 59.0	61 44	57.0	49 17.1	60 44	56.4	49 35.0	59 44	55.8	49 52.7	59 43	55.2	50 44.6	57 42	53.3	51 01.4	56 42	52.6	80
1	47 36.5	63 45	58.3	47 55.3	62 45	57.7	48 32.4	61 44	56.5	48 50.7	61 44	55.9	49 08.8	60 43	55.3	49 26.7	59 43	54.7	50 19.2	57 42	52.8	50 36.2	57 42	52.2	1
2	47 09.5	64 45	57.7	47 28.5	63 44	57.2	48 06.0	62 44	56.0	48 24.4	61 44	55.4	48 42.7	61 43	54.8	49 00.8	60 43	54.2	49 53.9	58 42	52.4	50 11.2	57 41	51.7	2
3	46 42.7	64 44	57.2	47 01.9	64 44	56.6	47 39.7	62 44	55.5	47 58.3	62 43	54.9	48 16.8	61 43	54.3	48 35.1	61 43	53.7	49 28.8	59 42	51.9	49 46.3	58 41	51.3	3
4	46 16.0	65 44	56.7	46 35.4	64 44	56.1	47 13.6	63 43	55.0	47 32.4	62 43	54.4	47 51.1	62 43	53.8	48 09.5	61 42	53.2	49 03.9	59 41	51.4	49 21.6	59 41	50.8	4
85	45 49.6	65 44	56.1	46 09.1	65 44	55.6	46 47.6	64 43	54.5	47 06.6	63 43	53.9	47 25.5	63 42	53.3	47 44.2	62 42	52.7	48 39.1	60 41	51.0	48 57.0	59 41	50.3	85
6	45 23.3	66 44	55.6	45 42.9	65 43	55.0	46 21.8	64 43	53.9	46 41.0	64 42	53.4	47 00.1	63 42	52.8	47 18.9	63 42	52.2	48 14.5	61 41	50.5	48 32.6	60 40	49.9	6
7	44 57.1	66 43	55.0	45 17.0	66 43	54.5	45 56.2	65 42	53.4	46 15.6	64 42	52.9	46 34.8	64 42	52.3	46 53.9	63 41	51.7	47 50.0	62 40	50.0	48 08.4	61 40	49.4	7
8	44 31.2	67 43	54.5	44 51.2	66 43	54.0	45 30.8	65 42	52.9	45 50.3	65 42	52.3	46 09.7	64 41	51.8	46 29.0	64 41	51.2	47 25.8	62 40	49.5	47 44.3	62 40	49.0	8
9	44 05.4	68 43	53.9	44 25.5	67 42	53.4	45 05.5	66 42	52.4	45 25.2	66 42	51.8	45 44.8	65 41	51.3	46 04.3	65 41	50.7	47 01.7	63 40	49.1	47 20.4	62 40	48.5	9
90	43 39.8	68 42	53.4	44 00.1	68 42	52.9	44 40.4	67 42	51.8	45 00.3	66 41	51.3	45 20.1	66 41	50.8	45 39.8	65 41	50.2	46 37.7	64 40	48.6	46 56.7	63 39	48.0	90

Lat. 58°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	43 14.3	69 42	52.8	43 34.8	68 42	52.3	44 15.5	67 41	51.3	44 35.6	67 41	50.8	44 55.6	66 41	50.3	45 15.4	66 40	49.7	46 14.9	64 39	48.1	46 33.2	64 39	47.6	91
2	42 49.1	69 42	52.3	43 09.8	69 42	51.8	43 50.8	68 41	50.8	44 11.1	67 41	50.3	44 31.2	67 40	49.8	44 51.2	66 40	49.2	45 50.4	65 39	47.6	46 09.8	64 39	47.1	2
3	42 24.0	70 41	51.7	42 44.9	69 41	51.3	43 26.2	68 41	50.3	43 46.7	68 40	49.8	44 07.0	68 40	49.3	44 27.2	67 40	48.7	45 27.0	66 39	47.2	45 46.6	65 38	46.6	3
4	41 59.1	70 41	51.2	42 20.2	70 41	50.7	43 01.9	69 40	49.7	43 22.5	69 40	49.2	43 43.0	68 40	48.7	44 03.4	68 39	48.2	45 03.8	66 38	46.7	45 23.6	66 38	46.1	4
95	41 34.4	71 41	50.6	41 55.6	70 41	50.2	42 37.7	70 40	49.2	42 58.5	69 40	48.7	43 19.2	69 39	48.2	43 39.8	68 39	47.7	44 40.7	67 38	46.2	45 00.8	67 38	45.7	95
6	41 10.0	71 40	50.1	41 31.3	71 40	49.6	42 13.7	70 40	48.7	42 34.7	70 39	48.2	42 55.6	69 39	47.7	43 16.4	69 39	47.2	44 17.9	68 38	45.7	44 38.1	67 37	45.2	6
7	40 45.7	72 40	49.5	41 07.2	72 40	49.1	41 49.9	71 39	48.2	42 11.1	70 39	47.7	42 32.2	70 39	47.2	42 53.1	70 38	46.7	43 55.2	68 37	45.2	44 15.6	68 37	44.7	7
8	40 21.6	73 40	49.0	40 43.3	72 40	48.5	41 26.3	71 39	47.6	41 47.7	71 39	47.1	42 09.0	71 38	46.7	42 30.1	70 38	46.2	43 32.8	69 37	44.7	43 53.4	69 37	44.2	8
9	39 57.7	73 40	48.4	40 19.5	73 39	48.0	41 03.0	72 39	47.1	41 24.5	72 38	46.6	41 45.9	71 38	46.2	42 07.2	71 38	45.7	43 10.5	70 37	44.2	43 31.3	69 36	43.7	9
100	39 34.0	74 39	47.9	39 56.0	73 39	47.4	40 39.8	73 38	46.6	41 01.5	72 38	46.1	41 23.1	72 38	45.6	41 44.6	71 37	45.2	42 48.4	70 36	43.7	43 09.4	70 36	43.2	100
1	39 10.5	74 39	47.3	39 32.7	74 39	46.9	40 16.8	73 38	46.0	40 38.7	73 38	45.6	41 00.5	72 37	45.1	41 22.2	72 37	44.7	42 26.5	71 36	43.2	42 47.7	71 36	42.8	1
2	38 47.2	75 38	46.8	39 09.6	74 38	46.3	39 54.0	74 38	45.5	40 16.1	73 37	45.0	40 38.0	73 37	44.6	40 59.9	73 37	44.1	42 04.8	72 36	42.7	42 26.2	71 36	42.3	2
3	38 24.2	75 38	46.2	38 46.7	75 38	45.8	39 31.5	74 37	44.9	39 53.7	74 37	44.5	40 15.8	74 37	44.1	40 37.9	73 36	43.6	41 43.4	72 35	42.2	42 05.0	72 35	41.8	3
4	38 01.3	76 38	45.7	38 24.0	75 37	45.2	39 09.1	75 37	44.4	39 31.5	75 37	44.0	39 53.8	74 36	43.5	40 16.0	74 36	43.1	41 22.1	73 35	41.8	41 43.9	72 35	41.3	4
105	37 38.7	76 37	45.1	38 01.5	76 37	44.7	38 47.0	75 37	43.9	39 09.5	75 36	43.4	39 32.0	75 36	43.0	39 54.4	74 36	42.6	41 01.0	73 35	41.2	41 23.0	73 34	40.8	105
6	37 16.3	77 37	44.5	37 39.3	77 37	44.1	38 25.0	76 36	43.3	38 47.8	76 36	42.9	39 10.5	75 36	42.5	39 33.0	75 35	42.1	40 40.1	74 34	40.7	41 02.3	74 34	40.3	6
7	36 54.1	77 37	44.0	37 17.2	77 36	43.6	38 03.3	77 36	42.8	38 26.3	76 36	42.4	38 49.1	76 35	42.0	39 11.8	76 35	41.5	40 19.5	75 34	40.2	40 41.9	74 34	39.8	7
8	36 32.1	78 36	43.4	36 55.4	78 36	43.0	37 41.9	77 35	42.2	38 04.9	77 35	41.8	38 27.9	77 35	41.4	38 50.9	76 35	41.0	39 59.1	75 34	39.7	40 21.6	75 33	39.3	8
9	36 10.4	78 36	42.9	36 33.9	78 36	42.5	37 20.6	78 35	41.7	37 43.8	77 35	41.3	38 07.0	77 34	40.9	38 30.1	77 34	40.5	39 38.8	76 33	39.2	40 01.6	76 33	38.8	9
110	35 48.9	79 35	42.3	36 12.5	79 35	41.9	36 59.6	78 35	41.1	37 23.0	78 34	40.7	37 46.3	78 34	40.4	38 09.6	77 34	40.0	39 18.8	77 33	38.7	39 41.8	76 33	38.3	110
1	35 27.6	79 35	41.7	35 51.4	79 35	41.4	36 38.8	79 34	40.6	37 02.3	78 34	40.2	37 25.8	78 34	39.8	37 49.3	78 33	39.4	38 59.1	77 33	38.2	39 22.2	77 32	37.8	1
2	35 06.5	80 35	41.2	35 30.5	80 34	40.8	36 18.2	79 34	40.0	36 41.9	79 34	39.7	37 05.6	79 33	39.3	37 29.2	79 33	38.9	38 39.5	78 32	37.7	39 02.8	77 32	37.3	2
3	34 45.7	80 34	40.6	35 09.8	80 34	40.2	35 57.9	80 34	39.5	36 21.8	80 33	39.1	36 45.6	79 33	38.7	37 09.4	79 33	38.4	38 20.2	78 32	37.2	38 43.6	78 32	36.8	3
4	34 25.2	81 34	40.0	34 49.4	81 34	39.7	35 37.8	80 33	38.9	36 01.8	80 33	38.6	36 25.8	80 33	38.2	36 49.7	80 32	37.8	38 01.1	79 31	36.7	38 24.7	79 31	36.3	4
115	34 04.8	81 33	39.5	34 29.2	81 33	39.1	35 17.9	81 33	38.4	35 42.1	81 32	38.0	36 06.3	80 32	37.7	36 30.4	80 32	37.3	37 42.2	79 31	36.2	38 06.0	79 31	35.8	115
6	33 44.8	82 33	38.9	34 09.3	82 33	38.5	34 58.3	81 32	37.8	35 22.6	81 32	37.5	35 47.0	81 32	37.1	36 11.2	81 32	36.8	37 23.6	80 31	35.6	37 47.5	80 30	35.3	6
7	33 24.9	82 33	38.3	33 49.6	82 32	38.0	34 38.9	82 32	37.3	35 03.4	82 32	36.9	35 27.9	81 31	36.6	35 52.3	81 31	36.2	37 05.2	81 30	35.1	37 29.3	80 30	34.7	7
8	33 05.3	83 32	37.7	33 30.2	83 32	37.4	34 19.8	82 31	36.7	34 44.4	82 31	36.4	35 09.1	82 31	36.0	35 33.6	82 31	35.7	36 47.0	81 30	34.6	37 11.3	81 30	34.2	8
9	32 46.0	83 32	37.2	33 11.0	83 32	36.8	34 00.9	83 31	36.2	34 25.7	83 31	35.8	34 50.5	83 31	35.5	35 15.2	82 30	35.1	36 29.0	82 30	34.1	36 53.5	81 29	33.7	9
120	32 26.9	84 31	36.6	32 52.1	84 31	36.3	33 42.2	83 31	35.6	34 07.2	83 30	35.3	34 32.2	83 30	34.9	34 57.1	83 30	34.6	36 11.4	82 29	33.5	36 36.0	82 29	33.2	120
1	32 08.1	84 31	36.0	32 33.4	84 31	35.7	33 23.8	84 30	35.0	33 49.0	84 30	34.7	34 14.1	84 30	34.4	34 39.1	83 29	34.0	35 53.9	83 29	33.0	36 18.7	83 28	32.7	1
2	31 49.6	85 30	35.4	32 15.0	85 30	35.1	33 05.7	84 30	34.5	33 31.0	84 30	34.2	33 56.3	84 29	33.8	34 21.5	84 29	33.5	35 36.7	83 28	32.5	36 01.7	83 28	32.2	2
3	31 31.3	85 30	34.8	31 56.8	85 30	34.5	32 47.9	85 29	33.9	33 13.3	85 29	33.6	33 38.7	85 29	33.3	34 04.0	84 29	33.0	35 19.7	84 28	32.0	35 44.9	84 28	31.6	3
4	31 13.2	86 30	34.3	31 38.9	86 29	34.0	32 30.2	85 29	33.3	32 55.8	85 29	33.0	33 21.4	85 28	32.7	33 46.9	85 28	32.4	35 03.0	84 27	31.4	35 28.3	84 27	31.1	4
125	30 55.5	86 29	33.7	31 21.3	86 29	33.4	32 12.9	86 28	32.8	32 38.6	86 28	32.5	33 04.3	86 28	32.2	33 30.0	85 28	31.9	34 46.6	85 27	30.9	35 12.0	85 27	30.6	125
6	30 38.0	87 29	33.1	31 04.0	87 28	32.8	31 55.8	86 28	32.2	32 21.7	86 28	31.9	32 47.5	86 28	31.6	33 13.3	86 27	31.3	34 30.4	85 27	30.4	34 56.0	85 26	30.1	6
7	30 20.7	87 28	32.5	30 46.9	87 28	32.2	31 39.0	87 28	31.6	32 05.0	87 27	31.3	32 31.0	86 27	31.1	32 56.9	86 27	30.8	34 14.4	86 26	29.8	34 40.2	86 26	29.5	7
8	30 03.8	88 28	31.9	30 30.0	87 28	31.6	31 22.5	87 27	31.1	31 48.6	87 27	30.8	32 14.7	87 27	30.5	32 40.8	87 26	30.2	33 58.7	86 26	29.3	34 24.6	86 25	29.0	8
9	29 47.1	88 27	31.3	30 13.5	88 27	31.1	31 06.2	88 27	30.5	31 32.5	88 26	30.2	31 58.7	87 26	29.9	32 24.9	87 26	29.6	33 43.3	87 25	28.8	34 09.3	87 25	28.5	9
130	29 30.7	88 27	30.7	29 57.2	88 27	30.5	30 50.2	88 26	29.9	31 16.6	88 26	29.6	31 43.0	88 26	29.4	32 09.3	88 26	29.1	33 28.1	87 25	28.2	33 54.3	87 25	27.9	130
1	29 14.6	89 26	30.2	29 41.3	89 26	29.9	30 34.5	89 26	29.4	31 01.0	88 26	29.1	31 27.5	88 25	28.8	31 54.0	88 25	28.5	33 13.2	88 24	27.7	33 39.6	88 24	27.4	1
2	28 58.8	89 26	29.6	29 25.6	89 26	29.3	30 19.0	89 25	28.8	30 45.7	89 25	28.5	31 12.3	89 25	28.2	31 39.0	89 25	28.0	32 58.6	88 24	27.1	33 25.1	88 24	26.9	2
3	28 43.2	90 25	29.0	29 10.1	90 25	28.7	30 03.8	89 25	28.2	30 30.7	89 25	27.9	30 57.4	89 24	27.7	31 24.2	89 24	27.4	32 44.2	89 24	26.6	33 10.8	89 23	26.3	3
4	28 28.0	90 25	28.4	28 55.0	90 25	28.1	29 49.0	90 24	27.6	30 15.9	90 24	27.4	30 42.8	90 24	27.1	31 09.7	90 24	26.9	32 30.1	89 23	26.1	32 56.9	89 23	25.8	4
135	28 13.0	91 24	27.8	28 40.2	90 24	27.5	29 34.4	90 24	27.0	30 01.4	90 24	26.8	30 28.5	90 23	26.5	30 55.5	90 23	26.3	32 16.3	90 23	25.5	32 43.2	90 22	25.2	135
6	27 58.4	91 24	27.2	28 25.6	91 24	26.9	29 20.1	91 23	26.5	29 47.2	91 23	26.2	30 14.4	90 23	26.0	30 41.5	90 23	25.7	32 02.7	90 22	25.0	32 29.7	90 22	24.7	6
7	27 44.0	91 23	26.6	28 11.4	91 23	26.3	29 06.0	91 23	25.9	29 33.3	91 23	25.6	30 00.6	91 22	25.4	30 27.9	91 22	25.2	31 49.4	91 22	24.4	32 16.6	90 21	24.2	7
8	27 29.9	92 23	26.0	27 57.4	92 23	25.8	28 52.3	91 22	25.3	29 19.7	91 22	25.1	29 47.1	91 22	24.8	30 14.5	91 22	24.6	31 36.4	91 21	23.9	32 03.7	91 21	23.6	8
9	27 16.1	92 22	25.4	27 43.7	92 22	25.2	28 38.9	92 22	24.7	29 06.4	92 22	24.5	29 33.9	92 22	24.3	30 01.4	92 21	24.0	31 23.7	91 21	23.3	31 51.1	91 21	23.1	9
140	27 02.7	92 22	24.8	27 30.4	92 22	24.6	28 25.7	92 21	24.1	28 53.4	92 21	23.9	29 21.0	92 21	23.7	29 48.6	92 21	23.5	31 11.3	92 20	22.8	31 38.8	92 20	22.5	140
1	26 49.5	93 21	24.2	27 17.3	93 21	24.0	28 12.9	93 21	23.5	28 40.6	92 21	23.3	29 08.4	92 21	23.1	29 36.1	92 20	22.9	30 59.1	92 20	22.2	31 26.7	92 20	22.0	1
2	26 36.6	93 21	23.6	27 04.5	93 21	23.4	28 00.3	93 20	23.0	28 28.2	93 20	22.7	28 56.0	93 20	22.5	29 23.9	93 20	22.3	30 47.2	93 19	21.7	31 15.0	92 19	21.4	2
3	26 24.1	93 20	23.0	26 52.1	93 20	22.8	27 48.1	93 20	22.4	28 16.0	93 20	22.2	28 44.0	93 20	22.0	29 11.9	93 19	21.7	30 35.6	93 19	21.1	31 03.5	93 19	20.9	3
4	26 11.8	94 20	22.4	26 39.9	94 20	22.2	27 36.1	94 19	21.8	28 04.2	94 19	21.6	28 32.3	94 19	21.4	29 00.3	93 19	21.2	30 24.3	93 18	20.5	30 52.3	93 18	20.3	4
145	25 59.9	94 19	21.8	26 28.1	94 19	21.6	27 24.5	94 19	21.2	27 52.7	94 19	21.0	28 20.8	94 19	20.8	28 49.0	94 18	20.6	30 13.3	94 18	20.0	30 41.4	94 18	19.8	145
6	25 48.2	94 19	21.1	26 16.6	94 19	21.0	27 13.2	94 18	20.6	27 41.4	94 18	20.4	28 09.7	94 18	20.2	28 37.9	94 18	20.0	30 02.6	94 17	19.4	30 30.8	94 17	19.2	6
7	25 36.9	95 18	20.5	26 05.3	95 18	20.4	27 02.1	95 18	20.0	27 30.5	95 18	19.8	27 58.9	95 18	19.6	28 27.2	94 17	19.4	29 52.2	94 17	18.9	30 20.4	94 17	18.7	7
8	25 25.9	95 18	19.9	25 54.4	95 18	19.7	26 51.4	95 17	19.4	27 19.9	95 17	19.2	27 48.3	95 17	19.0	28 16.8	95 17	18.9	29 42.0	95 16	18.3	30 10.4	95 16	18.1	8
9	25 15.3	95 17	19.3	25 43.9	95 17	19.1	26 41.0	95 17	18.8	27 09.6	95 17	18.6	27 38.1	95 17	18.5	28 06.7	95 16	18.3	29 32.2	95 16	17.8	30 00.7	95 16	17.6	9
150	25 04.9	96 17	18.7	25 33.6	96 17	18.5	26 30.9	96 16	18.2	26 59.6	95 16	18.0	27 28.2	95 16	17.9	27 56.8	95 16	17.7	29 22.6	95 15	17.2	29 51.2	95 15	17.0	150
1	24 54.9	96 16	18.1	25 23.6	96 16	17.9	26 21.1	96 16	17.6	26 49.9	96 16	17.4	27 18.6	96 15	17.3	27 47.3	96 15	17.1	29 13.4	96 15	16.6	29 42.0	96 15	16.5	1
2	24 45.2	96 16	17.5	25 14.0	96 16	17.3	26 11.7	96 15	17.0	26 40.5	96 15	16.9	27 09.3	96 15	16.7	27 38.1	96 15	16.5	29 04.4	96 14	16.1	29 33.2	96 14	15.9	2
3	24 35.8	96 15	16.9	25 04.7	96 15	16.7	26 02.5	96 15	16.4	26 31.4	96 15	16.3	27 00.3	96 14	16.1	27 29.2	96 14	16.0	28 55.8	96 14	15.5	29 24.6	96 14	15.3	3
4	24 26.7	97 15	16.2	24 55.7	97 14	16.1	25 53.7	97 14	15.8	26 22.7	97 14	15.7	26 51.7	97 14	15.5	27 20.6	97 14	15.4	28 47.4	96 13	14.9	29 16.4	96 13	14.8	4
155	24 18.0	97 14	15.6	24 47.1	97 14	15.5	25 45.2	97 14	15.2	26 14.3	97 14	15.1	26 43.3	97 13	14.9	27 12.3	97 13	14.8	28 39.4	97 13	14.4	29 08.4	97 13	14.2	155
6	24 09.6	97 13	15.0	24 38.8	97 13	14.9	25 37.0	97 13	14.6	26 06.2	97 13	14.5	26 35.3	97 13	14.3	27 04.4	97 13	14.2	28 31.7	97 12	13.8	29 00.8	97 12	13.7	6
7	24 01.5	97 13	14.4	24 30.8	97 13	14.3	25 29.2	97 13	14.0	25 58.4	97 12	13.9	26 27.6	97 12	13.8	26 56.7	97 12	13.6	28 24.2	97 12	13.2	28 53.4	97 12	13.1	7
8	23 53.8	98 12	13.8	24 23.1	98 12	13.6	25 21.6	98 12	13.4	25 50.9	98 12	13.3	26 20.2	98 12	13.2	26 49.4	97 12	13.0	28 17.1	97 11	12.7	28 46.3	97 11	12.5	8
9	23 46.4	98 12	13.1	24 15.8	98 12	13.0	25 14.4	98 11	12.8	25 43.8	98 11	12.7	26 13.1	98 11	12.6	26 42.4	98 11	12.4	28 10.3	98 11	12.1	28 39.6	98 11	12.0	9
160	23 39.3	98 11	12.5	24 08.8	98 11	12.4	25 07.5	98 11	12.2	25 36.9	98 11	12.1	26 06.3	98 11	12.0	26 35.7	98 11	11.9	28 03.8	98 10	11.5	28 33.2	98 10	11.4	160
1	23 32.6	98 11	11.9	24 02.1	98 11	11.8	25 01.0	98 10	11.6	25 30.4	98 10	11.5	25 59.9	98 10	11.4	26 29.3	98 10	11.3	27 57.6	98 10	10.9	28 27.0	98 10	10.8	1
2	23 26.2	98 10	11.3	23 55.8	98 10	11.2	24 54.8	98 10	11.0	25 24.3	98 10	10.9	25 53.8	98 10	10.8	26 23.3	98 10	10.7	27 51.7	98 09	10.4	28 21.2	98 09	10.3	2
3	23 20.2	99 10	10.7	23 49.8	99 09	10.6	24 48.9	99 09	10.4	25 18.4	99 09	10.3	25 48.0	99 09	10.2	26 17.5	98 09	10.1	27 46.2	98 09	09.8	28 15.7	98 09	09.7	3
4	23 14.5	99 09	10.0	23 44.1	99 09	09.9	24 43.3	99 09	09.8	25 12.9	99 09	09.7	25 42.5	99 09	09.6	26 12.1	99 08	09.5	27 40.9	99 08	09.2	28 10.5	99 08	09.1	4
165	23 09.1	99 08	09.4	23 38.8	99 08	09.3	24 38.1	99 08	09.2	25 07.7	99 08	09.1	25 37.4	99 08	09.0	26 07.0	99 08	08.9	27 36.0	99 08	08.7	28 05.6	99 08	08.6	165
6	23 04.1	99 08	08.8	23 33.8	99 08	08.7	24 33.2	99 08	08.6	25 02.9	99 08	08.5	25 32.6	99 07	08.4	26 02.3	99 07	08.3	27 31.4	99 07	08.1	28 01.0	99 07	08.0	6
7	22 59.4	99 07	08.2	23 29.1	99 07	08.1	24 28.6	99 07	07.9	24 58.4	99 07	07.9	25 28.1	99 07	07.8	25 57.8	99 07	07.7	27 27.0	99 07	07.5	27 56.8	99 07	07.4	7
8	22 55.1	99 07	07.5	23 24.8	99 07	07.5	24 24.4	99 06	07.3	24 54.2	99 06	07.3	25 24.0	99 06	07.2	25 53.7	99 06	07.1	27 23.1	99 06	06.9	27 52.8	99 06	06.9	8
9	22 51.1	99 06	06.9	23 20.9	99 06	06.8	24 20.5	99 06	06.7	24 50.3	99 06	06.7	25 20.1	99 06	06.6	25 50.0	99 06	06.5	27 19.4	99 06	06.4	27 49.2	99 06	06.3	9
170	22 47.4	1.0 06	06.3	23 17.3	99 05	06.2	24 17.0	99 05	06.1	24 46.8	99 05	06.1	25 16.7	99 05	06.0	25 46.5	99 05	05.9	27 16.0	99 05	05.8	27 45.9	99 05	05.7	170
1	22 44.1	1.0 05	05.7	23 14.0	1.0 05	05.6	24 13.7	1.0 05	05.5	24 43.6	1.0 05	05.5	25 13.5	1.0 05	05.4	25 43.4	1.0 05	05.4	27 13.0	1.0 05	05.2	27 42.8	1.0 04	05.1	1
2	22 41.2	1.0 04	05.0	23 11.1	1.0 04	05.0	24 10.9	1.0 04	04.9	24 40.8	1.0 04	04.8	25 10.7	1.0 04	04.8	25 40.6	1.0 04	04.8	27 10.3	1.0 04	04.6	27 40.2	1.0 04	04.6	2
3	22 38.5	1.0 04	04.4	23 08.5	1.0 04	04.4	24 08.3	1.0 04	04.3	24 38.2	1.0 04	04.2	25 08.2	1.0 04	04.2	25 38.1	1.0 04	04.2	27 07.9	1.0 03	04.0	27 37.8	1.0 03	04.0	3
4	22 36.3	1.0 03	03.8	23 06.2	1.0 03	03.7	24 06.1	1.0 03	03.7	24 36.1	1.0 03	03.6	25 06.0	1.0 03	03.6	25 35.9	1.0 03	03.6	27 05.8	1.0 03	03.5	27 35.7	1.0 03	03.4	4
175	22 34.4	1.0 03	03.1	23 04.3	1.0 03	03.1	24 04.2	1.0 03	03.1	24 34.2	1.0 02	03.0	25 04.2	1.0 02	03.0	25 34.1	1.0 02	03.0	27 04.0	1.0 02	02.9	27 34.0	1.0 02	02.9	175
6	22 32.8	1.0 02	02.5	23 02.8	1.0 02	02.5	24 02.7	1.0 02	02.4	24 32.7	1.0 02	02.4	25 02.7	1.0 02	02.4	25 32.6	1.0 02	02.4	27 02.6	1.0 02	02.3	27 32.5	1.0 02	02.3	6
7	22 31.6	1.0 01	01.9	23 01.6	1.0 01	01.9	24 01.5	1.0 01	01.8	24 31.5	1.0 01	01.8	25 01.5	1.0 01	01.8	25 31.5	1.0 01	01.8	27 01.4	1.0 01	01.7	27 31.4	1.0 01	01.7	7
8	22 30.7	1.0 01	01.3	23 00.7	1.0 01	01.2	24 00.7	1.0 01	01.2	24 30.7	1.0 01	01.2	25 00.7	1.0 01	01.2	25 30.7	1.0 01	01.2	27 00.6	1.0 01	01.2	27 30.6	1.0 01	01.1	8
9	22 30.2	1.0 00	00.6	23 00.2	1.0 00	00.6	24 00.2	1.0 00	00.6	24 30.2	1.0 00	00.6	25 00.2	1.0 00	00.6	25 30.2	1.0 00	00.6	27 00.2	1.0 00	00.6	27 30.2	1.0 00	00.6	9
180	22 30.0	1.0 00	00.0	23 00.0	1.0 00	00.0	24 00.0	1.0 00	00.0	24 30.0	1.0 00	00.0	25 00.0	1.0 00	00.0	25 30.0	1.0 00	00.0	27 00.0	1.0 00	00.0	27 30.0	1.0 00	00.0	180

Lat. 58°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	88 00.0	1.0 07	00.0	87 30.0	1.0 05	00.0	86 00.0	1.0 03	00.0	85 30.0	1.0 03	00.0	85 00.0	1.0 02	00.0	79 00.0	1.0 01	00.0	78 30.0	1.0 01	00.0	73 30.0	1.0 00	00.0	00
1	87 56.1	97 18	14.0	87 26.9	98 15	11.1	85 58.1	99 09	06.7	85 28.4	99 08	05.9	84 58.6	99 07	05.2	78 59.5	1.0 03	01.9	78 29.5	1.0 02	01.8	73 29.7	1.0 01	00.9	1
2	87 45.0	88 28	26.4	87 18.0	92 23	21.4	85 52.6	97 15	13.2	85 23.6	97 13	11.6	84 54.3	98 12	10.3	78 57.9	1.0 04	03.7	78 28.1	1.0 04	03.5	73 29.0	1.0 02	01.9	2
3	87 28.4	78 34	36.4	87 04.0	84 30	30.2	85 43.7	93 20	19.3	85 15.7	94 18	17.0	84 47.3	95 16	15.2	78 55.3	99 06	05.6	78 25.6	99 06	05.2	73 27.7	1.0 03	02.8	3
4	87 07.8	67 39	44.1	86 46.3	75 35	37.6	85 31.8	88 24	24.8	85 05.0	90 22	22.1	84 37.7	92 20	19.8	78 51.7	98 08	07.4	78 22.2	98 07	07.0	73 25.8	99 04	03.7	4
05	86 44.4	58 42	50.0	86 25.6	67 38	43.5	85 17.2	83 28	29.9	84 51.9	86 26	26.7	84 25.8	88 23	24.1	78 47.1	97 09	09.2	78 17.9	97 09	08.7	73 23.5	99 05	04.7	05
6	86 19.3	50 44	54.5	86 02.7	60 41	48.3	85 00.3	77 31	34.3	84 36.5	81 29	30.9	84 11.9	84 26	28.0	78 41.5	96 11	11.0	78 12.7	96 10	10.3	73 20.7	98 06	05.6	6
7	85 52.8	44 46	58.0	85 38.3	53 43	52.1	84 41.4	72 34	38.2	84 19.3	76 31	34.7	83 56.1	79 29	31.6	78 35.0	95 12	12.7	78 06.5	95 12	12.0	73 17.3	97 06	06.5	7
8	85 25.4	38 47	60.7	85 12.7	47 44	55.2	84 21.0	66 36	41.6	84 00.5	71 34	38.0	83 38.6	75 31	34.8	78 27.5	93 14	14.4	77 59.5	94 13	13.5	73 13.5	97 07	07.4	8
9	84 57.4	33 48	62.8	84 46.2	42 45	57.7	83 59.3	61 38	44.5	83 40.2	66 36	40.9	83 19.8	70 33	37.7	78 19.1	91 15	16.1	77 51.7	92 14	15.1	73 09.1	96 08	08.3	9
10	84 28.9	29 48	64.5	84 19.0	37 46	59.7	83 36.5	56 40	47.1	83 18.9	61 37	43.5	82 59.8	66 35	40.3	78 09.9	89 17	17.7	77 43.0	90 16	16.6	73 04.3	95 09	09.2	10
1	84 00.0	25 49	65.9	83 51.3	33 47	61.4	83 12.8	52 41	49.3	82 56.5	57 39	45.8	82 38.8	61 37	42.6	77 59.8	87 18	19.2	77 33.5	88 17	18.1	72 59.0	94 10	10.0	1
2	83 30.9	22 49	67.0	83 23.2	29 47	62.7	82 48.4	48 42	51.2	82 33.3	53 40	47.8	82 16.8	57 38	44.6	77 49.0	85 19	20.7	77 23.3	86 18	19.5	72 53.2	93 10	10.9	2
3	83 01.5	19 49	67.9	82 54.8	26 48	63.9	82 23.3	44 43	52.9	82 09.4	49 41	49.6	81 54.1	53 39	46.5	77 37.4	83 20	22.1	77 12.3	84 19	20.8	72 47.0	92 11	11.7	3
4	82 32.0	16 49	68.6	82 26.1	23 48	64.8	81 57.7	40 43	54.3	81 44.9	45 42	51.1	81 30.8	50 40	48.1	77 25.1	81 22	23.5	77 00.6	82 21	22.1	72 40.3	90 12	12.5	4
15	82 02.3	14 50	69.1	81 57.3	20 48	65.6	81 31.7	37 44	55.6	81 20.0	41 42	52.5	81 06.8	46 41	49.5	77 12.1	79 23	24.8	76 48.3	80 22	23.4	72 33.2	89 13	13.3	15
6	81 32.6	12 50	69.6	81 28.2	17 49	66.2	81 05.3	33 45	56.6	80 54.5	38 43	53.7	80 42.4	43 41	50.8	76 58.5	76 24	26.0	76 35.4	78 23	24.6	72 25.6	88 13	14.1	6
7	81 02.8	10 50	69.9	80 59.1	15 49	66.7	80 38.6	30 45	57.6	80 28.8	35 44	54.7	80 17.6	39 42	51.9	76 44.2	74 25	27.2	76 21.9	75 23	25.7	72 17.7	86 14	14.9	7
8	80 32.9	08 50	70.2	80 29.8	13 49	67.2	80 11.6	28 45	58.4	80 02.6	32 44	55.6	79 52.4	36 43	52.9	76 29.4	71 26	28.3	76 07.8	73 24	26.8	72 09.3	85 15	15.6	8
9	80 02.9	06 50	70.4	80 00.5	11 49	67.5	79 44.4	25 46	59.1	79 36.3	29 44	56.4	79 26.9	34 43	53.8	76 14.1	69 26	29.4	75 53.2	71 25	27.9	72 00.5	83 15	16.4	9
20	79 33.0	04 50	70.5	79 31.1	09 49	67.8	79 17.0	22 46	59.7	79 09.7	27 45	57.1	79 01.1	31 43	54.6	75 58.3	66 27	30.4	75 38.1	68 26	28.9	71 51.4	81 16	17.1	20
1	79 03.0	02 50	70.6	79 01.6	07 49	68.0	78 49.5	20 46	60.2	78 42.9	24 45	57.7	78 35.0	28 44	55.3	75 42.0	64 28	31.3	75 22.5	66 27	29.8	71 41.9	80 16	17.8	1
2	78 33.0	01 50	70.6	78 32.1	05 49	68.1	78 21.8	18 46	60.7	78 15.9	22 45	58.3	78 08.8	26 44	55.9	75 25.2	61 29	32.2	75 06.5	64 27	30.7	71 32.0	78 17	18.4	2
3	78 03.0	01 50	70.6	78 02.6	03 49	68.2	77 54.1	16 46	61.1	77 48.8	19 45	58.7	77 42.4	23 44	56.4	75 08.1	59 29	33.1	74 50.0	61 28	31.5	71 21.8	76 18	19.1	3
4	77 33.0	02 50	70.6	77 33.1	02 49	68.3	77 26.2	13 47	61.4	77 21.6	17 46	59.1	77 15.8	21 44	56.9	74 50.5	57 30	33.9	74 33.2	59 29	32.3	71 11.2	74 18	19.7	4
25	77 03.0	04 50	70.5	77 03.5	00 49	68.3	76 58.2	11 47	61.6	76 54.2	15 46	59.5	76 49.1	19 45	57.3	74 32.6	54 30	34.6	74 16.0	56 29	33.1	71 00.3	73 19	20.3	25
6	76 33.0	05 50	70.5	76 34.0	01 49	68.3	76 30.2	10 47	61.9	76 26.8	13 46	59.7	76 22.3	17 45	57.6	74 14.4	52 31	35.3	73 58.5	54 30	33.8	70 49.2	71 19	20.9	6
7	76 03.1	06 50	70.3	76 04.4	03 49	68.3	76 02.2	08 47	62.0	75 59.3	11 46	60.0	75 55.4	15 45	57.9	73 55.9	49 31	36.0	73 40.7	52 30	34.5	70 37.7	69 20	21.5	7
8	75 33.2	08 50	70.2	75 34.9	04 49	68.2	75 34.1	06 47	62.2	75 31.8	09 46	60.2	75 28.4	13 45	58.2	73 37.0	47 32	36.6	73 22.6	49 31	35.1	70 25.9	67 20	22.0	8
9	75 03.2	09 50	70.0	75 05.4	06 49	68.1	75 05.9	04 47	62.3	75 04.2	08 46	60.3	75 01.4	11 45	58.4	73 17.9	45 32	37.2	73 04.1	47 31	35.7	70 13.9	65 21	22.5	9
30	74 33.4	10 50	69.9	74 35.9	07 49	68.0	74 37.8	03 47	62.3	74 36.5	06 46	60.4	74 34.3	09 45	58.6	72 58.6	43 33	37.7	72 45.5	45 32	36.2	70 01.6	63 21	23.0	30
1	74 03.6	11 50	69.7	74 06.4	08 49	67.8	74 09.6	01 47	62.4	74 08.8	04 46	60.5	74 07.1	07 45	58.7	72 39.0	40 33	38.2	72 26.6	43 32	36.7	69 49.0	61 21	23.5	1
2	73 33.8	12 50	69.4	73 37.0	09 49	67.7	73 41.5	00 47	62.4	73 41.2	03 46	60.6	73 40.0	05 45	58.8	72 19.2	38 33	38.7	72 07.5	40 32	37.2	69 36.2	59 22	24.0	2
3	73 04.0	13 50	69.2	73 07.6	11 49	67.5	73 13.3	02 47	62.3	73 13.5	01 46	60.6	73 12.7	04 45	58.9	71 59.3	36 34	39.1	71 48.1	38 32	37.6	69 23.2	57 22	24.4	3
4	72 34.3	15 49	69.0	72 38.3	12 49	67.3	72 45.1	03 47	62.3	72 45.7	01 46	60.6	72 45.5	02 45	58.9	71 39.1	34 34	39.5	71 28.6	36 33	38.1	69 09.9	55 22	24.8	4
35	72 04.6	16 49	68.7	72 08.9	13 49	67.1	72 17.0	05 47	62.2	72 18.0	02 46	60.6	72 18.3	01 45	58.9	71 18.8	32 34	39.9	71 08.9	34 33	38.4	68 56.4	53 23	25.2	35
6	71 35.0	17 49	68.5	71 39.7	14 49	66.9	71 48.9	06 47	62.2	71 50.4	04 46	60.5	71 51.0	01 45	58.9	70 58.3	30 34	40.2	70 49.1	32 33	38.8	68 42.8	51 23	25.6	6
7	71 05.5	18 49	68.2	71 10.4	15 49	66.7	71 20.8	08 47	62.0	71 22.7	05 46	60.5	71 23.8	02 45	58.9	70 37.7	27 35	40.6	70 29.1	30 34	39.1	68 28.9	49 23	26.0	7
8	70 36.0	19 49	67.9	70 41.3	16 49	66.4	70 52.7	09 47	61.9	70 55.0	06 46	60.4	70 56.6	04 45	58.9	70 17.0	25 35	40.8	70 09.0	28 34	39.4	68 14.9	47 24	26.4	8
9	70 06.6	20 49	67.6	70 12.2	17 48	66.2	70 24.7	10 47	61.8	70 27.4	08 46	60.3	70 29.4	05 45	58.8	69 56.1	23 35	41.1	69 48.7	26 34	39.7	68 00.7	45 24	26.7	9
40	69 37.2	21 49	67.4	69 43.1	19 48	65.9	69 56.7	12 47	61.6	69 59.8	09 46	60.2	70 02.2	07 45	58.7	69 35.2	22 35	41.3	69 28.4	24 34	39.9	67 46.3	43 24	27.0	40
1	69 07.9	22 49	67.0	69 14.1	20 48	65.7	69 28.7	13 46	61.5	69 32.2	11 46	60.1	69 35.0	08 45	58.6	69 14.1	20 35	41.5	69 07.9	22 34	40.2	67 31.8	42 24	27.3	1
2	68 38.6	23 49	66.7	68 45.1	21 48	65.4	69 00.8	14 46	61.3	69 04.7	12 46	59.9	69 07.9	10 45	58.5	68 53.0	18 35	41.7	68 47.4	20 34	40.4	67 17.2	40 25	27.6	2
3	68 09.5	24 48	66.4	68 16.3	22 48	65.1	68 32.9	15 46	61.1	68 37.2	13 46	59.7	68 40.8	11 45	58.4	68 31.8	16 35	41.9	68 26.7	18 34	40.6	67 02.4	38 25	27.9	3
4	67 40.3	25 48	66.1	67 47.5	23 48	64.8	68 05.1	16 46	60.9	68 09.8	14 46	59.6	68 13.7	12 45	58.2	68 10.5	14 36	42.0	68 06.0	16 35	40.7	66 47.5	36 25	28.1	4
45	67 11.3	26 48	65.8	67 18.7	24 48	64.5	67 37.4	18 46	60.7	67 42.4	16 46	59.4	67 46.7	14 45	58.1	67 49.2	12 36	42.2	67 45.3	14 35	40.9	66 32.4	34 25	28.3	45
6	66 42.4	27 48	65.4	66 50.1	25 48	64.2	67 09.7	19 46	60.5	67 15.0	17 45	59.2	67 19.8	15 45	57.9	67 27.9	10 36	42.3	67 24.4	12 35	41.0	66 17.3	32 25	28.6	6
7	66 13.5	28 48	65.1	66 21.5	26 48	63.9	66 42.0	20 46	60.2	66 47.7	18 45	59.0	66 52.9	16 45	57.7	67 06.5	09 36	42.4	67 03.6	11 35	41.1	66 02.0	30 26	28.8	7
8	65 44.7	28 48	64.8	65 53.0	27 47	63.6	66 14.5	21 46	60.0	66 20.5	19 45	58.8	66 26.0	17 45	57.5	66 45.0	07 36	42.4	66 42.6	09 35	41.2	65 46.7	28 26	29.0	8
9	65 16.0	29 48	64.4	65 24.5	28 47	63.3	65 47.0	22 46	59.7	65 53.4	20 45	58.5	65 59.2	18 45	57.3	66 23.6	05 36	42.5	66 21.7	07 35	41.2	65 31.3	26 26	29.1	9
50	64 47.3	30 48	64.1	64 56.2	29 47	62.9	65 19.5	23 46	59.5	65 26.3	22 45	58.3	65 32.5	20 44	57.1	66 02.1	03 36	42.5	66 00.7	05 35	41.3	65 15.7	24 26	29.3	50
1	64 18.8	31 47	63.7	64 27.9	30 47	62.6	64 52.2	24 45	59.2	64 59.3	23 45	58.1	65 05.8	21 44	56.9	65 40.6	02 36	42.5	65 39.7	04 35	41.3	65 00.1	22 26	29.4	1
2	63 50.3	32 47	63.3	63 59.7	30 47	62.3	64 24.9	25 45	58.9	64 32.3	24 45	57.8	64 39.2	22 44	56.7	65 19.1	00 36	42.6	65 18.7	02 35	41.4	64 44.5	21 26	29.6	2
3	63 22.0	33 47	63.0	63 31.6	31 47	61.9	63 57.7	27 45	58.7	64 05.4	25 45	57.6	64 12.6	23 44	56.4	64 57.6	01 36	42.5	64 57.7	00 35	41.4	64 28.8	19 26	29.7	3
4	62 53.7	34 47	62.6	63 03.6	32 47	61.6	63 30.6	28 45	58.4	63 38.6	26 44	57.3	63 46.2	24 44	56.2	64 36.1	03 36	42.5	64 36.7	01 35	41.4	64 13.0	17 26	29.8	4
55	62 25.5	35 47	62.2	62 35.7	33 46	61.2	63 03.6	29 45	58.1	63 11.9	27 44	57.0	63 19.8	25 44	55.9	64 14.6	05 36	42.5	64 15.7	03 35	41.3	63 57.2	15 26	29.9	55
6	61 57.4	36 47	61.8	62 07.9	34 46	60.8	62 36.6	30 45	57.8	62 45.3	28 44	56.7	62 53.5	27 44	55.7	63 53.1	06 36	42.5	63 54.7	04 35	41.3	63 41.3	13 26	30.0	6
7	61 29.4	36 46	61.5	61 40.2	35 46	60.5	62 09.8	31 45	57.5	62 18.8	29 44	56.5	62 27.3	28 44	55.4	63 31.7	08 36	42.4	63 33.7	06 35	41.3	63 25.4	12 27	30.1	7
8	61 01.6	37 46	61.1	61 12.5	36 46	60.1	61 43.0	32 44	57.2	61 52.3	30 44	56.2	62 01.1	29 43	55.1	63 10.2	09 36	42.3	63 12.8	08 35	41.2	63 09.4	10 27	30.1	8
9	60 33.8	38 46	60.7	60 45.0	37 46	59.8	61 16.3	33 44	56.8	61 25.9	31 44	55.9	61 35.1	30 43	54.9	62 48.9	11 36	42.2	62 51.8	09 35	41.2	62 53.5	08 27	30.2	9
60	60 06.1	39 46	60.3	60 17.6	38 46	59.4	60 49.8	34 44	56.5	60 59.7	32 44	55.6	61 09.1	31 43	54.6	62 27.5	12 36	42.2	62 30.9	11 35	41.1	62 37.5	06 27	30.2	60
1	59 38.5	40 46	59.9	59 50.3	39 45	59.0	60 23.3	35 44	56.2	60 33.5	33 43	55.2	60 43.3	32 43	54.3	62 06.2	14 35	42.1	62 10.0	12 35	41.0	62 21.5	05 27	30.3	1
2	59 11.1	41 46	59.5	59 23.1	39 45	58.6	59 56.9	36 44	55.9	60 07.4	34 43	54.9	60 17.5	33 43	54.0	61 44.9	15 35	42.0	61 49.2	14 35	40.9	62 05.4	03 27	30.3	2
3	58 43.7	42 45	59.1	58 56.0	40 45	58.2	59 30.7	37 44	55.5	59 41.4	35 43	54.6	59 51.8	34 43	53.7	61 23.7	17 35	41.8	61 28.4	15 35	40.8	61 49.4	01 27	30.3	3
4	58 16.5	42 45	58.7	58 29.0	41 45	57.9	59 04.5	38 43	55.2	59 15.6	36 43	54.3	59 26.3	35 42	53.4	61 02.5	18 35	41.7	61 07.6	16 34	40.7	61 33.4	01 27	30.3	4
65	57 49.4	43 45	58.3	58 02.2	42 45	57.5	58 38.5	39 43	54.8	58 49.8	37 43	54.0	59 00.8	36 42	53.1	60 41.4	19 35	41.6	60 47.0	18 34	40.6	61 17.3	02 27	30.3	65
6	57 22.4	44 45	57.9	57 35.4	43 44	57.1	58 12.5	39 43	54.5	58 24.2	38 43	53.6	58 35.5	37 42	52.7	60 20.3	21 35	41.4	60 26.3	19 34	40.4	61 01.3	04 27	30.3	6
7	56 55.5	45 45	57.5	57 08.8	44 44	56.7	57 46.7	40 43	54.1	57 58.6	39 42	53.3	58 10.2	38 42	52.4	59 59.3	22 35	41.3	60 05.7	21 34	40.3	60 45.3	06 27	30.2	7
8	56 28.8	46 44	57.1	56 42.3	45 44	56.3	57 21.0	41 43	53.8	57 33.2	40 42	52.9	57 45.1	39 42	52.1	59 38.4	23 35	41.1	59 45.2	22 34	40.1	60 29.3	07 27	30.2	8
9	56 02.1	46 44	56.7	56 15.9	45 44	55.9	56 55.4	42 42	53.4	57 07.9	41 42	52.6	57 20.0	40 42	51.7	59 17.5	25 35	40.9	59 24.7	23 34	40.0	60 13.3	09 27	30.2	9
70	55 35.6	47 44	56.3	55 49.7	46 44	55.5	56 29.9	43 42	53.1	56 42.7	42 42	52.2	56 55.1	41 41	51.4	58 56.7	26 35	40.8	59 04.3	25 34	39.8	59 57.4	10 27	30.1	70
1	55 09.3	48 44	55.8	55 23.5	47 43	55.1	56 04.6	44 42	52.7	56 17.6	43 42	51.9	56 30.3	42 41	51.1	58 36.0	27 34	40.6	58 44.0	26 34	39.6	59 41.4	12 26	30.0	1
2	54 43.0	49 44	55.4	54 57.5	48 43	54.7	55 39.3	45 42	52.3	55 52.7	44 41	51.5	56 05.7	43 41	50.7	58 15.3	29 34	40.4	58 23.8	27 34	39.5	59 25.5	14 26	30.0	2
3	54 16.9	50 43	55.0	54 31.7	49 43	54.2	55 14.2	46 42	51.9	55 27.8	45 41	51.2	55 41.1	44 41	50.4	57 54.8	30 34	40.2	58 03.6	29 33	39.3	59 09.6	15 26	29.9	3
4	53 50.9	50 43	54.6	54 05.9	50 43	53.8	54 49.3	47 41	51.6	55 03.1	46 41	50.8	55 16.7	45 40	50.0	57 34.3	31 34	40.0	57 43.5	30 33	39.1	58 53.8	17 26	29.8	4
75	53 25.1	51 43	54.1	53 40.3	50 42	53.4	54 24.4	48 41	51.2	54 38.6	47 41	50.4	54 52.4	46 40	49.7	57 13.9	32 34	39.8	57 23.5	31 33	38.9	58 38.0	18 26	29.7	75
6	52 59.4	52 43	53.7	53 14.9	51 42	53.0	53 59.7	48 41	50.8	54 14.1	48 40	50.0	54 28.2	47 40	49.3	56 53.7	34 34	39.5	57 03.6	33 33	38.7	58 22.3	20 26	29.6	6
7	52 33.8	53 42	53.3	52 49.6	52 42	52.6	53 35.1	49 41	50.4	53 49.8	48 40	49.7	54 04.2	48 40	48.9	56 33.5	35 34	39.3	56 43.8	34 33	38.5	58 06.6	21 26	29.5	7
8	52 08.4	54 42	52.8	52 24.4	53 42	52.1	53 10.7	50 40	50.0	53 25.6	49 40	49.3	53 40.3	48 40	48.6	56 13.4	36 33	39.1	56 24.0	35 33	38.2	57 50.9	23 26	29.4	8
9	51 43.2	54 42	52.4	51 59.3	54 41	51.7	52 46.4	51 40	49.6	53 01.6	50 40	48.9	53 16.5	49 39	48.2	55 53.4	37 33	38.9	56 04.4	36 33	38.0	57 35.3	24 26	29.3	9
80	51 18.1	55 42	52.0	51 34.5	54 41	51.3	52 22.3	52 40	49.2	52 37.7	51 40	48.5	52 52.9	50 39	47.8	55 33.5	39 33	38.6	55 44.9	37 32	37.8	57 19.8	26 26	29.2	80
1	50 53.1	56 41	51.5	51 09.7	55 41	50.9	51 58.3	53 40	48.8	52 14.0	52 39	48.1	52 29.4	51 39	47.4	55 13.7	40 33	38.4	55 25.4	39 32	37.6	57 04.3	27 26	29.0	1
2	50 28.3	57 41	51.1	50 45.1	56 41	50.4	51 34.4	54 40	48.4	51 50.4	53 39	47.7	52 06.1	52 39	47.0	54 54.0	41 33	38.1	55 06.1	40 32	37.3	56 48.9	28 26	28.9	2
3	50 03.6	57 41	50.6	50 20.7	57 40	50.0	51 10.7	54 39	48.0	51 26.9	54 39	47.3	51 42.9	53 38	46.7	54 34.4	42 32	37.9	54 46.9	41 32	37.1	56 33.6	30 25	28.8	3
4	49 39.1	58 41	50.2	49 56.4	57 40	49.5	50 47.1	55 39	47.6	51 03.6	54 39	46.9	51 19.8	54 38	46.3	54 15.0	43 32	37.6	54 27.8	42 32	36.8	56 18.3	31 25	28.6	4
85	49 14.8	59 40	49.7	49 32.3	58 40	49.1	50 23.7	56 39	47.2	50 40.4	55 38	46.5	50 56.9	55 38	45.9	53 55.6	44 32	37.3	54 08.8	43 31	36.6	56 03.1	33 25	28.5	85
6	48 50.6	60 40	49.3	49 08.4	59 40	48.7	50 00.5	57 38	46.8	50 17.4	56 38	46.1	50 34.2	55 38	45.5	53 36.4	45 32	37.1	53 49.9	44 31	36.3	55 48.0	34 25	28.3	6
7	48 26.6	60 40	48.8	48 44.6	60 39	48.2	49 37.4	58 38	46.4	49 54.6	57 38	45.7	50 11.6	56 37	45.1	53 17.3	47 32	36.8	53 31.1	46 31	36.0	55 33.0	35 25	28.1	7
8	48 02.7	61 39	48.4	48 21.0	60 39	47.8	49 14.5	58 38	45.9	49 31.9	58 38	45.3	49 49.2	57 37	44.7	52 58.4	48 31	36.5	53 12.5	47 31	35.8	55 18.0	37 25	28.0	8
9	47 39.1	62 39	47.9	47 57.5	61 39	47.3	48 51.7	59 38	45.5	49 09.4	59 37	44.9	49 26.9	58 37	44.3	52 39.5	49 31	36.2	52 54.0	48 31	35.5	55 03.1	38 25	27.8	9
90	47 15.6	62 39	47.5	47 34.2	62 39	46.9	48 29.1	60 37	45.1	48 47.0	59 37	44.5	49 04.8	59 37	43.9	52 20.8	50 31	35.9	52 35.6	49 30	35.2	54 48.4	39 24	27.6	90

Digitized by Google

Lat. 58°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	46 52.2	63 39	47.0	47 11.1	63 38	46.4	48 06.7	61 37	44.7	48 24.8	60 37	44.1	48 42.8	60 36	43.5	52 02.2	51 31	35.6	52 17.3	50 30	34.9	54 33.7	41 24	27.4	91
2	46 29.1	64 38	46.5	46 48.1	63 38	46.0	47 44.4	62 37	44.2	48 02.8	61 36	43.7	48 21.0	60 36	43.1	51 43.8	52 31	35.3	51 59.2	51 30	34.6	54 19.1	42 24	27.2	2
3	46 06.1	65 38	46.1	46 25.4	64 38	45.5	47 22.3	62 37	43.8	47 40.9	62 36	43.2	47 59.4	61 36	42.6	51 25.4	53 30	35.0	51 41.2	52 30	34.3	54 04.5	43 24	27.1	3
4	45 43.3	65 38	45.6	46 02.8	65 37	45.1	47 00.4	63 36	43.4	47 19.2	63 36	42.8	47 37.9	62 35	42.2	51 07.3	54 30	34.7	51 23.3	53 30	34.0	53 50.1	44 24	26.9	4
95	45 20.6	66 37	45.1	45 40.4	66 37	44.6	46 38.6	64 36	42.9	46 57.7	63 36	42.4	47 16.7	63 35	41.8	50 49.2	55 30	34.4	51 05.6	54 29	33.7	53 35.8	46 24	26.7	95
6	44 58.2	67 37	44.7	45 18.1	66 37	44.1	46 17.1	65 36	42.5	46 36.4	64 35	41.9	46 55.5	64 35	41.4	50 31.3	56 30	34.1	50 48.0	55 29	33.4	53 21.6	47 24	26.4	6
7	44 35.9	67 37	44.2	44 56.1	67 36	43.7	45 55.7	65 35	42.1	46 15.2	65 35	41.5	46 34.6	64 35	41.0	50 13.6	57 29	33.8	50 30.6	56 29	33.1	53 07.5	48 23	26.2	7
8	44 13.9	68 36	43.7	44 34.2	68 36	43.2	45 34.5	66 35	41.6	45 54.2	66 35	41.1	46 13.9	65 34	40.5	49 56.0	58 29	33.5	50 13.2	57 29	32.8	52 53.5	49 23	26.0	8
9	43 52.0	69 36	43.2	44 12.6	68 36	42.7	45 13.4	67 35	41.2	45 33.4	66 34	40.6	45 53.3	66 34	40.1	49 38.5	59 29	33.1	49 56.1	58 28	32.5	52 39.6	51 23	25.8	9
100	43 30.3	69 36	42.8	43 51.1	69 35	42.3	44 52.6	68 34	40.7	45 12.8	67 34	40.2	45 32.9	67 34	39.7	49 21.2	60 29	32.8	49 39.1	59 28	32.2	52 25.8	52 23	25.6	100
1	43 08.8	70 36	42.3	43 29.8	70 35	41.8	44 31.9	68 34	40.3	44 52.4	68 34	39.8	45 12.7	67 33	39.2	49 04.1	61 28	32.5	49 22.2	60 28	31.9	52 12.2	53 23	25.3	1
2	42 47.5	71 35	41.8	43 08.7	70 35	41.3	44 11.5	69 34	39.8	44 32.1	69 33	39.3	44 52.7	68 33	38.8	48 47.1	62 28	32.1	49 05.5	61 28	31.5	51 58.6	54 22	25.1	2
3	42 26.4	71 35	41.3	42 47.8	71 34	40.8	43 51.2	70 33	39.4	44 12.1	69 33	38.9	44 32.8	69 33	38.4	48 30.2	63 28	31.8	48 48.9	62 27	31.2	51 45.2	55 22	24.9	3
4	42 05.6	72 34	40.8	42 27.1	72 34	40.4	43 31.1	71 33	38.9	43 52.2	70 33	38.4	44 13.2	70 32	37.9	48 13.6	64 28	31.5	48 32.5	63 27	30.9	51 31.9	56 22	24.6	4
105	41 44.9	73 34	40.3	42 06.6	72 34	39.9	43 11.3	71 33	38.5	43 32.6	71 32	38.0	43 53.8	70 32	37.5	47 57.0	64 27	31.1	48 16.3	64 27	30.5	51 18.7	57 22	24.4	105
6	41 24.4	73 34	39.9	41 46.4	73 33	39.4	42 51.6	72 32	38.0	43 13.1	72 32	37.5	43 34.5	71 32	37.0	47 40.7	65 27	30.8	48 00.2	65 27	30.2	51 05.6	58 22	24.1	6
7	41 04.1	74 33	39.4	41 26.3	74 33	38.9	42 32.1	73 32	37.5	42 53.8	72 32	37.1	43 15.4	72 31	36.6	47 24.5	66 27	30.4	47 44.3	66 26	29.9	50 52.7	60 21	23.9	7
8	40 44.1	75 33	38.9	41 06.4	74 33	38.4	42 12.9	73 32	37.1	42 34.8	73 31	36.6	42 56.6	73 31	36.1	47 08.5	67 26	30.1	47 28.6	67 26	29.5	50 39.8	61 21	23.6	8
9	40 24.2	75 33	38.4	40 46.8	75 32	37.9	41 53.8	74 31	36.6	42 15.9	74 31	36.2	42 37.9	73 31	35.7	46 52.6	68 26	29.7	47 13.0	68 26	29.2	50 27.2	62 21	23.4	9
110	40 04.6	76 32	37.9	40 27.3	76 32	37.5	41 34.9	75 31	36.1	41 57.3	74 31	35.7	42 19.5	74 30	35.2	46 37.0	69 26	29.4	46 57.6	68 25	28.8	50 14.6	63 21	23.1	110
1	39 45.2	77 32	37.4	40 08.1	76 32	37.0	41 16.3	75 31	35.7	41 38.8	75 30	35.2	42 01.2	75 30	34.8	46 21.5	70 26	29.0	46 42.3	69 25	28.5	50 02.2	64 20	22.9	1
2	39 26.0	77 32	36.9	39 49.1	77 31	36.5	40 57.8	76 30	35.2	41 20.6	76 30	34.8	41 43.2	75 30	34.3	46 06.1	71 25	28.6	46 27.2	70 25	28.1	49 49.9	65 20	22.6	2
3	39 07.0	78 31	36.4	39 30.3	77 31	36.0	40 39.6	77 30	34.7	41 02.6	76 30	34.3	41 25.4	76 29	33.9	45 51.0	71 25	28.3	46 12.3	71 25	27.8	49 37.8	66 20	22.3	3
4	38 48.3	78 31	35.9	39 11.7	78 31	35.5	40 21.6	77 30	34.3	40 44.7	77 29	33.8	41 07.8	77 29	33.4	45 36.0	72 25	27.9	45 57.6	72 24	27.4	49 25.8	67 20	22.0	4
115	38 29.7	79 30	35.4	38 53.4	79 30	35.0	40 03.8	78 29	33.8	40 27.2	78 29	33.4	40 50.4	77 29	32.9	45 21.2	73 24	27.5	45 43.1	73 24	27.0	49 13.9	68 20	21.8	115
6	38 11.4	80 30	34.9	38 35.3	79 30	34.5	39 46.3	78 29	33.3	40 09.8	78 29	32.9	40 33.2	78 28	32.5	45 06.6	74 24	27.2	45 28.7	73 24	26.7	49 02.2	69 19	21.5	6
7	37 53.4	80 30	34.4	38 17.4	80 29	34.0	39 28.9	79 29	32.8	39 52.6	79 28	32.4	40 16.2	79 28	32.0	44 52.2	75 24	26.8	45 14.5	74 23	26.3	48 50.6	70 19	21.2	7
8	37 35.5	81 29	33.9	37 59.7	80 29	33.5	39 11.8	80 28	32.3	39 35.7	79 28	31.9	39 59.5	79 28	31.5	44 38.0	75 23	26.4	45 00.5	75 23	25.9	48 39.2	71 19	20.9	8
9	37 17.9	81 29	33.3	37 42.3	81 29	33.0	38 54.9	80 28	31.9	39 19.0	80 27	31.5	39 43.0	80 27	31.1	44 23.9	76 23	26.0	44 46.7	76 23	25.6	48 27.9	72 19	20.6	9
120	37 00.6	82 29	32.8	37 25.1	82 28	32.5	38 38.3	81 27	31.4	39 02.5	81 27	31.0	39 26.7	80 27	30.6	44 10.1	77 23	25.6	44 33.1	77 22	25.2	48 16.8	72 18	20.4	120
1	36 43.5	82 28	32.3	37 08.2	82 28	32.0	38 21.8	82 27	30.9	38 46.2	81 27	30.5	39 10.6	81 26	30.1	43 56.4	78 22	25.3	44 19.7	77 22	24.8	48 05.8	73 18	20.1	1
2	36 26.6	83 28	31.8	36 51.4	83 27	31.5	38 05.6	82 27	30.4	38 30.2	82 26	30.0	38 54.7	82 26	29.7	43 43.0	78 22	24.9	44 06.4	78 22	24.4	47 54.9	74 18	19.8	2
3	36 09.9	83 27	31.3	36 35.0	83 27	31.0	37 49.6	83 26	29.9	38 14.4	82 26	29.5	38 39.1	82 26	29.2	43 29.7	79 22	24.5	43 53.4	79 21	24.1	47 44.3	75 18	19.5	3
4	35 53.6	84 27	30.8	36 18.7	84 27	30.4	37 33.9	83 26	29.4	37 58.9	83 26	29.1	38 23.7	83 25	28.7	43 16.6	80 21	24.1	43 40.5	79 21	23.7	47 33.8	76 17	19.2	4
125	35 37.4	85 26	30.3	36 02.7	84 26	29.9	37 18.4	84 25	28.9	37 43.5	84 25	28.6	38 08.6	83 25	28.2	43 03.7	80 21	23.7	43 27.8	80 21	23.3	47 23.4	77 17	18.9	125
6	35 21.5	85 26	29.7	35 47.0	85 26	29.4	37 03.2	84 25	28.4	37 28.4	84 25	28.1	37 53.7	84 24	27.7	42 51.1	81 21	23.3	43 15.4	81 20	22.9	47 13.2	78 17	18.6	6
7	35 05.9	86 26	29.2	35 31.5	85 25	28.9	36 48.2	85 25	27.9	37 13.6	85 24	27.6	37 39.0	85 24	27.3	42 38.6	82 20	22.9	43 03.1	82 20	22.5	47 03.2	78 16	18.3	7
8	34 50.5	86 25	28.7	35 16.3	86 25	28.4	36 33.4	85 24	27.4	36 59.0	85 24	27.1	37 24.5	85 24	26.8	42 26.3	82 20	22.5	42 51.0	82 20	22.1	46 53.3	79 16	17.9	8
9	34 35.3	87 25	28.2	35 01.3	86 25	27.9	36 18.9	86 24	26.9	36 44.6	86 24	26.6	37 10.3	86 23	26.3	42 14.3	83 20	22.1	42 39.2	83 19	21.7	46 43.6	80 16	17.6	9
130	34 20.5	87 24	27.6	34 46.6	87 24	27.3	36 04.6	86 23	26.4	36 30.5	86 23	26.1	36 56.4	86 23	25.8	42 02.4	84 19	21.7	42 27.5	84 19	21.3	46 34.0	81 16	17.3	130
1	34 05.8	88 24	27.1	34 32.1	87 24	26.8	35 50.6	87 23	25.9	36 16.7	87 23	25.6	36 42.7	87 22	25.3	41 50.8	84 19	21.3	42 16.0	84 19	20.9	46 24.6	81 15	17.0	1
2	33 51.5	88 23	26.6	34 17.9	88 23	26.3	35 36.8	87 23	25.4	36 03.0	87 22	25.1	36 29.2	87 22	24.8	41 39.3	85 19	20.9	42 04.8	85 18	20.5	46 15.4	82 15	16.7	2
3	33 37.4	89 23	26.0	34 03.9	88 23	25.8	35 23.3	88 22	24.9	35 49.7	88 22	24.6	36 16.0	88 22	24.3	41 28.1	86 18	20.5	41 53.7	85 18	20.1	46 06.4	83 15	16.4	3
4	33 23.6	89 23	25.5	33 50.2	89 22	25.2	35 10.0	88 22	24.4	35 36.5	88 21	24.1	36 03.0	88 21	23.8	41 17.1	86 18	20.1	41 42.9	86 18	19.7	45 57.5	84 14	16.1	4
135	33 10.0	89 22	25.0	33 36.8	89 22	24.7	34 57.0	89 21	23.9	35 23.7	89 21	23.6	35 50.3	89 21	23.3	41 06.3	87 18	19.7	41 32.3	87 17	19.3	45 48.8	84 14	15.7	135
6	32 56.7	90 22	24.4	33 23.6	90 22	24.2	34 44.3	89 21	23.4	35 11.1	89 21	23.1	35 37.8	89 20	22.8	40 55.7	87 17	19.2	41 21.9	87 17	18.9	45 40.2	85 14	15.4	6
7	32 43.7	90 21	23.9	33 10.8	90 21	23.7	34 31.8	90 20	22.9	34 58.7	90 20	22.6	35 25.6	90 20	22.3	40 45.3	88 17	18.8	41 11.7	88 17	18.5	45 31.9	86 14	15.1	7
8	32 30.9	91 21	23.4	32 58.1	91 21	23.1	34 19.6	90 20	22.4	34 46.6	90 20	22.1	35 13.7	90 20	21.8	40 35.2	88 17	18.4	41 01.7	88 16	18.1	45 23.7	86 13	14.8	8
9	32 18.5	91 20	22.8	32 45.8	91 20	22.6	34 07.6	91 20	21.8	34 34.8	91 19	21.6	35 02.0	91 19	21.3	40 25.3	89 16	18.0	40 51.9	89 16	17.7	45 15.7	87 13	14.4	9
140	32 06.3	92 20	22.3	32 33.7	91 20	22.1	33 55.9	91 19	21.3	34 23.2	91 19	21.1	34 50.6	91 19	20.8	40 15.5	89 16	17.6	40 42.4	89 16	17.3	45 07.9	88 13	14.1	140
1	31 54.3	92 19	21.8	32 21.9	92 19	21.5	33 44.5	92 19	20.8	34 11.9	92 18	20.6	34 39.4	91 18	20.3	40 06.1	90 15	17.1	40 33.0	90 15	16.9	45 00.2	88 12	13.8	1
2	31 42.7	92 19	21.2	32 10.4	92 19	21.0	33 33.3	92 18	20.3	34 00.9	92 18	20.1	34 28.5	92 18	19.8	39 56.8	90 15	16.7	40 23.9	90 15	16.4	44 52.7	89 12	13.4	2
3	31 31.3	93 18	20.7	31 59.1	93 18	20.5	33 22.4	92 18	19.8	33 50.1	92 18	19.5	34 17.8	92 17	19.3	39 47.8	91 15	16.3	40 15.0	91 14	16.0	44 45.4	89 12	13.1	3
4	31 20.2	93 18	20.1	31 48.2	93 18	19.9	33 11.8	93 17	19.3	33 39.6	93 17	19.0	34 07.4	93 17	18.8	39 38.9	91 14	15.9	40 06.4	91 14	15.6	44 38.3	90 12	12.8	4
145	31 09.4	93 18	19.6	31 37.5	93 17	19.4	33 01.4	93 17	18.7	33 29.4	93 17	18.5	33 57.3	93 16	18.3	39 30.4	92 14	15.5	39 57.9	92 14	15.2	44 31.4	90 11	12.4	145
6	30 58.9	94 17	19.0	31 27.1	94 17	18.8	32 51.4	94 16	18.2	33 19.4	94 16	18.0	33 47.5	93 16	17.8	39 22.0	92 14	15.0	39 49.7	92 13	14.8	44 24.7	91 11	12.1	6
7	30 48.7	94 17	18.5	31 16.9	94 16	18.3	32 41.6	94 16	17.7	33 09.7	94 16	17.5	33 37.9	94 16	17.3	39 13.9	93 13	14.6	39 41.7	93 13	14.4	44 18.1	92 11	11.7	7
8	30 38.8	95 16	17.9	31 07.1	94 16	17.7	32 32.1	94 15	17.2	33 00.3	94 15	17.0	33 28.6	94 15	16.8	39 06.0	93 13	14.2	39 33.9	93 13	13.9	44 11.7	92 10	11.4	8
9	30 29.1	95 16	17.4	30 57.6	95 15	17.2	32 22.8	95 15	16.6	32 51.2	95 15	16.4	33 19.6	95 15	16.3	38 58.3	94 12	13.7	39 26.4	94 12	13.5	44 05.5	92 10	11.0	9
150	30 19.8	95 15	16.8	30 48.3	95 15	16.7	32 13.8	95 14	16.1	32 42.3	95 14	15.9	33 10.8	95 14	15.7	38 50.9	94 12	13.3	39 19.1	94 12	13.1	43 59.5	93 10	10.7	150
1	30 10.7	95 15	16.3	30 39.3	95 14	16.1	32 05.2	95 14	15.6	32 33.7	95 14	15.4	33 02.3	95 14	15.2	38 43.7	94 12	12.9	39 12.0	94 11	12.7	43 53.7	93 09	10.4	1
2	30 01.9	96 14	15.7	30 30.7	96 14	15.6	31 56.8	96 14	15.1	32 25.4	96 13	14.9	32 54.1	96 13	14.7	38 36.7	95 11	12.4	39 05.2	95 11	12.2	43 48.1	94 09	10.0	2
3	29 53.5	96 14	15.2	30 22.3	96 13	15.0	31 48.6	96 13	14.5	32 17.4	96 13	14.4	32 46.2	96 13	14.2	38 30.0	95 11	12.0	38 58.5	95 11	11.8	43 42.7	94 09	09.7	3
4	29 45.3	96 13	14.6	30 14.2	96 13	14.5	31 40.8	96 13	14.0	32 09.7	96 12	13.8	32 38.5	96 12	13.7	38 23.5	96 10	11.6	38 52.1	95 10	11.4	43 37.4	95 08	09.3	4
155	29 37.4	97 13	14.1	30 06.4	97 12	13.9	31 33.3	96 12	13.5	32 02.2	96 12	13.3	32 31.1	96 12	13.2	38 17.2	96 10	11.1	38 46.0	96 10	10.9	43 32.4	95 08	09.0	155
6	29 29.8	97 12	13.5	29 58.9	97 12	13.4	31 26.0	97 12	12.9	31 55.0	97 12	12.8	32 24.0	97 11	12.6	38 11.2	96 10	10.7	38 40.1	96 09	10.5	43 27.5	95 08	08.6	6
7	29 22.5	97 12	13.0	29 51.7	97 12	12.8	31 19.0	97 11	12.4	31 48.1	97 11	12.3	32 17.2	97 11	12.1	38 05.5	96 09	10.2	38 34.4	96 09	10.1	43 22.9	96 07	08.3	7
8	29 15.6	97 11	12.4	29 44.8	97 11	12.3	31 12.4	97 11	11.9	31 41.5	97 11	11.7	32 10.7	97 10	11.6	37 59.9	97 09	09.8	38 28.9	97 09	09.6	43 18.4	96 07	07.9	8
9	29 08.9	98 11	11.8	29 38.2	98 10	11.7	31 06.0	98 10	11.3	31 35.2	97 10	11.2	32 04.5	97 10	11.1	37 54.6	97 08	09.4	38 23.7	97 08	09.2	43 14.1	97 07	07.6	9
160	29 02.5	98 10	11.3	29 31.9	98 10	11.2	30 59.9	98 10	10.8	31 29.2	98 10	10.7	31 58.5	98 09	10.5	37 49.6	97 08	08.9	38 18.8	97 08	08.8	43 10.0	97 06	07.2	160
1	28 56.5	98 10	10.7	29 25.9	98 10	10.6	30 54.1	98 09	10.3	31 23.4	98 09	10.1	31 52.8	98 09	10.0	37 44.8	98 08	08.5	38 14.0	98 08	08.3	43 06.2	97 06	06.8	1
2	28 50.7	98 09	10.2	29 20.2	98 09	10.1	30 48.5	98 09	09.7	31 18.0	98 09	09.6	31 47.4	98 08	09.5	37 40.2	98 07	08.0	38 09.5	98 07	07.9	43 02.5	97 06	06.5	2
3	28 45.2	98 09	09.6	29 14.8	98 08	09.5	30 43.3	98 08	09.2	31 12.8	98 08	09.1	31 42.3	98 08	09.0	37 35.9	98 07	07.6	38 05.3	98 07	07.5	42 59.0	98 06	06.1	3
4	28 40.1	99 08	09.0	29 09.7	99 08	08.9	30 38.4	99 08	08.7	31 07.9	99 08	08.6	31 37.5	99 08	08.5	37 31.8	98 06	07.2	38 01.3	98 06	07.0	42 55.7	98 05	05.8	4
165	28 35.2	99 08	08.5	29 04.9	99 07	08.4	30 33.7	99 07	08.1	31 03.4	99 07	08.0	31 33.0	99 07	07.9	37 27.9	98 06	06.7	37 57.5	98 06	06.6	42 52.6	98 05	05.4	165
6	28 30.7	99 07	07.9	29 00.4	99 07	07.8	30 29.4	99 07	07.6	30 59.1	99 07	07.5	31 28.7	99 07	07.4	37 24.3	99 06	06.3	37 54.0	99 05	06.2	42 49.7	98 04	05.1	6
7	28 26.5	99 07	07.3	28 56.2	99 06	07.3	30 25.4	99 06	07.0	30 55.1	99 06	07.0	31 24.8	99 06	06.9	37 21.0	99 05	05.8	37 50.7	99 05	05.7	42 47.0	99 04	04.7	7
8	28 22.6	99 06	06.8	28 52.3	99 06	06.7	30 21.6	99 06	06.5	30 51.4	99 06	06.4	31 21.1	99 06	06.3	37 17.9	99 05	05.4	37 47.6	99 05	05.3	42 44.5	99 04	04.3	8
9	28 19.0	99 05	06.2	28 48.8	99 05	06.2	30 18.2	99 05	06.0	30 48.0	99 05	05.9	31 17.8	99 05	05.8	37 15.0	99 04	04.9	37 44.8	99 04	04.8	42 42.2	99 04	04.0	9
170	28 15.7	99 05	05.7	28 45.5	99 05	05.6	30 15.0	99 05	05.4	30 44.9	99 05	05.4	31 14.7	99 05	05.3	37 12.4	99 04	04.5	37 42.2	99 04	04.4	42 40.0	99 03	03.6	170
1	28 12.7	1.0 04	05.1	28 42.6	1.0 04	05.0	30 12.2	1.0 04	04.9	30 42.0	1.0 04	04.8	31 11.9	1.0 04	04.8	37 10.1	99 04	04.0	37 39.9	99 03	04.0	42 38.1	99 03	03.3	1
2	28 10.0	1.0 04	04.5	28 39.9	1.0 04	04.5	30 09.6	1.0 04	04.3	30 39.5	1.0 04	04.3	31 09.4	1.0 04	04.2	37 08.0	1.0 03	03.6	37 37.8	1.0 03	03.5	42 36.4	99 02	02.9	2
3	28 07.7	1.0 03	04.0	28 37.6	1.0 03	03.9	30 07.4	1.0 03	03.8	30 37.3	1.0 03	03.7	31 07.2	1.0 03	03.7	37 06.1	1.0 03	03.1	37 36.0	1.0 03	03.1	42 34.9	1.0 02	02.5	3
4	28 05.7	1.0 03	03.4	28 35.6	1.0 03	03.4	30 05.4	1.0 03	03.3	30 35.4	1.0 03	03.2	31 05.3	1.0 03	03.2	37 04.5	1.0 02	02.7	37 34.4	1.0 02	02.6	42 33.6	1.0 02	02.2	4
175	28 03.9	1.0 02	02.8	28 33.9	1.0 02	02.8	30 03.8	1.0 02	02.7	30 33.7	1.0 02	02.7	31 03.7	1.0 02	02.6	37 03.1	1.0 02	02.2	37 33.1	1.0 02	02.2	42 32.5	1.0 02	01.8	175
6	28 02.5	1.0 02	02.3	28 32.5	1.0 02	02.2	30 02.4	1.0 02	02.2	30 32.4	1.0 02	02.1	31 02.4	1.0 02	02.1	37 02.0	1.0 01	01.8	37 32.0	1.0 01	01.8	42 31.6	1.0 01	01.4	6
7	28 01.4	1.0 01	01.7	28 31.4	1.0 01	01.7	30 01.4	1.0 01	01.6	30 31.3	1.0 01	01.6	31 01.3	1.0 01	01.6	37 01.1	1.0 01	01.3	37 31.1	1.0 01	01.3	42 30.9	1.0 01	01.1	7
8	28 00.6	1.0 01	01.1	28 30.6	1.0 01	01.1	30 01.6	1.0 01	01.1	30 30.6	1.0 01	01.1	31 00.6	1.0 01	01.1	37 00.5	1.0 01	00.9	37 30.5	1.0 01	00.9	42 30.4	1.0 00	00.7	8
9	28 00.2	1.0 00	00.6	28 30.2	1.0 00	00.6	30 00.2	1.0 00	00.5	30 30.1	1.0 00	00.5	31 00.1	1.0 00	00.5	37 00.1	1.0 00	00.4	37 30.1	1.0 00	00.4	42 30.1	1.0 00	00.4	9
180	28 00.0	1.0 00	00.0	28 30.0	1.0 00	00.0	30 00.0	1.0 00	00.0	30 30.0	1.0 00	00.0	31 00.0	1.0 00	00.0	37 00.0	1.0 00	00.0	37 30.0	1.0 00	00.0	42 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 58°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	36	180	40	180	44	180	48	180	52	180	56	180	60	180	64	180	68	180	72	180	76	180	00
4	36	175	40	175	44	175	48	174	52	174	56	173	60	173	64	172	68	171	72	170	76	168	4
8	36	170	40	170	44	169	48	169	52	168	56	167	59	166	63	165	67	163	71	161	75	157	8
12	35	165	39	165	43	164	47	163	51	162	55	161	59	159	63	157	67	155	70	152	74	147	12
16	35	160	38	160	42	159	46	157	50	156	54	155	58	153	62	150	66	147	69	143	73	138	16
20	34	156	38	155	42	153	45	152	49	150	53	149	57	146	61	144	64	140	68	136	71	130	20
24	33	151	37	150	41	148	44	147	48	145	52	143	56	140	59	137	63	134	66	129	70	123	24
28	32	147	36	145	39	144	43	142	47	140	51	138	54	135	58	132	61	128	65	123	68	117	28
32	30	142	34	141	38	139	42	137	45	135	49	132	53	130	56	126	60	122	63	117	66	111	32
36	29	138	33	136	37	134	40	132	44	130	47	127	51	125	54	121	58	117	61	112	64	107	36
40	28	134	31	132	35	130	39	128	42	125	46	123	49	120	53	116	56	112	59	108	62	102	40
44	26	130	30	128	33	126	37	123	40	121	44	118	47	115	51	112	54	108	57	103	60	98	44
48	24	126	28	124	32	121	35	119	39	117	42	114	45	111	49	108	52	104	55	99	58	94	48
52	23	122	26	120	30	117	33	115	37	113	40	110	43	107	47	104	50	100	53	96	55	91	52
56	21	118	24	116	28	114	31	111	35	109	38	106	41	103	44	100	48	96	51	92	53	87	56
60	19	114	22	112	26	110	29	107	33	105	36	102	39	99	42	96	45	93	48	89	51	84	60
64	17	110	20	108	24	106	27	104	31	101	34	99	37	96	40	93	43	89	46	85	49	81	64
68	15	107	18	105	22	102	25	100	28	98	32	95	35	92	38	89	41	86	44	82	47	78	68
72	13	103	16	101	20	99	23	97	26	94	30	92	33	89	36	86	39	83	42	79	45	75	72
76	11	100	14	98	18	95	21	93	24	91	28	88	31	85	34	83	37	79	40	76	43	72	76
80	09	96	12	94	15	92	19	90	22	87	25	85	29	82	32	79	35	76	38	73	41	70	80
84	07	93	10	91	13	89	17	86	20	84	23	82	27	79	30	76	33	73	36	70	39	67	84
88	04	90	08	87	11	85	15	83	18	81	21	78	24	76	28	73	31	70	34	67	37	64	88
92	02	86	06	84	09	82	12	80	16	77	19	75	22	73	26	70	29	67	32	65	35	62	92
96	00	83	04	81	07	79	10	76	14	74	17	72	20	70	24	67	27	65	30	62	33	59	96
100	*02*	79	02	77	05	75	08	73	12	71	15	69	18	66	22	64	25	62	28	59	32	56	100
104	*04*	76	*01*	74	03	72	06	70	10	68	13	66	17	63	20	61	23	59	27	56	30	54	104
108	*06*	73	*03*	71	01	69	04	66	08	64	11	62	15	60	18	58	21	56	25	53	28	51	108
112	*08*	69	*05*	67	*01*	65	02	63	06	61	09	59	13	57	16	55	20	53	23	51	27	48	112
116	*10*	66	*06*	64	*03*	62	01	60	04	58	08	56	11	54	15	52	18	50	22	48	25	45	116
120	*12*	62	*08*	60	*05*	58	*01*	56	02	55	06	53	09	51	13	49	17	47	20	45	23	43	120
124	*14*	58	*10*	57	*07*	55	*03*	53	01	51	04	49	08	48	11	46	15	44	19	42	22	40	124
128	*15*	55	*12*	53	*08*	51	*05*	49	*01*	48	03	46	06	44	10	43	14	41	17	39	21	37	128
132	*17*	51	*13*	49	*10*	48	*06*	46	*02*	44	01	43	05	41	09	40	12	38	16	36	20	35	132
136	*19*	47	*15*	45	*11*	44	*08*	42	*04*	41	*00*	39	04	38	07	36	11	35	15	33	18	32	136
140	*20*	43	*16*	42	*13*	40	*09*	39	*05*	37	*01*	36	02	35	06	33	10	32	14	30	17	29	140
144	*22*	39	*18*	38	*14*	36	*10*	35	*06*	34	*03*	33	01	31	05	30	09	29	13	27	16	26	144
148	*23*	35	*19*	34	*15*	33	*11*	31	*08*	30	*04*	29	00	28	04	27	08	26	12	24	15	23	148
152	*24*	31	*20*	30	*16*	29	*12*	28	*09*	26	*05*	25	*01*	25	03	24	07	22	11	21	15	20	152
156	*25*	27	*21*	26	*17*	25	*13*	24	*09*	23	*06*	22	*02*	21	02	20	06	19	10	18	14	18	156
160	*26*	22	*22*	21	*18*	21	*14*	20	*10*	19	*06*	18	*02*	18	02	17	05	16	09	15	13	15	160
164	*27*	18	*23*	17	*19*	17	*15*	16	*11*	15	*07*	15	*03*	14	01	14	05	13	09	12	13	12	164
168	*27*	13	*23*	13	*19*	12	*15*	12	*11*	11	*07*	11	*03*	11	01	10	05	10	09	09	12	09	168
172	*28*	09	*24*	09	*20*	08	*16*	08	*12*	08	*08*	07	*04*	07	00	07	04	06	08	06	12	06	172
176	*28*	05	*24*	04	*20*	04	*16*	04	*12*	04	*08*	04	*04*	04	00	03	04	03	08	03	12	03	176
180	*28*	00	*24*	00	*20*	00	*16*	00	*12*	00	*08*	00	*04*	00	00	00	04	00	08	00	12	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—15886

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

Lat. 58°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	80	180	84	180	88	180	88	00	84	00	80	00	76	00	72	00	68	00	64	00	60	00	00
4	80	165	84	157	87	131	87	44	84	16	80	09	76	05	72	03	68	02	64	01	60	00	4
8	79	151	82	139	85	111	85	61	83	29	79	16	76	10	72	06	68	04	64	02	60	01	8
12	78	139	81	126	83	102	84	67	82	39	79	23	75	15	71	09	68	05	64	03	60	01	12
16	76	129	79	116	81	96	82	70	80	45	78	29	75	19	71	12	67	07	64	04	60	01	16
20	74	121	77	109	79	92	80	71	79	50	77	34	74	22	71	14	67	09	64	05	60	01	20
24	73	115	75	103	77	88	78	71	77	53	75	37	73	25	70	17	67	10	63	05	60	02	24
28	71	109	73	99	75	86	76	70	75	54	74	40	72	28	69	19	66	12	63	06	60	02	28
32	69	104	71	94	73	83	74	69	74	55	73	42	71	30	69	21	66	13	63	07	60	02	32
36	67	99	69	91	71	80	72	68	72	56	71	43	70	32	68	22	65	14	63	08	60	02	36
40	64	95	67	87	68	78	70	67	70	56	70	44	69	33	67	24	65	15	62	08	60	03	40
44	62	92	65	84	66	76	68	66	68	56	68	45	68	34	66	25	64	16	62	09	59	03	44
48	60	88	62	82	64	74	66	65	67	55	67	45	66	35	65	26	64	17	62	09	59	03	48
52	58	85	60	79	62	72	64	63	65	54	65	45	65	35	64	26	63	18	61	10	59	03	52
56	56	82	58	76	60	69	62	62	63	54	64	45	64	36	63	27	62	18	61	10	59	03	56
60	54	79	56	74	58	67	60	60	61	53	62	44	63	36	62	27	62	19	61	11	59	03	60
64	52	76	54	71	56	65	58	59	60	52	61	44	61	36	62	27	61	19	60	11	59	03	64
68	50	74	52	69	54	63	56	57	58	50	59	43	60	35	61	27	60	19	60	11	59	04	68
72	48	71	50	66	53	61	55	55	57	49	58	42	59	35	60	27	60	19	59	11	59	04	72
76	46	68	48	64	51	59	53	54	55	48	57	41	58	34	59	27	59	19	59	11	58	04	76
80	44	66	46	62	49	57	51	52	53	46	55	40	57	34	58	26	58	19	59	11	58	04	80
84	42	63	45	59	47	55	50	50	52	45	54	39	55	33	57	26	58	19	58	11	58	04	84
88	40	61	43	57	46	53	48	48	50	43	52	38	54	32	56	25	57	19	58	11	58	04	88
92	38	58	41	55	44	51	46	47	49	42	51	37	53	31	55	25	56	18	57	11	58	04	92
96	36	56	39	52	42	49	45	45	48	40	50	35	52	30	54	24	56	18	57	11	58	04	96
100	35	53	38	50	41	47	44	43	46	39	49	34	51	29	53	23	55	17	56	11	58	04	100
104	33	51	36	48	39	44	42	41	45	37	48	33	50	28	52	23	54	17	56	10	57	04	104
108	31	48	35	45	38	42	41	39	44	35	46	31	49	27	52	22	54	16	56	10	57	04	108
112	30	46	33	43	36	40	39	37	42	33	45	30	48	25	51	21	53	16	55	10	57	03	112
116	28	43	32	41	35	38	38	35	41	32	44	28	47	24	50	20	53	15	55	09	57	03	116
120	27	41	30	38	34	36	37	33	40	30	43	27	46	23	49	19	52	14	55	09	57	03	120
124	26	38	29	36	33	33	36	31	39	28	42	25	46	21	49	18	52	13	54	09	57	03	124
128	24	35	28	33	31	31	35	29	38	26	42	23	45	20	48	17	51	13	54	08	57	03	128
132	23	33	27	31	30	29	34	27	37	24	41	22	44	19	47	15	51	12	54	08	57	03	132
136	22	30	26	28	29	26	33	24	37	22	40	20	44	17	47	14	50	11	53	07	57	03	136
140	21	27	25	26	28	24	32	22	36	20	39	18	43	16	46	13	50	10	53	06	56	02	140
144	20	25	24	23	28	22	31	20	35	18	39	16	42	14	46	12	50	09	53	06	56	02	144
148	19	22	23	21	27	19	31	18	34	16	38	15	42	13	46	11	49	08	53	05	56	02	148
152	18	19	22	18	26	17	30	16	34	14	38	13	41	11	45	09	49	07	53	05	56	02	152
156	18	17	22	16	26	15	29	14	33	12	37	11	41	10	45	08	49	06	52	04	56	01	156
160	17	14	21	13	25	12	29	11	33	10	37	09	41	08	45	07	48	05	52	03	56	01	160
164	17	11	21	10	25	10	29	09	33	08	37	07	40	06	44	05	48	04	52	03	56	01	164
168	16	08	20	08	24	07	28	07	32	06	36	06	40	05	44	04	48	03	52	02	56	01	168
172	16	06	20	05	24	05	28	05	32	04	36	04	40	03	44	03	48	02	52	01	56	00	172
176	16	03	20	03	24	02	28	02	32	02	36	02	40	02	44	01	48	01	52	01	56	00	176
180	16	00	20	00	24	00	28	00	32	00	36	00	40	00	44	00	48	00	52	00	56	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

16—15936

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

Lat. 59

Lat. 59°

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	31 00.0 1.0 01	180.0	31 30.0 1.0 01	180.0	32 00.0 1.0 01	180.0	32 30.0 1.0 01	180.0	33 00.0 1.0 01	180.0	33 30.0 1.0 01	180.0	34 00.0 1.0 01	180.0	34 30.0 1.0 01	180.0	00
1	30 59.7 1.0 02	178.8	31 29.7 1.0 02	178.8	31 59.7 1.0 02	178.8	32 29.7 1.0 02	178.8	32 59.7 1.0 02	178.8	33 29.7 1.0 02	178.8	33 59.7 1.0 02	178.8	34 29.7 1.0 02	178.8	1
2	30 58.7 1.0 03	177.7	31 28.7 1.0 03	177.7	31 58.7 1.0 03	177.6	32 28.7 1.0 03	177.6	32 58.7 1.0 03	177.6	33 28.7 1.0 03	177.6	33 58.7 1.0 03	177.6	34 28.7 1.0 03	177.6	2
3	30 57.2 1.0 04	176.5	31 27.2 1.0 04	176.5	31 57.1 1.0 04	176.5	32 27.1 1.0 04	176.4	32 57.1 1.0 04	176.4	33 27.1 1.0 04	176.4	33 57.1 1.0 04	176.4	34 27.1 1.0 04	176.4	3
4	30 55.0 1.0 05	175.3	31 24.9 1.0 05	175.3	31 54.9 1.0 05	175.3	32 24.9 1.0 05	175.3	32 54.9 1.0 05	175.2	33 24.8 1.0 05	175.2	33 54.8 1.0 05	175.2	34 24.8 1.0 05	175.2	4
05	30 52.1 1.0 06	174.2	31 22.1 1.0 06	174.1	31 52.1 1.0 06	174.1	32 22.0 1.0 06	174.1	32 52.0 1.0 06	174.0	33 21.9 1.0 06	174.0	33 51.9 1.0 06	174.0	34 21.8 1.0 06	174.0	05
6	30 48.7 1.0 07	173.0	31 18.6 1.0 07	173.0	31 48.6 1.0 07	172.9	32 18.5 1.0 07	172.9	32 48.5 1.0 07	172.9	33 18.4 1.0 07	172.8	33 48.3 1.0 07	172.8	34 18.3 1.0 07	172.7	6
7	30 44.6 1.0 08	171.8	31 14.5 1.0 08	171.8	31 44.5 1.0 08	171.8	32 14.4 1.0 08	171.7	32 44.3 1.0 08	171.7	33 14.2 1.0 08	171.6	33 44.1 1.0 08	171.6	34 14.0 1.0 08	171.5	7
8	30 39.9 1.0 09	170.7	31 09.8 1.0 09	170.6	31 39.7 1.0 09	170.6	32 09.6 1.0 09	170.5	32 39.5 1.0 09	170.5	33 09.4 1.0 09	170.4	33 39.3 1.0 09	170.4	34 09.2 1.0 09	170.3	8
9	30 34.6 1.0 10	169.5	31 04.5 1.0 10	169.5	31 34.4 1.0 10	169.4	32 04.2 1.0 10	169.4	32 34.1 1.0 10	169.3	33 03.9 1.0 10	169.3	33 33.8 1.0 10	169.2	34 03.7 1.0 10	169.1	9
10	30 28.7 99 11	168.4	30 58.5 99 11	168.3	31 28.4 99 11	168.3	31 58.2 99 11	168.2	32 28.0 99 11	168.1	32 57.9 99 11	168.1	33 27.7 99 11	168.0	33 57.5 99 11	167.9	10
1	30 22.2 99 12	167.2	30 52.0 99 12	167.2	31 21.8 99 12	167.1	31 51.6 99 12	167.0	32 21.4 99 12	167.0	32 51.2 99 12	166.9	33 21.0 99 12	166.8	33 50.8 99 12	166.7	1
2	30 15.0 99 13	166.1	30 44.8 99 13	166.0	31 14.6 99 13	165.9	31 44.3 99 13	165.9	32 14.1 99 13	165.8	32 43.8 99 13	165.7	33 13.6 99 13	165.6	33 43.4 99 13	165.6	2
3	30 07.3 99 14	164.9	30 37.0 99 14	164.8	31 06.8 99 14	164.8	31 36.5 99 14	164.7	32 06.2 99 14	164.6	32 35.9 99 14	164.5	33 05.6 99 14	164.4	33 35.3 99 14	164.4	3
4	29 59.0 99 15	163.8	30 28.7 99 15	163.7	30 58.3 99 15	163.6	31 28.0 99 15	163.5	31 57.7 99 15	163.4	32 27.4 99 15	163.4	32 57.0 99 15	163.3	33 26.7 99 15	163.2	4
15	29 50.0 99 16	162.6	30 19.7 99 16	162.6	30 49.3 99 16	162.5	31 19.0 99 16	162.4	31 48.6 99 16	162.3	32 18.2 99 16	162.2	32 47.8 99 16	162.1	33 17.5 99 16	162.0	15
6	29 40.5 99 17	161.5	30 10.1 99 17	161.4	30 39.7 99 17	161.3	31 09.3 99 17	161.2	31 38.9 99 17	161.1	32 08.5 99 17	161.0	32 38.0 99 17	160.9	33 07.6 99 17	160.8	6
7	29 30.4 98 18	160.4	30 00.0 98 18	160.3	30 29.5 98 18	160.2	30 59.1 98 18	160.1	31 28.6 98 18	160.0	31 58.1 98 18	159.9	32 27.6 98 18	159.8	32 57.1 98 18	159.6	7
8	29 19.8 98 19	159.2	29 49.3 98 19	159.1	30 18.7 98 19	159.0	30 48.2 98 19	158.9	31 17.7 98 19	158.8	31 47.2 98 19	158.7	32 16.6 98 19	158.6	32 46.1 98 19	158.5	8
9	29 08.5 98 20	158.1	29 38.0 98 20	158.0	30 07.4 98 20	157.9	30 36.8 98 20	157.8	31 06.3 98 20	157.7	31 35.7 98 20	157.6	32 05.1 98 20	157.4	32 34.5 98 20	157.3	9
20	28 56.7 98 21	157.0	29 26.1 98 21	156.9	29 55.5 98 21	156.8	30 24.9 98 21	156.6	30 54.2 98 21	156.5	31 23.6 98 21	156.4	31 52.9 98 21	156.3	32 22.3 98 21	156.2	20
1	28 44.4 98 22	155.9	29 13.7 98 22	155.8	29 43.0 98 22	155.6	30 12.3 98 22	155.5	30 41.6 98 22	155.4	31 10.9 98 22	155.3	31 40.2 98 22	155.1	32 09.5 98 22	155.0	1
2	28 31.5 98 22	154.8	29 00.7 98 22	154.6	29 30.0 98 23	154.5	29 59.2 97 23	154.4	30 28.5 97 23	154.3	30 57.7 97 23	154.1	31 26.9 97 23	154.0	31 56.2 97 23	153.9	2
3	28 18.0 97 23	153.7	28 47.2 97 23	153.5	29 16.4 97 24	153.4	29 45.6 97 24	153.3	30 14.8 97 24	153.1	30 44.0 97 24	153.0	31 13.1 97 24	152.9	31 42.3 97 24	152.7	3
4	28 04.0 97 24	152.6	28 33.2 97 24	152.4	29 02.3 97 24	152.3	29 31.4 97 24	152.1	30 00.6 97 25	152.0	30 29.7 97 25	151.9	30 58.8 97 25	151.7	31 27.8 97 25	151.6	4
25	27 49.5 97 25	151.5	28 18.6 97 25	151.3	28 47.7 97 25	151.2	29 16.7 97 25	151.0	29 45.8 97 26	150.9	30 14.8 97 26	150.7	30 43.8 97 26	150.6	31 12.9 97 26	150.4	25
6	27 34.5 97 26	150.4	28 03.5 97 26	150.2	28 32.5 97 26	150.1	29 01.5 97 26	149.9	29 30.5 97 26	149.8	29 59.5 97 26	149.6	30 28.4 97 27	149.5	30 57.4 96 27	149.3	6
7	27 19.0 96 27	149.3	27 47.9 96 27	149.1	28 16.8 96 27	149.0	28 45.8 96 27	148.8	29 14.7 96 27	148.7	29 43.6 96 27	148.5	30 12.5 96 27	148.4	30 41.3 96 28	148.2	7
8	27 02.9 96 28	148.2	27 31.8 96 28	148.0	28 00.7 96 28	147.9	28 29.5 96 28	147.7	28 58.3 96 28	147.6	29 27.2 96 28	147.4	29 56.0 96 28	147.2	30 24.8 96 28	147.1	8
9	26 46.4 96 28	147.1	27 15.2 96 28	147.0	27 44.0 96 29	146.8	28 12.8 96 29	146.6	28 41.5 96 29	146.5	29 10.3 96 29	146.3	29 39.0 96 29	146.1	30 07.8 96 29	146.0	9
30	26 29.4 96 29	146.0	26 58.1 96 29	145.9	27 26.8 96 29	145.7	27 55.5 96 30	145.5	28 24.2 96 30	145.4	28 52.9 96 30	145.2	29 21.6 96 30	145.0	29 50.2 95 30	144.9	30
1	26 11.9 96 30	145.0	26 40.5 95 30	144.8	27 09.2 95 30	144.6	27 37.8 95 30	144.5	28 06.4 95 30	144.3	28 35.0 95 31	144.1	29 03.6 95 31	144.0	29 32.2 95 31	143.8	1
2	25 53.9 95 31	143.9	26 22.5 95 31	143.7	26 51.1 95 31	143.6	27 19.6 95 31	143.4	27 48.2 95 31	143.2	28 16.7 95 31	143.0	28 45.2 95 31	142.9	29 13.7 95 32	142.7	2
3	25 35.5 95 31	142.9	26 04.0 95 32	142.7	26 32.5 95 32	142.5	27 01.0 95 32	142.3	27 29.4 95 32	142.2	27 57.9 95 32	142.0	28 26.3 95 32	141.8	28 54.7 95 32	141.6	3
4	25 16.6 95 32	141.8	25 45.0 95 32	141.6	26 13.4 95 32	141.4	26 41.8 95 33	141.3	27 10.2 95 33	141.1	27 38.6 95 33	140.9	28 07.0 95 33	140.7	28 35.3 94 33	140.5	4
35	24 57.3 95 33	140.8	25 25.6 94 33	140.6	25 54.0 94 33	140.4	26 22.3 94 33	140.2	26 50.6 94 33	140.0	27 18.9 94 34	139.8	27 47.2 94 34	139.7	28 15.5 94 34	139.5	35
6	24 37.5 94 34	139.7	25 05.8 94 34	139.5	25 34.0 94 34	139.3	26 02.3 94 34	139.2	26 30.5 94 34	139.0	26 58.8 94 34	138.8	27 27.0 94 34	138.6	27 55.2 94 35	138.4	6
7	24 17.3 94 34	138.7	24 45.5 94 34	138.5	25 13.7 94 35	138.3	25 41.9 94 35	138.1	26 10.0 94 35	137.9	26 38.2 94 35	137.7	27 06.3 94 35	137.5	27 34.4 94 35	137.3	7
8	23 56.7 94 35	137.7	24 24.8 94 35	137.5	24 52.9 94 35	137.3	25 21.0 94 35	137.1	25 49.1 94 36	136.9	26 17.2 94 36	136.7	26 45.2 93 36	136.5	27 13.3 93 36	136.3	8
9	23 35.7 94 36	136.6	24 03.7 93 36	136.4	24 31.8 93 36	136.2	24 59.8 93 36	136.0	25 27.8 93 36	135.8	25 55.8 93 36	135.6	26 23.8 93 36	135.4	26 51.7 93 37	135.2	9
40	23 14.2 93 36	135.6	23 42.2 93 36	135.4	24 10.2 93 37	135.2	24 38.1 93 37	135.0	25 06.1 93 37	134.8	25 34.0 93 37	134.6	26 01.9 93 37	134.4	26 29.8 93 37	134.2	40
1	22 52.4 93 37	134.6	23 20.3 93 37	134.4	23 48.2 93 37	134.2	24 16.1 93 37	134.0	24 43.9 93 38	133.8	25 11.8 93 38	133.6	25 39.6 93 38	133.4	26 07.4 93 38	133.2	1
2	22 30.2 93 38	133.6	22 58.1 93 38	133.4	23 25.9 93 38	133.2	23 53.7 93 38	133.0	24 21.5 93 38	132.8	24 49.2 93 38	132.6	25 17.0 92 38	132.4	25 44.7 92 38	132.1	2
3	22 07.7 93 38	132.6	22 35.4 92 38	132.4	23 03.2 92 38	132.2	23 30.9 92 39	132.0	23 58.6 92 39	131.8	24 26.3 92 39	131.5	24 53.9 92 39	131.3	25 21.6 92 39	131.1	3
4	21 44.7 92 39	131.6	22 12.4 92 39	131.4	22 40.1 92 39	131.2	23 07.7 92 39	131.0	23 35.4 92 39	130.8	24 03.0 92 39	130.5	24 30.6 92 40	130.3	24 58.1 92 40	130.1	4
45	21 21.5 92 39	130.6	21 49.1 92 40	130.4	22 16.6 92 40	130.2	22 44.2 92 40	130.0	23 11.8 92 40	129.8	23 39.3 92 40	129.5	24 06.8 92 40	129.3	24 34.3 92 40	129.1	45
6	20 57.8 92 40	129.6	21 25.3 92 40	129.4	21 52.9 92 40	129.2	22 20.4 92 40	129.0	22 47.8 92 40	128.8	23 15.3 92 41	128.5	23 42.7 91 41	128.3	24 10.2 91 41	128.1	6
7	20 33.8 92 40	128.6	21 01.3 91 41	128.4	21 28.7 91 41	128.2	21 56.2 91 41	128.0	22 23.6 91 41	127.8	22 51.0 91 41	127.5	23 18.3 91 41	127.3	23 45.7 91 41	127.1	7
8	20 09.5 91 41	127.7	20 36.9 91 41	127.4	21 04.3 91 41	127.2	21 31.6 91 41	127.0	21 59.0 91 42	126.8	22 26.3 91 42	126.6	22 53.6 91 42	126.3	23 20.9 91 42	126.1	8
9	19 44.9 91 42	126.7	20 12.2 91 42	126.5	20 39.5 91 42	126.2	21 06.8 91 42	126.0	21 34.1 91 42	125.8	22 01.3 91 42	125.6	22 28.5 91 42	125.4	22 55.8 91 42	125.1	9
50	19 20.0 91 42	125.7	19 47.2 91 42	125.5	20 14.5 91 42	125.3	20 41.7 91 42	125.1	21 08.9 91 43	124.8	21 36.0 91 43	124.6	22 03.2 90 43	124.4	22 30.3 90 43	124.1	50
1	18 54.8 91 43	124.8	19 21.9 91 43	124.5	19 49.1 90 43	124.3	20 16.2 90 43	124.1	20 43.3 90 43	123.9	21 10.5 90 43	123.6	21 37.5 90 43	123.4	22 04.6 90 43	123.2	1
2	18 29.2 90 43	123.8	18 56.3 90 43	123.6	19 23.4 90 43	123.4	19 50.5 90 43	123.1	20 17.5 90 44	122.9	20 44.6 90 44	122.7	21 11.6 90 44	122.4	21 38.6 90 44	122.2	2
3	18 03.4 90 44	122.9	18 30.4 90 44	122.6	18 57.5 90 44	122.4	19 24.5 90 44	122.2	19 51.5 90 44	121.9	20 18.4 90 44	121.7	20 45.4 90 44	121.5	21 12.3 90 44	121.2	3
4	17 37.3 90 44	121.9	18 04.3 90 44	121.7	18 31.2 90 44	121.5	18 58.2 90 44	121.2	19 25.1 90 44	121.0	19 52.0 90 44	120.8	20 18.9 90 45	120.5	20 45.8 90 45	120.3	4
55	17 10.9 90 44	121.0	17 37.8 90 44	120.7	18 04.7 90 45	120.5	18 31.6 90 45	120.3	18 58.5 90 45	120.0	19 25.3 89 45	119.8	19 52.1 89 45	119.6	20 18.9 89 45	119.3	55
6	16 44.3 90 45	120.0	17 11.2 89 45	119.8	17 38.0 89 45	119.6	18 04.8 89 45	119.3	18 31.6 89 45	119.1	18 58.4 89 45	118.9	19 25.1 89 45	118.6	19 51.9 89 46	118.4	6
7	16 17.4 89 45	119.1	16 44.2 89 45	118.9	17 11.0 89 45	118.6	17 37.7 89 46	118.4	18 04.5 89 46	118.2	18 31.2 89 46	117.9	18 57.9 89 46	117.7	19 24.6 89 46	117.4	7
8	15 50.3 89 46	118.2	16 17.0 89 46	117.9	16 43.7 89 46	117.7	17 10.4 89 46	117.5	17 37.1 89 46	117.2	18 03.8 89 46	117.0	18 30.4 89 46	116.7	18 57.0 89 46	116.5	8
9	15 23.0 89 46	117.3	15 49.6 89 46	117.0	16 16.3 89 46	116.8	16 42.9 89 46	116.5	17 09.5 89 46	116.3	17 36.1 89 46	116.0	18 02.7 89 47	115.8	18 29.3 89 47	115.6	9
60	14 55.4 89 46	116.3	15 22.0 89 46	116.1	15 48.6 89 47	115.9	16 15.1 89 47	115.6	16 41.7 88 47	115.4	17 08.2 88 47	115.1	17 34.8 88 47	114.9	18 01.3 88 47	114.6	60
1	14 27.6 89 47	115.4	14 54.1 88 47	115.2	15 20.7 88 47	114.9	15 47.2 88 47	114.7	16 13.7 88 47	114.4	16 40.2 88 47	114.2	17 06.6 88 47	114.0	17 33.1 88 47	113.7	1
2	13 59.6 88 47	114.5	14 26.0 88 47	114.3	14 52.5 88 47	114.0	15 19.0 88 47	113.8	15 45.4 88 47	113.5	16 11.9 88 47	113.3	16 38.3 88 48	113.0	17 04.7 88 48	112.8	2
3	13 31.3 88 47	113.6	13 57.8 88 47	113.4	14 24.2 88 48	113.1	14 50.6 88 48	112.9	15 17.0 88 48	112.6	15 43.4 88 48	112.4	16 09.8 88 48	112.1	16 36.1 88 48	111.9	3
4	13 02.9 88 48	112.7	13 29.3 88 48	112.4	13 55.7 88 48	112.2	14 22.0 88 48	112.0	14 48.4 88 48	111.7	15 14.7 88 48	111.5	15 41.0 88 48	111.2	16 07.3 88 48	111.0	4
65	12 34.3 88 48	111.8	13 00.7 88 48	111.5	13 27.0 88 48	111.3	13 53.3 88 48	111.0	14 19.6 88 48	110.8	14 45.9 88 48	110.5	15 12.1 88 48	110.3	15 38.4 87 49	110.0	65
6	12 05.5 88 48	110.9	12 31.8 88 48	110.6	12 58.1 88 48	110.4	13 24.4 88 48	110.1	13 50.6 87 49	109.9	14 16.8 87 49	109.6	14 43.1 87 49	109.4	15 09.3 87 49	109.1	6
7	11 36.6 88 49	110.0	12 02.8 87 49	109.7	12 29.1 87 49	109.5	12 55.3 87 49	109.2	13 21.5 87 49	109.0	13 47.7 87 49	108.7	14 13.8 87 49	108.5	14 40.0 87 49	108.2	7
8	11 07.5 87 49	109.1	11 33.7 87 49	108.9	11 59.8 87 49	108.6	12 26.0 87 49	108.4	12 52.2 87 49	108.1	13 18.3 87 49	107.9	13 44.5 87 49	107.6	14 10.6 87 49	107.3	8
9	10 38.2 87 49	108.2	11 04.3 87 49	108.0	11 30.5 87 49	107.7	11 56.6 87 49	107.5	12 22.7 87 49	107.2	12 48.8 87 49	107.0	13 14.9 87 49	106.7	13 41.0 87 50	106.5	9
70	10 08.7 87 49	107.3	10 34.9 87 49	107.1	11 01.0 87 49	106.8	11 27.1 87 49	106.6	11 53.1 87 50	106.3	12 19.2 87 50	106.1	12 45.3 87 50	105.8	13 11.3 87 50	105.6	70
1	9 39.2 87 50	106.4	10 05.3 87 50	106.2	10 31.3 87 50	105.9	10 57.4 87 50	105.7	11 23.4 87 50	105.4	11 49.5 87 50	105.2	12 15.5 87 50	104.9	12 41.5 87 50	104.7	1
2	9 09.5 87 50	105.6	9 35.5 87 50	105.3	10 01.5 87 50	105.1	10 27.6 87 50	104.8	10 53.6 87 50	104.6	11 19.6 87 50	104.3	11 45.5 87 50	104.0	12 11.5 87 50	103.8	2
3	8 39.6 87 50	104.7	9 05.6 87 50	104.4	9 31.6 87 50	104.2	9 57.6 87 50	103.9	10 23.6 87 50	103.7	10 49.6 87 50	103.4	11 15.5 86 50	103.2	11 41.4 86 50	102.9	3
4	8 09.7 87 50	103.8	8 35.7 87 50	103.6	9 01.6 87 50	103.3	9 27.6 86 50	103.0	9 53.5 86 50	102.8	10 19.5 86 50	102.5	10 45.4 86 50	102.3	11 11.3 86 50	102.0	4
75	7 39.6 86 50	102.9	8 05.6 86 50	102.7	8 31.5 86 50	102.4	8 57.4 86 50	102.2	9 23.3 86 50	101.9	9 49.2 86 50	101.7	10 15.1 86 51	101.4	10 41.0 86 51	101.1	75
6	7 09.5 86 50	102.1	7 35.4 86 50	101.8	8 01.3 86 51	101.6	8 27.2 86 51	101.3	8 53.1 86 51	101.0	9 18.9 86 51	100.8	9 44.8 86 51	100.5	10 10.6 86 51	100.3	6
7	6 39.2 86 51	101.2	7 05.1 86 51	100.9	7 31.0 86 51	100.7	7 56.8 86 51	100.4	8 22.7 86 51	100.2	8 48.5 86 51	99.9	9 14.4 86 51	99.7	9 40.2 86 51	99.4	7
8	6 08.8 86 51	100.3	6 34.7 86 51	100.1	7 00.5 86 51	99.8	7 26.4 86 51	99.6	7 52.2 86 51	99.3	8 18.0 86 51	99.0	8 43.9 86 51	98.8	9 09.7 86 51	98.5	8
9	5 38.4 86 51	99.5	6 04.2 86 51	99.2	6 30.1 86 51	98.9	6 55.9 86 51	98.7	7 21.7 86 51	98.4	7 47.5 86 51	98.2	8 13.3 86 51	97.9	8 39.1 86 51	97.7	9
80	5 07.9 86 51	98.6	5 33.7 86 51	98.3	5 59.5 86 51	98.1	6 25.3 86 51	97.8	6 51.1 86 51	97.6	7 16.9 86 51	97.3	7 42.6 86 51	97.1	8 08.4 86 51	96.8	80
1			5 03.1 86 51	97.5	5 28.9 86 51	97.2	5 54.6 86 51	97.0	6 20.4 86 51	96.7	6 46.2 86 51	96.4	7 12.0 86 51	96.2	7 37.7 86 51	95.9	1
2							5 23.9 86 51	96.1	5 49.7 86 51	95.8	6 15.5 86 51	95.6	6 41.2 86 51	95.3	7 06.9 86 51	95.1	2
3									5 18.9 86 51	95.0	5 44.7 86 51	94.7	6 10.4 86 51	94.5	6 36.1 86 51	94.2	3
4											5 13.9 86 51	93.9	5 39.6 86 51	93.6	6 05.3 86 51	93.3	4
85													5 08.7 86 52	92.7	5 34.4 86 51	92.5	85
6															5 03.6 86 52	91.6	6

Digitized by Google

Lat. 59°

H.A.	0° 00′ Alt.	Az.	0° 30′ Alt.	Az.	1° 00′ Alt.	Az.	1° 30′ Alt.	Az.	2° 00′ Alt.	Az.	2° 30′ Alt.	Az.	3° 00′ Alt.	Az.	3° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	31 00.0 1.0 01	180.0	30 30.0 1.0 01	180.0	30 00.0 1.0 01	180.0	29 30.0 1.0 01	180.0	29 00.0 1.0 01	180.0	28 30.0 1.0 00	180.0	28 00.0 1.0 00	180.0	27 30.0 1.0 00	180.0	00
1	30 59.7 1.0 02	178.8	30 29.7 1.0 02	178.8	29 59.7 1.0 02	178.8	29 29.7 1.0 02	178.9	28 59.7 1.0 02	178.9	28 29.7 1.0 02	178.9	27 59.7 1.0 02	178.9	27 29.7 1.0 02	178.9	1
2	30 58.7 1.0 03	177.7	30 28.7 1.0 03	177.7	29 58.8 1.0 03	177.7	29 28.8 1.0 03	177.7	28 58.8 1.0 03	177.7	28 28.8 1.0 03	177.7	27 58.8 1.0 03	177.7	27 28.8 1.0 03	177.7	2
3	30 57.2 1.0 04	176.5	30 27.2 1.0 04	176.5	29 57.2 1.0 04	176.5	29 27.2 1.0 04	176.6	28 57.2 1.0 04	176.6	28 27.2 1.0 04	176.6	27 57.3 1.0 04	176.6	27 27.3 1.0 04	176.6	3
4	30 55.0 1.0 05	175.3	30 25.0 1.0 05	175.4	29 55.0 1.0 05	175.4	29 25.0 1.0 05	175.4	28 55.1 1.0 05	175.4	28 25.1 1.0 05	175.5	27 55.1 1.0 05	175.5	27 25.1 1.0 05	175.5	4
05	30 52.1 1.0 06	174.2	30 22.2 1.0 06	174.2	29 52.2 1.0 06	174.2	29 22.3 1.0 06	174.3	28 52.3 1.0 06	174.3	28 22.3 1.0 06	174.3	27 52.4 1.0 06	174.3	27 22.4 1.0 06	174.4	05
6	30 48.7 1.0 07	173.0	30 18.8 1.0 07	173.0	29 48.8 1.0 07	173.1	29 18.9 1.0 07	173.1	28 48.9 1.0 07	173.2	28 19.0 1.0 07	173.2	27 49.0 1.0 07	173.2	27 19.1 1.0 07	173.3	6
7	30 44.6 1.0 08	171.8	30 14.7 1.0 08	171.9	29 44.8 1.0 08	171.9	29 14.9 1.0 08	172.0	28 44.9 1.0 08	172.0	28 15.0 1.0 08	172.1	27 45.1 1.0 08	172.1	27 15.2 1.0 08	172.1	7
8	30 39.9 1.0 09	170.7	30 10.0 1.0 09	170.7	29 40.1 1.0 09	170.8	29 10.2 1.0 09	170.8	28 40.3 1.0 09	170.9	28 10.4 1.0 09	170.9	27 40.5 1.0 09	171.0	27 10.6 1.0 09	171.0	8
9	30 34.6 1.0 10	169.5	30 04.8 1.0 10	169.6	29 34.9 1.0 10	169.6	29 05.0 1.0 10	169.7	28 35.1 1.0 10	169.7	28 05.3 1.0 10	169.8	27 35.4 1.0 10	169.8	27 05.5 1.0 10	169.9	9
10	30 28.7 99 11	168.4	29 58.9 99 11	168.4	29 29.0 99 11	168.5	28 59.2 99 11	168.6	28 29.3 99 11	168.6	27 59.5 99 11	168.7	27 29.6 99 11	168.7	26 59.8 99 10	168.8	10
1	30 22.2 99 12	167.2	29 52.4 99 12	167.3	29 22.6 99 12	167.4	28 52.8 99 12	167.4	28 22.9 99 12	167.5	27 53.1 99 12	167.5	27 23.3 99 12	167.6	26 53.5 99 12	167.7	1
2	30 15.0 99 13	166.1	29 45.3 99 13	166.1	29 15.5 99 13	166.2	28 45.7 99 13	166.3	28 15.9 99 13	166.4	27 46.2 99 13	166.4	27 16.4 99 12	166.5	26 46.6 99 12	166.6	2
3	30 07.3 99 14	164.9	29 37.6 99 14	165.0	29 07.8 99 14	165.1	28 38.1 99 14	165.2	28 08.4 99 14	165.2	27 38.6 99 14	165.3	27 08.9 99 14	165.4	26 39.1 99 13	165.4	3
4	29 59.0 99 15	163.8	29 29.3 99 15	163.9	28 59.6 99 15	163.9	28 29.9 99 15	164.0	28 00.2 99 15	164.1	27 30.5 99 14	164.2	27 00.8 99 14	164.3	26 31.1 99 14	164.3	4
15	29 50.0 99 16	162.6	29 20.4 99 16	162.7	28 50.7 99 16	162.8	28 21.1 99 16	162.9	27 51.4 99 16	163.0	27 21.8 99 15	163.1	26 52.1 99 15	163.2	26 22.5 99 15	163.2	15
6	29 40.5 99 17	161.5	29 10.9 99 17	161.6	28 41.3 99 17	161.7	28 11.7 99 17	161.8	27 42.1 99 16	161.9	27 12.5 99 16	162.0	26 42.9 99 16	162.1	26 13.3 99 16	162.1	6
7	29 30.4 98 18	160.4	29 00.9 99 18	160.5	28 31.3 99 18	160.6	28 01.8 99 18	160.7	27 32.2 99 17	160.8	27 02.6 99 17	160.9	26 33.1 99 17	161.0	26 03.5 99 17	161.0	7
8	29 19.8 98 19	159.2	28 50.3 98 19	159.3	28 20.8 98 19	159.4	27 51.3 98 18	159.6	27 21.7 98 18	159.7	26 52.2 98 18	159.8	26 22.7 98 18	159.9	25 53.2 98 18	160.0	8
9	29 08.5 98 20	158.1	28 39.1 98 20	158.2	28 09.6 98 19	158.3	27 40.2 98 19	158.4	27 10.7 98 19	158.5	26 41.3 98 19	158.7	26 11.8 98 19	158.8	25 42.3 98 19	158.9	9
20	28 56.7 98 21	157.0	28 27.3 98 20	157.1	27 57.9 98 20	157.2	27 28.5 98 20	157.3	26 59.1 98 20	157.4	26 29.7 98 20	157.6	26 00.3 98 20	157.7	25 30.9 98 20	157.8	20
1	28 44.4 98 22	155.9	28 15.0 98 21	156.0	27 45.7 98 21	156.1	27 16.4 98 21	156.2	26 47.0 98 21	156.3	26 17.7 98 21	156.5	25 48.3 98 21	156.6	25 18.9 98 21	156.7	1
2	28 31.5 98 22	154.8	28 02.2 98 22	154.9	27 32.9 98 22	155.0	27 03.6 98 22	155.1	26 34.3 98 22	155.3	26 05.1 98 22	155.4	25 35.7 98 22	155.5	25 06.4 98 22	155.6	2
3	28 18.0 97 23	153.7	27 48.8 97 23	153.8	27 19.6 97 23	153.9	26 50.4 97 23	154.0	26 21.1 97 23	154.2	25 51.9 97 23	154.3	25 22.7 97 23	154.4	24 53.4 98 23	154.5	3
4	28 04.0 97 24	152.6	27 34.9 97 24	152.7	27 05.7 97 24	152.8	26 36.6 97 24	153.0	26 07.4 97 24	153.1	25 38.2 97 24	153.2	25 09.1 97 24	153.3	24 39.9 97 23	153.5	4
25	27 49.5 97 25	151.5	27 20.5 97 25	151.6	26 51.4 97 25	151.7	26 22.3 97 25	151.9	25 53.2 97 25	152.0	25 24.1 97 24	152.1	24 54.9 97 24	152.3	24 25.8 97 24	152.4	25
6	27 34.5 97 26	150.4	27 05.5 97 26	150.5	26 36.5 97 26	150.6	26 07.4 97 26	150.8	25 38.4 97 25	150.9	25 09.4 97 25	151.1	24 40.3 97 25	151.2	24 11.2 97 25	151.3	6
7	27 19.0 96 27	149.3	26 50.0 97 27	149.4	26 21.1 97 26	149.6	25 52.1 97 26	149.7	25 23.1 97 26	149.9	24 54.2 97 26	150.0	24 25.2 97 26	150.1	23 56.2 97 26	150.3	7
8	27 02.9 96 28	148.2	26 34.1 96 27	148.3	26 05.2 96 27	148.5	25 36.3 96 27	148.6	25 07.4 96 27	148.8	24 38.5 96 27	148.9	24 09.5 96 27	149.1	23 40.6 96 27	149.2	8
9	26 46.4 96 28	147.1	26 17.6 96 28	147.3	25 48.8 96 28	147.4	25 19.9 96 28	147.6	24 51.1 96 28	147.7	24 22.3 96 28	147.9	23 53.4 96 28	148.0	23 24.5 96 28	148.2	9
30	26 29.4 96 29	146.0	26 00.6 96 29	146.2	25 31.9 96 29	146.4	25 03.1 96 29	146.5	24 34.4 96 29	146.7	24 05.6 96 29	146.8	23 36.8 96 28	147.0	23 08.0 96 28	147.1	30
1	26 11.9 96 30	145.0	25 43.2 96 30	145.1	25 14.5 96 30	145.3	24 45.9 96 30	145.5	24 17.2 96 29	145.6	23 48.4 96 29	145.8	23 19.7 96 29	145.9	22 51.0 96 29	146.1	1
2	25 53.9 95 31	143.9	25 25.3 96 31	144.1	24 56.7 95 30	144.2	24 28.1 95 30	144.4	23 59.5 95 30	144.6	23 30.8 95 30	144.7	23 02.2 96 30	144.9	22 33.5 96 30	145.1	2
3	25 35.5 95 31	142.9	25 07.0 95 31	143.0	24 38.4 95 31	143.2	24 09.9 95 31	143.4	23 41.3 95 31	143.5	23 12.8 95 31	143.7	22 44.2 95 31	143.9	22 15.6 95 31	144.0	3
4	25 16.6 95 32	141.8	24 48.1 95 32	142.0	24 19.7 95 32	142.2	23 51.2 95 32	142.3	23 22.7 95 32	142.5	22 54.2 95 32	142.7	22 25.7 95 32	142.8	21 57.2 95 31	143.0	4
35	24 57.3 95 33	140.8	24 28.9 95 33	140.9	24 00.5 95 33	141.1	23 32.1 95 33	141.3	23 03.7 95 32	141.5	22 35.3 95 32	141.6	22 06.9 95 32	141.8	21 38.4 95 32	142.0	35
6	24 37.5 94 34	139.7	24 09.2 94 34	139.9	23 40.9 94 33	140.1	23 12.6 94 33	140.3	22 44.2 94 33	140.4	22 15.9 94 33	140.6	21 47.5 95 33	140.8	21 19.2 95 33	141.0	6
7	24 17.3 94 34	138.7	23 49.1 94 34	138.9	23 20.8 94 34	139.1	22 52.6 94 34	139.2	22 24.3 94 34	139.4	21 56.1 94 34	139.6	21 27.8 94 34	139.8	20 59.5 94 33	140.0	7
8	23 56.7 94 35	137.7	23 28.5 94 35	137.8	23 00.4 94 35	138.0	22 32.2 94 35	138.2	22 04.0 94 35	138.4	21 35.8 94 34	138.6	21 07.6 94 34	138.8	20 39.4 94 34	138.9	8
9	23 35.7 94 36	136.6	23 07.6 94 36	136.8	22 39.5 94 35	137.0	22 11.4 94 35	137.2	21 43.3 94 35	137.4	21 15.2 94 35	137.6	20 47.1 94 35	137.8	20 18.9 94 35	137.9	9
40	23 14.2 93 36	135.6	22 46.3 93 36	135.8	22 18.2 93 36	136.0	21 50.2 93 36	136.2	21 22.2 93 36	136.4	20 54.1 94 36	136.6	20 26.1 94 36	136.8	19 58.0 94 35	137.0	40
1	22 52.4 93 37	134.6	22 24.5 93 37	134.8	21 56.6 93 37	135.0	21 28.6 93 37	135.2	21 00.7 93 36	135.4	20 32.7 93 36	135.6	20 04.7 93 36	135.8	19 36.7 93 36	136.0	1
2	22 30.2 93 38	133.6	22 02.4 93 38	133.8	21 34.5 93 37	134.0	21 06.7 93 37	134.2	20 38.8 93 37	134.4	20 10.9 93 37	134.6	19 43.0 93 37	134.8	19 15.1 93 37	135.0	2
3	22 07.7 93 38	132.6	21 39.9 93 38	132.8	21 12.1 93 38	133.0	20 44.3 93 38	133.2	20 16.5 93 38	133.4	19 48.7 93 38	133.6	19 20.9 93 37	133.8	18 53.0 93 37	134.0	3
4	21 44.7 92 39	131.6	21 17.0 92 39	131.8	20 49.3 92 39	132.0	20 21.6 92 38	132.2	19 53.9 92 38	132.4	19 26.1 93 38	132.6	18 58.4 93 38	132.8	18 30.6 93 38	133.0	4
45	21 21.5 92 39	130.6	20 53.8 92 39	130.8	20 26.2 92 39	131.0	19 58.6 92 39	131.2	19 30.9 92 39	131.4	19 03.2 92 39	131.6	18 35.5 92 39	131.8	18 07.8 92 39	132.0	45
6	20 57.8 92 40	129.6	20 30.3 92 40	129.8	20 02.7 92 40	130.0	19 35.1 92 40	130.2	19 07.5 92 39	130.5	18 39.9 92 39	130.7	18 12.3 92 39	130.9	17 44.7 92 39	131.1	6
7	20 33.8 92 40	128.6	20 06.4 92 40	128.9	19 38.9 92 40	129.1	19 11.4 92 40	129.3	18 43.9 92 40	129.5	18 16.3 92 40	129.7	17 48.8 92 40	129.9	17 21.2 92 40	130.1	7
8	20 09.5 91 41	127.7	19 42.1 91 41	127.9	19 14.7 91 41	128.1	18 47.3 91 41	128.3	18 19.8 92 41	128.5	17 52.4 92 40	128.7	17 24.9 92 40	128.9	16 57.4 92 40	129.2	8
9	19 44.9 91 42	126.7	19 17.6 91 41	126.9	18 50.2 91 41	127.1	18 22.9 91 41	127.3	17 55.5 91 41	127.6	17 28.1 91 41	127.8	17 00.7 91 41	128.0	16 33.3 91 41	128.2	9
50	19 20.0 91 42	125.7	18 52.7 91 42	125.9	18 25.5 91 42	126.2	17 58.2 91 42	126.4	17 30.9 91 42	126.6	17 03.5 91 41	126.8	16 36.2 91 41	127.0	16 08.9 91 41	127.2	50
1	18 54.8 91 43	124.8	18 27.6 91 42	125.0	18 00.4 91 42	125.2	17 33.1 91 42	125.4	17 05.9 91 42	125.7	16 38.6 91 42	125.9	16 11.4 91 42	126.1	15 44.1 91 42	126.3	1
2	18 29.2 90 43	123.8	18 02.1 90 43	124.0	17 35.0 90 43	124.3	17 07.8 91 43	124.5	16 40.6 91 43	124.7	16 13.5 91 42	124.9	15 46.3 91 42	125.1	15 19.1 91 42	125.4	2
3	18 03.4 90 44	122.9	17 36.3 90 43	123.1	17 09.3 90 43	123.3	16 42.2 90 43	123.5	16 15.1 90 43	123.8	15 48.0 90 43	124.0	15 20.8 90 43	124.2	14 53.7 90 43	124.4	3
4	17 37.3 90 44	121.9	17 10.3 90 44	122.1	16 43.3 90 44	122.4	16 16.3 90 44	122.6	15 49.3 90 44	122.8	15 22.2 90 43	123.0	14 55.2 90 43	123.3	14 28.1 90 43	123.5	4
55	17 10.9 90 44	121.0	16 44.0 90 44	121.2	16 17.1 90 44	121.4	15 50.1 90 44	121.7	15 23.2 90 44	121.9	14 56.2 90 44	122.1	14 29.2 90 44	122.3	14 02.2 90 44	122.6	55
6	16 44.3 90 45	120.0	16 17.5 90 45	120.3	15 50.6 90 45	120.5	15 23.7 90 44	120.7	14 56.8 90 44	121.0	14 29.9 90 44	121.2	14 02.9 90 44	121.4	13 36.0 90 44	121.6	6
7	16 17.4 89 45	119.1	15 50.6 89 45	119.3	15 23.8 89 45	119.6	14 57.0 89 45	119.8	14 30.2 89 45	120.0	14 03.3 90 45	120.3	13 36.4 90 45	120.5	13 09.6 90 44	120.7	7
8	15 50.3 89 46	118.2	15 23.6 89 46	118.4	14 56.8 89 45	118.6	14 30.1 89 45	118.9	14 03.3 89 45	119.1	13 36.5 89 45	119.3	13 09.7 89 45	119.6	12 42.9 89 45	119.8	8
9	15 23.0 89 46	117.3	14 56.3 89 46	117.5	14 29.6 89 46	117.7	14 02.9 89 46	118.0	13 36.2 89 46	118.2	13 09.4 89 46	118.4	12 42.7 89 45	118.7	12 15.9 89 45	118.9	9
60	14 55.4 89 46	116.3	14 28.8 89 46	116.6	14 02.1 89 46	116.8	13 35.5 89 46	117.0	13 08.8 89 46	117.3	12 42.1 89 46	117.5	12 15.4 89 46	117.7	11 48.8 89 46	118.0	60
1	14 27.6 89 47	115.4	14 01.0 89 47	115.7	13 34.4 89 47	115.9	13 07.8 89 46	116.1	12 41.2 89 46	116.4	12 14.6 89 46	116.6	11 48.0 89 46	116.8	11 21.3 89 46	117.1	1
2	13 59.6 88 47	114.5	13 33.0 88 47	114.7	13 06.5 88 47	115.0	12 40.0 88 47	115.2	12 13.4 89 47	115.5	11 46.9 89 47	115.7	11 20.3 89 46	115.9	10 53.7 89 46	116.2	2
3	13 31.3 88 47	113.6	13 04.9 88 47	113.8	12 38.4 88 47	114.1	12 11.9 88 47	114.3	11 45.4 88 47	114.6	11 18.9 88 47	114.8	10 52.4 88 47	115.0	10 25.9 88 47	115.3	3
4	13 02.9 88 48	112.7	12 36.5 88 48	112.9	12 10.1 88 48	113.2	11 43.7 88 47	113.4	11 17.2 88 47	113.7	10 50.8 88 47	113.9	10 24.3 88 47	114.1	9 57.8 88 47	114.4	4
65	12 34.3 88 48	111.8	12 08.0 88 48	112.0	11 41.6 88 48	112.3	11 15.2 88 48	112.5	10 48.8 88 48	112.8	10 22.4 88 48	113.0	9 56.0 88 48	113.2	9 29.6 88 47	113.5	65
6	12 05.5 88 48	110.9	11 39.2 88 48	111.1	11 12.9 88 48	111.4	10 46.6 88 48	111.6	10 20.2 88 48	111.9	9 53.9 88 48	112.1	9 27.5 88 48	112.4	9 01.2 88 48	112.6	6
7	11 36.6 88 49	110.0	11 10.3 88 48	110.2	10 44.0 88 48	110.5	10 17.8 88 48	110.7	9 51.5 88 48	111.0	9 25.2 88 48	111.2	8 58.9 88 48	111.5	8 32.5 88 48	111.7	7
8	11 07.5 87 49	109.1	10 41.2 87 49	109.3	10 15.0 87 49	109.6	9 48.8 87 49	109.8	9 22.5 88 48	110.1	8 56.3 88 48	110.3	8 30.0 88 48	110.6	8 03.7 88 48	110.8	8
9	10 38.2 87 49	108.2	10 12.0 87 49	108.5	9 45.8 87 49	108.7	9 19.6 87 49	109.0	8 53.4 87 49	109.2	8 27.2 87 49	109.5	8 01.0 87 49	109.7	7 34.8 87 49	109.9	9
70	10 08.7 87 49	107.3	9 42.6 87 49	107.6	9 16.5 87 49	107.8	8 50.3 87 49	108.1	8 24.2 87 49	108.3	7 58.0 87 49	108.6	7 31.8 87 49	108.8	7 05.6 87 49	109.1	70
1	9 39.2 87 50	106.4	9 13.1 87 49	106.7	8 47.0 87 49	106.9	8 20.9 87 49	107.2	7 54.8 87 49	107.4	7 28.6 87 49	107.7	7 02.5 87 49	107.9	6 36.4 87 49	108.2	1
2	9 09.5 87 50	105.6	8 43.4 87 50	105.8	8 17.4 87 50	106.1	7 51.3 87 50	106.3	7 25.2 87 49	106.6	6 59.1 87 49	106.8	6 33.0 87 49	107.1	6 06.9 87 49	107.3	2
3	8 39.6 87 50	104.7	8 13.6 87 50	104.9	7 47.6 87 50	105.2	7 21.6 87 50	105.4	6 55.5 87 50	105.7	6 29.5 87 50	105.9	6 03.4 87 50	106.2	5 37.3 87 50	106.4	3
4	8 09.7 87 50	103.8	7 43.7 87 50	104.1	7 17.7 87 50	104.3	6 51.7 87 50	104.6	6 25.7 87 50	104.8	5 59.7 87 50	105.1	5 33.7 87 50	105.3	5 07.6 87 50	105.6	4
75	7 39.6 86 50	102.9	7 13.7 87 50	103.2	6 47.7 87 50	103.4	6 21.7 87 50	103.7	5 55.8 87 50	103.9	5 29.8 87 50	104.2	5 03.8 87 50	104.4			75
6	7 09.5 86 50	102.1	6 43.5 86 50	102.3	6 17.6 86 50	102.6	5 51.7 86 50	102.8	5 25.7 86 50	103.1							6
7	6 39.2 86 51	101.2	6 13.3 86 51	101.4	5 47.4 86 51	101.7	5 21.5 86 50	102.0									7
8	6 08.8 86 51	100.3	5 43.0 86 51	100.6	5 17.1 86 51	100.8											8
9	5 38.4 86 51	99.5	5 12.5 86 51	99.7													9
80	5 07.9 86 51	98.6															80

Digitized by Google

Lat. 59°

Lat. 59°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	
00	35 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	36 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	37 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	38 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	00
1	34 59.7	1.0 02	178.8	35 29.7	1.0 02	178.8	35 59.7	1.0 02	178.8	36 29.7	1.0 02	178.8	36 59.7	1.0 02	178.8	37 29.7	1.0 02	178.7	37 59.7	1.0 02	178.7	38 29.7	1.0 02	178.7	1
2	34 58.7	1.0 03	177.6	35 28.7	1.0 03	177.6	35 58.7	1.0 03	177.5	36 28.7	1.0 03	177.5	36 58.7	1.0 03	177.5	37 28.6	1.0 03	177.5	37 58.6	1.0 03	177.5	38 28.6	1.0 03	177.5	2
3	34 57.0	1.0 04	176.3	35 27.0	1.0 04	176.3	35 57.0	1.0 04	176.3	36 27.0	1.0 04	176.3	36 57.0	1.0 04	176.3	37 27.0	1.0 04	176.2	37 56.9	1.0 04	176.2	38 26.9	1.0 04	176.2	3
4	34 54.7	1.0 05	175.1	35 24.7	1.0 05	175.1	35 54.7	1.0 05	175.1	36 24.7	1.0 05	175.1	36 54.6	1.0 05	175.0	37 24.6	1.0 05	175.0	37 54.6	1.0 05	175.0	38 24.5	1.0 05	174.9	4
05	34 51.8	1.0 06	173.9	35 21.8	1.0 06	173.9	35 51.7	1.0 06	173.8	36 21.7	1.0 06	173.8	36 51.6	1.0 06	173.8	37 21.6	1.0 06	173.7	37 51.5	1.0 06	173.7	38 21.5	1.0 06	173.7	05
6	34 48.2	1.0 07	172.7	35 18.1	1.0 07	172.7	35 48.1	1.0 07	172.6	36 18.0	1.0 07	172.6	36 47.9	1.0 07	172.5	37 17.9	1.0 07	172.5	37 47.8	1.0 07	172.5	38 17.7	1.0 07	172.4	6
7	34 44.0	1.0 08	171.5	35 13.9	1.0 08	171.4	35 43.8	1.0 08	171.4	36 13.7	1.0 08	171.4	36 43.6	1.0 08	171.3	37 13.5	1.0 08	171.3	37 43.4	1.0 08	171.2	38 13.3	1.0 08	171.2	7
8	34 39.1	1.0 09	170.3	35 08.9	1.0 09	170.2	35 38.8	1.0 09	170.2	36 08.7	1.0 09	170.1	36 38.6	1.0 09	170.1	37 08.5	1.0 09	170.0	37 38.4	1.0 10	170.0	38 08.2	1.0 10	169.9	8
9	34 33.5	1.0 10	169.1	35 03.4	1.0 10	169.0	35 33.2	1.0 10	169.0	36 03.1	1.0 10	168.9	36 32.9	99 11	168.8	37 02.8	99 11	168.8	37 32.6	99 11	168.7	38 02.5	99 11	168.6	9
10	34 27.4	99 11	167.9	34 57.2	99 11	167.8	35 27.0	99 11	167.7	35 56.8	99 12	167.7	36 26.6	99 12	167.6	36 56.4	99 12	167.5	37 26.2	99 12	167.5	37 56.1	99 12	167.4	10
1	34 20.5	99 12	166.7	34 50.3	99 12	166.6	35 20.1	99 13	166.5	35 49.9	99 13	166.5	36 19.7	99 13	166.4	36 49.4	99 13	166.3	37 19.2	99 13	166.2	37 49.0	99 13	166.1	1
2	34 13.1	99 13	165.5	34 42.9	99 14	165.4	35 12.6	99 14	165.3	35 42.3	99 14	165.2	36 12.1	99 14	165.2	36 41.8	99 14	165.1	37 11.5	99 14	165.0	37 41.3	99 14	164.9	2
3	34 05.0	99 14	164.3	34 34.7	99 15	164.2	35 04.4	99 15	164.1	35 34.1	99 15	164.0	36 03.8	99 15	163.9	36 33.5	99 15	163.8	37 03.2	99 15	163.8	37 32.9	99 15	163.7	3
4	33 56.4	99 16	163.1	34 26.0	99 16	163.0	34 55.7	99 16	162.9	35 25.3	99 16	162.8	35 55.0	99 16	162.7	36 24.6	99 16	162.6	36 54.2	99 16	162.5	37 23.9	99 16	162.4	4
15	33 47.1	99 16	161.9	34 16.7	99 17	161.8	34 46.3	99 17	161.7	35 15.9	99 17	161.6	35 45.5	99 17	161.5	36 15.1	99 17	161.4	36 44.6	99 17	161.3	37 14.2	99 17	161.2	15
6	33 37.2	99 18	160.7	34 06.7	99 18	160.6	34 36.3	99 18	160.5	35 05.8	98 18	160.4	35 35.4	98 18	160.3	36 04.9	98 18	160.2	36 34.4	98 18	160.1	37 04.0	98 18	160.0	6
7	33 26.7	98 18	159.5	33 56.2	98 19	159.4	34 25.7	98 19	159.3	34 55.2	98 19	159.2	35 24.6	98 19	159.1	35 54.1	98 19	159.0	36 23.6	98 19	158.9	36 53.1	98 19	158.8	7
8	33 15.6	98 19	158.4	33 45.0	98 20	158.3	34 14.5	98 20	158.1	34 43.9	98 20	158.0	35 13.3	98 20	157.9	35 42.7	98 20	157.8	36 12.2	98 20	157.7	36 41.6	98 20	157.5	8
9	33 03.9	98 20	157.2	33 33.3	98 21	157.1	34 02.7	98 21	157.0	34 32.0	98 21	156.8	35 01.4	98 21	156.7	35 30.8	98 21	156.6	36 00.1	98 21	156.5	36 29.5	98 21	156.3	9
20	32 51.6	98 21	156.0	33 20.9	98 22	155.9	33 50.3	98 22	155.8	34 19.6	98 22	155.7	34 48.9	98 22	155.5	35 18.2	98 22	155.4	35 47.5	98 22	155.3	36 16.7	98 22	155.1	20
1	32 38.8	98 22	154.9	33 08.0	98 22	154.7	33 37.3	98 23	154.6	34 06.6	97 23	154.5	34 35.8	97 23	154.3	35 05.0	97 23	154.2	35 34.2	97 23	154.1	36 03.5	97 23	153.9	1
2	32 25.4	97 23	153.7	32 54.6	97 23	153.6	33 23.8	97 23	153.4	33 53.0	97 24	153.3	34 22.1	97 24	153.2	34 51.3	97 24	153.0	35 20.4	97 24	152.9	35 49.6	97 24	152.7	2
3	32 11.4	97 24	152.6	32 40.6	97 24	152.4	33 09.7	97 24	152.3	33 38.8	97 25	152.1	34 07.9	97 25	152.0	34 37.0	97 25	151.9	35 06.1	97 25	151.7	35 35.2	97 25	151.6	3
4	31 56.9	97 25	151.4	32 26.0	97 25	151.3	32 55.0	97 25	151.1	33 24.1	97 25	151.0	33 53.1	97 26	150.8	34 22.1	97 26	150.7	34 51.2	97 26	150.5	35 20.2	97 26	150.4	4
25	31 41.9	97 26	150.3	32 10.9	97 26	150.1	32 39.8	97 26	150.0	33 08.8	97 26	149.8	33 37.8	97 26	149.7	34 06.7	96 27	149.5	34 35.7	96 27	149.4	35 04.6	96 27	149.2	25
6	31 26.3	96 27	149.2	31 55.2	96 27	149.0	32 24.1	96 27	148.9	32 53.0	96 27	148.7	33 21.9	96 27	148.5	33 50.8	96 27	148.4	34 19.7	96 28	148.2	34 48.5	96 28	148.0	6
7	31 10.2	96 28	148.0	31 39.0	96 28	147.9	32 07.9	96 28	147.7	32 36.7	96 28	147.6	33 05.5	96 28	147.4	33 34.3	96 28	147.2	34 03.1	96 28	147.1	34 31.9	96 29	146.9	7
8	30 53.6	96 29	146.9	31 22.4	96 29	146.8	31 51.1	96 29	146.6	32 19.9	96 29	146.4	32 48.6	96 29	146.3	33 17.3	96 29	146.1	33 46.1	96 29	145.9	34 14.7	96 29	145.7	8
9	30 36.5	96 29	145.8	31 05.2	96 29	145.6	31 33.9	96 30	145.5	32 02.5	96 30	145.3	32 31.2	96 30	145.1	32 59.8	95 30	144.9	33 28.5	95 30	144.8	33 57.1	95 30	144.6	9
30	30 18.9	95 30	144.7	30 47.5	95 30	144.5	31 16.1	95 30	144.4	31 44.7	95 31	144.2	32 13.3	95 31	144.0	32 41.8	95 31	143.8	33 10.4	95 31	143.6	33 38.9	95 31	143.5	30
1	30 00.8	95 31	143.6	30 29.3	95 31	143.4	30 57.8	95 31	143.2	31 26.4	95 31	143.1	31 54.9	95 31	142.9	32 23.4	95 32	142.7	32 51.8	95 32	142.5	33 20.3	95 32	142.3	1
2	29 42.2	95 32	142.5	30 10.7	95 32	142.3	30 39.1	95 32	142.1	31 07.6	95 32	142.0	31 36.0	95 32	141.8	32 04.4	95 32	141.6	32 32.8	95 33	141.4	33 01.2	95 33	141.2	2
3	29 23.1	95 32	141.4	29 51.5	95 33	141.2	30 19.9	95 33	141.1	30 48.3	95 33	140.9	31 16.6	94 33	140.7	31 45.0	94 33	140.5	32 13.3	94 33	140.3	32 41.6	94 33	140.1	3
4	29 03.7	94 33	140.3	29 32.0	94 33	140.2	30 00.3	94 34	140.0	30 28.6	94 34	139.8	30 56.8	94 34	139.6	31 25.1	94 34	139.4	31 53.3	94 34	139.2	32 21.5	94 34	139.0	4
35	28 43.7	94 34	139.3	29 11.9	94 34	139.1	29 40.2	94 34	138.9	30 08.4	94 34	138.7	30 36.6	94 34	138.5	31 04.7	94 35	138.3	31 32.9	94 35	138.1	32 01.0	94 35	137.9	35
6	28 23.3	94 35	138.2	28 51.5	94 35	138.0	29 19.6	94 35	137.8	29 47.8	94 35	137.6	30 15.9	94 35	137.4	30 43.9	94 35	137.2	31 12.0	94 35	137.0	31 40.1	93 36	136.8	6
7	28 02.5	94 35	137.1	28 30.6	94 36	136.9	28 58.7	94 36	136.7	29 26.7	93 36	136.5	29 54.7	93 36	136.3	30 22.7	93 36	136.1	30 50.7	93 36	135.9	31 18.7	93 36	135.7	7
8	27 41.3	93 36	136.1	28 09.3	93 36	135.9	28 37.3	93 36	135.7	29 05.2	93 36	135.5	29 33.2	93 37	135.3	30 01.1	93 37	135.1	30 29.0	93 37	134.8	30 56.9	93 37	134.6	8
9	27 19.7	93 37	135.0	27 47.6	93 37	134.8	28 15.5	93 37	134.6	28 43.4	93 37	134.4	29 11.2	93 37	134.2	29 39.1	93 37	134.0	30 06.9	93 38	133.8	30 34.7	93 38	133.6	9
40	26 57.6	93 37	134.0	27 25.5	93 38	133.8	27 53.3	93 38	133.6	28 21.1	93 38	133.4	28 48.9	93 38	133.1	29 16.6	93 38	132.9	29 44.4	92 38	132.7	30 12.1	92 38	132.5	40
1	26 35.2	93 38	133.0	27 03.0	93 38	132.7	27 30.7	92 38	132.5	27 58.4	92 38	132.3	28 26.1	92 39	132.1	28 53.8	92 39	131.9	29 21.5	92 39	131.7	29 49.1	92 39	131.4	1
2	26 12.4	92 39	131.9	26 40.1	92 39	131.7	27 07.8	92 39	131.5	27 35.4	92 39	131.3	28 03.0	92 39	131.1	28 30.6	92 39	130.8	28 58.2	92 39	130.6	29 25.8	92 40	130.4	2
3	25 49.2	92 39	130.9	26 16.8	92 39	130.7	26 44.4	92 39	130.5	27 12.0	92 40	130.2	27 39.5	92 40	130.0	28 07.1	92 40	129.8	28 34.6	92 40	129.6	29 02.1	92 40	129.3	3
4	25 25.7	92 40	129.9	25 53.2	92 40	129.7	26 20.7	92 40	129.4	26 48.2	92 40	129.2	27 15.7	92 40	129.0	27 43.2	91 40	128.8	28 10.6	91 41	128.5	28 38.0	91 41	128.3	4
45	25 01.8	92 40	128.9	25 29.3	92 40	128.7	25 56.7	91 41	128.4	26 24.1	91 41	128.2	26 51.5	91 41	128.0	27 18.9	91 41	127.7	27 46.2	91 41	127.5	28 13.6	91 41	127.3	45
6	24 37.6	91 41	127.9	25 05.0	91 41	127.6	25 32.3	91 41	127.4	25 59.7	91 41	127.2	26 27.0	91 41	127.0	26 54.3	91 42	126.7	27 21.6	91 42	126.5	27 48.8	91 42	126.3	6
7	24 13.0	91 41	126.9	24 40.3	91 42	126.6	25 07.6	91 42	126.4	25 34.9	91 42	126.2	26 02.1	91 42	126.0	26 29.4	91 42	125.7	26 56.6	91 42	125.5	27 23.7	91 42	125.2	7
8	23 48.1	91 42	125.9	24 15.4	91 42	125.7	24 42.6	91 42	125.4	25 09.8	91 42	125.2	25 37.0	91 42	125.0	26 04.1	90 43	124.7	26 31.2	90 43	124.5	26 58.3	90 43	124.2	8
9	23 22.9	91 42	124.9	23 50.1	91 43	124.7	24 17.3	90 43	124.4	24 44.4	90 43	124.2	25 11.5	90 43	124.0	25 38.6	90 43	123.7	26 05.6	90 43	123.5	26 32.6	90 43	123.2	9
50	22 57.4	90 43	123.9	23 24.5	90 43	123.7	23 51.6	90 43	123.4	24 18.7	90 43	123.2	24 45.7	90 43	123.0	25 12.7	90 44	122.7	25 39.7	90 44	122.5	26 06.7	90 44	122.2	50
1	22 31.7	90 43	122.9	22 58.7	90 44	122.7	23 25.7	90 44	122.5	23 52.7	90 44	122.2	24 19.6	90 44	122.0	24 46.6	90 44	121.7	25 13.5	90 44	121.5	25 40.4	90 44	121.3	1
2	22 05.6	90 44	122.0	22 32.5	90 44	121.7	22 59.5	90 44	121.5	23 26.4	90 44	121.2	23 53.3	90 44	121.0	24 20.2	90 44	120.8	24 47.0	89 45	120.5	25 13.8	89 45	120.3	2
3	21 39.2	90 44	121.0	22 06.1	90 44	120.8	22 33.0	90 45	120.5	22 59.8	89 45	120.3	23 26.7	89 45	120.0	23 53.5	89 45	119.8	24 20.2	89 45	119.5	24 47.0	89 45	119.3	3
4	21 12.6	89 45	120.0	21 39.4	89 45	119.8	22 06.2	89 45	119.6	22 33.0	89 45	119.3	22 59.8	89 45	119.1	23 26.5	89 45	118.8	23 53.2	89 45	118.6	24 19.9	89 46	118.3	4
55	20 45.7	89 45	119.1	21 12.5	89 45	118.8	21 39.2	89 45	118.6	22 05.9	89 46	118.4	22 32.6	89 46	118.1	22 59.3	89 46	117.9	23 26.0	89 46	117.6	23 52.6	89 46	117.4	55
6	20 18.6	89 46	118.1	20 45.3	89 46	117.9	21 12.0	89 46	117.6	21 38.6	89 46	117.4	22 05.3	89 46	117.2	22 31.9	89 46	116.9	22 58.5	89 46	116.7	23 25.0	89 46	116.4	6
7	19 51.2	89 46	117.2	20 17.9	89 46	116.9	20 44.5	89 46	116.7	21 11.1	89 46	116.5	21 37.7	89 46	116.2	22 04.2	88 46	116.0	22 30.7	88 47	115.7	22 57.2	88 47	115.4	7
8	19 23.6	89 46	116.3	19 50.2	89 46	116.0	20 16.8	88 47	115.8	20 43.3	88 47	115.5	21 09.8	88 47	115.3	21 36.3	88 47	115.0	22 02.8	88 47	114.8	22 29.2	88 47	114.5	8
9	18 55.8	88 47	115.3	19 22.3	88 47	115.1	19 48.8	88 47	114.8	20 15.3	88 47	114.6	20 41.8	88 47	114.3	21 08.2	88 47	114.1	21 34.6	88 47	113.8	22 01.0	88 47	113.6	9
60	18 27.8	88 47	114.4	18 54.2	88 47	114.1	19 20.7	88 47	113.9	19 47.1	88 47	113.6	20 13.5	88 47	113.4	20 39.9	88 48	113.1	21 06.2	88 48	112.9	21 32.6	88 48	112.6	60
1	17 59.5	88 47	113.5	18 25.9	88 48	113.2	18 52.3	88 48	113.0	19 18.7	88 48	112.7	19 45.0	88 48	112.5	20 11.4	88 48	112.2	20 37.7	88 48	111.9	21 04.0	88 48	111.7	1
2	17 31.1	88 48	112.5	17 57.4	88 48	112.3	18 23.8	88 48	112.0	18 50.1	88 48	111.8	19 16.4	88 48	111.5	19 42.7	88 48	111.3	20 08.9	87 48	111.0	20 35.1	87 48	110.8	2
3	17 02.4	88 48	111.6	17 28.7	88 48	111.4	17 55.0	88 48	111.1	18 21.3	88 48	110.9	18 47.5	87 48	110.6	19 13.8	87 48	110.3	19 40.0	87 49	110.1	20 06.2	87 49	109.8	3
4	16 33.6	88 48	110.7	16 59.9	88 48	110.5	17 26.1	87 48	110.2	17 52.3	87 49	109.9	18 18.5	87 49	109.7	18 44.7	87 49	109.4	19 10.9	87 49	109.2	19 37.0	87 49	108.9	4
65	16 04.6	87 49	109.8	16 30.8	87 49	109.5	16 57.0	87 49	109.3	17 23.2	87 49	109.0	17 49.4	87 49	108.8	18 15.5	87 49	108.5	18 41.6	87 49	108.3	19 07.7	87 49	108.0	65
6	15 35.5	87 49	108.9	16 01.6	87 49	108.6	16 27.8	87 49	108.4	16 53.9	87 49	108.1	17 20.0	87 49	107.9	17 46.1	87 49	107.6	18 12.2	87 49	107.3	18 38.2	87 49	107.1	6
7	15 06.1	87 49	108.0	15 32.3	87 49	107.7	15 58.4	87 49	107.5	16 24.5	87 49	107.2	16 50.5	87 49	107.0	17 16.6	87 49	106.7	17 42.6	87 50	106.4	18 08.6	87 50	106.2	7
8	14 36.7	87 49	107.1	15 02.8	87 49	106.8	15 28.8	87 50	106.6	15 54.9	87 50	106.3	16 20.9	87 50	106.1	16 46.9	87 50	105.8	17 12.9	87 50	105.5	17 38.9	87 50	105.3	8
9	14 07.1	87 50	106.2	14 33.1	87 50	105.9	14 59.1	87 50	105.7	15 25.2	87 50	105.4	15 51.1	87 50	105.2	16 17.1	87 50	104.9	16 43.1	86 50	104.6	17 09.0	86 50	104.4	9
70	13 37.3	87 50	105.3	14 03.3	87 50	105.0	14 29.3	87 50	104.8	14 55.3	87 50	104.5	15 21.3	86 50	104.3	15 47.2	86 50	104.0	16 13.1	86 50	103.7	16 39.0	86 50	103.5	70
1	13 07.5	87 50	104.4	13 33.4	87 50	104.2	13 59.4	86 50	103.9	14 25.3	86 50	103.6	14 51.3	86 50	103.4	15 17.2	86 50	103.1	15 43.0	86 50	102.9	16 08.9	86 50	102.6	1
2	12 37.5	86 50	103.5	13 03.4	86 50	103.3	13 29.3	86 50	103.0	13 55.2	86 50	102.8	14 21.1	86 50	102.5	14 47.0	86 50	102.2	15 12.9	86 50	102.0	15 38.7	86 50	101.7	2
3	12 07.4	86 50	102.6	12 33.3	86 50	102.4	12 59.2	86 50	102.1	13 25.1	86 50	101.9	13 50.9	86 51	101.6	14 16.8	86 51	101.3	14 42.6	86 51	101.1	15 08.4	86 51	100.8	3
4	11 37.2	86 50	101.8	12 03.0	86 51	101.5	12 28.9	86 51	101.3	12 54.8	86 51	101.0	13 20.6	86 51	100.7	13 46.4	86 51	100.5	14 12.2	86 51	100.2	14 38.0	86 51	99.9	4
75	11 06.9	86 51	100.9	11 32.7	86 51	100.6	11 58.6	86 51	100.4	12 24.4	86 51	100.1	12 50.2	86 51	99.9	13 16.0	86 51	99.6	13 41.8	86 51	99.3	14 07.5	86 51	99.1	75
6	10 36.5	86 51	100.0	11 02.3	86 51	99.8	11 28.1	86 51	99.5	11 53.9	86 51	99.2	12 19.7	86 51	99.0	12 45.5	86 51	98.7	13 11.2	86 51	98.4	13 37.0	86 51	98.2	6
7	10 06.0	86 51	99.1	10 31.8	86 51	98.9	10 57.6	86 51	98.6	11 23.4	86 51	98.4	11 49.1	86 51	98.1	12 14.9	86 51	97.8	12 40.6	86 51	97.6	13 06.3	86 51	97.3	7
8	9 35.5	86 51	98.3	10 01.2	86 51	98.0	10 27.0	86 51	97.8	10 52.8	86 51	97.5	11 18.5	86 51	97.2	11 44.2	86 51	97.0	12 10.0	86 51	96.7	12 35.7	86 51	96.4	8
9	9 04.8	86 51	97.4	9 30.6	86 51	97.1	9 56.4	86 51	96.9	10 22.1	86 51	96.6	10 47.8	86 51	96.4	11 13.5	86 51	96.1	11 39.2	86 51	95.8	12 04.9	86 51	95.6	9
80	8 34.2	86 51	96.5	8 59.9	86 51	96.3	9 25.7	86 51	96.0	9 51.4	86 51	95.8	10 17.1	86 51	95.5	10 42.8	86 51	95.2	11 08.5	86 51	95.0	11 34.2	86 51	94.7	80
1	8 03.4	86 51	95.7	8 29.2	86 51	95.4	8 54.9	86 51	95.2	9 20.6	86 51	94.9	9 46.3	86 51	94.6	10 12.0	86 51	94.4	10 37.7	86 51	94.1	11 03.3	86 51	93.8	1
2	7 32.7	86 51	94.8	7 58.4	86 51	94.5	8 24.1	86 51	94.3	8 49.8	86 51	94.0	9 15.5	86 51	93.8	9 41.2	86 51	93.5	10 06.8	86 51	93.2	10 32.5	85 51	93.0	2
3	7 01.9	86 51	93.9	7 27.6	86 51	93.7	7 53.3	86 51	93.4	8 19.0	86 51	93.2	8 44.6	86 51	92.9	9 10.3	86 51	92.6	9 36.0	86 51	92.4	10 01.6	85 51	92.1	3
4	6 31.0	86 51	93.1	6 56.7	86 51	92.8	7 22.4	86 51	92.6	7 48.1	86 51	92.3	8 13.8	86 51	92.0	8 39.4	86 51	91.8	9 05.1	85 52	91.5	9 30.7	85 52	91.3	4
85	6 00.2	86 51	92.2	6 25.8	86 52	92.0	6 51.5	86 52	91.7	7 17.2	86 52	91.4	7 42.9	86 52	91.2	8 08.5	86 52	90.9	8 34.2	85 52	90.7	8 59.8	85 52	90.4	85
6	5 29.3	86 52	91.4	5 55.0	86 52	91.1	6 20.6	86 52	90.8	6 46.3	86 52	90.6	7 12.0	86 52	90.3	7 37.6	86 52	90.1	8 03.3	85 52	89.8	8 28.9	85 52	89.5	6
7				5 24.1	86 52	90.2	5 49.7	86 52	90.0	6 15.4	86 52	89.7	6 41.1	86 52	89.5	7 06.7	86 52	89.2	7 32.4	85 52	88.9	7 58.0	85 51	88.7	7
8							5 18.8	86 52	89.1	5 44.5	86 52	88.9	6 10.2	86 51	88.6	6 35.8	86 51	88.4	7 01.5	85 51	88.1	7 27.1	85 51	87.8	8
9										5 13.6	86 52	88.0	5 39.3	86 51	87.8	6 05.0	86 51	87.5	6 30.6	86 51	87.2	6 56.3	85 51	87.0	9
90													5 08.4	86 51	86.9	5 34.1	86 51	86.6	5 59.8	86 51	86.4	6 25.4	86 51	86.1	90

Digitized by Google

Lat. 59°

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30′		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	27 00.0 1.0 00	180.0	26 30.0 1.0 00	180.0	26 00.0 1.0 00	180.0	25 30.0 1.0 00	180.0	25 00.0 1.0 00	180.0	24 30.0 1.0 00	180.0	24 00.0 1.0 00	180.0	23 30.0 1.0 00	180.0	00
1	26 59.7 1.0 02	178.9	26 29.7 1.0 02	178.9	25 59.7 1.0 02	178.9	25 29.7 1.0 01	178.9	24 59.7 1.0 01	178.9	24 29.7 1.0 01	178.9	23 59.7 1.0 01	178.9	23 29.7 1.0 01	178.9	1
2	26 58.8 1.0 03	177.8	26 28.8 1.0 02	177.8	25 58.8 1.0 02	177.8	25 28.8 1.0 02	177.8	24 58.8 1.0 02	177.8	24 28.8 1.0 02	177.8	23 58.8 1.0 02	177.8	23 28.8 1.0 02	177.8	2
3	26 57.3 1.0 04	176.6	26 27.3 1.0 04	176.7	25 57.3 1.0 04	176.7	25 27.3 1.0 03	176.7	24 57.3 1.0 03	176.7	24 27.4 1.0 03	176.7	23 57.4 1.0 03	176.7	23 27.4 1.0 03	176.8	3
4	26 55.2 1.0 04	175.5	26 25.2 1.0 04	175.5	25 55.2 1.0 04	175.6	25 25.2 1.0 04	175.6	24 55.3 1.0 04	175.6	24 25.3 1.0 04	175.6	23 55.3 1.0 04	175.7	23 25.3 1.0 04	175.7	4
05	26 52.5 1.0 06	174.4	26 22.5 1.0 06	174.4	25 52.5 1.0 05	174.5	25 22.6 1.0 05	174.5	24 52.6 1.0 05	174.5	24 22.6 1.0 05	174.5	23 52.7 1.0 05	174.6	23 22.7 1.0 05	174.6	05
6	26 49.1 1.0 07	173.3	26 19.2 1.0 06	173.3	25 49.3 1.0 06	173.4	25 19.3 1.0 06	173.4	24 49.4 1.0 06	173.4	24 19.4 1.0 06	173.5	23 49.5 1.0 06	173.5	23 19.5 1.0 06	173.5	6
7	26 45.2 1.0 08	172.2	26 15.3 1.0 07	172.2	25 45.4 1.0 07	172.3	25 15.5 1.0 07	172.3	24 45.5 1.0 07	172.3	24 15.6 1.0 07	172.4	23 45.7 1.0 07	172.4	23 15.7 1.0 07	172.4	7
8	26 40.7 1.0 08	171.1	26 10.8 1.0 08	171.1	25 40.9 1.0 08	171.2	25 11.0 1.0 08	171.2	24 41.1 1.0 08	171.2	24 11.2 1.0 08	171.3	23 41.3 1.0 08	171.3	23 11.4 1.0 08	171.4	8
9	26 35.6 1.0 09	169.9	26 05.8 1.0 09	170.0	25 35.9 1.0 09	170.0	25 06.0 1.0 09	170.1	24 36.1 1.0 09	170.1	24 06.2 1.0 09	170.2	23 36.4 1.0 09	170.2	23 06.5 1.0 09	170.3	9
10	26 30.0 99 10	168.8	26 00.1 1.0 10	168.9	25 30.2 1.0 10	169.0	25 00.4 1.0 10	169.0	24 30.5 1.0 10	169.1	24 00.7 1.0 10	169.1	23 30.8 1.0 10	169.2	23 01.0 1.0 10	169.2	10
1	26 23.7 99 11	167.7	25 53.9 99 11	167.8	25 24.0 99 11	167.9	24 54.2 99 11	167.9	24 24.4 99 11	168.0	23 54.6 99 11	168.0	23 24.7 99 11	168.1	22 54.9 99 11	168.1	1
2	26 16.8 99 12	166.6	25 47.0 99 12	166.7	25 17.2 99 12	166.8	24 47.5 99 12	166.8	24 17.7 99 12	166.9	23 47.9 99 12	167.0	23 18.1 99 12	167.0	22 48.3 99 12	167.1	2
3	26 09.4 99 13	165.5	25 39.6 99 13	165.6	25 09.9 99 13	165.7	24 40.1 99 13	165.7	24 10.4 99 13	165.8	23 40.6 99 13	165.9	23 10.9 99 13	165.9	22 41.1 99 13	166.0	3
4	26 01.4 99 14	164.4	25 31.7 99 14	164.5	25 01.9 99 14	164.6	24 32.2 99 14	164.7	24 02.5 99 14	164.7	23 32.8 99 14	164.8	23 03.1 99 14	164.9	22 33.3 99 14	164.9	4
15	25 52.8 99 15	163.3	25 23.1 99 15	163.4	24 53.4 99 15	163.5	24 23.8 99 15	163.6	23 54.1 99 15	163.6	23 24.4 99 15	163.7	22 54.7 99 15	163.8	22 25.0 99 15	163.9	15
6	25 43.6 99 16	162.2	25 14.0 99 16	162.3	24 44.4 99 16	162.4	24 14.7 99 16	162.5	23 45.1 99 16	162.6	23 15.5 99 16	162.7	22 45.8 99 16	162.7	22 16.2 99 16	162.8	6
7	25 33.9 99 17	161.1	25 04.3 99 17	161.2	24 34.8 99 17	161.3	24 05.2 99 17	161.4	23 35.6 99 17	161.5	23 06.0 99 17	161.6	22 36.4 99 17	161.7	22 06.8 99 17	161.8	7
8	25 23.7 98 18	160.0	24 54.1 98 18	160.1	24 24.6 98 18	160.2	23 55.0 98 18	160.3	23 25.5 98 18	160.4	22 56.0 98 18	160.5	22 26.4 99 18	160.6	21 56.9 99 17	160.7	8
9	25 12.8 98 19	159.0	24 43.4 98 19	159.1	24 13.9 98 19	159.2	23 44.4 98 19	159.3	23 14.9 98 19	159.4	22 45.4 98 18	159.5	22 15.9 98 18	159.6	21 46.4 98 18	159.7	9
20	25 01.5 98 20	157.9	24 32.0 98 20	158.0	24 02.6 98 20	158.1	23 33.2 98 20	158.2	23 03.7 98 19	158.3	22 34.3 98 19	158.4	22 04.8 98 19	158.5	21 35.4 98 19	158.6	20
1	24 49.6 98 21	156.8	24 20.2 98 21	156.9	23 50.8 98 21	157.0	23 21.4 98 20	157.1	22 52.0 98 20	157.2	22 22.6 98 20	157.4	21 53.2 98 20	157.5	21 23.8 98 20	157.6	1
2	24 37.1 98 22	155.7	24 07.8 98 22	155.8	23 38.5 98 21	156.0	23 09.2 98 21	156.1	22 39.8 98 21	156.2	22 10.5 98 21	156.3	21 41.1 98 21	156.4	21 11.8 98 21	156.5	2
3	24 24.2 98 22	154.7	23 54.9 98 22	154.8	23 25.6 98 22	154.9	22 56.4 98 22	155.0	22 27.1 98 22	155.1	21 57.8 98 22	155.3	21 28.5 98 22	155.4	20 59.2 98 22	155.5	3
4	24 10.7 97 23	153.6	23 41.5 97 23	153.7	23 12.3 97 23	153.8	22 43.1 97 23	154.0	22 13.8 97 23	154.1	21 44.6 97 23	154.2	21 15.4 97 23	154.3	20 46.1 97 23	154.5	4
25	23 56.7 97 24	152.5	23 27.5 97 24	152.7	22 58.4 97 24	152.8	22 29.2 97 24	152.9	22 00.1 97 24	153.0	21 30.9 97 24	153.2	21 01.7 97 24	153.3	20 32.6 97 23	153.4	25
6	23 42.2 97 25	151.5	23 13.1 97 25	151.6	22 44.0 97 25	151.7	22 14.9 97 25	151.9	21 45.8 97 25	152.0	21 16.7 97 24	152.1	20 47.6 97 24	152.3	20 18.5 97 24	152.4	6
7	23 27.7 97 26	150.4	22 58.1 97 26	150.6	22 29.1 97 26	150.7	22 00.1 97 26	150.8	21 31.1 97 25	151.0	21 02.0 97 25	151.1	20 33.0 97 25	151.2	20 03.9 97 25	151.4	7
8	23 11.7 96 27	149.4	22 42.7 97 27	149.5	22 13.8 97 26	149.7	21 44.8 97 26	149.8	21 15.8 97 26	149.9	20 46.9 97 26	150.1	20 17.9 97 26	150.2	19 48.9 97 26	150.3	8
9	22 55.7 96 27	148.3	22 26.8 96 27	148.5	21 57.9 96 27	148.6	21 29.0 96 27	148.8	21 00.1 96 27	148.9	20 31.2 96 27	149.0	20 02.3 96 27	149.2	19 33.4 96 27	149.3	9
30	22 39.2 96 28	147.3	22 10.4 96 28	147.4	21 41.6 96 28	147.6	21 12.7 96 28	147.7	20 43.9 96 28	147.9	20 15.1 96 28	148.0	19 46.2 96 28	148.2	19 17.4 96 27	148.3	30
1	22 22.3 96 29	146.2	21 53.5 96 29	146.4	21 24.8 96 29	146.6	20 56.0 96 29	146.7	20 27.2 96 29	146.9	19 58.5 96 28	147.0	19 29.7 96 28	147.2	19 00.9 96 28	147.3	1
2	22 04.9 96 30	145.2	21 36.2 96 30	145.4	21 07.5 96 30	145.5	20 38.8 96 29	145.7	20 10.1 96 29	145.8	19 41.4 96 29	146.0	19 12.7 96 29	146.2	18 44.0 96 29	146.3	2
3	21 47.0 95 30	144.2	21 18.4 95 30	144.4	20 49.8 96 30	144.5	20 21.2 95 30	144.7	19 52.5 95 30	144.8	19 23.9 96 30	145.0	18 55.3 96 30	145.1	18 26.6 96 30	145.3	3
4	21 28.7 95 31	143.2	21 00.2 95 31	143.3	20 31.6 95 31	143.5	20 03.1 95 31	143.7	19 34.5 95 31	143.8	19 06.0 95 31	144.0	18 37.4 95 31	144.1	18 08.8 95 30	144.3	4
35	21 10.0 95 32	142.2	20 41.5 95 32	142.3	20 13.0 95 32	142.5	19 44.6 95 32	142.7	19 16.1 95 31	142.8	18 47.6 95 31	143.0	18 19.1 95 31	143.2	17 50.6 95 31	143.3	35
6	20 50.8 95 33	141.1	20 22.4 95 33	141.3	19 54.0 95 32	141.5	19 25.6 95 32	141.7	18 57.2 95 32	141.8	18 28.8 95 32	142.0	18 00.3 95 32	142.2	17 31.9 95 32	142.3	6
7	20 31.2 94 33	140.1	20 02.9 94 33	140.3	19 34.6 94 33	140.5	19 06.2 94 33	140.7	18 37.9 94 33	140.8	18 09.5 95 33	141.0	17 41.2 95 33	141.2	17 12.8 95 32	141.3	7
8	20 11.2 94 34	139.1	19 42.9 94 34	139.3	19 14.7 94 34	139.5	18 46.4 94 34	139.7	18 18.2 94 34	139.8	17 49.9 94 33	140.0	17 21.6 94 33	140.2	16 53.3 94 33	140.4	8
9	19 50.8 94 35	138.1	19 22.6 94 35	138.3	18 54.4 94 34	138.5	18 26.2 94 34	138.7	17 58.0 94 34	138.9	17 29.8 94 34	139.0	17 01.6 94 34	139.2	16 33.4 94 34	139.4	9
40	19 29.9 94 35	137.1	19 01.8 94 35	137.3	18 33.7 94 35	137.5	18 05.6 94 35	137.7	17 37.5 94 35	137.9	17 09.4 94 35	138.1	16 41.2 94 35	138.2	16 13.0 94 34	138.4	40
1	19 08.7 93 36	136.1	18 40.7 93 36	136.3	18 12.7 93 36	136.5	17 44.6 93 36	136.7	17 16.6 94 36	136.9	16 48.5 94 35	137.1	16 20.4 94 35	137.3	15 52.3 94 35	137.4	1
2	18 47.1 93 37	135.2	18 19.2 93 36	135.4	17 51.2 93 36	135.5	17 23.2 93 36	135.7	16 55.3 93 36	135.9	16 27.3 93 36	136.1	15 59.3 93 36	136.3	15 31.3 93 36	136.5	2
3	18 25.1 93 37	134.2	17 57.3 93 37	134.4	17 29.4 93 37	134.6	17 01.5 93 37	134.8	16 33.6 93 37	135.0	16 05.7 93 37	135.2	15 37.7 93 36	135.3	15 09.8 93 36	135.5	3
4	18 02.8 93 38	133.2	17 35.0 93 38	133.4	17 07.2 93 38	133.6	16 39.4 93 37	133.8	16 11.5 93 37	134.0	15 43.7 93 37	134.2	15 15.8 93 37	134.4	14 48.0 93 37	134.6	4
45	17 40.1 92 38	132.2	17 12.4 92 38	132.4	16 44.6 92 38	132.6	16 16.9 93 38	132.8	15 49.1 93 38	133.0	15 21.3 93 38	133.2	14 53.6 93 38	133.4	14 25.8 93 38	133.6	45
6	17 17.1 92 39	131.3	16 49.4 92 39	131.5	16 21.7 92 39	131.7	15 54.0 92 39	131.9	15 26.4 92 38	132.1	14 58.7 92 38	132.3	14 30.9 92 38	132.5	14 03.2 92 38	132.7	6
7	16 53.7 92 40	130.3	16 26.1 92 39	130.5	15 58.5 92 39	130.7	15 30.9 92 39	130.9	15 03.3 92 39	131.1	14 35.6 92 39	131.3	14 08.0 92 39	131.5	13 40.3 92 39	131.7	7
8	16 29.9 92 40	129.4	16 02.4 92 40	129.6	15 34.9 92 40	129.8	15 07.4 92 40	130.0	14 39.8 92 40	130.2	14 12.3 92 40	130.4	13 44.7 92 39	130.6	13 17.1 92 39	130.8	8
9	16 05.9 91 41	128.4	15 38.4 91 40	128.6	15 11.0 92 40	128.8	14 43.5 92 40	129.0	14 16.0 92 40	129.2	13 48.6 92 40	129.5	13 21.1 92 40	129.7	12 53.5 92 40	129.9	9
50	15 41.5 91 41	127.5	15 14.1 91 41	127.7	14 46.7 91 41	127.9	14 19.4 91 41	128.1	13 51.9 91 41	128.3	13 24.5 91 41	128.5	12 57.1 91 40	128.7	12 29.7 91 40	128.9	50
1	15 16.8 91 42	126.5	14 49.5 91 42	126.7	14 22.2 91 41	126.9	13 54.9 91 41	127.2	13 27.5 91 41	127.4	13 00.2 91 41	127.6	12 32.8 91 41	127.8	12 05.5 91 41	128.0	1
2	14 51.8 91 42	125.6	14 24.6 91 42	125.8	13 57.4 91 42	126.0	13 30.1 91 42	126.2	13 02.8 91 42	126.4	12 35.6 91 42	126.7	12 08.3 91 41	126.9	11 41.0 91 41	127.1	2
3	14 26.6 91 43	124.6	13 59.4 91 42	124.9	13 32.2 91 42	125.1	13 05.0 91 42	125.3	12 37.8 91 42	125.5	12 10.6 91 42	125.7	11 43.4 91 42	125.9	11 16.2 91 42	126.2	3
4	14 01.0 90 43	123.7	13 33.9 90 43	123.9	13 06.8 90 43	124.2	12 39.7 90 43	124.4	12 12.5 90 43	124.6	11 45.4 90 43	124.8	11 18.2 91 42	125.0	10 51.1 91 42	125.2	4
55	13 35.1 90 44	122.8	13 08.1 90 43	123.0	12 41.1 90 43	123.2	12 14.0 90 43	123.5	11 46.9 90 43	123.7	11 19.9 90 43	123.9	10 52.8 90 43	124.1	10 25.7 90 43	124.3	55
6	13 09.0 90 44	121.9	12 42.1 90 44	122.1	12 15.1 90 44	122.3	11 48.1 90 44	122.5	11 21.1 90 44	122.8	10 54.1 90 43	123.0	10 27.1 90 43	123.2	10 00.0 90 43	123.4	6
7	12 42.7 90 44	120.9	12 15.8 90 44	121.2	11 48.8 90 44	121.4	11 21.9 90 44	121.6	10 55.0 90 44	121.8	10 28.0 90 44	122.1	10 01.1 90 44	122.3	9 34.1 90 44	122.5	7
8	12 16.0 89 45	120.0	11 49.2 89 45	120.3	11 22.3 90 45	120.5	10 55.5 90 44	120.7	10 28.6 90 44	120.9	10 01.7 90 44	121.2	9 34.8 90 44	121.4	9 07.9 90 44	121.6	8
9	11 49.2 89 45	119.1	11 22.4 89 45	119.4	10 55.6 89 45	119.6	10 28.8 89 45	119.8	10 02.0 89 45	120.0	9 35.2 89 45	120.3	9 08.3 89 45	120.5	8 41.5 89 44	120.7	9
60	11 22.0 89 46	118.2	10 55.3 89 45	118.4	10 28.6 89 45	118.7	10 01.8 89 45	118.9	9 35.1 89 45	119.1	9 08.3 89 45	119.4	8 41.6 89 45	119.6	8 14.8 89 45	119.8	60
1	10 54.7 89 46	117.3	10 28.0 89 46	117.5	10 01.4 89 46	117.8	9 34.7 89 46	118.0	9 08.0 89 46	118.2	8 41.3 89 45	118.5	8 14.6 89 45	118.7	7 47.9 89 45	118.9	1
2	10 27.1 89 46	116.4	10 00.5 89 46	116.6	9 33.9 89 46	116.9	9 07.3 89 46	117.1	8 40.7 89 46	117.3	8 14.0 89 46	117.6	7 47.4 89 46	117.8	7 20.7 89 46	118.0	2
3	9 59.3 88 47	115.5	9 32.8 89 47	115.7	9 06.2 89 46	116.0	8 39.7 89 46	116.2	8 13.1 89 46	116.5	7 46.5 89 46	116.7	7 19.9 89 46	116.9	6 53.3 89 46	117.2	3
4	9 31.3 88 47	114.6	9 04.9 88 47	114.9	8 38.4 88 47	115.1	8 11.8 88 47	115.3	7 45.3 88 47	115.6	7 18.8 88 47	115.8	6 52.3 88 46	116.0	6 25.7 88 46	116.3	4
65	9 03.2 88 47	113.7	8 36.7 88 47	114.0	8 10.3 88 47	114.2	7 43.8 88 47	114.4	7 17.3 88 47	114.7	6 50.9 88 47	114.9	6 24.4 88 47	115.1	5 57.9 88 47	115.4	65
6	8 34.8 88 48	112.8	8 08.4 88 48	113.1	7 42.0 88 47	113.3	7 15.6 88 47	113.6	6 49.2 88 47	113.8	6 22.7 88 47	114.0	5 56.3 88 47	114.3	5 29.9 88 47	114.5	6
7	8 06.2 88 48	111.9	7 39.9 88 48	112.2	7 13.5 88 48	112.4	6 47.2 88 48	112.7	6 20.8 88 48	112.9	5 54.4 88 48	113.2	5 28.0 88 48	113.4	5 01.7 88 47	113.6	7
8	7 37.4 88 48	111.1	7 11.2 88 48	111.3	6 44.9 88 48	111.5	6 18.5 88 48	111.8	5 52.2 88 48	112.0	5 25.9 88 48	112.3					8
9	7 08.5 87 48	110.2	6 42.3 87 48	110.4	6 16.0 88 48	110.7	5 49.8 88 48	110.9	5 23.5 88 48	111.2							9
70	6 39.4 87 49	109.3	6 13.2 87 49	109.6	5 47.0 87 49	109.8	5 20.8 87 49	110.0									70
1	6 10.2 87 49	108.4	5 44.0 87 49	108.7	5 17.9 87 49	108.9											1
2	5 40.8 87 49	107.6	5 14.7 87 49	107.8													2
3	5 11.3 87 49	106.7															3

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
91											5 03.3 86 51	85.8	5 28.9 86 51	85.5	5 54.6 86 51	85.3	91
2															5 23.8 86 51	84.4	2

Digitized by Google

Lat. 59°

H.A.	8° 00′ Alt.	Δd Δt	Az.	8° 30′ Alt.	Δd Δt	Az.	9° 00′ Alt.	Δd Δt	Az.	9° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	39 00.0	1.0 01	180.0	39 30.0	1.0 01	180.0	40 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0
1	38 59.7	1.0 02	178.7	39 29.7	1.0 02	178.7	39 59.7	1.0 02	178.7	40 29.6	1.0 02	178.7
2	38 58.6	1.0 03	177.5	39 28.6	1.0 03	177.4	39 58.6	1.0 03	177.4	40 28.6	1.0 03	177.4
3	38 56.9	1.0 04	176.2	39 26.9	1.0 04	176.2	39 56.9	1.0 04	176.1	40 26.9	1.0 04	176.1
4	38 54.5	1.0 05	174.9	39 24.5	1.0 05	174.9	39 54.4	1.0 05	174.8	40 24.4	1.0 05	174.8
05	38 51.4	1.0 06	173.6	39 21.4	1.0 06	173.6	39 51.3	1.0 06	173.6	40 21.3	1.0 06	173.5
6	38 47.7	1.0 07	172.4	39 17.6	1.0 07	172.3	39 47.5	1.0 08	172.3	40 17.4	1.0 08	172.2
7	38 43.2	1.0 09	171.1	39 13.1	1.0 09	171.0	39 43.0	1.0 09	171.0	40 12.9	1.0 09	170.9
8	38 38.1	1.0 10	169.8	39 08.0	1.0 10	169.8	39 37.8	1.0 10	169.7	40 07.7	1.0 10	169.7
9	38 32.3	99 11	168.6	39 02.2	99 11	168.5	39 32.0	99 11	168.4	40 01.8	99 11	168.4
10	38 25.9	99 12	167.3	38 55.7	99 12	167.2	39 25.5	99 12	167.2	39 55.3	99 12	167.1
1	38 18.7	99 13	166.1	38 48.5	99 13	166.0	39 18.3	99 13	165.9	39 48.0	99 13	165.8
2	38 11.0	99 14	164.8	38 40.7	99 14	164.7	39 10.4	99 14	164.6	39 40.1	99 14	164.6
3	38 02.6	99 15	163.6	38 32.2	99 15	163.5	39 01.9	99 15	163.4	39 31.6	99 15	163.3
4	37 53.5	99 16	162.3	38 23.1	99 16	162.2	38 52.7	99 16	162.1	39 22.3	99 16	162.0
15	37 43.8	99 17	161.1	38 13.4	99 17	161.0	38 42.9	99 17	160.9	39 12.5	99 18	160.8
6	37 33.5	98 18	159.9	38 03.0	98 18	159.7	38 32.5	98 18	159.6	39 02.0	98 19	159.5
7	37 22.5	98 19	158.6	37 52.0	98 19	158.5	38 21.4	98 19	158.4	38 50.9	98 20	158.3
8	37 11.0	98 20	157.4	37 40.4	98 20	157.3	38 09.7	98 20	157.2	38 39.1	98 21	157.0
9	36 58.8	98 21	156.2	37 28.1	98 21	156.1	37 57.4	98 22	155.9	38 26.7	98 22	155.8
20	36 46.0	98 22	155.0	37 15.3	98 22	154.9	37 44.5	97 22	154.7	38 13.8	97 23	154.6
1	36 32.7	97 23	153.8	37 01.9	97 23	153.6	37 31.0	97 23	153.5	38 00.2	97 24	153.3
2	36 18.7	97 24	152.6	36 47.8	97 24	152.4	37 17.0	97 24	152.3	37 46.1	97 25	152.1
3	36 04.2	97 25	151.4	36 33.3	97 25	151.2	37 02.3	97 25	151.1	37 31.3	97 25	150.9
4	35 49.1	97 26	150.2	36 18.1	97 26	150.1	36 47.1	97 26	149.9	37 16.0	96 26	149.7
25	35 33.5	96 27	149.0	36 02.4	96 27	148.9	36 31.3	96 27	148.7	37 00.2	96 27	148.5
6	35 17.3	96 28	147.9	35 46.2	96 28	147.7	36 15.0	96 28	147.5	36 43.8	96 28	147.4
7	35 00.6	96 29	146.7	35 29.4	96 29	146.5	35 58.1	96 29	146.4	36 26.8	96 29	146.2
8	34 43.4	96 30	145.6	35 12.1	96 30	145.4	35 40.7	95 30	145.2	36 09.4	95 30	145.0
9	34 25.7	95 30	144.4	34 54.3	95 31	144.2	35 22.8	95 31	144.0	35 51.4	95 31	143.8
30	34 07.5	95 31	143.3	34 36.0	95 31	143.1	35 04.4	95 32	142.9	35 32.9	95 32	142.7
1	33 48.7	95 32	142.1	34 17.2	95 32	141.9	34 45.6	95 32	141.7	35 13.9	95 32	141.5
2	33 29.5	94 33	141.0	33 57.9	94 33	140.8	34 26.2	94 33	140.6	34 54.5	94 33	140.4
3	33 09.8	94 34	139.9	33 38.1	94 34	139.7	34 06.3	94 34	139.5	34 34.6	94 34	139.3
4	32 49.7	94 34	138.8	33 17.9	94 34	138.6	33 46.0	94 35	138.4	34 14.2	94 35	138.2
35	32 29.1	94 35	137.7	32 57.2	94 35	137.5	33 25.3	94 35	137.3	33 53.3	93 35	137.0
6	32 08.1	93 36	136.6	32 36.1	93 36	136.4	33 04.1	93 36	136.2	33 32.0	93 36	135.9
7	31 46.6	93 36	135.5	32 14.6	93 37	135.3	32 42.5	93 37	135.1	33 10.3	93 37	134.8
8	31 24.8	93 37	134.4	31 52.6	93 37	134.2	32 20.4	93 37	134.0	32 48.2	93 38	133.7
9	31 02.5	93 38	133.3	31 30.3	92 38	133.1	31 58.0	92 38	132.9	32 25.7	92 38	132.7
40	30 39.8	92 38	132.3	31 07.5	92 39	132.0	31 35.1	92 39	131.8	32 02.8	92 39	131.6
1	30 16.8	92 39	131.2	30 44.4	92 39	131.0	31 11.9	92 39	130.8	31 39.5	92 39	130.5
2	29 53.3	92 40	130.2	30 20.8	92 40	129.9	30 48.3	92 40	129.7	31 15.8	92 40	129.5
3	29 29.5	91 40	129.1	29 57.0	91 40	128.9	30 24.4	91 41	128.6	30 51.8	91 41	128.4
4	29 05.4	91 41	128.1	29 32.7	91 41	127.8	30 00.1	91 41	127.6	30 27.4	91 41	127.4
45	28 40.9	91 41	127.0	29 08.2	91 42	126.8	29 35.4	91 42	126.6	30 02.6	91 42	126.3
6	28 16.0	91 42	126.0	28 43.3	91 42	125.8	29 10.4	91 42	125.5	29 37.6	90 42	125.3
7	27 50.9	90 42	125.0	28 18.0	90 43	124.8	28 45.1	90 43	124.5	29 12.2	90 43	124.3
8	27 25.4	90 43	124.0	27 52.5	90 43	123.8	28 19.5	90 43	123.5	28 46.5	90 43	123.3
9	26 59.7	90 43	123.0	27 26.6	90 44	122.7	27 53.6	90 44	122.5	28 20.5	90 44	122.2
50	26 33.6	90 44	122.0	27 00.5	90 44	121.7	27 27.4	90 44	121.5	27 54.2	89 44	121.2
1	26 07.2	90 44	121.0	26 34.1	89 44	120.8	27 00.9	89 45	120.5	27 27.7	89 45	120.3
2	25 40.6	89 45	120.0	26 07.4	89 45	119.8	26 34.1	89 45	119.5	27 00.9	89 45	119.3
3	25 13.7	89 45	119.0	25 40.4	89 45	118.8	26 07.1	89 45	118.5	26 33.8	89 46	118.3
4	24 46.6	89 46	118.1	25 13.2	89 46	117.8	25 39.8	89 46	117.6	26 06.4	89 46	117.3
55	24 19.2	89 46	117.1	24 45.8	89 46	116.8	25 12.3	88 46	116.6	25 38.9	88 46	116.3
6	23 51.6	88 46	116.1	24 18.1	88 47	115.9	24 44.6	88 47	115.6	25 11.0	88 47	115.4
7	23 23.7	88 47	115.2	23 50.2	88 47	114.9	24 16.6	88 47	114.7	24 43.0	88 47	114.4
8	22 55.7	88 47	114.2	23 22.1	88 47	114.0	23 48.4	88 47	113.7	24 14.8	88 47	113.5
9	22 27.4	88 47	113.3	22 53.7	88 48	113.0	23 20.0	88 48	112.8	23 46.3	88 48	112.5
60	21 58.9	88 48	112.4	22 25.2	88 48	112.1	22 51.4	88 48	111.8	23 17.7	87 48	111.6
1	21 30.2	87 48	111.4	21 56.5	87 48	111.2	22 22.7	87 48	110.9	22 48.9	87 48	110.6
2	21 01.4	87 48	110.5	21 27.5	87 48	110.2	21 53.7	87 49	110.0	22 19.8	87 49	109.7
3	20 32.3	87 49	109.6	20 58.5	87 49	109.3	21 24.6	87 49	109.0	21 50.7	87 49	108.8
4	20 03.1	87 49	108.7	20 29.2	87 49	108.4	20 55.3	87 49	108.1	21 21.3	87 49	107.9
65	19 33.8	87 49	107.7	19 59.8	87 49	107.5	20 25.8	87 49	107.2	20 51.8	87 49	106.9
6	19 04.3	87 49	106.8	19 30.3	87 49	106.6	19 56.3	87 50	106.3	20 22.2	86 50	106.0
7	18 34.6	87 50	105.9	19 00.6	87 50	105.7	19 26.5	86 50	105.4	19 52.4	86 50	105.1
8	18 04.8	86 50	105.0	18 30.8	86 50	104.8	18 56.7	86 50	104.5	19 22.6	86 50	104.2
9	17 34.9	86 50	104.1	18 00.8	86 50	103.9	18 26.7	86 50	103.6	18 52.5	86 50	103.3
70	17 04.9	86 50	103.2	17 30.8	86 50	103.0	17 56.6	86 50	102.7	18 22.4	86 50	102.4
1	16 34.8	86 50	102.3	17 00.6	86 50	102.1	17 26.4	86 50	101.8	17 52.2	86 51	101.5
2	16 04.5	86 51	101.4	16 30.3	86 51	101.2	16 56.1	86 51	100.9	17 21.9	86 51	100.6
3	15 34.2	86 51	100.6	16 00.0	86 51	100.3	16 25.7	86 51	100.0	16 51.4	86 51	99.8
4	15 03.8	86 51	99.7	15 29.5	86 51	99.4	15 55.2	86 51	99.1	16 21.0	86 51	98.9
75	14 33.3	86 51	98.8	14 59.0	86 51	98.5	15 24.7	86 51	98.3	15 50.4	86 51	98.0
6	14 02.7	86 51	97.9	14 28.4	86 51	97.7	14 54.1	86 51	97.4	15 19.7	86 51	97.1
7	13 32.1	86 51	97.0	13 57.7	86 51	96.8	14 23.4	86 51	96.5	14 49.1	85 51	96.2
8	13 01.4	86 51	96.2	13 27.0	86 51	95.9	13 52.7	85 51	95.6	14 18.3	85 51	95.4
9	12 30.6	86 51	95.3	12 56.3	85 51	95.0	13 21.9	85 51	94.8	13 47.5	85 51	94.5
80	11 59.8	86 51	94.4	12 25.5	85 51	94.2	12 51.1	85 51	93.9	13 16.7	85 51	93.6
1	11 29.0	85 51	93.6	11 54.6	85 51	93.3	12 20.2	85 51	93.0	12 45.8	85 51	92.8
2	10 58.1	85 51	92.7	11 23.8	85 51	92.4	11 49.4	85 51	92.2	12 15.0	85 51	91.9
3	10 27.3	85 51	91.9	10 52.9	85 52	91.6	11 18.5	85 52	91.3	11 44.1	85 52	91.1
4	9 56.4	85 52	91.0	10 22.0	85 52	90.7	10 47.6	85 52	90.5	11 13.2	85 52	90.2
85	9 25.5	85 52	90.1	9 51.1	85 52	89.9	10 16.7	85 52	89.6	10 42.3	85 52	89.3
6	8 54.6	85 52	89.3	9 20.2	85 52	89.0	9 45.8	85 51	88.7	10 11.4	85 51	88.5
7	8 23.7	85 51	88.4	8 49.3	85 51	88.2	9 14.9	85 51	87.9	9 40.5	85 51	87.6
8	7 52.8	85 51	87.6	8 18.4	85 51	87.3	8 44.0	85 51	87.0	9 09.6	85 51	86.8
9	7 21.9	85 51	86.7	7 47.6	85 51	86.5	8 13.2	85 51	86.2	8 38.8	85 51	85.9
90	6 51.1	85 51	85.9	7 16.7	85 51	85.6	7 42.4	85 51	85.3	8 08.0	85 51	85.1

H.A.	10° 00′ Alt.	Δd Δt	Az.	10° 30′ Alt.	Δd Δt	Az.	11° 00′ Alt.	Δd Δt	Az.	11° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	41 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	42 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0
1	40 59.6	1.0 02	178.7	41 29.6	1.0 02	178.7	41 59.6	1.0 02	178.7	42 29.6	1.0 02	178.7
2	40 58.6	1.0 03	177.4	41 28.6	1.0 03	177.4	41 58.6	1.0 03	177.4	42 28.6	1.0 03	177.3
3	40 56.8	1.0 04	176.1	41 26.8	1.0 04	176.1	41 56.8	1.0 04	176.0	42 26.8	1.0 04	176.0
4	40 54.4	1.0 05	174.8	41 24.3	1.0 05	174.8	41 54.3	1.0 05	174.7	42 24.3	1.0 05	174.7
05	40 51.2	1.0 06	173.5	41 21.2	1.0 06	173.4	41 51.1	1.0 06	173.4	42 21.1	1.0 07	173.4
6	40 47.4	1.0 08	172.2	41 17.3	1.0 08	172.1	41 47.2	1.0 08	172.1	42 17.1	1.0 08	172.0
7	40 42.8	1.0 09	170.9	41 12.7	1.0 09	170.8	41 42.6	1.0 09	170.8	42 12.5	1.0 09	170.7
8	40 37.6	1.0 10	169.6	41 07.4	1.0 10	169.5	41 37.3	1.0 10	169.5	42 07.2	1.0 10	169.4
9	40 31.7	99 11	168.3	41 01.5	99 11	168.2	41 31.3	99 11	168.2	42 01.1	99 11	168.1
10	40 25.1	99 12	167.0	40 54.8	99 12	166.9	41 24.6	99 12	166.9	41 54.4	99 12	166.8
1	40 17.8	99 13	165.7	40 47.5	99 13	165.7	41 17.3	99 13	165.6	41 47.0	99 14	165.5
2	40 09.8	99 14	164.5	40 39.5	99 14	164.4	41 09.2	99 15	164.3	41 38.9	99 15	164.2
3	40 01.2	99 15	163.2	40 30.9	99 16	163.1	41 00.5	99 16	163.0	41 30.2	99 16	162.9
4	39 52.0	99 17	161.9	40 21.6	99 17	161.8	40 51.1	99 17	161.7	41 20.7	99 17	161.6
15	39 42.0	98 18	160.7	40 11.6	98 18	160.5	40 41.1	98 18	160.4	41 10.6	98 18	160.3
6	39 31.5	98 19	159.4	40 01.0	98 19	159.3	40 30.4	98 19	159.2	40 59.9	98 19	159.0
7	39 20.3	98 20	158.1	39 49.7	98 20	158.0	40 19.1	98 20	157.9	40 48.5	98 20	157.8
8	39 08.5	98 21	156.9	39 37.8	98 21	156.8	40 07.2	98 21	156.6	40 36.5	98 21	156.5
9	38 56.0	98 22	155.7	39 25.3	98 22	155.5	39 54.6	98 22	155.4	40 23.9	98 22	155.2
20	38 43.0	97 23	154.4	39 12.2	97 23	154.3	39 41.4	97 23	154.1	40 10.6	97 23	154.0
1	38 29.4	97 24	153.2	38 58.5	97 24	153.0	39 27.7	97 24	152.9	39 56.8	97 24	152.7
2	38 15.1	97 25	152.0	38 44.2	97 25	151.8	39 13.3	97 25	151.7	39 42.3	97 25	151.5
3	38 00.3	97 26	150.8	38 29.3	97 26	150.6	38 58.3	97 26	150.4	39 27.3	97 26	150.3
4	37 45.0	96 27	149.6	38 13.9	96 27	149.4	38 42.8	96 27	149.2	39 11.7	96 27	149.1
25	37 29.0	96 27	148.4	37 57.9	96 28	148.2	38 26.7	96 28	148.0	38 55.5	96 28	147.8
6	37 12.5	96 28	147.2	37 41.3	96 28	147.0	38 10.1	96 29	146.8	38 38.8	96 29	146.6
7	36 55.5	96 29	146.0	37 24.2	96 29	145.8	37 52.9	96 30	145.6	38 21.5	95 30	145.4
8	36 38.0	95 30	144.8	37 06.6	95 30	144.6	37 35.2	95 30	144.4	38 03.7	95 31	144.2
9	36 19.9	95 31	143.7	36 48.4	95 31	143.5	37 16.9	95 31	143.3	37 45.4	95 31	143.1
30	36 01.4	95 32	142.5	36 29.8	95 32	142.3	36 58.2	95 32	142.1	37 26.6	95 32	141.9
1	35 42.3	95 33	141.3	36 10.6	94 33	141.1	36 39.0	94 33	140.9	37 07.3	94 33	140.7
2	35 22.8	94 33	140.2	35 51.0	94 34	140.0	36 19.3	94 34	139.8	36 47.5	94 34	139.6
3	35 02.7	94 34	139.1	35 30.9	94 34	138.9	35 59.1	94 34	138.6	36 27.2	94 35	138.4
4	34 42.3	94 35	137.9	35 10.4	94 35	137.7	35 38.4	94 35	137.5	36 06.5	93 35	137.3
35	34 21.3	93 36	136.8	34 49.4	93 36	136.6	35 17.3	93 36	136.4	35 45.3	93 36	136.2
6	34 00.0	93 36	135.7	34 27.9	93 36	135.5	34 55.8	93 37	135.3	35 23.7	93 37	135.0
7	33 38.2	93 37	134.6	34 06.0	93 37	134.4	34 33.8	93 37	134.2	35 01.6	93 37	133.9
8	33 16.0	93 38	133.5	33 43.7	92 38	133.3	34 11.5	92 38	133.1	34 39.2	92 38	132.8
9	32 53.4	92 38	132.4	33 21.0	92 38	132.2	33 48.7	92 39	132.0	34 16.3	92 39	131.7
40	32 30.4	92 39	131.4	32 58.0	92 39	131.1	33 25.5	92 39	130.9	33 53.0	92 39	130.6
1	32 07.0	92 40	130.3	32 34.5	92 40	130.0	33 02.0	92 40	129.8	33 29.4	91 40	129.6
2	31 43.2	91 40	129.2	32 10.7	91 40	129.0	32 38.0	91 40	128.7	33 05.4	91 41	128.5
3	31 19.1	91 41	128.2	31 46.5	91 41	127.9	32 13.8	91 41	127.7	32 41.0	91 41	127.4
4	30 54.7	91 41	127.1	31 21.9	91 41	126.9	31 49.1	91 42	126.6	32 16.3	91 42	126.4
45	30 29.8	91 42	126.1	30 57.0	91 42	125.8	31 24.2	90 42	125.6	31 51.3	90 42	125.3
6	30 04.7	90 42	125.1	30 31.8	90 43	124.8	30 58.9	90 43	124.6	31 25.9	90 43	124.3
7	29 39.3	90 43	124.0	30 06.3	90 43	123.8	30 33.3	90 43	123.5	31 00.2	90 43	123.3
8	29 13.5	90 43	123.0	29 40.4	90 44	122.8	30 07.4	90 44	122.5	30 34.2	90 44	122.2
9	28 47.4	90 44	122.0	29 14.3	90 44	121.7	29 41.1	89 44	121.5	30 08.0	89 44	121.2
50	28 21.1	89 44	121.0	28 47.9	89 44	120.7	29 14.7	89 45	120.5	29 41.4	89 45	120.2
1	27 54.4	89 45	120.0	28 21.2	89 45	119.7	28 47.9	89 45	119.5	29 14.6	89 45	119.2
2	27 27.6	89 45	119.0	27 54.2	89 45	118.7	28 20.9	89 45	118.5	28 47.5	89 46	118.2
3	27 00.4	89 46	118.0	27 27.0	89 46	117.8	27 53.6	89 46	117.5	28 20.1	88 46	117.2
4	26 33.0	88 46	117.0	26 59.5	88 46	116.8	27 26.0	88 46	116.5	27 52.5	88 46	116.3
55	26 05.4	88 46	116.1	26 31.8	88 47	115.8	26 58.3	88 47	115.5	27 24.7	88 47	115.3
6	25 37.5	88 47	115.1	26 03.9	88 47	114.8	26 30.3	88 47	114.6	26 56.6	88 47	114.3
7	25 09.4	88 47	114.2	25 35.7	88 47	113.9	26 02.1	88 47	113.6	26 28.4	88 47	113.4
8	24 41.1	88 48	113.2	25 07.4	88 48	112.9	25 33.7	87 48	112.7	25 59.9	87 48	112.4
9	24 12.6	88 48	112.2	24 38.8	87 48	112.0	25 05.0	87 48	111.7	25 31.2	87 48	111.4
60	23 43.9	87 48	111.3	24 10.1	87 48	111.0	24 36.2	87 48	110.8	25 02.4	87 48	110.5
1	23 15.0	87 48	110.4	23 41.1	87 49	110.1	24 07.3	87 49	109.8	24 33.3	87 49	109.6
2	22 46.0	87 49	109.4	23 12.0	87 49	109.2	23 38.1	87 49	108.9	24 04.1	87 49	108.6
3	22 16.7	87 49	108.5	22 42.8	87 49	108.2	23 08.8	87 49	108.0	23 34.8	87 49	107.7
4	21 47.4	87 49	107.6	22 13.3	87 49	107.3	22 39.3	87 49	107.0	23 05.3	86 49	106.8
65	21 17.8	87 49	106.7	21 43.8	86 50	106.4	22 09.7	86 50	106.1	22 35.6	86 50	105.9
6	20 48.2	86 50	105.8	21 14.1	86 50	105.5	21 39.9	86 50	105.2	22 05.8	86 50	104.9
7	20 18.3	86 50	104.9	20 44.2	86 50	104.6	21 10.1	86 50	104.3	21 35.9	86 50	104.0
8	19 48.4	86 50	103.9	20 14.2	86 50	103.7	20 40.1	86 50	103.4	21 05.8	86 50	103.1
9	19 18.4	86 50	103.0	19 44.2	86 50	102.8	20 09.9	86 50	102.5	20 35.7	86 50	102.2
70	18 48.2	86 50	102.2	19 14.0	86 50	101.9	19 39.7	86 51	101.6	20 05.4	86 51	101.3
1	18 17.9	86 51	101.3	18 43.7	86 51	101.0	19 09.4	86 51	100.7	19 35.1	86 51	100.4
2	17 47.6	86 51	100.4	18 13.3	86 51	100.1	18 39.0	86 51	99.8	19 04.7	86 51	99.6
3	17 17.2	86 51	99.5	17 42.8	86 51	99.2	18 08.5	86 51	98.9	18 34.2	85 51	98.7
4	16 46.6	86 51	98.6	17 12.3	86 51	98.3	17 38.0	85 51	98.1	18 03.6	85 51	97.8
75	16 16.0	86 51	97.7	16 41.7	85 51	97.5	17 07.3	85 51	97.2	17 32.9	85 51	96.9
6	15 45.4	85 51	96.8	16 11.0	85 51	96.6	16 36.6	85 51	96.3	17 02.2	85 51	96.0
7	15 14.7	85 51	96.0	15 40.3	85 51	95.7	16 05.9	85 51	95.4	16 31.5	85 51	95.2
8	14 43.9	85 51	95.1	15 09.5	85 51	94.8	15 35.1	85 51	94.6	16 00.7	85 51	94.3
9	14 13.1	85 51	94.2	14 38.7	85 51	94.0	15 04.3	85 51	93.7	15 29.8	85 51	93.4
80	13 42.3	85 51	93.4	14 07.9	85 51	93.1	14 33.4	85 51	92.8	14 59.0	85 51	92.6
1	13 11.4	85 51	92.5	13 37.0	85 51	92.2	14 02.6	85 52	92.0	14 28.1	85 52	91.7
2	12 40.6	85 51	91.6	13 06.1	85 52	91.4	13 31.7	85 52	91.1	13 57.2	85 52	90.8
3	12 09.7	85 52	90.8	12 35.2	85 52	90.5	13 00.8	85 52	90.3	13 26.3	85 52	90.0
4	11 38.8	85 52	89.9	12 04.3	85 52	89.7	12 29.9	85 52	89.4	12 55.4	85 52	89.1
85	11 07.9	85 51	89.1	11 33.4	85 51	88.8	11 59.0	85 51	88.5	12 24.5	85 51	88.3
6	10 37.0	85 51	88.2	11 02.5	85 51	88.0	11 28.1	85 51	87.7	11 53.6	85 51	87.4
7	10 06.1	85 51	87.4	10 31.7	85 51	87.1	10 57.2	85 51	86.8	11 22.8	85 51	86.6
8	9 35.2	85 51	86.5	10 00.8	85 51	86.2	10 26.4	85 51	86.0	10 51.9	85 51	85.7
9	9 04.4	85 51	85.7	9 30.0	85 51	85.4	9 55.6	85 51	85.1	10 21.1	85 51	84.9
90	8 33.6	85 51	84.8	8 59.2	85 51	84.5	9 24.8	85 51	84.3	9 50.4	85 51	84.0

Digitized by Google

Lat. 59°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	23 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	20 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	00
1	22 59.7	1.0 01	178.9	22 29.7	1.0 01	178.9	21 59.7	1.0 01	178.9	21 29.7	1.0 01	178.9	20 59.7	1.0 01	178.9	20 29.7	1.0 01	179.0	19 59.7	1.0 01	179.0	19 29.7	1.0 01	179.0	1
2	22 58.8	1.0 02	177.8	22 28.8	1.0 02	177.9	21 58.9	1.0 02	177.9	21 28.9	1.0 02	177.9	20 58.9	1.0 02	177.9	20 28.9	1.0 02	177.9	19 58.9	1.0 02	177.9	19 28.9	1.0 02	177.9	2
3	22 57.4	1.0 03	176.8	22 27.4	1.0 03	176.8	21 57.4	1.0 03	176.8	21 27.4	1.0 03	176.8	20 57.4	1.0 03	176.8	20 27.5	1.0 03	176.9	19 57.5	1.0 03	176.9	19 27.5	1.0 03	176.9	3
4	22 55.4	1.0 04	175.7	22 25.4	1.0 04	175.7	21 55.4	1.0 04	175.7	21 25.4	1.0 04	175.8	20 55.5	1.0 04	175.8	20 25.5	1.0 04	175.8	19 55.5	1.0 04	175.8	19 25.5	1.0 04	175.8	4
05	22 52.8	1.0 05	174.6	22 22.8	1.0 05	174.7	21 52.8	1.0 05	174.7	21 22.9	1.0 05	174.7	20 52.9	1.0 05	174.7	20 22.9	1.0 05	174.8	19 53.0	1.0 05	174.8	19 23.0	1.0 05	174.8	05
6	22 49.6	1.0 06	173.6	22 19.6	1.0 06	173.6	21 49.7	1.0 06	173.6	21 19.7	1.0 06	173.6	20 49.8	1.0 06	173.7	20 19.8	1.0 06	173.7	19 49.9	1.0 06	173.7	19 19.9	1.0 06	173.8	6
7	22 45.8	1.0 07	172.5	22 15.9	1.0 07	172.5	21 46.0	1.0 07	172.6	21 16.0	1.0 07	172.6	20 46.1	1.0 07	172.6	20 16.2	1.0 07	172.7	19 46.2	1.0 07	172.7	19 16.3	1.0 07	172.7	7
8	22 41.5	1.0 08	171.4	22 11.6	1.0 08	171.5	21 41.7	1.0 08	171.5	21 11.8	1.0 08	171.5	20 41.8	1.0 08	171.6	20 11.9	1.0 08	171.6	19 42.0	1.0 08	171.7	19 12.1	1.0 08	171.7	8
9	22 36.6	1.0 09	170.3	22 06.7	1.0 09	170.4	21 36.8	1.0 09	170.4	21 06.9	1.0 09	170.5	20 37.0	1.0 09	170.5	20 07.1	1.0 09	170.6	19 37.3	1.0 09	170.6	19 07.4	1.0 09	170.7	9
10	22 31.1	1.0 10	169.3	22 01.3	1.0 10	169.3	21 31.4	1.0 10	169.4	21 01.5	1.0 10	169.4	20 31.7	1.0 10	169.5	20 01.8	1.0 10	169.5	19 31.9	1.0 10	169.6	19 02.1	1.0 10	169.6	10
1	22 25.1	99 11	168.2	21 55.2	99 11	168.3	21 25.4	99 11	168.3	20 55.6	99 11	168.4	20 25.7	99 11	168.4	19 55.9	99 11	168.5	19 26.1	99 11	168.5	18 56.2	99 11	168.6	1
2	22 18.5	99 12	167.1	21 48.7	99 12	167.2	21 18.9	99 12	167.3	20 49.1	99 12	167.3	20 19.3	99 12	167.4	19 49.5	99 12	167.4	19 19.7	99 12	167.5	18 49.9	99 12	167.6	2
3	22 11.3	99 13	166.1	21 41.6	99 13	166.1	21 11.8	99 13	166.2	20 42.0	99 13	166.3	20 12.3	99 13	166.3	19 42.5	99 13	166.4	19 12.7	99 12	166.5	18 42.9	99 12	166.5	3
4	22 03.6	99 14	165.0	21 33.9	99 14	165.1	21 04.2	99 14	165.2	20 34.4	99 14	165.2	20 04.7	99 14	165.3	19 35.0	99 13	165.4	19 05.2	99 13	165.4	18 35.5	99 13	165.5	4
15	21 55.4	99 15	164.0	21 25.7	99 15	164.0	20 56.0	99 15	164.1	20 26.3	99 14	164.2	19 56.6	99 14	164.3	19 26.9	99 14	164.3	18 57.2	99 14	164.4	18 27.5	99 14	164.5	15
6	21 46.5	99 16	162.9	21 16.9	99 16	163.0	20 47.2	99 15	163.1	20 17.6	99 15	163.2	19 47.9	99 15	163.2	19 18.3	99 15	163.3	18 48.6	99 15	163.4	18 19.0	99 15	163.5	6
7	21 37.2	99 16	161.9	21 07.6	99 16	161.9	20 38.0	99 16	162.0	20 08.4	99 16	162.1	19 38.7	99 16	162.2	19 09.1	99 16	162.3	18 39.5	99 16	162.4	18 09.9	99 16	162.5	7
8	21 27.3	99 17	160.8	20 57.7	99 17	160.9	20 28.2	99 17	161.0	19 58.6	99 17	161.1	19 29.0	99 17	161.2	18 59.5	99 17	161.3	18 29.9	99 17	161.3	18 00.3	99 17	161.4	8
9	21 16.9	98 18	159.8	20 47.4	98 18	159.9	20 17.8	98 18	159.9	19 48.3	98 18	160.0	19 18.8	98 18	160.1	18 49.3	98 18	160.2	18 19.7	98 18	160.3	17 50.2	98 18	160.4	9
20	21 05.9	98 19	158.7	20 36.5	98 19	158.8	20 07.0	98 19	158.9	19 37.5	98 19	159.0	19 08.0	98 19	159.1	18 38.6	98 19	159.2	18 09.1	98 19	159.3	17 39.6	98 19	159.4	20
1	20 54.4	98 20	157.7	20 25.0	98 20	157.8	19 55.6	98 20	157.9	19 26.2	98 20	158.0	18 56.8	98 20	158.1	18 27.3	98 20	158.2	17 57.9	98 19	158.3	17 28.5	98 19	158.4	1
2	20 42.4	98 21	156.6	20 13.1	98 21	156.7	19 43.7	98 21	156.9	19 14.4	98 21	157.0	18 45.0	98 20	157.1	18 15.6	98 20	157.2	17 46.2	98 20	157.3	17 16.9	98 20	157.4	2
3	20 29.9	98 22	155.6	20 00.6	98 22	155.7	19 31.3	98 22	155.8	19 02.0	98 21	155.9	18 32.7	98 21	156.1	18 03.4	98 21	156.2	17 34.1	98 21	156.3	17 04.7	98 21	156.4	3
4	20 16.9	97 23	154.6	19 47.7	97 22	154.7	19 18.4	98 22	154.8	18 49.2	98 22	154.9	18 19.9	98 22	155.0	17 50.6	98 22	155.2	17 21.4	98 22	155.3	16 52.1	98 22	155.4	4
25	20 03.4	97 23	153.5	19 34.2	97 23	153.7	19 05.0	97 23	153.8	18 35.8	97 23	153.9	18 06.6	97 23	154.0	17 37.4	97 23	154.2	17 08.2	97 23	154.3	16 39.0	97 23	154.4	25
6	19 49.4	97 24	152.5	19 20.2	97 24	152.6	18 51.1	97 24	152.8	18 22.0	97 24	152.9	17 52.8	97 24	153.0	17 23.7	97 24	153.1	16 54.5	97 24	153.3	16 25.4	97 23	153.4	6
7	19 34.9	97 25	151.5	19 05.8	97 25	151.6	18 36.7	97 25	151.8	18 07.7	97 25	151.9	17 38.6	97 25	152.0	17 09.5	97 24	152.1	16 40.4	97 24	152.3	16 11.3	97 24	152.4	7
8	19 19.9	97 26	150.5	18 50.9	97 26	150.6	18 21.9	97 26	150.8	17 52.9	97 25	150.9	17 23.8	97 25	151.0	16 54.8	97 25	151.2	16 25.8	97 25	151.3	15 56.8	97 25	151.4	8
9	19 04.4	96 27	149.5	18 35.5	96 26	149.6	18 06.5	96 26	149.7	17 37.6	97 26	149.9	17 08.6	97 26	150.0	16 39.7	97 26	150.2	16 10.7	97 26	150.3	15 41.7	97 26	150.4	9
30	18 48.5	96 27	148.5	18 19.6	96 27	148.6	17 50.7	96 27	148.7	17 21.9	96 27	148.9	16 53.0	96 27	149.0	16 24.1	96 27	149.2	15 55.2	96 27	149.3	15 26.3	96 27	149.4	30
1	18 32.1	96 28	147.5	18 03.3	96 28	147.6	17 34.5	96 28	147.8	17 05.7	96 28	147.9	16 36.8	96 28	148.0	16 08.0	96 28	148.2	15 39.2	96 27	148.3	15 10.3	96 27	148.5	1
2	18 15.2	96 29	146.5	17 46.5	96 29	146.6	17 17.8	96 29	146.8	16 49.0	96 28	146.9	16 20.3	96 28	147.1	15 51.5	96 28	147.2	15 22.7	96 28	147.4	14 53.9	96 28	147.5	2
3	17 57.9	96 30	145.5	17 29.3	96 29	145.6	17 00.6	96 29	145.8	16 31.9	96 29	145.9	16 03.2	96 29	146.1	15 34.5	96 29	146.2	15 05.8	96 29	146.4	14 37.1	96 29	146.5	3
4	17 40.2	95 30	144.5	17 11.6	95 30	144.6	16 43.0	95 30	144.8	16 14.4	95 30	144.9	15 45.8	95 30	145.1	15 17.1	95 30	145.3	14 48.5	95 30	145.4	14 19.9	95 29	145.6	4
35	17 22.0	95 31	143.5	16 53.5	95 31	143.6	16 25.0	95 31	143.8	15 56.4	95 31	144.0	15 27.9	95 31	144.1	14 59.3	95 30	144.3	14 30.7	95 30	144.4	14 02.2	95 30	144.6	35
6	17 03.4	95 32	142.5	16 35.0	95 32	142.7	16 06.5	95 31	142.8	15 38.0	95 31	143.0	15 09.5	95 31	143.1	14 41.1	95 31	143.3	14 12.6	95 31	143.5	13 44.1	95 31	143.6	6
7	16 44.4	95 32	141.5	16 16.0	95 32	141.7	15 47.6	95 32	141.8	15 19.2	95 32	142.0	14 50.8	95 32	142.2	14 22.4	95 32	142.3	13 54.0	95 32	142.5	13 25.5	95 32	142.7	7
8	16 25.0	94 33	140.5	15 56.6	94 33	140.7	15 28.3	94 33	140.9	15 00.0	94 33	141.1	14 31.6	94 33	141.2	14 03.3	95 32	141.4	13 34.9	95 32	141.6	13 06.6	95 32	141.7	8
9	16 05.1	94 34	139.6	15 36.9	94 34	139.7	15 08.6	94 33	139.9	14 40.4	94 33	140.1	14 12.1	94 33	140.3	13 43.8	94 33	140.4	13 15.5	94 33	140.6	12 47.2	94 33	140.8	9
40	15 44.9	94 34	138.6	15 16.7	94 34	138.8	14 48.5	94 34	139.0	14 20.3	94 34	139.1	13 52.1	94 34	139.3	13 23.9	94 34	139.5	12 55.7	94 34	139.7	12 27.5	94 34	139.8	40
1	15 24.3	94 35	137.6	14 56.2	94 35	137.8	14 28.0	94 35	138.0	13 59.9	94 35	138.2	13 31.8	94 35	138.4	13 03.7	94 34	138.5	12 35.5	94 34	138.7	12 07.4	94 34	138.9	1
2	15 03.2	93 36	136.7	14 35.2	93 36	136.9	14 07.2	93 35	137.0	13 39.1	94 35	137.2	13 11.1	94 35	137.4	12 43.0	94 35	137.6	12 14.9	94 35	137.8	11 46.9	94 35	137.9	2
3	14 41.8	93 36	135.7	14 13.9	93 36	135.9	13 45.9	93 36	136.1	13 18.0	93 36	136.3	12 50.0	93 36	136.5	12 22.0	93 36	136.6	11 54.0	93 36	136.8	11 26.0	93 35	137.0	3
4	14 20.1	93 37	134.8	13 52.2	93 37	135.0	13 24.3	93 37	135.1	12 56.4	93 36	135.3	12 28.5	93 36	135.5	12 00.6	93 36	135.7	11 32.7	93 36	135.9	11 04.7	93 36	136.1	4
45	13 58.0	93 37	133.8	13 30.2	93 37	134.0	13 02.3	93 37	134.2	12 34.5	93 37	134.4	12 06.7	93 37	134.6	11 38.8	93 37	134.8	11 11.0	93 37	135.0	10 43.1	93 37	135.2	45
6	13 35.5	92 38	132.9	13 07.8	92 38	133.1	12 40.0	93 38	133.3	12 12.2	93 38	133.5	11 44.5	93 38	133.7	11 16.7	93 37	133.8	10 48.9	93 37	134.0	10 21.1	93 37	134.2	6
7	13 12.7	92 39	131.9	12 45.0	92 38	132.1	12 17.3	92 38	132.3	11 49.6	92 38	132.5	11 22.0	92 38	132.7	10 54.3	92 38	132.9	10 26.5	92 38	133.1	9 58.8	92 38	133.3	7
8	12 49.5	92 39	131.0	12 21.9	92 39	131.2	11 54.3	92 39	131.4	11 26.7	92 39	131.6	10 59.1	92 39	131.8	10 31.5	92 39	132.0	10 03.8	92 38	132.2	9 36.2	92 38	132.4	8
9	12 26.0	92 40	130.1	11 58.5	92 40	130.3	11 31.0	92 39	130.5	11 03.4	92 39	130.7	10 35.9	92 39	130.9	10 08.3	92 39	131.1	9 40.8	92 39	131.3	9 13.2	92 39	131.5	9
50	12 02.2	92 40	129.1	11 34.8	92 40	129.3	11 07.3	92 40	129.5	10 39.8	92 40	129.8	10 12.4	92 40	130.0	9 44.9	92 40	130.2	9 17.4	92 40	130.4	8 49.9	92 39	130.6	50
1	11 38.1	91 41	128.2	11 10.7	91 41	128.4	10 43.3	91 40	128.6	10 15.9	91 40	128.8	9 48.5	91 40	129.0	9 21.1	91 40	129.2	8 53.7	91 40	129.5	8 26.2	91 40	129.7	1
2	11 13.7	91 41	127.3	10 46.3	91 41	127.5	10 19.0	91 41	127.7	9 51.7	91 41	127.9	9 24.4	91 41	128.1	8 57.0	91 41	128.3	8 29.6	91 41	128.5	8 02.3	91 40	128.8	2
3	10 48.9	91 42	126.4	10 21.7	91 42	126.6	9 54.4	91 42	126.8	9 27.2	91 41	127.0	8 59.9	91 41	127.2	8 32.6	91 41	127.4	8 05.3	91 41	127.6	7 38.0	91 41	127.9	3
4	10 23.9	91 42	125.5	9 56.7	91 42	125.7	9 29.5	91 42	125.9	9 02.3	91 42	126.1	8 35.1	91 42	126.3	8 07.9	91 42	126.5	7 40.7	91 42	126.7	7 13.5	91 41	127.0	4
55	9 58.6	90 43	124.5	9 31.5	90 43	124.8	9 04.4	90 42	125.0	8 37.2	90 42	125.2	8 10.1	90 42	125.4	7 43.0	90 42	125.6	7 15.8	91 42	125.8	6 48.6	91 42	126.1	55
6	9 33.0	90 43	123.6	9 06.0	90 43	123.9	8 38.9	90 43	124.1	8 11.8	90 43	124.3	7 44.8	90 43	124.5	7 17.7	90 43	124.7	6 50.6	90 42	125.0	6 23.5	90 42	125.2	6
7	9 07.1	90 44	122.7	8 40.2	90 43	123.0	8 13.2	90 43	123.2	7 46.2	90 43	123.4	7 19.2	90 43	123.6	6 52.2	90 43	123.8	6 25.1	90 43	124.1	5 58.1	90 43	124.3	7
8	8 41.0	90 44	121.8	8 14.1	90 44	122.1	7 47.2	90 44	122.3	7 20.2	90 44	122.5	6 53.3	90 44	122.7	6 26.4	90 43	123.0	5 59.4	90 43	123.2	5 32.5	90 43	123.4	8
9	8 14.6	89 44	120.9	7 47.8	90 44	121.2	7 20.9	90 44	121.4	6 54.1	90 44	121.6	6 27.2	90 44	121.8	6 00.3	90 44	122.1	5 33.4	90 44	122.3	5 06.5	90 44	122.5	9
60	7 48.0	89 45	120.0	7 21.2	89 45	120.3	6 54.4	89 45	120.5	6 27.6	89 44	120.7	6 00.8	89 44	121.0	5 34.0	89 44	121.2	5 07.2	89 44	121.4				60
1	7 21.1	89 45	119.2	6 54.4	89 45	119.4	6 27.7	89 45	119.6	6 00.9	89 45	119.8	5 34.2	89 45	120.1	5 07.4	89 45	120.3							1
2	6 54.0	89 46	118.3	6 27.4	89 45	118.5	6 00.7	89 45	118.7	5 34.0	89 45	119.0	5 07.3	89 45	119.2										2
3	6 26.7	89 46	117.4	6 00.1	89 46	117.6	5 33.5	89 46	117.8	5 06.9	89 46	118.1													3
4	5 59.2	89 46	116.5	5 32.6	89 46	116.7	5 06.0	89 46	117.0																4
65	5 31.4	88 47	115.6	5 04.9	88 46	115.9																			65
6	5 03.4	88 47	114.7																						6

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	6 20.3	86 51	85.0	6 45.9	86 51	84.7	7 11.6	85 51	84.5	7 37.2	85 51	84.2	8 02.8	85 51	84.0	8 28.5	85 51	83.7	8 54.1	85 51	83.4	9 19.7	85 51	83.2	91
2	5 49.5	86 51	84.2	6 15.2	86 51	83.9	6 40.8	86 51	83.6	7 06.5	85 51	83.4	7 32.1	85 51	83.1	7 57.8	85 51	82.8	8 23.4	85 51	82.6	8 49.0	85 51	82.3	2
3	5 18.8	86 51	83.3	5 44.5	86 51	83.0	6 10.2	86 51	82.8	6 35.8	86 51	82.5	7 01.5	86 51	82.3	7 27.1	85 51	82.0	7 52.8	85 51	81.7	8 18.4	85 51	81.5	3
4				5 13.8	86 51	82.2	5 39.5	86 51	81.9	6 05.2	86 51	81.7	6 30.9	86 51	81.4	6 56.6	86 51	81.2	7 22.2	86 51	80.9	7 47.9	86 51	80.6	4
95							5 09.0	86 51	81.1	5 34.7	86 51	80.8	6 00.4	86 51	80.6	6 26.1	86 51	80.3	6 51.8	86 51	80.0	7 17.4	86 51	79.8	95
6										5 04.2	86 51	80.0	5 29.9	86 51	79.7	5 55.7	86 51	79.5	6 21.4	86 51	79.2	6 47.1	86 50	78.9	6
7																5 25.3	86 50	78.6	5 51.1	86 50	78.4	6 16.8	86 50	78.1	7
8																			5 20.8	86 50	77.5	5 46.6	86 50	77.2	8
9																						5 16.5	86 50	76.4	9

Digitized by Google

Lat. 59°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	43 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	44 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0
1	42 59.6	1.0 02	178.7	43 29.6	1.0 02	178.7	43 59.6	1.0 02	178.6	44 29.6	1.0 02	178.6
2	42 58.6	1.0 03	177.3	43 28.5	1.0 03	177.3	43 58.5	1.0 03	177.3	44 28.5	1.0 03	177.3
3	42 56.8	1.0 04	176.0	43 26.7	1.0 04	176.0	43 56.7	1.0 04	175.9	44 26.7	1.0 04	175.9
4	42 54.2	1.0 05	174.7	43 24.2	1.0 05	174.6	43 54.2	1.0 05	174.6	44 24.1	1.0 05	174.6
05	42 51.0	1.0 07	173.3	43 20.9	1.0 07	173.3	43 50.9	1.0 07	173.2	44 20.8	1.0 07	173.2
6	42 47.0	1.0 08	172.0	43 17.0	1.0 08	171.9	43 46.9	1.0 08	171.9	44 16.8	1.0 08	171.8
7	42 42.4	1.0 09	170.7	43 12.3	1.0 09	170.6	43 42.2	1.0 09	170.5	44 12.1	1.0 09	170.5
8	42 37.0	1.0 10	169.3	43 06.9	1.0 10	169.3	43 36.7	1.0 10	169.2	44 06.6	1.0 10	169.1
9	42 31.0	99 11	168.0	43 00.8	99 11	167.9	43 30.6	99 11	167.9	44 00.4	99 11	167.8
10	42 24.2	99 12	166.7	42 54.0	99 12	166.6	43 23.7	99 13	166.5	43 53.5	99 13	166.4
1	42 16.7	99 14	165.4	42 46.5	99 14	165.3	43 16.2	99 14	165.2	43 45.9	99 14	165.1
2	42 08.6	99 15	164.1	42 38.3	99 15	164.0	43 08.0	99 15	163.9	43 37.6	99 15	163.8
3	41 59.8	99 16	162.8	42 29.4	99 16	162.7	42 59.0	99 16	162.6	43 28.7	99 16	162.5
4	41 50.3	99 17	161.5	42 19.9	99 17	161.4	42 49.5	99 17	161.3	43 19.0	99 17	161.1
15	41 40.2	98 18	160.2	42 09.7	98 18	160.1	42 39.2	98 18	159.9	43 08.7	98 18	159.8
6	41 29.4	98 19	158.9	41 58.8	98 19	158.8	42 28.3	98 19	158.6	42 57.7	98 19	158.5
7	41 17.9	98 20	157.6	41 47.3	98 20	157.5	42 16.7	98 20	157.4	42 46.1	98 20	157.2
8	41 05.8	98 21	156.4	41 35.2	98 21	156.2	42 04.5	98 21	156.1	42 33.8	98 22	155.9
9	40 53.1	98 22	155.1	41 22.4	97 22	154.9	41 51.6	97 22	154.8	42 20.8	97 23	154.6
20	40 39.8	97 23	153.8	41 09.0	97 23	153.7	41 38.2	97 23	153.5	42 07.3	97 24	153.4
1	40 25.9	97 24	152.6	40 55.0	97 24	152.4	41 24.1	97 24	152.3	41 53.1	97 25	152.1
2	40 11.4	97 25	151.3	40 40.4	97 25	151.2	41 09.4	97 25	151.0	41 38.4	97 26	150.8
3	39 56.2	96 26	150.1	40 25.2	96 26	149.9	40 54.1	96 26	149.8	41 23.0	96 27	149.6
4	39 40.6	96 27	148.9	40 09.4	96 27	148.7	40 38.3	96 27	148.5	41 07.1	96 28	148.3
25	39 24.3	96 28	147.7	39 53.1	96 28	147.5	40 21.8	96 28	147.3	40 50.6	96 28	147.1
6	39 07.5	96 29	146.4	39 36.2	96 29	146.3	40 04.9	96 29	146.1	40 33.5	95 29	145.9
7	38 50.1	95 30	145.2	39 18.7	95 30	145.0	39 47.3	95 30	144.9	40 15.9	95 30	144.7
8	38 32.3	95 31	144.0	39 00.8	95 31	143.9	39 29.3	95 31	143.6	39 57.8	95 31	143.4
9	38 13.9	95 32	142.9	38 42.3	95 32	142.7	39 10.7	95 32	142.5	39 39.1	95 32	142.2
30	37 55.0	95 32	141.7	38 23.3	94 32	141.5	38 51.6	94 33	141.3	39 19.9	94 33	141.1
1	37 35.6	94 33	140.5	38 03.8	94 33	140.3	38 32.0	94 33	140.1	39 00.3	94 34	139.9
2	37 15.7	94 34	139.4	37 43.8	94 34	139.1	38 12.0	94 34	138.9	38 40.1	94 34	138.7
3	36 55.3	94 35	138.2	37 23.4	94 35	138.0	37 51.4	93 35	137.8	38 19.5	93 35	137.5
4	36 34.5	93 35	137.1	37 02.5	93 36	136.8	37 30.4	93 36	136.6	37 58.4	93 36	136.4
35	36 13.2	93 36	135.9	36 41.1	93 36	135.7	37 09.0	93 36	135.5	37 36.8	93 37	135.2
6	35 51.5	93 37	134.8	36 19.3	93 37	134.6	36 47.1	93 37	134.3	37 14.9	92 37	134.1
7	35 29.4	92 38	133.7	35 57.1	92 38	133.5	36 24.8	92 38	133.2	36 52.5	92 38	133.0
8	35 06.8	92 38	132.6	35 34.5	92 38	132.4	36 02.1	92 39	132.1	36 29.7	92 39	131.9
9	34 43.9	92 39	131.5	35 11.4	92 39	131.3	35 39.0	92 39	131.0	36 06.5	92 39	130.8
40	34 20.5	92 40	130.4	34 48.0	92 40	130.2	35 15.4	91 40	129.9	35 42.9	91 40	129.7
1	33 56.8	91 40	129.3	34 24.2	91 40	129.1	34 51.6	91 40	128.8	35 18.9	91 41	128.6
2	33 32.7	91 41	128.3	34 00.0	91 41	128.0	34 27.3	91 41	127.7	34 54.5	91 41	127.5
3	33 08.3	91 41	127.2	33 35.5	91 41	126.9	34 02.7	91 42	126.7	34 29.8	90 42	126.4
4	32 43.5	91 42	126.1	33 10.6	90 42	125.9	33 37.7	90 42	125.6	34 04.8	90 42	125.4
45	32 18.4	90 42	125.1	32 45.4	90 43	124.8	33 12.5	90 43	124.6	33 39.4	90 43	124.3
6	31 52.9	90 43	124.0	32 19.9	90 43	123.8	32 46.8	90 43	123.5	33 13.8	90 43	123.3
7	31 27.2	90 43	123.0	31 54.1	90 44	122.7	32 20.9	90 44	122.5	32 47.8	89 44	122.2
8	31 01.1	89 44	122.0	31 27.9	89 44	121.7	31 54.7	89 44	121.5	32 21.5	89 44	121.2
9	30 34.7	89 44	121.0	31 01.5	89 45	120.7	31 28.2	89 45	120.4	31 54.9	89 45	120.2
50	30 08.1	89 45	120.0	30 34.8	89 45	119.7	31 01.4	89 45	119.4	31 28.0	89 45	119.2
1	29 41.2	89 45	119.0	30 07.8	89 45	118.7	30 34.4	89 46	118.4	31 00.9	88 46	118.1
2	29 14.0	89 46	118.0	29 40.6	88 46	117.7	30 07.1	88 46	117.4	30 33.6	88 46	117.1
3	28 46.6	88 46	117.0	29 13.1	88 46	116.7	29 39.5	88 46	116.4	30 05.9	88 46	116.2
4	28 18.9	88 46	116.0	28 45.4	88 47	115.7	29 11.7	88 47	115.4	29 38.1	88 47	115.2
55	27 51.1	88 47	115.0	28 17.4	88 47	114.7	28 43.7	88 47	114.5	29 10.0	88 47	114.2
6	27 22.9	88 47	114.0	27 49.2	88 47	113.8	28 15.5	87 47	113.5	28 41.7	87 48	113.2
7	26 54.6	87 48	113.1	27 20.8	87 48	112.8	27 47.0	87 48	112.5	28 13.2	87 48	112.3
8	26 26.1	87 48	112.1	26 52.3	87 48	111.8	27 18.4	87 48	111.6	27 44.5	87 48	111.3
9	25 57.4	87 48	111.2	26 23.5	87 48	110.9	26 49.6	87 48	110.6	27 15.6	87 48	110.3
60	25 28.5	87 48	110.2	25 54.5	87 49	110.0	26 20.6	87 49	109.7	26 46.6	87 49	109.4
1	24 59.4	87 49	109.3	25 25.4	87 49	109.0	25 51.4	87 49	108.7	26 17.3	86 49	108.5
2	24 30.1	87 49	108.4	24 56.1	87 49	108.1	25 22.0	86 49	107.8	25 47.9	86 49	107.5
3	24 00.7	86 49	107.4	24 26.6	86 49	107.2	24 52.5	86 49	106.9	25 18.4	86 49	106.6
4	23 31.2	86 50	106.5	23 57.0	86 50	106.2	24 22.9	86 50	105.9	24 48.7	86 50	105.7
65	23 01.5	86 50	105.6	23 27.3	86 50	105.3	23 53.1	86 50	105.0	24 18.9	86 50	104.8
6	22 31.6	86 50	104.7	22 57.4	86 50	104.4	23 23.2	86 50	104.1	23 49.0	86 50	103.8
7	22 01.7	86 50	103.8	22 27.4	86 50	103.5	22 53.2	86 50	103.2	23 18.9	86 50	102.9
8	21 31.6	86 50	102.9	21 57.3	86 50	102.6	22 23.0	86 50	102.3	22 48.7	86 50	102.0
9	21 01.4	86 50	102.0	21 27.1	86 51	101.7	21 52.8	86 51	101.4	22 18.4	85 51	101.1
70	20 31.1	86 51	101.1	20 56.8	86 51	100.8	21 22.5	85 51	100.5	21 48.1	85 51	100.2
1	20 00.8	86 51	100.2	20 26.4	85 51	99.9	20 52.0	85 51	99.6	21 17.6	85 51	99.3
2	19 30.3	85 51	99.3	19 55.9	85 51	99.0	20 21.5	85 51	98.7	20 47.1	85 51	98.4
3	18 59.8	85 51	98.4	19 25.4	85 51	98.1	19 50.9	85 51	97.8	20 16.5	85 51	97.6
4	18 29.2	85 51	97.5	18 54.7	85 51	97.2	19 20.3	85 51	97.0	19 45.8	85 51	96.7
75	17 58.5	85 51	96.6	18 24.1	85 51	96.4	18 49.6	85 51	96.1	19 15.1	85 51	95.8
6	17 27.8	85 51	95.8	17 53.3	85 51	95.5	18 18.8	85 51	95.2	18 44.3	85 51	94.9
7	16 57.0	85 51	94.9	17 22.5	85 51	94.6	17 48.1	85 51	94.3	18 13.5	85 51	94.1
8	16 26.2	85 51	94.0	16 51.7	85 51	93.7	17 17.2	85 51	93.5	17 42.7	85 51	93.2
9	15 55.4	85 51	93.2	16 20.9	85 51	92.9	16 46.4	85 51	92.6	17 11.8	85 51	92.3
80	15 24.5	85 51	92.3	15 50.0	85 51	92.0	16 15.5	85 52	91.7	16 40.9	85 52	91.5
1	14 53.6	85 52	91.4	15 19.1	85 52	91.2	15 44.6	85 52	90.9	16 10.0	85 52	90.6
2	14 22.7	85 52	90.6	14 48.2	85 52	90.3	15 13.7	85 52	90.0	15 39.1	85 52	89.7
3	13 51.8	85 52	89.7	14 17.3	85 52	89.4	14 42.8	85 51	89.2	15 08.2	85 52	88.9
4	13 20.9	85 52	88.9	13 46.4	85 51	88.6	14 11.9	85 51	88.3	14 37.4	85 51	88.0
85	12 50.0	85 51	88.0	13 15.5	85 51	87.7	13 41.0	85 51	87.5	14 06.5	85 51	87.2
6	12 19.2	85 51	87.1	12 44.7	85 51	86.9	13 10.2	85 51	86.6	13 35.6	85 51	86.3
7	11 48.3	85 51	86.3	12 13.8	85 51	86.0	12 39.3	85 51	85.8	13 04.8	85 51	85.5
8	11 17.5	85 51	85.4	11 43.0	85 51	85.2	12 08.5	85 51	84.9	12 34.0	85 51	84.6
9	10 46.7	85 51	84.6	11 12.2	85 51	84.3	11 37.8	85 51	84.1	12 03.3	85 51	83.8
90	10 15.9	85 51	83.8	10 41.5	85 51	83.5	11 07.0	85 51	83.2	11 32.6	85 51	83.0

14° 00′			14° 30′			15° 00′			15° 30′			H.A.
Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	°
45 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	46 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0	00
44 59.6	1.0 02	178.6	45 29.6	1.0 02	178.6	45 59.6	1.0 02	178.6	46 29.6	1.0 02	178.6	1
44 58.5	1.0 03	177.3	45 28.5	1.0 03	177.2	45 58.5	1.0 03	177.2	46 28.5	1.0 03	177.2	2
44 56.7	1.0 04	175.9	45 26.7	1.0 04	175.9	45 56.6	1.0 04	175.8	46 26.6	1.0 04	175.8	3
44 54.1	1.0 06	174.5	45 24.0	1.0 06	174.5	45 54.0	1.0 06	174.4	46 24.0	1.0 06	174.4	4
44 50.8	1.0 07	173.1	45 20.7	1.0 07	173.1	45 50.6	1.0 07	173.1	46 20.6	1.0 07	173.0	05
44 46.7	1.0 08	171.8	45 16.6	1.0 08	171.7	45 46.5	1.0 08	171.7	46 16.4	1.0 08	171.6	6
44 41.9	1.0 09	170.4	45 11.8	1.0 09	170.4	45 41.7	1.0 09	170.3	46 11.6	1.0 09	170.2	7
44 36.4	99 10	169.1	45 06.3	99 10	169.0	45 36.1	99 11	168.9	46 06.0	99 11	168.8	8
44 30.2	99 12	167.7	45 00.0	99 12	167.6	45 29.8	99 12	167.6	45 59.6	99 12	167.5	9
44 23.3	99 13	166.4	44 53.0	99 13	166.3	45 22.8	99 13	166.2	45 52.6	99 13	166.1	10
44 15.6	99 14	165.0	44 45.4	99 14	164.9	45 15.1	99 14	164.8	45 44.8	99 14	164.7	1
44 07.3	99 15	163.7	44 37.0	99 15	163.6	45 06.6	99 15	163.5	45 36.3	99 15	163.4	2
43 58.3	99 16	162.3	44 27.9	99 16	162.2	44 57.5	99 16	162.1	45 27.1	99 16	162.0	3
43 48.6	98 17	161.0	44 18.1	98 17	160.9	44 47.7	98 18	160.8	45 17.2	98 18	160.6	4
43 38.2	98 18	159.7	44 07.7	98 19	159.6	44 37.1	98 19	159.4	45 06.6	98 19	159.3	15
43 27.1	98 20	158.4	43 56.5	98 20	158.2	44 25.9	98 20	158.1	44 55.3	98 20	158.0	6
43 15.4	98 21	157.1	43 44.8	98 21	156.9	44 14.1	98 21	156.8	44 43.4	98 21	156.6	7
43 03.1	98 22	155.8	43 32.3	98 22	155.6	44 01.6	98 22	155.5	44 30.8	97 22	155.3	8
42 50.1	97 23	154.5	43 19.3	97 23	154.3	43 48.4	97 23	154.2	44 17.6	97 23	154.0	9
42 36.4	97 24	153.2	43 05.6	97 24	153.0	43 34.7	97 24	152.9	44 03.8	97 24	152.7	20
42 22.2	97 25	151.9	42 51.2	97 25	151.8	43 20.3	97 25	151.6	43 49.3	97 25	151.4	1
42 07.4	97 26	150.7	42 36.3	97 26	150.5	43 05.2	96 26	150.3	43 34.2	96 26	150.1	2
41 51.9	96 27	149.4	42 20.8	96 27	149.2	42 49.6	96 27	149.0	43 18.5	96 27	148.8	3
41 35.9	96 28	148.1	42 04.7	96 28	148.0	42 33.4	96 28	147.8	43 02.2	96 28	147.6	4
41 19.3	96 29	146.9	41 48.0	96 29	146.7	42 16.7	96 29	146.5	42 45.3	96 29	146.3	25
41 02.1	95 30	145.7	41 30.8	95 30	145.5	41 59.4	95 30	145.3	42 27.9	95 30	145.1	6
40 44.5	95 30	144.5	41 13.0	95 31	144.2	41 41.5	95 31	144.0	42 10.0	95 31	143.8	7
40 26.2	95 31	143.2	40 54.7	95 31	143.0	41 23.1	95 32	142.8	41 51.5	95 32	142.6	8
40 07.5	95 32	142.0	40 35.8	94 32	141.8	41 04.1	94 32	141.6	41 32.4	94 33	141.4	9
39 48.2	94 33	140.8	40 16.5	94 33	140.6	40 44.7	94 33	140.4	41 12.9	94 33	140.2	30
39 28.4	94 34	139.7	39 56.6	94 34	139.4	40 24.7	94 34	139.2	40 52.8	94 34	139.0	1
39 08.2	94 35	138.5	39 36.3	94 35	138.2	40 04.3	93 35	138.0	40 32.3	93 35	137.8	2
38 47.5	93 35	137.3	39 15.4	93 35	137.1	39 43.4	93 36	136.8	40 11.3	93 36	136.6	3
38 26.3	93 36	136.2	38 54.2	93 36	135.9	39 22.0	93 36	135.7	39 49.9	93 36	135.4	4
38 04.7	93 37	135.0	38 32.5	93 37	134.8	39 00.2	92 37	134.5	39 28.0	92 37	134.3	35
37 42.6	92 37	133.9	38 10.3	92 38	133.6	38 38.0	92 38	133.4	39 05.6	92 38	133.1	6
37 20.1	92 38	132.7	37 47.7	92 38	132.5	38 15.3	92 38	132.2	38 42.9	92 39	132.0	7
36 57.2	92 39	131.6	37 24.7	92 39	131.4	37 52.2	92 39	131.1	38 19.7	91 39	130.9	8
36 33.9	91 39	130.5	37 01.3	91 40	130.3	37 28.7	91 40	130.0	37 56.1	91 40	129.7	9
36 10.2	91 40	129.4	36 37.6	91 40	129.2	37 04.9	91 40	128.9	37 32.2	91 41	128.6	40
35 46.2	91 41	128.3	36 13.4	91 41	128.1	36 40.7	91 41	127.8	37 07.8	91 41	127.5	1
35 21.7	91 41	127.2	35 48.9	91 41	127.0	36 16.1	90 42	126.7	36 43.2	90 42	126.4	2
34 57.0	90 42	126.2	35 24.1	90 42	125.9	35 51.1	90 42	125.6	36 18.1	90 42	125.4	3
34 31.9	90 42	125.1	34 58.9	90 43	124.8	35 25.8	90 43	124.6	35 52.8	90 43	124.3	4
34 06.4	90 43	124.0	34 33.3	90 43	123.8	35 00.2	90 43	1[illegible].5	35 27.1	89 43	123.2	45
33 40.6	90 43	123.0	34 07.5	89 44	122.7	34 34.3	89 44	122.5	35 01.1	89 44	122.2	6
33 14.6	89 44	122.0	33 41.3	89 44	121.7	34 08.1	89 44	121.4	34 34.8	89 44	121.1	7
32 48.2	89 44	120.9	33 14.9	89 45	120.7	33 41.6	89 45	120.4	34 08.2	89 45	120.1	8
32 21.6	89 45	119.9	32 48.2	89 45	119.6	33 14.8	89 45	119.3	33 41.3	88 45	119.1	9
31 54.6	89 45	118.9	32 21.2	88 45	118.6	32 47.7	88 46	118.3	33 14.2	88 46	118.0	50
31 27.4	88 46	117.9	31 53.9	88 46	117.6	32 20.4	88 46	117.3	32 46.8	88 46	117.0	1
31 00.0	88 46	116.9	31 26.4	88 46	116.6	31 52.8	88 46	116.3	32 19.1	88 46	116.0	2
30 32.3	88 47	115.9	30 58.7	88 47	115.6	31 25.0	88 47	115.3	31 51.2	87 47	115.0	3
30 04.4	88 47	114.9	30 30.7	88 47	114.6	30 56.9	87 47	114.3	31 23.1	87 47	114.0	4
29 36.3	87 47	113.9	30 02.5	87 47	113.6	30 28.6	87 47	113.4	30 54.8	87 48	113.1	55
29 07.9	87 48	112.9	29 34.1	87 48	112.7	30 00.2	87 48	112.4	30 26.3	87 48	112.1	6
28 39.3	87 48	112.0	29 05.4	87 48	111.7	29 31.5	87 48	111.4	29 57.5	87 48	111.1	7
28 10.6	87 48	111.0	28 36.6	87 48	110.7	29 02.6	87 48	110.5	29 28.6	87 48	110.2	8
27 41.7	87 49	110.1	28 07.6	87 49	109.8	28 33.6	86 49	109.5	28 59.5	86 49	109.2	9
27 12.5	87 49	109.1	27 38.5	86 49	108.8	28 04.4	86 49	108.5	28 30.2	86 49	108.3	60
26 43.3	86 49	108.2	27 09.1	86 49	107.9	27 35.0	86 49	107.6	28 00.8	86 49	107.3	1
26 13.8	86 49	107.2	26 39.7	86 49	107.0	27 05.5	86 49	106.7	27 31.2	86 50	106.4	2
25 44.2	86 50	106.3	26 10.0	86 50	106.0	26 35.8	86 50	105.7	27 01.5	86 50	105.5	3
25 14.5	86 50	105.4	25 40.3	86 50	105.1	26 06.0	86 50	104.8	26 31.7	86 50	104.5	4
24 44.6	86 50	104.5	25 10.4	86 50	104.2	25 36.1	86 50	103.9	26 01.7	85 50	103.6	65
24 14.7	86 50	103.6	24 40.3	86 50	103.3	25 06.0	85 50	103.0	25 31.6	85 50	102.7	6
23 44.6	86 50	102.6	24 10.2	85 50	102.4	24 35.8	85 50	102.1	25 01.4	85 50	101.8	7
23 14.4	85 51	101.7	23 40.0	85 51	101.5	24 05.6	85 51	101.2	24 31.1	85 51	100.9	8
22 44.1	85 51	100.8	23 09.6	85 51	100.6	23 35.2	85 51	100.3	24 00.7	85 51	100.0	9
22 13.7	85 51	99.9	22 39.2	85 51	99.7	23 04.7	85 51	99.4	23 30.2	85 51	99.1	70
21 43.2	85 51	99.1	22 08.7	85 51	98.8	22 34.2	85 51	98.5	22 59.7	85 51	98.2	1
21 12.6	85 51	98.2	21 38.1	85 51	97.9	22 03 6	85 51	97.6	22 29.1	85 51	97.3	2
20 42.0	85 51	97.3	21 07.5	85 51	97.0	21 33.0	85 51	96.7	21 58.4	85 51	96.4	3
20 11.3	85 51	96.4	20 36.8	85 51	96.1	21 02.2	85 51	95.8	21 27.7	85 51	95.6	4
19 40.6	85 51	95.5	20 06.0	85 51	95.2	20 31.5	85 51	95.0	20 56.9	85 51	94.7	75
19 09.8	85 51	94.7	19 35.3	85 51	94.4	20 00.7	85 51	94.1	20 26.1	85 51	93.8	6
18 39.0	85 51	93.8	19 04.4	85 51	93.5	19 29.8	85 51	93.2	19 55.2	85 51	92.9	7
18 08.1	85 51	92.9	18 33.6	85 51	92.6	18 59.0	85 51	92.4	19 24.3	85 52	92.1	8
17 37.3	85 51	92.1	18 02.7	85 51	91.8	18 28.1	85 52	91.5	18 53.5	85 52	91.2	9
17 06.4	85 52	91.2	17 31.8	85 52	90.9	17 57.2	85 52	90.6	18 22.6	85 52	90.4	80
16 35.5	85 52	90.3	17 00.9	85 52	90.1	17 26.3	85 52	89.8	17 51.7	85 52	89.5	1
16 04.6	85 52	89.5	16 30.0	85 52	89.2	16 55.4	85 51	88.9	17 20.8	85 51	88.6	2
15 33.7	85 51	88.6	15 59.1	85 51	88.3	16 24.5	85 51	88.1	16 49.9	85 51	87.8	3
15 02.8	85 51	87.8	15 28.2	85 51	87.5	15 53.6	85 51	87.2	16 19.0	85 51	86.9	4
14 31.9	85 51	86.9	14 57.4	85 51	86.6	15 22.8	85 51	86.4	15 48.2	85 51	86.1	85
14 01.1	85 51	86.1	14 26.5	85 51	85.8	14 51.9	85 51	85.5	15 17.3	85 51	85.2	6
13 30.3	85 51	85.2	13 55.7	85 51	84.9	14 21.2	85 51	84.7	14 46.6	85 51	84.4	7
12 59.5	85 51	84.4	13 25.0	85 51	84.1	13 50.4	85 51	83.8	14 15.8	85 51	83.6	8
12 28.8	85 51	83.5	12 54.2	85 51	83.3	13 19.7	85 51	83.0	13 45.2	85 51	82.7	9
11 58.1	85 51	82.7	12 23.6	85 51	82.4	12 49.1	85 51	82.1	13 14.5	85 51	81.9	90

Digitized by Google

Lat. 59°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	19 00.0	1.0 00	180.0	18 30.0	1.0 00	180.0	18 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0	17 00.0	1.0 00	180.0	16 30.0	1.0 00	180.0	16 00.0	1.0 00	180.0	15 30.0	1.0 00	180.0	00
1	18 59.7	1.0 01	179.0	18 29.7	1.0 01	179.0	17 59.7	1.0 01	179.0	17 29.7	1.0 01	179.0	16 59.7	1.0 01	179.0	16 29.7	1.0 01	179.0	15 59.7	1.0 01	179.0	15 29.7	1.0 01	179.0	1
2	18 58.9	1.0 02	177.9	18 28.9	1.0 02	177.9	17 58.9	1.0 02	178.0	17 28.9	1.0 02	178.0	16 58.9	1.0 02	178.0	16 28.9	1.0 02	178.0	15 58.9	1.0 02	178.0	15 28.9	1.0 02	178.0	2
3	18 57.5	1.0 03	176.9	18 27.5	1.0 03	176.9	17 57.5	1.0 03	176.9	17 27.5	1.0 03	176.9	16 57.5	1.0 03	177.0	16 27.6	1.0 03	177.0	15 57.6	1.0 03	177.0	15 27.6	1.0 03	177.0	3
4	18 55.5	1.0 04	175.9	18 25.6	1.0 04	175.9	17 55.6	1.0 04	175.9	17 25.6	1.0 04	175.9	16 55.6	1.0 04	175.9	16 25.6	1.0 04	176.0	15 55.7	1.0 04	176.0	15 25.7	1.0 04	176.0	4
05	18 53.0	1.0 05	174.8	18 23.1	1.0 05	174.9	17 53.1	1.0 05	174.9	17 23.1	1.0 05	174.9	16 53.2	1.0 05	174.9	16 23.2	1.0 05	175.0	15 53.2	1.0 05	175.0	15 23.3	1.0 05	175.0	05
6	18 50.0	1.0 06	173.8	18 20.0	1.0 06	173.8	17 50.1	1.0 06	173.9	17 20.1	1.0 06	173.9	16 50.2	1.0 06	173.9	16 20.2	1.0 06	173.9	15 50.3	1.0 06	174.0	15 20.3	1.0 06	174.0	6
7	18 46.4	1.0 07	172.8	18 16.4	1.0 07	172.8	17 46.5	1.0 07	172.8	17 16.6	1.0 07	172.9	16 46.6	1.0 07	172.9	16 16.7	1.0 07	172.9	15 46.7	1.0 07	173.0	15 16.8	1.0 07	173.0	7
8	18 42.2	1.0 08	171.7	18 12.3	1.0 08	171.8	17 42.4	1.0 08	171.8	17 12.4	1.0 08	171.9	16 42.5	1.0 08	171.9	16 12.6	1.0 08	171.9	15 42.7	1.0 08	172.0	15 12.8	1.0 08	172.0	8
9	18 37.5	1.0 09	170.7	18 07.6	1.0 09	170.8	17 37.7	1.0 09	170.8	17 07.8	1.0 09	170.8	16 37.9	1.0 09	170.9	16 08.0	1.0 09	170.9	15 38.1	1.0 09	171.0	15 08.2	1.0 08	171.0	9
10	18 32.2	1.0 10	169.7	18 02.3	1.0 10	169.7	17 32.5	1.0 10	169.8	17 02.6	1.0 10	169.8	16 32.7	1.0 09	169.9	16 02.9	1.0 09	169.9	15 33.0	1.0 09	170.0	15 03.1	1.0 09	170.0	10
1	18 26.4	99 11	168.7	17 56.6	99 11	168.7	17 26.7	99 10	168.8	16 56.9	99 10	168.8	16 27.0	99 10	168.9	15 57.2	99 10	168.9	15 27.4	99 10	169.0	14 57.5	99 10	169.0	1
2	18 20.1	99 11	167.6	17 50.2	99 11	167.7	17 20.4	99 11	167.7	16 50.6	99 11	167.8	16 20.8	99 11	167.9	15 51.0	99 11	167.9	15 21.2	99 11	168.0	14 51.4	99 11	168.0	2
3	18 13.2	99 12	166.6	17 43.4	99 12	166.7	17 13.6	99 12	166.7	16 43.8	99 12	166.8	16 14.0	99 12	166.9	15 44.3	99 12	166.9	15 14.5	99 12	167.0	14 44.7	99 12	167.0	3
4	18 05.7	99 13	165.6	17 36.0	99 13	165.7	17 06.3	99 13	165.7	16 36.5	99 13	165.8	16 06.8	99 13	165.9	15 37.0	99 13	165.9	15 07.3	99 13	166.0	14 37.5	99 13	166.1	4
15	17 57.8	99 14	164.6	17 28.1	99 14	164.6	16 58.4	99 14	164.7	16 28.7	99 14	164.8	15 58.9	99 14	164.9	15 29.2	99 14	164.9	14 59.5	99 14	165.0	14 29.8	99 14	165.1	15
6	17 49.3	99 15	163.5	17 19.6	99 15	163.6	16 50.0	99 15	163.7	16 20.3	99 15	163.8	15 50.6	99 15	163.9	15 20.9	99 15	163.9	14 51.3	99 15	164.0	14 21.6	99 15	164.1	6
7	17 40.3	99 16	162.5	17 10.7	99 16	162.6	16 41.0	99 16	162.7	16 11.4	99 16	162.8	15 41.8	99 16	162.9	15 12.1	99 16	162.9	14 42.5	99 15	163.0	14 12.9	99 15	163.1	7
8	17 30.7	99 17	161.5	17 01.2	99 17	161.6	16 31.6	99 17	161.7	16 02.0	99 17	161.8	15 32.4	99 16	161.9	15 02.8	99 16	162.0	14 33.2	99 16	162.0	14 03.6	99 16	162.1	8
9	17 20.7	98 18	160.5	16 51.2	98 18	160.6	16 21.6	98 17	160.7	15 52.1	98 17	160.8	15 22.5	98 17	160.9	14 53.0	98 17	161.0	14 23.4	98 17	161.1	13 53.9	98 17	161.1	9
20	17 10.1	98 18	159.5	16 40.6	98 18	159.6	16 11.1	98 18	159.7	15 41.7	98 18	159.8	15 12.2	98 18	159.9	14 42.7	98 18	160.0	14 13.2	98 18	160.1	13 43.7	98 18	160.2	20
1	16 59.0	98 19	158.5	16 29.6	98 19	158.6	16 00.2	98 19	158.7	15 30.7	98 19	158.8	15 01.3	98 19	158.9	14 31.8	98 19	159.0	14 02.4	98 19	159.1	13 32.9	98 19	159.2	1
2	16 47.5	98 20	157.5	16 18.1	98 20	157.6	15 48.7	98 20	157.7	15 19.3	98 20	157.8	14 49.9	98 20	157.9	14 20.5	98 20	158.0	13 51.1	98 20	158.1	13 21.7	98 20	158.2	2
3	16 35.4	98 21	156.5	16 06.1	98 21	156.6	15 36.7	98 21	156.7	15 07.4	98 21	156.8	14 38.0	98 21	156.9	14 08.7	98 20	157.0	13 39.4	98 20	157.1	13 10.0	98 20	157.3	3
4	16 22.8	98 22	155.5	15 53.8	98 22	155.6	15 24.3	98 22	155.7	14 55.0	98 21	155.8	14 25.7	98 21	156.0	13 56.4	98 21	156.1	13 27.1	98 21	156.2	12 57.8	98 21	156.3	4
25	16 09.8	97 23	154.5	15 40.5	97 22	154.6	15 11.3	97 22	154.7	14 42.1	97 22	154.9	14 12.9	97 22	155.0	13 43.6	97 22	155.1	13 14.4	97 22	155.2	12 45.1	97 22	155.3	25
6	15 56.2	97 23	153.5	15 27.1	97 23	153.6	14 57.9	97 23	153.8	14 28.7	97 23	153.9	13 59.6	97 23	154.0	13 30.4	97 23	154.1	13 01.2	97 23	154.2	12 32.0	97 23	154.4	6
7	15 42.2	97 24	152.5	15 13.1	97 24	152.7	14 44.0	97 24	152.8	14 14.9	97 24	152.9	13 45.8	97 24	153.0	13 16.7	97 24	153.2	12 47.5	97 24	153.3	12 18.4	97 23	153.4	7
8	15 27.7	97 25	151.5	14 58.7	97 25	151.7	14 29.6	97 25	151.8	14 00.6	97 25	151.9	13 31.5	97 24	152.1	13 02.5	97 24	152.2	12 33.4	97 24	152.3	12 04.3	97 24	152.4	8
9	15 12.8	97 26	150.6	14 43.8	97 26	150.7	14 14.8	97 25	150.8	13 45.8	97 25	151.0	13 16.8	97 25	151.1	12 47.8	97 25	151.2	12 18.8	97 25	151.4	11 49.8	97 25	151.5	9
30	14 57.3	96 26	149.6	14 28.4	96 26	149.7	13 59.5	96 26	149.9	13 30.6	96 26	150.0	13 01.7	96 26	150.1	12 32.7	96 26	150.3	12 03.8	96 26	150.4	11 34.8	96 26	150.5	30
1	14 41.5	96 27	148.6	14 12.6	96 27	148.8	13 43.8	96 27	148.9	13 14.9	96 27	149.0	12 46.0	96 27	149.2	12 17.2	96 27	149.3	11 48.3	96 27	149.5	11 19.4	96 26	149.6	1
2	14 25.2	96 28	147.6	13 56.4	96 28	147.8	13 27.6	96 28	147.9	12 58.8	96 28	148.1	12 30.0	96 27	148.2	12 01.2	96 27	148.4	11 32.4	96 27	148.5	11 03.6	96 27	148.6	2
3	14 08.4	96 29	146.7	13 39.7	96 29	146.8	13 11.0	96 28	147.0	12 42.2	96 28	147.1	12 13.5	96 28	147.3	11 44.8	96 28	147.4	11 16.0	96 28	147.6	10 47.3	96 28	147.7	3
4	13 51.2	95 29	145.7	13 22.6	96 29	145.9	12 53.9	96 29	146.0	12 25.2	96 29	146.2	11 56.6	96 29	146.3	11 27.9	96 29	146.5	10 59.2	96 29	146.6	10 30.5	96 29	146.8	4
35	13 33.6	95 30	144.8	13 05.0	95 30	144.9	12 36.4	95 30	145.1	12 07.8	95 30	145.2	11 39.2	95 30	145.4	11 10.6	95 30	145.5	10 42.0	95 29	145.7	10 13.4	95 29	145.8	35
6	13 15.5	95 31	143.8	12 47.0	95 31	144.0	12 18.5	95 31	144.1	11 50.0	95 30	144.3	11 21.4	95 30	144.4	10 52.9	95 30	144.6	10 24.4	95 30	144.7	9 55.8	95 30	144.9	6
7	12 57.1	95 31	142.8	12 28.6	95 31	143.0	12 00.2	95 31	143.2	11 31.7	95 31	143.3	11 03.3	95 31	143.5	10 34.8	95 31	143.6	10 06.3	95 31	143.8	9 37.9	95 31	144.0	7
8	12 38.2	95 32	141.9	12 09.8	95 32	142.1	11 41.5	95 32	142.2	11 13.1	95 32	142.4	10 44.7	95 32	142.6	10 16.3	95 32	142.7	9 47.9	95 31	142.9	9 19.5	95 31	143.0	8
9	12 18.9	94 33	140.9	11 50.6	94 33	141.1	11 22.3	94 33	141.3	10 54.0	94 32	141.5	10 25.7	94 32	141.6	9 57.4	94 32	141.8	9 29.0	94 32	142.0	9 00.7	94 32	142.1	9
40	11 59.3	94 33	140.0	11 31.0	94 33	140.2	11 02.8	94 33	140.3	10 34.6	94 33	140.5	10 06.3	94 33	140.7	9 38.1	94 33	140.9	9 09.8	94 33	141.0	8 41.5	94 33	141.2	40
1	11 39.2	94 34	139.1	11 11.1	94 34	139.2	10 42.9	94 34	139.4	10 14.7	94 34	139.6	9 46.5	94 34	139.8	9 18.4	94 33	139.9	8 50.2	94 33	140.1	8 22.0	94 33	140.3	1
2	11 18.8	94 35	138.1	10 50.7	94 35	138.3	10 22.6	94 34	138.5	9 54.5	94 34	138.7	9 26.4	94 34	138.8	8 58.3	94 34	139.0	8 30.2	94 34	139.2	8 02.0	94 34	139.4	2
3	10 58.0	93 35	137.2	10 30.0	93 35	137.4	10 01.9	93 35	137.6	9 33.9	93 35	137.7	9 05.9	93 35	137.9	8 37.8	93 35	138.1	8 09.8	93 35	138.3	7 41.7	94 34	138.5	3
4	10 36.8	93 36	136.3	10 08.3	93 36	136.5	9 40.9	93 36	136.6	9 12.9	93 36	136.8	8 45.0	93 35	137.0	8 17.0	93 35	137.2	7 49.0	93 35	137.4	7 21.1	93 35	137.6	4
45	10 15.2	93 36	135.3	9 47.4	93 36	135.5	9 19.5	93 36	135.7	8 51.6	93 36	135.9	8 23.7	93 36	136.1	7 55.8	93 36	136.3	7 27.9	93 36	136.5	7 00.0	93 36	136.6	45
6	9 53.3	93 37	134.4	9 25.5	93 37	134.6	8 57.7	93 37	134.8	8 29.9	93 37	135.0	8 02.1	93 37	135.2	7 34.3	93 36	135.4	7 06.5	93 36	135.6	6 38.6	93 36	135.7	6
7	9 31.1	92 38	133.5	9 03.4	92 38	133.7	8 35.6	92 37	133.9	8 07.9	92 37	134.1	7 40.2	92 37	134.3	7 12.4	93 37	134.5	6 44.6	93 37	134.7	6 16.9	93 37	134.8	7
8	9 08.5	92 38	132.6	8 40.9	92 38	132.8	8 13.2	92 38	133.0	7 45.5	92 38	133.2	7 17.9	92 38	133.4	6 50.2	92 38	133.6	6 22.5	92 38	133.8	5 54.8	92 37	134.0	8
9	8 45.6	92 39	131.7	8 18.0	92 39	131.9	7 50.4	92 38	132.1	7 22.8	92 38	132.3	6 55.2	92 38	132.5	6 27.6	92 38	132.7	6 00.0	92 38	132.9	5 32.4	92 38	133.1	9
50	8 22.4	92 39	130.8	7 54.8	92 39	131.0	7 27.3	92 39	131.2	6 59.8	92 39	131.4	6 32.3	92 39	131.6	6 04.7	92 39	131.8	5 37.2	92 39	132.0	5 09.6	92 38	132.2	50
1	7 58.8	91 40	129.9	7 31.4	91 40	130.1	7 03.9	92 40	130.3	6 36.4	92 39	130.5	6 09.0	92 39	130.7	5 41.5	92 39	130.9	5 14.1	92 39	131.1				1
2	7 34.9	91 40	129.0	7 07.5	91 40	129.2	6 40.2	91 40	129.4	6 12.8	91 40	129.6	5 45.4	91 40	129.8	5 18.0	91 40	130.0							2
3	7 10.7	91 41	128.1	6 43.4	91 41	128.3	6 16.1	91 41	128.5	5 48.8	91 40	128.7	5 21.5	91 40	128.9										3
4	6 46.3	91 41	127.2	6 19.0	91 41	127.4	5 51.8	91 41	127.6	5 24.5	91 41	127.8													4
55	6 21.5	91 42	126.3	5 54.3	91 42	126.5	5 27.2	91 42	126.7	5 00.0	91 42	126.9													55
6	5 56.4	90 42	125.4	5 29.3	90 42	125.6	5 02.2	90 42	125.8																6
7	5 31.1	90 43	124.5	5 04.1	90 43	124.7																			7
8	5 05.5	90 43	123.6																						8

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	9 45.3	85 51	82.9	10 10.8	85 51	82.6	10 36.4	85 51	82.4	11 01.9	85 51	82.1	11 27.5	85 51	81.8	11 53.0	85 51	81.6	12 18.5	85 51	81.3	12 44.0	85 51	81.0	91
2	9 14.6	85 51	82.1	9 40.2	85 51	81.8	10 05.8	85 51	81.5	10 31.4	85 51	81.3	10 56.9	85 51	81.0	11 22.5	85 51	80.7	11 48.0	85 51	80.5	12 13.5	85 51	80.2	2
3	8 44.0	85 51	81.2	9 09.7	85 51	81.0	9 35.3	85 51	80.7	10 00.8	85 51	80.4	10 26.4	85 51	80.2	10 52.0	85 51	79.9	11 17.5	85 51	79.6	11 43.1	85 51	79.4	3
4	8 13.5	85 51	80.4	8 39.2	85 51	80.1	9 04.8	85 51	79.8	9 30.4	85 51	79.6	9 56.0	85 51	79.3	10 21.6	85 50	79.1	10 47.2	85 50	78.8	11 12.7	85 50	78.5	4
95	7 43.1	86 51	79.5	8 08.8	86 51	79.3	8 34.4	85 50	79.0	9 00.1	85 50	78.7	9 25.7	85 50	78.5	9 51.3	85 50	78.2	10 16.9	85 50	77.9	10 42.5	85 50	77.7	95
6	7 12.8	86 50	78.7	7 38.5	86 50	78.4	8 04.1	86 50	78.2	8 29.8	86 50	77.9	8 55.5	86 50	77.6	9 21.1	85 50	77.4	9 46.7	85 50	77.1	10 12.4	85 50	76.8	6
7	6 42.5	86 50	77.8	7 08.2	86 50	77.6	7 33.9	86 50	77.3	7 59.6	86 50	77.1	8 25.3	86 50	76.8	8 51.0	86 50	76.5	9 16.7	86 50	76.3	9 42.3	86 50	76.0	7
8	6 12.4	86 50	77.0	6 38.1	86 50	76.7	7 03.8	86 50	76.5	7 29.6	86 50	76.2	7 55.3	86 50	76.0	8 21.0	86 50	75.7	8 46.7	86 50	75.4	9 12.4	86 50	75.2	8
9	5 42.3	86 50	76.1	6 08.1	86 50	75.9	6 33.9	86 50	75.6	6 59.6	86 50	75.4	7 25.4	86 50	75.1	7 51.1	86 50	74.9	8 16.9	86 50	74.6	8 42.6	86 50	74.3	9
100	5 12.4	86 50	75.3	5 38.2	86 50	75.0	6 04.0	86 50	74.8	6 29.8	86 50	74.5	6 55.6	86 49	74.3	7 21.3	86 49	74.0	7 47.1	86 49	73.8	8 12.9	86 49	73.5	100
1				5 08.4	86 50	74.2	5 34.2	86 49	73.9	6 00.1	86 49	73.7	6 25.9	86 49	73.4	6 51.7	86 49	73.2	7 17.5	86 49	72.9	7 43.3	86 49	72.7	1
2							5 04.6	86 49	73.1	5 30.5	86 49	72.9	5 56.3	86 49	72.6	6 22.2	86 49	72.3	6 48.0	86 49	72.1	7 13.9	86 49	71.8	2
3										5 01.0	86 49	72.0	5 26.9	86 49	71.8	5 52.8	86 49	71.5	6 18.7	86 49	71.2	6 44.6	86 49	71.0	3
4																5 23.6	86 48	70.7	5 49.5	86 48	70.4	6 15.5	86 48	70.2	4
105																			5 20.5	87 48	69.6	5 46.5	87 48	69.3	105
6																						5 17.6	87 48	68.5	6

Digitized by Google

Lat. 59°

H.A.	16° 00′ Alt.		16° 00′ Az.	16° 30′ Alt.		16° 30′ Az.	17° 00′ Alt.		17° 00′ Az.	17° 30′ Alt.		17° 30′ Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	47 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	48 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0
1	46 59.6	1.0 02	178.6	47 29.6	1.0 02	178.6	47 59.6	1.0 02	178.6	48 29.6	1.0 02	178.6
2	46 58.5	1.0 03	177.2	47 28.5	1.0 03	177.2	47 58.5	1.0 03	177.1	48 28.4	1.0 03	177.1
3	46 56.6	1.0 04	175.8	47 26.6	1.0 04	175.7	47 56.5	1.0 04	175.7	48 26.5	1.0 05	175.7
4	46 53.9	1.0 06	174.4	47 23.9	1.0 06	174.3	47 53.8	1.0 06	174.3	48 23.8	1.0 06	174.2
05	46 50.5	1.0 07	173.0	47 20.5	1.0 07	172.9	47 50.4	1.0 07	172.9	48 20.3	1.0 07	172.8
6	46 46.4	1.0 08	171.6	47 16.3	1.0 08	171.5	47 46.2	1.0 08	171.4	48 16.1	1.0 08	171.4
7	46 41.5	1.0 09	170.2	47 11.3	1.0 10	170.1	47 41.2	1.0 10	170.0	48 11.1	1.0 10	170.0
8	46 35.8	99 11	168.8	47 05.6	99 11	168.7	47 35.5	99 11	168.6	48 05.3	99 11	168.5
9	46 29.4	99 12	167.4	46 59.2	99 12	167.3	47 29.0	99 12	167.2	47 58.8	99 12	167.1
10	46 22.3	99 13	166.0	46 52.1	99 13	165.9	47 21.8	99 13	165.8	47 51.5	99 13	165.7
1	46 14.5	99 14	164.6	46 44.2	99 14	164.5	47 13.9	99 14	164.4	47 43.5	99 15	164.3
2	46 05.9	99 15	163.2	46 35.6	99 16	163.1	47 05.2	99 16	163.0	47 34.8	99 16	162.9
3	45 56.7	99 17	161.9	46 26.2	99 17	161.8	46 55.8	99 17	161.6	47 25.4	99 17	161.5
4	45 46.7	98 18	160.5	46 16.2	98 18	160.4	46 45.7	98 18	160.3	47 15.2	98 18	160.1
15	45 36.1	98 19	159.2	46 05.5	98 19	159.0	46 34.9	98 19	158.9	47 04.4	98 19	158.8
6	45 24.7	98 20	157.8	45 54.1	98 20	157.7	46 23.5	98 20	157.5	46 52.8	98 20	157.4
7	45 12.7	98 21	156.5	45 42.0	98 21	156.3	46 11.3	98 21	156.2	46 40.6	98 22	156.0
8	45 00.1	97 22	155.2	45 29.3	97 22	155.0	45 58.5	97 22	154.8	46 27.7	97 23	154.7
9	44 46.8	97 23	153.8	45 15.9	97 23	153.7	45 45.0	97 24	153.5	46 14.2	97 24	153.3
20	44 32.8	97 24	152.5	45 01.9	97 24	152.4	45 30.9	97 25	152.2	46 00.0	97 25	152.0
1	44 18.3	97 25	151.2	44 47.2	97 25	151.0	45 16.2	96 26	150.9	45 45.1	96 26	150.7
2	44 03.1	96 26	149.9	44 32.0	96 26	149.7	45 00.8	96 27	149.6	45 29.7	96 27	149.4
3	43 47.3	96 27	148.6	44 16.1	96 27	148.5	44 44.9	96 28	148.3	45 13.6	96 28	148.1
4	43 30.9	96 28	147.4	43 59.6	96 28	147.2	44 28.3	96 29	147.0	44 57.0	96 29	146.8
25	43 14.0	95 29	146.1	43 42.6	95 29	145.9	44 11.2	95 30	145.7	44 39.8	95 30	145.5
6	42 56.5	95 30	144.9	43 25.0	95 30	144.6	43 53.5	95 30	144.4	44 22.0	95 31	144.2
7	42 38.4	95 31	143.6	43 06.8	95 31	143.4	43 35.3	95 31	143.2	44 03.6	95 31	142.9
8	42 19.8	95 32	142.4	42 48.2	94 32	142.2	43 16.5	94 32	141.9	43 44.7	94 32	141.7
9	42 00.7	94 33	141.2	42 28.9	94 33	140.9	42 57.1	94 33	140.7	43 25.3	94 33	140.5
30	41 41.1	94 34	139.9	42 09.2	94 34	139.7	42 37.3	94 34	139.5	43 05.4	94 34	139.2
1	41 20.9	94 34	138.7	41 49.0	93 35	138.5	42 17.0	93 35	138.3	42 45.0	93 35	138.0
2	41 00.3	93 35	137.5	41 28.3	93 35	137.3	41 56.2	93 36	137.1	42 24.1	93 36	136.8
3	40 39.2	93 36	136.4	41 07.1	93 36	136.1	41 34.9	93 36	135.9	42 02.7	93 36	135.6
4	40 17.7	93 37	135.2	40 45.4	92 37	134.9	41 13.1	92 37	134.7	41 40.8	92 37	134.4
35	39 55.7	92 37	134.0	40 23.3	92 38	133.8	40 51.0	92 38	133.5	41 18.6	92 38	133.3
6	39 33.2	92 38	132.9	40 00.8	92 38	132.6	40 28.3	92 38	132.4	40 55.8	92 39	132.1
7	39 10.4	92 39	131.7	39 37.8	92 39	131.5	40 05.3	91 39	131.2	40 32.7	91 39	130.9
8	38 47.1	91 39	130.6	39 14.5	91 40	130.3	39 41.8	91 40	130.1	40 09.2	91 40	129.8
9	38 23.4	91 40	129.5	38 50.7	91 40	129.2	39 18.0	91 40	128.9	39 45.2	91 41	128.7
40	37 59.4	91 41	128.4	38 26.6	91 41	128.1	38 53.8	91 41	127.8	39 20.9	90 41	127.6
1	37 35.0	90 41	127.3	38 02.1	90 41	127.0	38 29.2	90 42	126.7	38 56.2	90 42	126.4
2	37 10.2	90 42	126.2	37 37.3	90 42	125.9	38 04.2	90 42	125.6	38 31.2	90 42	125.3
3	36 45.1	90 42	125.1	37 12.1	90 43	124.8	37 39.0	90 43	124.5	38 05.8	89 43	124.3
4	36 19.7	90 43	124.0	36 46.5	89 43	123.7	37 13.3	89 43	123.5	37 40.1	89 43	123.2
45	35 53.9	89 43	123.0	36 20.7	89 44	122.7	36 47.4	89 44	122.4	37 14.1	89 44	122.1
6	35 27.8	89 44	121.9	35 54.5	89 44	121.6	36 21.2	89 44	121.3	36 47.8	89 44	121.0
7	35 01.4	89 44	120.9	35 28.0	89 45	120.6	35 54.6	89 45	120.3	36 21.2	88 45	120.0
8	34 34.8	89 45	119.8	35 01.3	88 45	119.5	35 27.8	88 45	119.2	35 54.3	88 45	119.0
9	34 07.8	88 45	118.8	34 34.3	88 45	118.5	35 00.7	88 46	118.2	35 27.1	88 46	117.9
50	33 40.6	88 46	117.8	34 07.0	88 46	117.5	34 33.3	88 46	117.2	34 59.6	88 46	116.9
1	33 13.1	88 46	116.8	33 39.4	88 46	116.5	34 05.7	88 46	116.2	34 32.0	87 47	115.9
2	32 45.4	88 47	115.7	33 11.7	87 47	115.5	33 37.9	87 47	115.2	34 04.0	87 47	114.9
3	32 17.5	87 47	114.7	32 43.6	87 47	114.5	33 09.8	87 47	114.2	33 35.9	87 47	113.9
4	31 49.3	87 47	113.8	32 15.4	87 47	113.5	32 41.5	87 48	113.2	33 07.5	87 48	112.9
55	31 20.9	87 48	112.8	31 47.0	87 48	112.5	32 13.0	87 48	112.2	32 39.0	87 48	111.9
6	30 52.3	87 48	111.8	31 18.3	87 48	111.5	31 44.3	86 48	111.2	32 10.2	86 48	110.9
7	30 23.5	87 48	110.8	30 49.5	86 48	110.5	31 15.4	86 48	110.2	31 41.2	86 49	110.0
8	29 54.5	86 49	109.9	30 20.4	86 49	109.6	30 46.3	86 49	109.3	31 12.1	86 49	109.0
9	29 25.4	86 49	108.9	29 51.2	86 49	108.6	30 17.0	86 49	108.3	30 42.8	86 49	108.0
60	28 56.1	86 49	108.0	29 21.9	86 49	107.7	29 47.6	86 49	107.4	30 13.3	86 49	107.1
1	28 26.6	86 49	107.0	28 52.3	86 49	106.7	29 18.1	86 50	106.4	29 43.7	85 50	106.1
2	27 57.0	86 50	106.1	28 22.7	86 50	105.8	28 48.3	85 50	105.5	29 14.0	85 50	105.2
3	27 27.2	86 50	105.2	27 52.9	85 50	104.9	28 18.5	85 50	104.6	28 44.1	85 50	104.3
4	26 57.3	85 50	104.2	27 23.0	85 50	103.9	27 48.5	85 50	103.7	28 14.1	85 50	103.4
65	26 27.3	85 50	103.3	26 52.9	85 50	103.0	27 18.4	85 50	102.7	27 44.0	85 50	102.4
6	25 57.2	85 50	102.4	26 22.7	85 50	102.1	26 48.3	85 50	101.8	27 13.7	85 51	101.5
7	25 27.0	85 51	101.5	25 52.5	85 51	101.2	26 18.0	85 51	100.9	26 43.4	85 51	100.6
8	24 56.6	85 51	100.6	25 22.1	85 51	100.3	25 47.6	85 51	100.0	26 13.0	85 51	99.7
9	24 26.2	85 51	99.7	24 51.7	85 51	99.4	25 17.1	85 51	99.1	25 42.5	85 51	98.8
70	23 55.7	85 51	98.8	24 21.1	85 51	98.5	24 46.5	85 51	98.2	25 11.9	84 51	97.9
1	23 25.1	85 51	97.9	23 50.5	85 51	97.6	24 15.9	85 51	97.3	24 41.3	84 51	97.0
2	22 54.5	85 51	97.0	23 19.9	85 51	96.7	23 45.2	84 51	96.4	24 10.6	84 51	96.2
3	22 23.8	85 51	96.1	22 49.2	85 51	95.9	23 14.5	84 51	95.6	23 39.8	84 51	95.3
4	21 53.1	85 51	95.3	22 18.4	84 51	95.0	22 43.7	84 51	94.7	23 09.0	84 51	94.4
75	21 22.3	85 51	94.4	21 47.6	84 51	94.1	22 12.9	84 51	93.8	22 38.2	84 51	93.5
6	20 51.4	84 51	93.5	21 16.8	84 51	93.2	21 42.1	84 51	92.9	22 07.3	84 51	92.7
7	20 20.6	84 51	92.7	20 45.9	84 51	92.4	21 11.2	84 51	92.1	21 36.5	84 52	91.8
8	19 49.7	84 52	91.8	20 15.0	84 52	91.5	20 40.3	84 52	91.2	21 05.6	84 52	90.9
9	19 18.8	84 52	90.9	19 44.1	84 52	90.6	20 09.4	84 52	90.4	20 34.7	84 52	90.1
80	18 47.9	84 52	90.1	19 13.2	84 52	89.8	19 38.5	84 52	89.5	20 03.8	84 51	89.2
1	18 17.0	84 52	89.2	18 42.3	84 51	88.9	19 07.6	84 52	88.6	19 32.9	84 51	88.4
2	17 46.1	84 51	88.4	18 11.4	84 51	88.1	18 36.7	84 51	87.8	19 02.0	84 51	87.5
3	17 15.2	84 51	87.5	17 40.5	84 51	87.2	18 05.9	84 51	86.9	18 31.1	84 51	86.7
4	16 44.4	84 51	86.7	17 09.7	84 51	86.4	17 35.0	84 51	86.1	18 00.3	84 51	85.8
85	16 13.5	85 51	85.8	16 38.9	84 51	85.5	17 04.2	84 51	85.3	17 29.5	84 51	85.0
6	15 42.7	85 51	85.0	16 08.1	84 51	84.7	16 33.4	84 51	84.4	16 58.7	84 51	84.1
7	15 12.0	85 51	84.1	15 37.3	85 51	83.8	16 02.7	84 51	83.6	16 28.0	84 51	83.3
8	14 41.2	85 51	83.3	15 06.6	85 51	83.0	15 32.0	85 51	82.7	15 57.4	84 51	82.4
9	14 10.6	85 51	82.4	14 36.0	85 51	82.2	15 01.4	85 51	81.9	15 26.8	85 51	81.6
90	13 40.0	85 51	81.6	14 05.4	85 51	81.3	14 30.8	85 51	81.1	14 56.2	85 51	80.8

H.A.	18° 00′ Alt.		18° 00′ Az.	18° 30′ Alt.		18° 30′ Az.	19° 00′ Alt.		19° 00′ Az.	19° 30′ Alt.		19° 30′ Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	49 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0
1	48 59.6	1.0 02	178.6	49 29.6	1.0 02	178.5	49 59.6	1.0 02	178.5	50 29.6	1.0 02	178.5
2	48 58.4	1.0 03	177.1	49 28.4	1.0 03	177.1	49 58.4	1.0 03	177.1	50 28.4	1.0 03	177.0
3	48 56.5	1.0 05	175.7	49 26.5	1.0 05	175.6	49 56.4	1.0 05	175.6	50 26.4	1.0 05	175.6
4	48 53.8	1.0 06	174.2	49 23.7	1.0 06	174.2	49 53.7	1.0 06	174.1	50 23.6	1.0 06	174.1
05	48 50.2	1.0 07	172.8	49 20.2	1.0 07	172.7	49 50.1	1.0 07	172.7	50 20.0	1.0 07	172.6
6	48 46.0	1.0 08	171.3	49 15.9	1.0 08	171.3	49 45.8	1.0 09	171.2	50 15.7	1.0 09	171.1
7	48 40.9	1.0 10	169.9	49 10.8	1.0 10	169.8	49 40.7	1.0 10	169.7	50 10.5	1.0 10	169.7
8	48 35.1	99 11	168.5	49 04.9	99 11	168.4	49 34.8	99 11	168.3	50 04.6	99 11	168.2
9	48 28.6	99 12	167.0	48 58.3	99 12	166.9	49 28.1	99 12	166.8	49 57.9	99 12	166.7
10	48 21.3	99 13	165.6	48 51.0	99 14	165.5	49 20.7	99 14	165.4	49 50.4	99 14	165.3
1	48 13.2	99 15	164.2	48 42.9	99 15	164.1	49 12.5	99 15	164.0	49 42.2	99 15	163.9
2	48 04.4	99 16	162.8	48 34.0	99 16	162.7	49 03.6	99 16	162.5	49 33.2	99 16	162.4
3	47 54.9	98 17	161.4	48 24.5	98 17	161.3	48 54.0	98 17	161.1	49 23.5	98 17	161.0
4	47 44.7	98 18	160.0	48 14.2	98 18	159.9	48 43.6	98 18	159.7	49 13.1	98 19	159.6
15	47 33.8	98 19	158.6	48 03.2	98 20	158.5	48 32.6	98 20	158.3	49 02.0	98 20	158.2
6	47 22.2	98 21	157.2	47 51.5	98 21	157.1	48 20.8	98 21	156.9	48 50.1	98 21	156.8
7	47 09.9	98 22	155.9	47 39.1	97 22	155.7	48 08.3	97 22	155.5	48 37.6	97 22	155.4
8	46 56.9	97 23	154.5	47 26.1	97 23	154.3	47 55.2	97 23	154.2	48 24.3	97 23	154.0
9	46 43.3	97 24	153.2	47 12.3	97 24	153.0	47 41.4	97 24	152.8	48 10.4	97 24	152.6
20	46 29.0	97 25	151.8	46 58.0	97 25	151.6	47 26.9	97 25	151.4	47 55.9	96 25	151.2
1	46 14.1	96 26	150.5	46 43.0	96 26	150.3	47 11.8	96 26	150.1	47 40.7	96 26	149.9
2	45 58.5	96 27	149.2	46 27.3	96 27	149.0	46 56.1	96 27	148.8	47 24.9	96 27	148.5
3	45 42.4	96 28	147.9	46 11.1	96 28	147.6	46 39.8	96 28	147.4	47 08.5	96 28	147.2
4	45 25.6	95 29	146.6	45 54.3	95 29	146.3	46 22.9	95 29	146.1	46 51.4	95 29	145.9
25	45 08.3	95 30	145.3	45 36.8	95 30	145.0	46 05.3	95 30	144.8	46 33.8	95 30	144.6
6	44 50.4	95 31	144.0	45 18.9	95 31	143.8	45 47.3	95 31	143.5	46 15.6	95 31	143.3
7	44 32.0	94 32	142.7	45 00.3	94 32	142.5	45 28.6	94 32	142.3	45 56.9	94 32	142.0
8	44 13.0	94 33	141.5	44 41.2	94 33	141.2	45 09.4	94 33	141.0	45 37.6	94 33	140.7
9	43 53.5	94 33	140.2	44 21.6	94 34	140.0	44 49.7	94 34	139.7	45 17.8	93 34	139.5
30	43 33.5	93 34	139.0	44 01.5	93 34	138.7	44 29.5	93 35	138.5	44 57.4	93 35	138.2
1	43 12.9	93 35	137.8	43 40.9	93 35	137.5	44 08.8	93 35	137.3	44 36.6	93 36	137.0
2	42 51.9	93 36	136.6	43 19.8	93 36	136.3	43 47.5	93 36	136.0	44 15.3	92 36	135.8
3	42 30.4	92 37	135.4	42 58.2	92 37	135.1	43 25.9	92 37	134.8	43 53.5	92 37	134.6
4	42 08.5	92 37	134.2	42 36.1	92 37	133.9	43 03.7	92 38	133.6	43 31.3	92 38	133.4
35	41 46.1	92 38	133.0	42 13.6	92 38	132.7	42 41.1	92 38	132.5	43 08.6	91 38	132.2
6	41 23.3	91 39	131.8	41 50.7	91 39	131.6	42 18.1	91 39	131.3	42 45.5	91 39	131.0
7	41 00.1	91 39	130.7	41 27.4	91 40	130.4	41 54.7	91 40	130.1	42 22.0	91 40	129.8
8	40 36.4	91 40	129.5	41 03.7	91 40	129.3	41 30.9	91 40	129.0	41 58.0	90 41	128.7
9	40 12.4	91 41	128.4	40 39.6	90 41	128.1	41 06.7	90 41	127.8	41 33.7	90 41	127.5
40	39 48.0	90 41	127.3	40 15.1	90 41	127.0	40 42.1	90 42	126.7	41 09.0	90 42	126.4
1	39 23.2	90 42	126.2	39 50.2	90 42	125.9	40 17.1	90 42	125.6	40 44.0	90 42	125.3
2	38 58.1	90 42	125.1	39 25.0	89 43	124.8	39 51.8	89 43	124.5	40 18.6	89 43	124.2
3	38 32.7	89 43	124.0	38 59.4	89 43	123.7	39 26.2	89 43	123.4	39 52.9	89 43	123.1
4	38 06.9	89 44	122.9	38 33.6	89 44	122.6	39 00.2	89 44	122.3	39 26.8	89 44	122.0
45	37 40.8	89 44	121.8	38 07.4	89 44	121.5	38 33.9	88 44	121.2	39 00.5	88 44	120.9
6	37 14.4	89 44	120.8	37 40.9	88 45	120.5	38 07.4	88 45	120.2	38 33.8	88 45	119.9
7	36 47.7	88 45	119.7	37 14.1	88 45	119.4	37 40.5	88 45	119.1	38 06.9	88 45	118.8
8	36 20.7	88 45	118.7	36 47.0	88 46	118.4	37 13.4	88 46	118.1	37 39.7	88 46	117.8
9	35 53.4	88 46	117.6	36 19.7	88 46	117.3	36 46.0	87 46	117.0	37 12.2	87 46	116.7
50	35 25.9	87 46	116.6	35 52.1	87 46	116.3	36 18.3	87 46	116.0	36 44.5	87 47	115.7
1	34 58.2	87 47	115.6	35 24.3	87 47	115.3	35 50.4	87 47	115.0	36 16.5	87 47	114.7
2	34 30.2	87 47	114.6	34 56.3	87 47	114.3	35 22.3	87 47	114.0	35 48.3	87 47	113.7
3	34 02.0	87 47	113.6	34 28.0	87 47	113.3	34 54.0	87 48	113.0	35 19.9	86 48	112.7
4	33 33.5	87 48	112.6	33 59.5	86 48	112.3	34 25.4	86 48	112.0	34 51.3	86 48	111.7
55	33 04.9	86 48	111.6	33 30.8	86 48	111.3	33 56.7	86 48	111.0	34 22.5	86 48	110.7
6	32 36.1	86 48	110.6	33 01.9	86 48	110.3	33 27.7	86 49	110.0	33 53.5	86 49	109.7
7	32 07.1	86 49	109.7	32 32.8	86 49	109.4	32 58.6	86 49	109.0	33 24.3	86 49	108.7
8	31 37.9	86 49	108.7	32 03.6	86 49	108.4	32 29.3	86 49	108.1	32 54.9	85 49	107.8
9	31 08.5	86 49	107.7	31 34.2	86 49	107.4	31 59.8	85 49	107.1	32 25.4	85 49	106.8
60	30 39.0	86 49	106.8	31 04.6	85 50	106.5	31 30.2	85 50	106.2	31 55.8	85 50	105.9
1	30 09.4	85 50	105.8	30 34.9	85 50	105.5	31 00.5	85 50	105.2	31 26.0	85 50	104.9
2	29 39.6	85 50	104.9	30 05.1	85 50	104.6	30 30.6	85 50	104.3	30 56.1	85 50	104.0
3	29 09.6	85 50	104.0	29 35.1	85 50	103.7	30 00.6	85 50	103.4	30 26.0	85 50	103.1
4	28 39.6	85 50	103.1	29 05.0	85 50	102.8	29 30.5	85 50	102.4	29 55.9	85 50	102.1
65	28 09.4	85 50	102.1	28 34.9	85 50	101.8	29 00.2	85 51	101.5	29 25.6	84 51	101.2
6	27 39.2	85 51	101.2	28 04.6	85 51	100.9	28 29.9	84 51	100.6	28 55.2	84 51	100.3
7	27 08.8	85 51	100.3	27 34.2	84 51	100.0	27 59.5	84 51	99.7	28 24.8	84 51	99.4
8	26 38.4	85 51	99.4	27 03.7	84 51	99.1	27 29.0	84 51	98.8	27 54.3	84 51	98.5
9	26 07.8	84 51	98.5	26 33.2	84 51	98.2	26 58.4	84 51	97.9	27 23.7	84 51	97.6
70	25 37.2	84 51	97.6	26 02.5	84 51	97.3	26 27.8	84 51	97.0	26 53.0	84 51	96.7
1	25 06.6	84 51	96.7	25 31.9	84 51	96.4	25 57.1	84 51	96.1	26 22.3	84 51	95.8
2	24 35.9	84 51	95.9	25 01.1	84 51	95.6	25 26.3	84 51	95.3	25 51.5	84 51	95.0
3	24 05.1	84 51	95.0	24 30.3	84 51	94.7	24 55.6	84 51	94.4	25 20.7	84 51	94.1
4	23 34.3	84 51	94.1	23 59.5	84 51	93.8	24 24.7	84 51	93.5	24 49.9	84 51	93.2
75	23 03.5	84 51	93.2	23 28.7	84 51	92.9	23 53.9	84 51	92.6	24 19.0	84 51	92.3
6	22 32.6	84 51	92.4	22 57.8	84 51	92.1	23 23.0	84 51	91.8	23 48.1	84 52	91.5
7	22 01.7	84 51	91.5	22 26.9	84 52	91.2	22 52.1	84 52	90.9	23 17.2	84 52	90.6
8	21 30.8	84 52	90.6	21 56.0	84 52	90.3	22 21.2	84 52	90.1	22 46.3	84 52	89.8
9	20 59.9	84 52	89.8	21 25.1	84 52	89.5	21 50.3	84 51	89.2	22 15.4	84 51	88.9
80	20 29.0	84 52	88.9	20 54.2	84 51	88.6	21 19.4	84 51	88.3	21 44.5	84 51	88.0
1	19 58.1	84 51	88.1	20 23.3	84 51	87.8	20 48.5	84 51	87.5	21 13.7	84 51	87.2
2	19 27.2	84 51	87.2	19 52.5	84 51	86.9	20 17.7	84 51	86.6	20 42.8	84 51	86.4
3	18 56.4	84 51	86.4	19 21.6	84 51	86.1	19 46.8	84 51	85.8	20 12.0	84 51	85.5
4	18 25.6	84 51	85.5	18 50.8	84 51	85.2	19 16.0	84 51	85.0	19 41.2	84 51	84.7
85	17 54.8	84 51	84.7	18 20.0	84 51	84.4	18 45.3	84 51	84.1	19 10.5	84 51	83.8
6	17 24.0	84 51	83.8	17 49.3	84 51	83.6	18 14.5	84 51	83.3	18 39.8	84 51	83.0
7	16 53.3	84 51	83.0	17 18.6	84 51	82.7	17 43.9	84 51	82.4	18 09.1	84 51	82.2
8	16 22.7	84 51	82.2	16 48.0	84 51	81.9	17 13.3	84 51	81.6	17 38.5	84 51	81.3
9	15 52.1	84 51	81.3	16 17.4	84 51	81.1	16 42.7	84 51	80.8	17 08.0	84 51	80.5
90	15 21.6	85 51	80.5	15 46.9	84 51	80.2	16 12.3	84 51	79.9	16 37.6	84 51	79.7

Digitized by Google

16—15036

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 59°

H.A.	16° 00′ Alt.	Az.	16° 30′ Alt.	Az.	17° 00′ Alt.	Az.	17° 30′ Alt.	Az.	18° 00′ Alt.	Az.	18° 30′ Alt.	Az.	19° 00′ Alt.	Az.	19° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	15 00.0 1.0 00	180.0	14 30.0 1.0 00	180.0	14 00.0 1.0 00	180.0	13 30.0 1.0 00	180.0	13 00.0 1.0 00	180.0	12 30.0 1.0 00	180.0	12 00.0 1.0 00	180.0	11 30.0 1.0 00	180.0	00
1	14 59.7 1.0 01	179.0	14 29.7 1.0 01	179.0	13 59.7 1.0 01	179.0	13 29.7 1.0 01	179.0	12 59.7 1.0 01	179.0	12 29.7 1.0 01	179.0	11 59.7 1.0 01	179.0	11 29.7 1.0 01	179.0	1
2	14 58.9 1.0 02	178.0	14 28.9 1.0 02	178.0	13 58.9 1.0 02	178.0	13 28.9 1.0 02	178.0	12 58.9 1.0 02	178.0	12 29.0 1.0 02	178.1	11 59.0 1.0 02	178.1	11 29.0 1.0 02	178.1	2
3	14 57.6 1.0 03	177.0	14 27.6 1.0 03	177.0	13 57.6 1.0 03	177.0	13 27.6 1.0 03	177.1	12 57.6 1.0 03	177.1	12 27.6 1.0 03	177.1	11 57.7 1.0 03	177.1	11 27.7 1.0 03	177.1	3
4	14 55.7 1.0 04	176.0	14 25.7 1.0 04	176.0	13 55.7 1.0 04	176.1	13 25.8 1.0 04	176.1	12 55.8 1.0 04	176.1	12 25.8 1.0 04	176.1	11 55.8 1.0 04	176.1	11 25.9 1.0 04	176.2	4
05	14 53.3 1.0 05	175.0	14 23.3 1.0 05	175.1	13 53.4 1.0 05	175.1	13 23.4 1.0 05	175.1	12 53.4 1.0 05	175.1	12 23.5 1.0 05	175.1	11 53.5 1.0 05	175.2	11 23.5 1.0 05	175.2	05
6	14 50.4 1.0 06	174.0	14 20.4 1.0 06	174.1	13 50.4 1.0 06	174.1	13 20.5 1.0 06	174.1	12 50.5 1.0 06	174.1	12 20.6 1.0 06	174.2	11 50.6 1.0 06	174.2	11 20.7 1.0 06	174.2	6
7	14 46.9 1.0 07	173.0	14 16.9 1.0 07	173.1	13 47.0 1.0 07	173.1	13 17.1 1.0 07	173.1	12 47.1 1.0 07	173.2	12 17.2 1.0 07	173.2	11 47.2 1.0 06	173.2	11 17.3 1.0 06	173.3	7
8	14 42.9 1.0 08	172.0	14 12.9 1.0 08	172.1	13 43.0 1.0 08	172.1	13 13.1 1.0 07	172.2	12 43.2 1.0 07	172.2	12 13.3 1.0 07	172.2	11 43.4 1.0 07	172.3	11 13.4 1.0 07	172.3	8
9	14 38.3 1.0 08	171.1	14 08.4 1.0 08	171.1	13 38.5 1.0 08	171.1	13 08.6 1.0 08	171.2	12 38.7 1.0 08	171.2	12 08.8 1.0 08	171.3	11 38.9 1.0 08	171.3	11 09.0 1.0 08	171.4	9
10	14 33.3 1.0 09	170.1	14 03.4 1.0 09	170.1	13 33.5 1.0 09	170.2	13 03.6 1.0 09	170.2	12 33.8 1.0 09	170.3	12 03.9 1.0 09	170.3	11 34.0 1.0 09	170.4	11 04.1 1.0 09	170.4	10
1	14 27.7 99 10	169.1	13 57.8 99 10	169.1	13 28.0 99 10	169.2	12 58.1 99 10	169.2	12 28.3 99 10	169.3	11 58.4 99 10	169.3	11 28.6 99 10	169.4	10 58.7 99 10	169.4	1
2	14 21.6 99 11	168.1	13 51.7 99 11	168.2	13 21.9 99 11	168.2	12 52.1 99 11	168.3	12 22.3 99 11	168.3	11 52.5 99 11	168.4	11 22.6 99 11	168.4	10 52.8 99 11	168.5	2
3	14 14.9 99 12	167.1	13 45.1 99 12	167.2	13 15.3 99 12	167.2	12 45.6 99 12	167.3	12 15.8 99 12	167.4	11 46.0 99 12	167.4	11 16.2 99 12	167.5	10 46.4 99 12	167.5	3
4	14 07.8 99 13	166.1	13 38.0 99 13	166.2	13 08.3 99 13	166.3	12 38.5 99 13	166.3	12 08.8 99 13	166.4	11 39.0 99 12	166.5	11 09.2 99 12	166.5	10 39.5 99 12	166.6	4
15	14 00.1 99 14	165.1	13 30.4 99 14	165.2	13 00.7 99 14	165.3	12 30.9 99 13	165.4	12 01.2 99 13	165.4	11 31.5 99 13	165.5	11 01.8 99 13	165.6	10 32.1 99 13	165.6	15
6	13 51.9 99 14	164.2	13 22.2 99 14	164.2	12 52.6 99 14	164.3	12 22.9 99 14	164.4	11 53.2 99 14	164.5	11 23.5 99 14	164.5	10 53.8 99 14	164.6	10 24.1 99 14	164.7	6
7	13 43.2 99 15	163.2	13 13.6 99 15	163.3	12 44.0 99 15	163.3	12 14.3 99 15	163.4	11 44.7 99 15	163.5	11 15.0 99 15	163.6	10 45.4 99 15	163.7	10 15.7 99 15	163.7	7
8	13 34.0 99 16	162.2	13 04.4 99 16	162.3	12 34.8 99 16	162.4	12 05.2 99 16	162.5	11 35.6 99 16	162.5	11 06.0 99 16	162.6	10 36.4 99 16	162.7	10 06.8 99 16	162.8	8
9	13 24.3 99 17	161.2	12 54.8 99 17	161.3	12 25.2 99 17	161.4	11 55.7 99 17	161.5	11 26.1 99 17	161.6	10 56.6 99 17	161.7	10 27.0 99 17	161.8	9 57.4 99 16	161.8	9
20	13 14.2 98 18	160.3	12 44.7 98 18	160.4	12 15.1 98 18	160.4	11 45.6 98 18	160.5	11 16.1 98 17	160.6	10 46.6 98 17	160.7	10 17.1 98 17	160.8	9 47.6 98 17	160.9	20
1	13 03.5 98 19	159.3	12 34.0 98 19	159.4	12 04.6 98 18	159.5	11 35.1 98 18	159.6	11 05.6 98 18	159.7	10 36.2 98 18	159.8	10 06.7 98 18	159.9	9 37.2 98 18	160.0	1
2	12 52.3 98 19	158.3	12 22.9 98 19	158.4	11 53.5 98 19	158.5	11 24.1 98 19	158.6	10 54.7 98 19	158.7	10 25.2 98 19	158.8	9 55.8 98 19	158.9	9 26.4 98 19	159.0	2
3	12 40.6 98 20	157.4	12 11.3 98 20	157.5	11 41.9 98 20	157.6	11 12.6 98 20	157.7	10 43.2 98 20	157.8	10 13.8 98 20	157.9	9 44.5 98 20	158.0	9 15.1 98 20	158.1	3
4	12 28.5 98 21	156.4	11 59.2 98 21	156.5	11 29.9 98 21	156.6	11 00.6 98 21	156.7	10 31.3 98 21	156.8	10 02.0 98 21	156.9	9 32.7 98 20	157.0	9 03.3 98 20	157.2	4
25	12 15.9 97 22	155.4	11 46.7 97 22	155.5	11 17.4 98 22	155.7	10 48.1 98 22	155.8	10 18.9 98 21	155.9	9 49.6 98 21	156.0	9 20.4 98 21	156.1	8 51.1 98 21	156.2	25
6	12 02.8 97 23	154.5	11 33.6 97 22	154.6	11 04.4 97 22	154.7	10 35.2 97 22	154.8	10 06.0 97 22	154.9	9 36.8 97 22	155.1	9 07.6 97 22	155.2	8 38.4 97 22	155.3	6
7	11 49.3 97 23	153.5	11 20.1 97 23	153.6	10 51.0 97 23	153.8	10 21.9 97 23	153.9	9 52.7 97 23	154.0	9 23.6 97 23	154.1	8 54.4 97 23	154.2	8 25.3 97 23	154.4	7
8	11 35.3 97 24	152.6	11 06.2 97 24	152.7	10 37.1 97 24	152.8	10 08.0 97 24	152.9	9 39.0 97 24	153.1	9 09.9 97 24	153.2	8 40.8 97 24	153.3	8 11.7 97 23	153.4	8
9	11 20.8 97 25	151.6	10 51.8 97 25	151.7	10 22.8 97 25	151.9	9 53.8 97 25	152.0	9 24.7 97 24	152.1	8 55.7 97 24	152.3	8 26.7 97 24	152.4	7 57.7 97 24	152.5	9
30	11 05.9 96 26	150.7	10 36.9 97 25	150.8	10 08.0 97 25	150.9	9 39.0 97 25	151.1	9 10.1 97 25	151.2	8 41.1 97 25	151.3	8 12.1 97 25	151.5	7 43.2 97 25	151.6	30
1	10 50.5 96 26	149.7	10 21.6 96 26	149.9	9 52.8 96 26	150.0	9 23.9 96 26	150.1	8 55.0 96 26	150.3	8 26.1 96 26	150.4	7 57.2 96 26	150.5	7 28.3 96 26	150.7	1
2	10 34.7 96 27	148.8	10 05.9 96 27	148.9	9 37.1 96 27	149.1	9 08.3 96 27	149.2	8 39.4 96 27	149.4	8 10.6 96 26	149.5	7 41.8 96 26	149.6	7 12.9 96 26	149.8	2
3	10 18.5 96 28	147.9	9 49.7 96 28	148.0	9 21.0 96 28	148.1	8 52.2 96 27	148.3	8 23.5 96 27	148.4	7 54.7 96 27	148.6	7 25.9 96 27	148.7	6 57.1 96 27	148.9	3
4	10 01.8 96 28	146.9	9 33.2 96 28	147.1	9 04.5 96 28	147.2	8 35.8 96 28	147.4	8 07.1 96 28	147.5	7 38.4 96 28	147.7	7 09.7 96 28	147.8	6 40.9 96 28	147.9	4
35	9 44.8 95 29	146.0	9 16.1 95 29	146.1	8 47.5 95 29	146.3	8 18.9 95 29	146.4	7 50.3 95 29	146.6	7 21.6 95 29	146.7	6 53.0 95 28	146.9	6 24.3 95 28	147.0	35
6	9 27.3 95 30	145.1	8 58.7 95 30	145.2	8 30.2 95 30	145.4	8 01.6 95 30	145.5	7 33.0 95 29	145.7	7 04.5 95 29	145.8	6 35.9 95 29	146.0	6 07.3 95 29	146.1	6
7	9 09.4 95 30	144.1	8 40.9 95 30	144.3	8 12.4 95 30	144.4	7 43.9 95 30	144.6	7 15.4 95 30	144.8	6 46.9 95 30	144.9	6 18.4 95 30	145.1	5 49.9 95 30	145.2	7
8	8 51.1 95 31	143.2	8 22.6 95 31	143.4	7 54.2 95 31	143.5	7 25.8 95 31	143.7	6 57.4 95 31	143.9	6 28.9 95 31	144.0	6 00.5 95 30	144.2	5 32.1 95 30	144.3	8
9	8 32.4 94 32	142.3	8 04.0 94 32	142.5	7 35.7 95 32	142.6	7 07.3 95 32	142.8	6 39.0 95 31	142.9	6 10.6 95 31	143.1	5 42.2 95 31	143.3	5 13.9 95 31	143.4	9
40	8 13.3 94 32	141.4	7 45.0 94 32	141.5	7 16.7 94 32	141.7	6 48.4 94 32	141.9	6 20.1 94 32	142.0	5 51.8 94 32	142.2	5 23.6 94 32	142.4			40
1	7 53.8 94 33	140.5	7 25.6 94 33	140.6	6 57.4 94 33	140.8	6 29.2 94 33	141.0	6 00.9 94 33	141.1	5 32.7 94 32	141.3	5 04.5 94 32	141.5			1
2	7 33.9 94 34	139.5	7 05.8 94 34	139.7	6 37.6 94 34	139.9	6 09.5 94 33	140.1	5 41.4 94 33	140.2	5 13.2 94 33	140.4					2
3	7 13.7 94 34	138.6	6 45.6 94 34	138.8	6 17.6 94 34	139.0	5 49.5 94 34	139.2	5 21.4 94 34	139.3							3
4	6 53.1 93 35	137.7	6 25.1 93 35	137.9	5 57.1 93 35	138.1	5 29.1 93 35	138.3	5 01.1 93 34	138.5							4
45	6 32.1 93 36	136.8	6 04.2 93 35	137.0	5 36.3 93 35	137.2	5 08.4 93 35	137.4									45
6	6 10.8 93 36	135.9	5 42.9 93 36	136.1	5 15.1 93 36	136.3											6
7	5 49.1 93 37	135.0	5 21.4 93 37	135.2													7
8	5 27.1 92 37	134.1															8
9	5 04.8 92 38	133.3															9

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Az.	16° 30′ Alt.	Az.	17° 00′ Alt.	Az.	17° 30′ Alt.	Az.	18° 00′ Alt.	Az.	18° 30′ Alt.	Az.	19° 00′ Alt.	Az.	19° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
91	13 09.4 85 51	80.8	13 34.9 85 51	80.5	14 00.3 85 51	80.2	14 25.7 85 51	79.9	14 51.1 85 51	79.7	15 16.5 85 51	79.4	15 41.9 84 50	79.1	16 07.2 84 50	78.8	91
2	12 39.0 85 51	79.9	13 04.5 85 51	79.7	13 29.9 85 51	79.4	13 55.4 85 50	79.1	14 20.8 85 50	78.8	14 46.2 85 50	78.6	15 11.6 85 50	78.3	15 36.9 85 50	78.0	2
3	12 08.6 85 50	79.1	12 34.1 85 50	78.8	12 59.6 85 50	78.5	13 25.1 85 50	78.3	13 50.5 85 50	78.0	14 15.9 85 50	77.7	14 41.4 85 50	77.5	15 06.8 85 50	77.2	3
4	11 38.3 85 50	78.3	12 03.8 85 50	78.0	12 29.3 85 50	77.7	12 54.8 85 50	77.4	13 20.3 85 50	77.2	13 45.8 85 50	76.9	14 11.3 85 50	76.6	14 36.7 85 50	76.4	4
95	11 08.1 85 50	77.4	11 33.7 85 50	77.1	11 59.2 85 50	76.9	12 24.7 85 50	76.6	12 50.3 85 50	76.3	13 15.8 85 50	76.1	13 41.2 85 50	75.8	14 06.7 85 50	75.5	95
6	10 38.0 85 50	76.6	11 03.6 85 50	76.3	11 29.2 85 50	76.0	11 54.7 85 50	75.8	12 20.3 85 50	75.5	12 45.8 85 50	75.2	13 11.3 85 50	75.0	13 36.8 85 50	74.7	6
7	10 08.0 85 50	75.7	10 33.6 85 50	75.5	10 59.2 85 50	75.2	11 24.8 85 50	75.0	11 50.4 85 50	74.7	12 16.0 85 50	74.4	12 41.6 85 49	74.2	13 07.1 85 49	73.9	7
8	9 38.1 86 50	74.9	10 03.7 86 50	74.6	10 29.4 85 50	74.4	10 55.0 85 49	74.1	11 20.7 85 49	73.9	11 46.3 85 49	73.6	12 11.9 85 49	73.3	12 37.5 85 49	73.1	8
9	9 08.3 86 49	74.1	9 34.0 86 49	73.8	9 59.7 86 49	73.6	10 25.4 86 49	73.3	10 51.1 86 49	73.0	11 16.7 85 49	72.8	11 42.3 85 49	72.5	12 08.0 85 49	72.2	9
100	8 38.6 86 49	73.2	9 04.4 86 49	73.0	9 30.1 86 49	72.7	9 55.9 86 49	72.5	10 21.6 86 49	72.2	10 47.3 86 49	71.9	11 12.9 86 49	71.7	11 38.6 86 49	71.4	100
1	8 09.1 86 49	72.4	8 34.9 86 49	72.1	9 00.7 86 49	71.9	9 26.5 86 49	71.6	9 52.2 86 49	71.4	10 17.9 86 49	71.1	10 43.7 86 49	70.8	11 09.4 86 48	70.6	1
2	7 39.7 86 49	71.6	8 05.6 86 49	71.3	8 31.4 86 49	71.1	8 57.2 86 49	70.8	9 23.0 86 48	70.5	9 48.8 86 48	70.3	10 14.6 86 48	70.0	10 40.3 86 48	69.8	2
3	7 10.5 86 48	70.7	7 36.4 86 48	70.5	8 02.2 86 48	70.2	8 28.1 86 48	70.0	8 53.9 86 48	69.7	9 19.8 86 48	69.5	9 45.6 86 48	69.2	10 11.4 86 48	68.9	3
4	6 41.4 86 48	69.9	7 07.3 86 48	69.6	7 33.2 86 48	69.4	7 59.1 86 48	69.1	8 25.0 86 48	68.9	8 50.9 86 48	68.6	9 16.8 86 48	68.4	9 42.7 86 48	68.1	4
105	6 12.5 87 48	69.1	6 38.4 87 48	68.8	7 04.4 87 48	68.6	7 30.3 86 48	68.3	7 56.3 86 48	68.1	8 22.2 86 48	67.8	8 48.1 86 47	67.5	9 14.1 86 47	67.3	105
6	5 43.7 87 48	68.2	6 09.7 87 48	68.0	6 35.7 87 48	67.7	7 01.7 87 47	67.5	7 27.7 87 47	67.2	7 53.7 87 47	67.0	8 19.7 87 47	66.7	8 45.6 87 47	66.5	6
7	5 15.1 87 47	67.4	5 41.1 87 47	67.1	6 07.2 87 47	66.9	6 33.2 87 47	66.6	6 59.3 87 47	66.4	7 25.3 87 47	66.1	7 51.4 87 47	65.9	8 17.4 87 47	65.6	7
8			5 12.7 87 47	66.3	5 38.9 87 47	66.1	6 05.0 87 47	65.8	6 31.1 87 47	65.6	6 57.2 87 47	65.3	7 23.3 87 47	65.1	7 49.3 87 46	64.8	8
9					5 10.7 87 47	65.2	5 36.9 87 46	65.0	6 03.0 87 46	64.7	6 29.2 87 46	64.5	6 55.3 87 46	64.2	7 21.5 87 46	64.0	9
110							5 09.0 87 46	64.1	5 35.2 87 46	63.9	6 01.4 87 46	63.6	6 27.6 87 46	63.4	6 53.8 87 46	63.2	110
1									5 07.5 88 46	63.1	5 33.8 88 46	62.8	6 00.1 88 46	62.6	6 26.3 88 45	62.3	1
2											5 06.4 88 45	62.0	5 32.7 88 45	61.7	5 59.1 88 45	61.5	2
3															5 05.6 88 45	60.9	5 32.0 88 45	60.7	3
4																	5 05.2 88 44	59.8	4

Digitized by Google

Lat. 59°

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	51 00.0	1.0	01	180.0	51 30.0	1.0	01	180.0	52 00.0	1.0	01	180.0	52 30.0	1.0	01	180.0
1	50 59.6	1.0	02	178.5	51 29.6	1.0	02	178.5	51 59.6	1.0	02	178.5	52 29.6	1.0	02	178.5
2	50 58.4	1.0	03	177.0	51 28.4	1.0	03	177.0	51 58.4	1.0	04	177.0	52 28.4	1.0	03	176.9
3	50 56.4	1.0	05	175.5	51 26.4	1.0	05	175.5	51 56.3	1.0	05	175.5	52 26.3	1.0	05	175.4
4	50 53.6	1.0	06	174.0	51 23.5	1.0	06	174.0	51 53.5	1.0	06	173.9	52 23.4	1.0	06	173.9
05	50 50.0	1.0	07	172.5	51 19.9	1.0	07	172.5	51 49.8	1.0	08	172.4	52 19.7	1.0	08	172.4
6	50 45.6	1.0	09	171.1	51 15.4	1.0	09	171.0	51 45.3	1.0	09	170.9	52 15.2	1.0	09	170.9
7	50 40.4	1.0	10	169.6	51 10.2	99	10	169.5	51 40.1	99	10	169.4	52 09.9	99	10	169.3
8	50 34.4	99	11	168.1	51 04.2	99	11	168.0	51 34.0	99	12	167.9	52 03.8	99	12	167.8
9	50 27.6	99	13	166.6	50 57.4	99	13	166.5	51 27.1	99	13	166.4	51 56.9	99	13	166.3
10	50 20.1	99	14	165.2	50 49.8	99	14	165.1	51 19.5	99	14	165.0	51 49.2	99	14	164.8
1	50 11.8	99	15	163.7	50 41.5	99	15	163.6	51 11.1	99	15	163.5	51 40.7	99	15	163.4
2	50 02.8	99	16	162.3	50 32.4	99	16	162.2	51 02.0	99	17	162.0	51 31.5	99	17	161.9
3	49 53.0	98	18	160.8	50 22.5	98	18	160.7	50 52.0	98	18	160.6	51 21.5	98	18	160.4
4	49 42.5	98	19	159.4	50 12.0	98	19	159.3	50 41.4	98	19	159.1	51 10.8	98	19	159.0
15	49 31.3	98	20	158.0	50 00.7	98	20	157.8	50 30.0	98	20	157.7	50 59.3	98	20	157.5
6	49 19.4	98	21	156.6	49 48.7	98	21	156.4	50 17.9	97	21	156.2	50 47.2	97	22	156.1
7	49 06.8	97	22	155.2	49 35.9	97	22	155.0	50 05.1	97	22	154.8	50 34.3	97	23	154.6
8	48 53.5	97	23	153.8	49 22.6	97	23	153.6	49 51.6	97	24	153.4	50 20.7	97	24	153.2
9	48 39.5	97	24	152.4	49 08.5	97	25	152.2	49 37.5	97	25	152.0	50 06.4	97	25	151.8
20	48 24.8	96	25	151.0	48 53.7	96	26	150.8	49 22.6	96	26	150.6	49 51.5	96	26	150.4
1	48 09.5	96	27	149.7	48 38.4	96	27	149.5	49 07.2	96	27	149.3	49 35.9	96	27	149.0
2	47 53.6	96	28	148.3	48 22.4	96	28	148.1	48 51.0	96	28	147.9	49 19.7	96	28	147.7
3	47 37.1	96	29	147.0	48 05.7	95	29	146.8	48 34.3	95	29	146.5	49 02.9	95	29	146.3
4	47 20.0	95	30	145.7	47 48.5	95	30	145.4	48 17.0	95	30	145.2	48 45.4	95	30	145.0
25	47 02.3	95	30	144.4	47 30.7	95	31	144.1	47 59.1	95	31	143.9	48 27.4	94	31	143.6
6	46 44.0	94	31	143.1	47 12.3	94	32	142.8	47 40.6	94	32	142.6	48 08.8	94	32	142.3
7	46 25.1	94	32	141.8	46 53.3	94	32	141.5	47 21.5	94	33	141.3	47 49.6	94	33	141.0
8	46 05.7	94	33	140.5	46 33.8	94	33	140.2	47 01.9	93	34	140.0	47 29.9	93	34	139.7
9	45 45.8	93	34	139.2	46 13.8	93	34	139.0	46 41.8	93	34	138.7	47 09.7	93	35	138.4
30	45 25.4	93	35	138.0	45 53.3	93	35	137.7	46 21.1	93	35	137.4	46 48.9	93	35	137.2
1	45 04.4	93	36	136.7	45 32.2	93	36	136.5	46 00.0	92	36	136.2	46 27.7	92	36	135.9
2	44 43.0	92	36	135.5	45 10.7	92	37	135.2	45 38.3	92	37	135.0	46 05.9	92	37	134.7
3	44 21.1	92	37	134.3	44 48.7	92	37	134.0	45 16.2	92	38	133.7	45 43.7	92	38	133.5
4	43 58.8	92	38	133.1	44 26.3	92	38	132.8	44 53.7	91	38	132.5	45 21.1	91	38	132.2
35	43 36.0	91	39	131.9	44 03.4	91	39	131.6	44 30.7	91	39	131.3	44 58.0	91	39	131.0
6	43 12.8	91	39	130.7	43 40.1	91	40	130.4	44 07.3	91	40	130.1	44 34.5	91	40	129.8
7	42 49.2	91	40	129.6	43 16.3	90	40	129.3	43 43.5	90	40	129.0	44 10.5	90	41	128.7
8	42 25.1	90	41	128.4	42 52.2	90	41	128.1	43 19.2	90	41	127.8	43 46.2	90	41	127.5
9	42 00.7	90	41	127.3	42 27.7	90	41	127.0	42 54.6	90	42	126.7	43 21.5	90	42	126.4
40	41 36.0	90	42	126.1	42 02.8	90	42	125.8	42 29.7	89	42	125.5	42 56.4	89	42	125.2
1	41 10.8	89	42	125.0	41 37.6	89	43	124.7	42 04.3	89	43	124.4	42 31.0	89	43	124.1
2	40 45.3	89	43	123.9	41 12.0	89	43	123.6	41 38.7	89	43	123.3	42 05.3	89	43	123.0
3	40 19.5	89	44	122.8	40 46.1	89	44	122.5	41 12.7	88	44	122.2	41 39.2	88	44	121.9
4	39 53.4	88	44	121.7	40 19.9	88	44	121.4	40 46.4	88	44	121.1	41 12.8	88	44	120.8
45	39 26.9	88	45	120.6	39 53.4	88	45	120.3	40 19.8	88	45	120.0	40 46.1	88	45	119.7
6	39 00.2	88	45	119.6	39 26.6	88	45	119.3	39 52.9	88	45	118.9	40 19.1	87	45	118.6
7	38 33.2	88	45	118.5	38 59.5	87	46	118.2	39 25.7	87	46	117.9	39 51.8	87	46	117.6
8	38 05.9	87	46	117.5	38 32.1	87	46	117.1	38 58.2	87	46	116.8	39 24.3	87	46	116.5
9	37 38.3	87	46	116.4	38 04.5	87	46	116.1	38 30.5	87	46	115.8	38 56.5	87	47	115.5
50	37 10.6	87	47	115.4	37 36.6	87	47	115.1	38 02.6	87	47	114.8	38 28.5	86	47	114.4
1	36 42.5	87	47	114.4	37 08.5	86	47	114.1	37 34.4	86	47	113.7	38 00.3	86	47	113.4
2	36 14.3	86	47	113.4	36 40.2	86	48	113.0	37 06.0	86	48	112.7	37 31.8	86	48	112.4
3	35 45.8	86	48	112.4	36 11.6	86	48	112.0	36 37.4	86	48	111.7	37 03.1	86	48	111.4
4	35 17.1	86	48	111.4	35 42.9	86	48	111.0	36 08.6	86	48	110.7	36 34.3	85	48	110.4
55	34 48.2	86	48	110.4	35 13.9	86	49	110.1	35 39.6	85	49	109.7	36 05.2	85	49	109.4
6	34 19.2	86	49	109.4	34 44.8	85	49	109.1	35 10.4	85	49	108.8	35 36.0	85	49	108.4
7	33 49.9	85	49	108.4	34 15.5	85	49	108.1	34 41.1	85	49	107.8	35 06.6	85	49	107.5
8	33 20.5	85	49	107.5	33 46.1	85	49	107.1	34 11.6	85	50	106.8	34 37.0	85	50	106.5
9	32 51.0	85	50	106.5	33 16.5	85	50	106.2	33 41.9	85	50	105.9	34 07.3	85	50	105.6
60	32 21.3	85	50	105.6	32 46.7	85	50	105.2	33 12.1	85	50	104.9	33 37.5	84	50	104.6
1	31 51.4	85	50	104.6	32 16.8	85	50	104.3	32 42.2	84	50	104.0	33 07.5	84	50	103.7
2	31 21.5	85	50	103.7	31 46.8	84	50	103.4	32 12.2	84	50	103.1	32 37.4	84	50	102.7
3	30 51.4	85	50	102.8	31 16.7	84	50	102.4	31 42.0	84	50	102.1	32 07.2	84	50	101.8
4	30 21.2	84	50	101.8	30 46.5	84	51	101.5	31 11.7	84	50	101.2	31 36.9	84	51	100.9
65	29 50.9	84	51	100.9	30 16.2	84	51	100.6	30 41.4	84	51	100.3	31 06.6	84	51	100.0
6	29 20.5	84	51	100.0	29 45.7	84	51	99.7	30 10.9	84	51	99.4	30 36.1	84	51	99.1
7	28 50.0	84	51	99.1	29 15.2	84	51	98.8	29 40.4	84	51	98.5	30 05.5	84	51	98.2
8	28 19.5	84	51	98.2	28 44.7	84	51	97.9	29 09.8	84	51	97.6	29 34.9	84	51	97.3
9	27 48.9	84	51	97.3	28 14.0	84	51	97.0	28 39.1	84	51	96.7	29 04.2	84	51	96.4
70	27 18.2	84	51	96.4	27 43.3	84	51	96.1	28 08.4	84	51	95.8	28 33.5	83	51	95.5
1	26 47.5	84	51	95.5	27 12.6	84	51	95.2	27 37.7	84	51	94.9	28 02.7	83	51	94.6
2	26 16.7	84	51	94.7	26 41.8	84	51	94.3	27 06.9	83	51	94.0	27 31.9	83	51	93.7
3	25 45.9	84	51	93.8	26 11.0	84	51	93.5	26 36.0	83	51	93.2	27 01.0	83	51	92.9
4	25 15.0	84	51	92.9	25 40.1	84	51	92.6	26 05.1	83	51	92.3	26 30.2	83	51	92.0
75	24 44.1	84	51	92.0	25 09.2	84	52	91.7	25 34.3	83	52	91.4	25 59.3	83	52	91.1
6	24 13.2	84	52	91.2	24 38.3	84	52	90.9	25 03.4	83	52	90.6	25 28.4	83	52	90.3
7	23 42.3	84	52	90.3	24 07.4	84	52	90.0	24 32.5	83	52	89.7	24 57.5	83	52	89.4
8	23 11.4	84	52	89.5	23 36.5	84	51	89.2	24 01.6	83	52	88.9	24 26.6	83	51	88.6
9	22 40.5	84	51	88.6	23 05.6	84	51	88.3	23 30.7	83	52	88.0	23 55.7	83	51	87.7
80	22 09.7	84	51	87.8	22 34.7	84	51	87.5	22 59.8	83	52	87.2	23 24.8	83	51	86.9
1	21 38.8	84	51	86.9	22 03.9	84	51	86.6	22 28.9	83	51	86.3	22 54.0	83	51	86.0
2	21 07.9	84	51	86.1	21 33.0	84	51	85.8	21 58.1	84	51	85.5	22 23.2	83	51	85.2
3	20 37.1	84	51	85.2	21 02.2	84	51	84.9	21 27.3	84	51	84.6	21 52.4	83	51	84.3
4	20 06.4	84	51	84.4	20 31.5	84	51	84.1	20 56.6	84	51	83.8	21 21.7	84	51	83.5
85	19 35.6	84	51	83.5	20 00.8	84	51	83.3	20 25.9	84	51	83.0	20 51.0	84	51	82.7
6	19 04.9	84	51	82.7	19 30.1	84	51	82.4	19 55.3	84	51	82.1	20 20.4	84	51	81.8
7	18 34.3	84	51	81.9	18 59.5	84	51	81.6	19 24.7	84	51	81.3	19 49.8	84	51	81.0
8	18 03.8	84	51	81.0	18 29.0	84	51	80.8	18 54.2	84	51	80.5	19 19.3	84	51	80.2
9	17 33.3	84	51	80.2	17 58.5	84	51	79.9	18 23.7	84	50	79.6	18 48.9	84	51	79.4
90	17 02.9	84	51	79.4	17 28.1	84	50	79.1	17 53.4	84	50	78.8	18 18.6	84	50	78.5

H.A.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	53 00.0	1.0	01	180.0	53 30.0	1.0	01	180.0	54 00.0	1.0	01	180.0	54 30.0	1.0	01	180.0
1	52 59.6	1.0	02	178.5	53 29.6	1.0	02	178.4	53 59.6	1.0	02	178.4	54 29.6	1.0	02	178.4
2	52 58.3	1.0	04	176.9	53 28.3	1.0	03	176.9	53 58.3	1.0	04	176.9	54 28.3	1.0	04	176.8
3	52 56.3	1.0	05	175.4	53 26.2	1.0	05	175.3	53 56.2	1.0	05	175.3	54 26.2	1.0	05	175.3
4	52 53.4	1.0	06	173.8	53 23.3	1.0	06	173.8	53 53.3	1.0	06	173.7	54 23.2	1.0	06	173.7
05	52 49.6	1.0	08	172.3	53 19.6	1.0	08	172.3	53 49.5	1.0	08	172.2	54 19.4	1.0	08	172.1
6	52 45.1	1.0	09	170.8	53 15.0	1.0	09	170.7	53 44.9	1.0	09	170.6	54 14.7	1.0	09	170.6
7	52 39.7	99	10	169.3	53 09.6	99	10	169.2	53 39.4	99	10	169.1	54 09.2	99	11	169.0
8	52 33.6	99	12	167.7	53 03.4	99	12	167.6	53 33.2	99	12	167.5	54 02.9	99	12	167.4
9	52 26.6	99	13	166.2	52 56.4	99	13	166.1	53 26.1	99	13	166.0	53 55.8	99	13	165.9
10	52 18.9	99	14	164.7	52 48.6	99	14	164.6	53 18.2	99	14	164.5	53 47.9	99	15	164.4
1	52 10.4	99	16	163.2	52 40.0	99	16	163.1	53 09.6	99	16	163.0	53 39.2	99	16	162.8
2	52 01.1	98	17	161.7	52 30.6	98	17	161.6	53 00.1	98	17	161.5	53 29.6	98	17	161.3
3	51 51.0	98	18	160.3	52 20.5	98	18	160.1	52 49.9	98	18	160.0	53 19.4	98	18	159.8
4	51 40.2	98	19	158.8	52 09.6	98	19	158.6	52 38.9	98	20	158.5	53 08.3	98	20	158.3
15	51 28.7	98	20	157.3	51 57.9	98	21	157.2	52 27.2	98	21	157.0	52 56.5	98	21	156.8
6	51 16.4	97	22	155.9	51 45.6	97	22	155.7	52 14.8	97	22	155.5	52 44.0	97	22	155.3
7	51 03.4	97	23	154.5	51 32.5	97	23	154.3	52 01.6	97	23	154.1	52 30.7	97	23	153.9
8	50 49.7	97	24	153.0	51 18.8	97	24	152.8	51 47.8	97	24	152.6	52 16.7	97	24	152.4
9	50 35.4	96	25	151.6	51 04.3	96	25	151.4	51 33.2	96	25	151.2	52 02.1	96	26	151.0
20	50 20.4	96	26	150.2	50 49.2	96	26	150.0	51 18.0	96	26	149.8	51 46.7	96	27	149.5
1	50 04.7	96	27	148.8	50 33.4	96	27	148.6	51 02.1	96	28	148.4	51 30.8	96	28	148.1
2	49 48.4	95	28	147.4	50 17.0	95	28	147.2	50 45.6	95	29	147.0	51 14.1	95	29	146.7
3	49 31.4	95	29	146.1	49 59.9	95	29	145.8	50 28.4	95	30	145.6	50 56.8	95	30	145.3
4	49 13.9	95	30	144.7	49 42.3	95	30	144.5	50 10.6	94	31	144.2	50 39.0	94	31	144.0
25	48 55.7	94	31	143.4	49 24.0	94	31	143.1	49 52.3	94	32	142.9	50 20.5	94	32	142.6
6	48 37.0	94	32	142.1	49 05.2	94	32	141.8	49 33.3	94	32	141.5	50 01.4	94	33	141.3
7	48 17.7	94	33	140.8	48 45.8	93	33	140.5	49 13.8	93	33	140.2	49 41.8	93	34	139.9
8	47 57.9	93	34	139.5	48 25.9	93	34	139.2	48 53.8	93	34	138.9	49 21.7	93	34	138.6
9	47 37.6	93	35	138.2	48 05.4	93	35	137.9	48 33.2	93	35	137.6	49 01.0	92	35	137.3
30	47 16.7	93	36	136.9	47 44.4	92	36	136.6	48 12.1	92	36	136.3	48 39.8	92	36	136.0
1	46 55.3	92	36	135.6	47 23.0	92	37	135.4	47 50.5	92	37	135.1	48 18.1	92	37	134.8
2	46 33.5	92	37	134.4	47 01.0	92	37	134.1	47 28.5	91	38	133.8	47 55.9	91	38	133.5
3	46 11.2	91	38	133.2	46 38.6	91	38	132.9	47 05.9	91	38	132.6	47 33.3	91	38	132.3
4	45 48.4	91	39	131.9	46 15.7	91	39	131.6	46 43.0	91	39	131.3	47 10.2	91	39	131.0
35	45 25.2	91	39	130.7	45 52.4	91	40	130.4	46 19.5	90	40	130.1	46 46.6	90	40	129.8
6	45 01.6	90	40	129.5	45 28.7	90	40	129.2	45 55.7	90	40	128.9	46 22.7	90	41	128.6
7	44 37.6	90	41	128.4	45 04.5	90	41	128.1	45 31.5	90	41	127.7	45 58.4	90	41	127.4
8	44 13.1	90	41	127.2	44 40.0	90	42	126.9	45 06.8	89	42	126.6	45 33.6	89	42	126.3
9	43 48.3	89	42	126.0	44 15.1	89	42	125.7	44 41.8	89	42	125.4	45 08.5	89	42	125.1
40	43 23.2	89	42	124.9	43 49.9	89	43	124.6	44 16.5	89	43	124.3	44 43.1	88	43	123.9
1	42 57.7	89	43	123.8	43 24.2	89	43	123.5	43 50.8	88	43	123.1	44 17.3	88	44	122.8
2	42 31.8	88	44	122.7	42 58.3	88	44	122.3	43 24.7	88	44	122.0	43 51.1	88	44	121.7
3	42 05.6	88	44	121.6	42 32.0	88	44	121.2	42 58.4	88	44	120.9	43 24.7	88	45	120.6
4	41 39.1	88	45	120.5	42 05.5	88	45	120.1	42 31.7	87	45	119.8	42 57.9	87	45	119.5
45	41 12.4	88	45	119.4	41 38.6	87	45	119.1	42 04.8	87	45	118.7	42 30.9	87	46	118.4
6	40 45.3	87	46	118.3	41 11.4	87	46	118.0	41 37.5	87	46	117.6	42 03.5	87	46	117.3
7	40 17.9	87	46	117.2	40 44.0	87	46	116.9	41 10.0	87	46	116.6	41 36.0	86	46	116.2
8	39 50.3	87	46	116.2	40 16.3	87	47	115.9	40 42.2	86	47	115.5	41 08.1	86	47	115.2
9	39 22.5	86	47	115.1	39 48.4	86	47	114.8	40 14.2	86	47	114.5	40 40.0	86	47	114.2
50	38 54.4	86	47	114.1	39 20.2	86	47	113.8	39 46.0	86	47	113.5	40 11.7	86	48	113.1
1	38 26.1	86	48	113.1	38 51.8	86	48	112.8	39 17.6	86	48	112.4	39 43.2	85	48	112.1
2	37 57.6	86	48	112.1	38 23.2	86	48	111.8	38 48.9	85	48	111.4	39 14.5	85	48	111.1
3	37 28.8	86	48	111.1	37 54.4	85	48	110.7	38 20.0	85	48	110.4	38 45.5	85	49	110.1
4	36 59.9	85	48	110.1	37 25.5	85	49	109.8	37 51.0	85	49	109.4	38 16.4	85	49	109.1
55	36 30.8	85	49	109.1	36 56.3	85	49	108.8	37 21.7	85	49	108.4	37 47.1	85	49	108.1
6	36 01.5	85	49	108.1	36 26.9	85	49	107.8	36 52.3	85	49	107.5	37 17.7	84	49	107.1
7	35 32.0	85	49	107.1	35 57.4	85	49	106.8	36 22.8	84	50	106.5	36 48.1	84	50	106.2
8	35 02.4	85	50	106.2	35 27.8	84	50	105.9	35 53.1	84	50	105.5	36 18.3	84	50	105.2
9	34 32.7	84	50	105.2	34 58.0	84	50	104.9	35 23.2	84	50	104.6	35 48.4	84	50	104.2
60	34 02.8	84	50	104.3	34 28.1	84	50	104.0	34 53.3	84	50	103.6	35 18.4	84	50	103.3
1	33 32.8	84	50	103.3	33 58.0	84	50	103.0	34 23.2	84	50	102.7	34 48.3	84	50	102.4
2	33 02.7	84	50	102.4	33 27.8	84	50	102.1	33 53.0	84	50	101.8	34 18.0	83	51	101.4
3	32 32.4	84	50	101.5	32 57.6	84	51	101.2	33 22.7	84	51	100.8	33 47.7	83	51	100.5
4	32 02.1	84	51	100.6	32 27.2	84	51	100.2	32 52.3	83	51	99.9	33 17.3	83	51	99.6
65	31 31.7	84	51	99.7	31 56.8	84	51	99.3	32 21.8	83	51	99.0	32 46.8	83	51	98.7
6	31 01.2	84	51	98.7	31 26.2	83	51	98.4	31 51.2	83	51	98.1	32 16.2	83	51	97.8
7	30 30.6	83	51	97.8	30 55.6	83	51	97.5	31 20.6	83	51	97.2	31 45.5	83	51	96.9
8	30 00.0	83	51	96.9	30 25.0	83	51	96.6	30 49.9	83	51	96.3	31 14.8	83	51	96.0
9	29 29.3	83	51	96.1	29 54.2	83	51	95.7	30 19.2	83	51	95.4	30 44.1	83	51	95.1
70	28 58.5	83	51	95.2	29 23.5	83	51	94.9	29 48.4	83	51	94.5	30 13.3	83	51	94.2
1	28 27.7	83	51	94.3	28 52.7	83	51	94.0	29 17.6	83	51	93.7	29 42.4	83	51	93.3
2	27 56.9	83	52	93.4	28 21.8	83	51	93.1	28 46.7	83	52	92.8	29 11.6	83	51	92.5
3	27 26.0	83	52	92.5	27 50.9	83	51	92.2	28 15.8	83	52	91.9	28 40.7	83	52	91.6
4	26 55.1	83	52	91.7	27 20.1	83	51	91.4	27 44.9	83	52	91.1	28 09.8	83	52	90.7
75	26 24.2	83	52	90.8	26 49.2	83	52	90.5	27 14.0	83	52	90.2	27 38.9	83	52	89.9
6	25 53.3	83	52	90.0	26 18.3	83	52	89.6	26 43.1	83	52	89.3	27 08.0	83	51	89.0
7	25 22.4	83	52	89.1	25 47.4	83	51	88.8	26 12.2	83	52	88.5	26 37.1	83	51	88.2
8	24 51.5	83	52	88.3	25 16.5	83	51	87.9	25 41.4	83	52	87.6	26 06.2	83	51	87.3
9	24 20.7	83	51	87.4	24 45.6	83	51	87.1	25 10.5	83	51	86.8	25 35.4	83	51	86.5
80	23 49.8	83	51	86.6	24 14.7	83	51	86.3	24 39.6	83	51	85.9	25 04.5	83	51	85.6
1	23 19.0	83	51	85.7	23 43.9	83	51	85.4	24 08.8	83	51	85.1	24 33.7	83	51	84.8
2	22 48.2	83	51	84.9	23 13.1	83	51	84.6	23 38.1	83	51	84.3	24 03.0	83	51	84.0
3	22 17.4	83	51	84.0	22 42.4	83	51	83.7	23 07.4	83	51	83.4	23 32.3	83	51	83.1
4	21 46.7	83	51	83.2	22 11.7	83	51	82.9	22 36.7	83	51	82.6	23 01.6	83	51	82.3
85	21 16.0	83	51	82.4	21 41.1	83	51	82.1	22 06.1	83	51	81.8	22 31.0	83	51	81.5
6	20 45.4	84	51	81.5	21 10.5	83	51	81.2	21 35.5	83	51	81.0	22 00.5	83	51	80.7
7	20 14.9	84	51	80.7	20 40.0	84	51	80.4	21 05.0	83	51	80.1	21 30.0	83	51	79.8
8	19 44.5	84	51	79.9	20 09.6	84	51	79.6	20 34.6	84	50	79.3	20 59.7	83	50	79.0
9	19 14.1	84	50	79.1	19 39.2	84	50	78.8	20 04.3	84	50	78.5	20 29.4	84	50	78.2
90	18 43.8	84	50	78.2	19 08.9	84	50	78.0	19 34.1	84	50	77.7	19 59.2	84	50	77.4

Digitized by Google

Lat. 59°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0	8 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	00
1	10 59.7	1.0 01	179.0	10 29.7	1.0 01	179.0	9 59.7	1.0 01	179.1	9 29.7	1.0 01	179.1	8 59.7	1.0 01	179.1	8 29.7	1.0 01	179.1	7 59.7	1.0 01	179.1	7 29.8	1.0 01	179.1	1
2	10 59.0	1.0 02	178.1	10 29.0	1.0 02	178.1	9 59.0	1.0 02	178.1	9 29.0	1.0 02	178.1	8 59.0	1.0 02	178.1	8 29.0	1.0 02	178.1	7 59.0	1.0 02	178.1	7 29.0	1.0 02	178.2	2
3	10 57.7	1.0 03	177.1	10 27.7	1.0 03	177.1	9 57.7	1.0 03	177.2	9 27.7	1.0 03	177.2	8 57.7	1.0 03	177.2	8 27.7	1.0 03	177.2	7 57.7	1.0 03	177.2	7 27.8	1.0 03	177.2	3
4	10 55.9	1.0 04	176.2	10 25.9	1.0 04	176.2	9 55.9	1.0 04	176.2	9 25.9	1.0 04	176.2	8 56.0	1.0 04	176.2	8 26.0	1.0 04	176.3	7 56.0	1.0 04	176.3	7 26.0	1.0 04	176.3	4
05	10 53.6	1.0 05	175.2	10 23.6	1.0 05	175.2	9 53.6	1.0 05	175.3	9 23.6	1.0 05	175.3	8 53.7	1.0 05	175.3	8 23.7	1.0 05	175.3	7 53.7	1.0 05	175.4	7 23.8	1.0 05	175.4	05
6	10 50.7	1.0 06	174.3	10 20.8	1.0 06	174.3	9 50.8	1.0 06	174.3	9 20.9	1.0 06	174.3	8 50.9	1.0 06	174.4	8 20.9	1.0 05	174.4	7 51.0	1.0 06	174.4	7 21.0	1.0 05	174.5	6
7	10 47.4	1.0 06	173.3	10 17.4	1.0 06	173.3	9 47.5	1.0 06	173.4	9 17.6	1.0 06	173.4	8 47.6	1.0 06	173.4	8 17.7	1.0 06	173.5	7 47.7	1.0 06	173.5	7 17.8	1.0 06	173.5	7
8	10 43.5	1.0 07	172.4	10 13.6	1.0 07	172.4	9 43.7	1.0 07	172.4	9 13.8	1.0 07	172.5	8 43.8	1.0 07	172.5	8 13.9	1.0 07	172.5	7 44.0	1.0 07	172.6	7 14.1	1.0 07	172.6	8
9	10 39.1	1.0 08	171.4	10 09.2	1.0 08	171.4	9 39.3	1.0 08	171.5	9 09.4	1.0 08	171.5	8 39.5	1.0 08	171.6	8 09.6	1.0 08	171.6	7 39.7	1.0 08	171.6	7 09.8	1.0 08	171.7	9
10	10 34.3	1.0 09	170.4	10 04.4	1.0 09	170.5	9 34.5	1.0 09	170.5	9 04.6	1.0 09	170.6	8 34.8	1.0 09	170.6	8 04.9	1.0 09	170.7	7 35.0	1.0 09	170.7	7 05.1	1.0 09	170.8	10
1	10 28.9	99 10	169.5	9 59.0	1.0 10	169.5	9 29.2	1.0 10	169.6	8 59.3	1.0 10	169.6	8 29.5	1.0 10	169.7	7 59.6	1.0 10	169.7	7 29.8	1.0 10	169.8	6 59.9	1.0 10	169.8	1
2	10 23.0	99 11	168.5	9 53.2	99 11	168.6	9 23.4	99 11	168.7	8 53.5	99 10	168.7	8 23.7	99 10	168.8	7 53.9	99 10	168.8	7 24.1	99 10	168.9	6 54.2	99 10	168.9	2
3	10 16.6	99 12	167.6	9 46.8	99 11	167.7	9 17.0	99 11	167.7	8 47.2	99 11	167.8	8 17.4	99 11	167.8	7 47.6	99 11	167.9	7 17.9	99 11	168.0	6 48.1	99 11	168.0	3
4	10 09.7	99 12	166.6	9 40.0	99 12	166.7	9 10.2	99 12	166.8	8 40.4	99 12	166.8	8 10.7	99 12	166.9	7 40.9	99 12	167.0	7 11.2	99 12	167.0	6 41.4	99 12	167.1	4
15	10 02.3	99 13	165.7	9 32.6	99 13	165.8	9 02.9	99 13	165.8	8 33.2	99 13	165.9	8 03.4	99 13	166.0	7 33.7	99 13	166.0	7 04.0	99 13	166.1	6 34.3	99 13	166.2	15
6	9 54.5	99 14	164.8	9 24.8	99 14	164.8	8 55.1	99 14	164.9	8 25.4	99 14	165.0	7 55.7	99 14	165.0	7 26.0	99 14	165.1	6 56.3	99 14	165.2	6 26.6	99 14	165.3	6
7	9 46.1	99 15	163.8	9 16.4	99 15	163.9	8 46.8	99 15	164.0	8 17.1	99 15	164.0	7 47.5	99 14	164.1	7 17.8	99 14	164.2	6 48.2	99 14	164.3	6 18.5	99 14	164.4	7
8	9 37.2	99 16	162.9	9 07.6	99 16	163.0	8 38.0	99 15	163.0	8 08.4	99 15	163.1	7 38.8	99 15	163.2	7 09.2	99 15	163.3	6 39.6	99 15	163.4	6 10.0	99 15	163.4	8
9	9 27.9	99 16	161.9	8 58.3	99 16	162.0	8 28.8	99 16	162.1	7 59.2	99 16	162.2	7 29.6	99 16	162.3	7 00.1	99 16	162.4	6 30.5	99 16	162.4	6 00.9	99 16	162.5	9
20	9 18.1	98 17	161.0	8 48.5	98 17	161.1	8 19.0	98 17	161.2	7 49.5	98 17	161.3	7 20.0	98 17	161.4	6 50.5	98 17	161.4	6 20.9	98 17	161.5	5 51.4	98 17	161.6	20
1	9 07.8	98 18	160.1	8 38.3	98 18	160.2	8 08.8	98 18	160.2	7 39.3	98 18	160.3	7 09.9	98 18	160.4	6 40.4	98 18	160.5	6 10.9	98 18	160.6	5 41.4	98 17	160.7	1
2	8 57.0	98 19	159.1	8 27.6	98 19	159.2	7 58.1	98 18	159.3	7 28.7	98 18	159.4	6 59.3	98 18	159.5	6 29.9	98 18	159.6	6 00.4	98 18	159.7	5 31.0	98 18	159.8	2
3	8 45.7	98 20	158.2	8 16.4	98 19	158.3	7 47.0	98 19	158.4	7 17.6	98 19	158.5	6 48.2	98 19	158.6	6 18.9	98 19	158.7	5 49.5	98 19	158.8	5 20.1	98 19	158.9	3
4	8 34.0	98 20	157.3	8 04.7	98 20	157.4	7 35.4	98 20	157.5	7 06.1	98 20	157.6	6 36.7	98 20	157.7	6 07.4	98 20	157.8	5 38.1	98 20	157.9	5 08.8	98 20	158.0	4
25	8 21.8	98 21	156.3	7 52.6	98 21	156.4	7 23.3	98 21	156.6	6 54.0	98 21	156.7	6 24.8	98 21	156.8	5 55.5	98 21	156.9	5 26.2	98 20	157.0				25
6	8 09.2	97 22	155.4	7 40.0	97 22	155.5	7 10.8	97 22	155.6	6 41.6	97 22	155.8	6 12.4	97 22	155.9	5 43.1	97 21	156.0	5 13.9	97 21	156.1				6
7	7 56.1	97 23	154.5	7 27.0	97 22	154.6	6 57.8	97 22	154.7	6 28.7	97 22	154.8	5 59.5	97 22	155.0	5 30.3	97 22	155.1	5 01.2	97 22	155.2				7
8	7 42.6	97 23	153.6	7 13.5	97 23	153.7	6 44.4	97 23	153.8	6 15.3	97 23	153.9	5 46.2	97 23	154.1	5 17.1	97 23	154.2							8
9	7 28.6	97 24	152.6	6 59.6	97 24	152.8	6 30.5	97 24	152.9	6 01.5	97 24	153.0	5 32.5	97 24	153.2	5 03.4	97 23	153.3							9
30	7 14.2	97 25	151.7	6 45.2	97 25	151.9	6 16.3	97 25	152.0	5 47.3	97 24	152.1	5 18.3	97 24	152.3										30
1	6 59.3	96 25	150.8	6 30.4	96 25	151.0	6 01.5	96 25	151.1	5 32.6	96 25	151.2	5 03.7	96 25	151.4										1
2	6 44.1	96 26	149.9	6 15.2	96 26	150.0	5 46.4	96 26	150.2	5 17.5	96 26	150.3													2
3	6 28.4	96 27	149.0	5 59.6	96 27	149.1	5 30.8	96 27	149.3	5 02.0	96 26	149.4													3
4	6 12.2	96 28	148.1	5 43.5	96 27	148.2	5 14.8	96 27	148.4																4
35	5 55.7	95 28	147.2	5 27.0	95 28	147.3																			35
6	5 38.7	95 29	146.3	5 10.2	95 29	146.4																			6
7	5 21.4	95 30	145.4																						7
8	5 03.6	95 30	144.5																						8

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	16 32.5	84 50	78.6	16 57.8	84 50	78.3	17 23.1	84 50	78.0	17 48.3	84 50	77.7	18 13.6	84 50	77.4	18 38.8	84 50	77.1	19 03.9	84 50	76.9	19 29.1	84 50	76.6	91
2	16 02.3	84 50	77.7	16 27.6	84 50	77.4	16 52.9	84 50	77.2	17 18.2	84 50	76.9	17 43.4	84 50	76.6	18 08.7	84 50	76.3	18 33.9	84 50	76.0	18 59.1	84 50	75.7	2
3	15 32.1	85 50	76.9	15 57.5	84 50	76.6	16 22.8	84 50	76.3	16 48.1	84 50	76.1	17 13.4	84 50	75.8	17 38.7	84 50	75.5	18 04.0	84 50	75.2	18 29.2	84 50	74.9	3
4	15 02.1	85 50	76.1	15 27.5	85 50	75.8	15 52.9	85 50	75.5	16 18.2	84 50	75.2	16 43.5	84 50	75.0	17 08.8	84 50	74.7	17 34.1	84 50	74.4	17 59.4	84 49	74.1	4
95	14 32.2	85 50	75.3	14 57.6	85 50	75.0	15 23.0	85 50	74.7	15 48.4	85 50	74.4	16 13.8	85 50	74.2	16 39.1	84 49	73.9	17 04.4	84 49	73.6	17 29.7	84 49	73.3	95
6	14 02.3	85 50	74.4	14 27.8	85 49	74.2	14 53.2	85 49	73.9	15 18.7	85 49	73.6	15 44.1	85 49	73.3	16 09.5	85 49	73.1	16 34.8	85 49	72.8	17 00.2	84 49	72.5	6
7	13 32.6	85 49	73.6	13 58.1	85 49	73.3	14 23.6	85 49	73.1	14 49.1	85 49	72.8	15 14.5	85 49	72.5	15 40.0	85 49	72.2	16 05.4	85 49	72.0	16 30.8	85 49	71.7	7
8	13 03.0	85 49	72.8	13 28.6	85 49	72.5	13 54.1	85 49	72.2	14 19.6	85 49	72.0	14 45.1	85 49	71.7	15 10.6	85 49	71.4	15 36.1	85 49	71.2	16 01.5	85 49	70.9	8
9	12 33.6	85 49	72.0	12 59.2	85 49	71.7	13 24.8	85 49	71.4	13 50.3	85 49	71.2	14 15.9	85 48	70.9	14 41.4	85 48	70.6	15 06.9	85 48	70.3	15 32.4	85 48	70.1	9
100	12 04.3	85 49	71.1	12 29.9	85 49	70.9	12 55.5	85 48	70.6	13 21.1	85 48	70.3	13 46.7	85 48	70.1	14 12.3	85 48	69.8	14 37.9	85 48	69.5	15 03.4	85 48	69.3	100
1	11 35.1	86 48	70.3	12 00.8	86 48	70.1	12 26.5	86 48	69.8	12 52.1	86 48	69.5	13 17.8	85 48	69.3	13 43.4	85 48	69.0	14 09.0	85 48	68.7	14 34.6	85 48	68.5	1
2	11 06.1	86 48	69.5	11 31.8	86 48	69.2	11 57.5	86 48	69.0	12 23.2	86 48	68.7	12 48.9	86 48	68.4	13 14.6	86 48	68.2	13 40.3	86 48	67.9	14 05.9	85 47	67.7	2
3	10 37.2	86 48	68.7	11 03.0	86 48	68.4	11 28.8	86 48	68.2	11 54.5	86 48	67.9	12 20.3	86 48	67.6	12 46.0	86 47	67.4	13 11.7	86 47	67.1	13 37.4	86 47	66.8	3
4	10 08.5	86 48	67.9	10 34.3	86 47	67.6	11 00.2	86 48	67.3	11 26.0	86 47	67.1	11 51.8	86 47	66.8	12 17.6	86 47	66.6	12 43.3	86 47	66.3	13 09.1	86 47	66.0	4
105	9 40.0	86 47	67.0	10 05.9	86 47	66.8	10 31.7	86 47	66.5	10 57.6	86 47	66.3	11 23.5	86 47	66.0	11 49.3	86 47	65.7	12 15.1	86 47	65.5	12 41.0	86 47	65.2	105
6	9 11.6	87 47	66.2	9 37.5	86 47	66.0	10 03.5	86 47	65.7	10 29.4	86 47	65.4	10 55.3	86 47	65.2	11 21.2	86 46	64.9	11 47.1	86 46	64.7	12 13.0	86 46	64.4	6
7	8 43.4	87 47	65.4	9 09.4	87 47	65.1	9 35.4	87 46	64.9	10 01.4	87 46	64.6	10 27.4	87 46	64.4	10 53.3	87 46	64.1	11 19.3	86 46	63.9	11 45.2	86 46	63.6	7
8	8 15.4	87 46	64.6	8 41.5	87 46	64.3	9 07.5	87 46	64.1	9 33.6	87 46	63.8	9 59.6	87 46	63.6	10 25.6	87 46	63.3	10 51.6	87 46	63.1	11 17.6	87 46	62.8	8
9	7 47.6	87 46	63.7	8 13.7	87 46	63.5	8 39.8	87 46	63.2	9 05.9	87 46	63.0	9 32.0	87 46	62.7	9 58.1	87 46	62.5	10 24.2	87 45	62.2	10 50.2	87 45	62.0	9
110	7 20.0	87 46	62.9	7 46.2	87 46	62.7	8 12.3	87 45	62.4	8 38.5	87 45	62.2	9 04.7	87 45	61.9	9 30.8	87 45	61.7	9 56.9	87 45	61.4	10 23.1	87 45	61.2	110
1	6 52.6	87 45	62.1	7 18.8	87 45	61.8	7 45.1	87 45	61.6	8 11.3	87 45	61.3	8 37.5	87 45	61.1	9 03.7	87 45	60.9	9 29.9	87 45	60.6	9 56.1	87 45	60.4	1
2	6 25.4	88 45	61.3	6 51.7	88 45	61.0	7 18.0	88 45	60.8	7 44.3	88 45	60.5	8 10.6	88 44	60.3	8 36.8	88 44	60.0	9 03.1	88 44	59.8	9 29.3	87 44	59.6	2
3	5 58.4	88 45	60.4	6 24.8	88 44	60.2	6 51.1	88 44	59.9	7 17.5	88 44	59.7	7 43.8	88 44	59.5	8 10.2	88 44	59.2	8 36.5	88 44	59.0	9 02.8	88 44	58.7	3
4	5 31.6	88 44	59.6	5 58.1	88 44	59.4	6 24.5	88 44	59.1	6 50.9	88 44	58.9	7 17.3	88 44	58.6	7 43.7	88 44	58.4	8 10.1	88 44	58.2	8 36.5	88 43	57.9	4
115	5 05.1	88 44	58.8	5 31.6	88 44	58.5	5 58.1	88 44	58.3	6 24.6	88 44	58.1	6 51.1	88 43	57.8	7 17.5	88 43	57.6	7 44.0	88 43	57.3	8 10.5	88 43	57.1	115
6				5 05.4	89 43	57.7	5 31.9	89 43	57.5	5 58.5	89 43	57.2	6 25.0	88 43	57.0	6 51.6	88 43	56.8	7 18.1	88 43	56.5	7 44.6	88 43	56.3	6
7							5 06.0	89 43	56.6	5 32.6	89 43	56.4	5 59.2	89 42	56.2	6 25.8	89 42	55.9	6 52.4	89 42	55.7	7 19.0	89 42	55.5	7
8										5 07.0	89 42	55.6	5 33.7	89 42	55.3	6 00.4	89 42	55.1	6 27.0	89 42	54.9	6 53.7	89 42	54.6	8
9													5 08.4	89 42	54.5	5 35.1	89 42	54.3	6 01.9	89 42	54.1	6 28.6	89 41	53.8	9
120																5 10.2	89 41	53.5	5 37.0	89 41	53.2	6 03.8	89 41	53.0	120
1																			5 12.4	90 41	52.4	5 39.3	90 40	52.2	1
2																						5 15.0	90 40	51.4	2

Digitized by Google

Lat. 59°

H.A.	24° 00′				24° 30′				25° 00′				25° 30′			
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	55 00.0	1.0	01	180.0	55 30.0	1.0	01	180.0	56 00.0	1.0	01	180.0	56 30.0	1.0	01	180.0
1	54 59.6	1.0	02	178.4	55 29.6	1.0	02	178.4	55 59.6	1.0	02	178.4	56 29.6	1.0	02	178.4
2	54 58.3	1.0	04	176.8	55 28.3	1.0	04	176.8	55 58.3	1.0	04	176.8	56 28.2	1.0	04	176.7
3	54 56.1	1.0	06	175.2	55 26.1	1.0	05	175.2	55 56.1	1.0	05	175.1	56 26.0	1.0	05	175.1
4	54 53.1	1.0	06	173.6	55 23.1	1.0	06	173.6	55 53.0	1.0	06	173.5	56 23.0	1.0	07	173.5
05	54 49.3	1.0	08	172.1	55 19.2	1.0	08	172.0	55 49.1	1.0	08	171.9	56 19.0	1.0	08	171.8
6	54 44.6	1.0	09	170.5	55 14.5	1.0	09	170.4	55 44.3	1.0	09	170.3	56 14.2	1.0	09	170.2
7	54 39.1	99	10	168.9	55 08.9	99	11	168.8	55 38.7	99	11	168.7	56 08.5	99	11	168.6
8	54 32.7	99	12	167.3	55 02.5	99	12	167.2	55 32.2	99	12	167.1	56 02.0	99	12	167.0
9	54 25.5	99	13	165.8	54 55.2	99	13	165.7	55 24.9	99	14	165.5	55 54.6	99	14	165.4
10	54 17.5	99	15	164.2	54 47.2	99	15	164.1	55 16.8	99	15	164.0	55 46.4	99	15	163.8
1	54 08.7	99	16	162.7	54 38.3	99	16	162.5	55 07.9	99	16	162.4	55 37.4	98	16	162.2
2	53 59.1	98	17	161.2	54 28.6	98	17	161.0	54 58.1	98	18	160.8	55 27.6	98	18	160.7
3	53 48.8	98	18	159.6	54 18.2	98	19	159.5	54 47.6	98	19	159.3	55 17.0	98	19	159.1
4	53 37.6	98	20	158.1	54 07.0	98	20	157.9	54 36.3	98	20	157.8	55 05.6	98	20	157.6
15	53 25.7	97	21	156.6	53 55.0	97	21	156.4	54 24.2	97	21	156.2	54 53.4	97	22	156.0
6	53 13.1	97	22	155.1	53 42.2	97	22	154.9	54 11.4	97	23	154.7	54 40.5	97	23	154.5
7	52 59.8	97	24	153.7	53 28.8	97	24	153.4	53 57.8	97	24	153.2	54 26.8	97	24	153.0
8	52 45.7	96	25	152.2	53 14.6	96	25	152.0	53 43.5	96	25	151.7	54 12.4	96	25	151.5
9	52 30.9	96	26	150.7	52 59.8	96	26	150.5	53 28.6	96	26	150.3	53 57.3	96	26	150.0
20	52 15.5	96	27	149.3	52 44.2	96	27	149.1	53 12.9	96	27	148.8	53 41.6	95	27	148.6
1	51 59.4	95	28	147.9	52 28.0	95	28	147.6	52 56.6	95	28	147.4	53 25.1	95	28	147.1
2	51 42.6	95	29	146.5	52 11.1	95	29	146.2	52 39.6	95	29	146.0	53 08.0	95	30	145.7
3	51 25.3	95	30	145.1	51 53.6	95	30	144.8	52 22.0	94	30	144.6	52 50.3	94	31	144.3
4	51 07.3	94	31	143.7	51 35.5	94	31	143.4	52 03.8	94	31	143.2	52 31.9	94	32	142.9
25	50 48.7	94	32	142.3	51 16.8	94	32	142.1	51 44.9	94	32	141.8	52 13.0	93	33	141.5
6	50 29.5	93	33	141.0	50 57.5	93	33	140.7	51 25.5	93	33	140.4	51 53.5	93	34	140.1
7	50 09.8	93	34	139.7	50 37.7	93	34	139.4	51 05.6	93	34	139.1	51 33.4	93	34	138.8
8	49 49.5	93	35	138.3	50 17.3	93	35	138.0	50 45.0	92	35	137.7	51 12.7	92	35	137.4
9	49 28.7	92	36	137.0	49 56.4	92	36	136.7	50 24.0	92	36	136.4	50 51.6	92	36	136.1
30	49 07.4	92	36	135.7	49 34.9	92	37	135.4	50 02.4	92	37	135.1	50 29.9	91	37	134.8
1	48 45.6	92	37	134.5	49 13.0	91	37	134.2	49 40.4	91	38	133.8	50 07.7	91	38	133.5
2	48 23.3	91	38	133.2	48 50.6	91	38	132.9	49 17.9	91	38	132.6	49 45.1	91	38	132.2
3	48 00.5	91	39	132.0	48 27.7	91	39	131.6	48 54.9	90	39	131.3	49 22.0	90	39	131.0
4	47 37.3	90	39	130.7	48 04.4	90	40	130.4	48 31.5	90	40	130.1	48 58.4	90	40	129.7
35	47 13.7	90	40	129.5	47 40.7	90	40	129.2	48 07.6	90	40	128.9	48 34.5	89	41	128.5
6	46 49.6	90	41	128.3	47 16.5	89	41	128.0	47 43.3	89	41	127.6	48 10.1	89	41	127.3
7	46 25.2	89	41	127.1	46 51.9	89	42	126.8	47 18.7	89	42	126.4	47 45.3	89	42	126.1
8	46 00.3	89	42	125.9	46 27.0	89	42	125.6	46 53.6	89	42	125.3	47 20.2	88	43	124.9
9	45 35.1	89	43	124.8	46 01.7	88	43	124.4	46 28.2	88	43	124.1	46 54.6	88	43	123.7
40	45 09.6	88	43	123.6	45 36.0	88	43	123.3	46 02.4	88	44	122.9	46 28.8	88	44	122.6
1	44 43.7	88	44	122.5	45 10.0	88	44	122.1	45 36.3	88	44	121.8	46 02.6	87	44	121.4
2	44 17.4	88	44	121.4	44 43.7	87	44	121.0	45 09.9	87	44	120.7	45 36.0	87	45	120.3
3	43 50.9	87	45	120.2	44 17.1	87	45	119.9	44 43.2	87	45	119.6	45 09.2	87	45	119.2
4	43 24.1	87	45	119.1	43 50.1	87	45	118.8	44 16.2	87	46	118.5	44 42.1	86	46	118.1
45	42 56.9	87	46	118.1	43 22.9	87	46	117.7	43 48.8	86	46	117.4	44 14.7	86	46	117.0
6	42 29.5	86	46	117.0	42 55.4	86	46	116.6	43 21.3	86	46	116.3	43 47.0	86	47	115.9
7	42 01.8	86	46	115.9	42 27.7	86	47	115.6	42 53.4	86	47	115.2	43 19.1	86	47	114.9
8	41 33.9	86	47	114.9	41 59.7	86	47	114.5	42 25.4	86	47	114.2	42 51.0	85	47	113.8
9	41 05.8	86	47	113.8	41 31.4	85	47	113.5	41 57.0	85	48	113.1	42 22.6	85	48	112.8
50	40 37.4	85	48	112.8	41 03.0	85	48	112.4	41 28.5	85	48	112.1	41 54.0	85	48	111.7
1	40 08.8	85	48	111.8	40 34.3	85	48	111.4	40 59.8	85	48	111.1	41 25.2	85	48	110.7
2	39 40.0	85	48	110.7	40 05.4	85	48	110.4	40 30.8	85	48	110.0	40 56.2	84	49	109.7
3	39 11.0	85	49	109.7	39 36.4	85	49	109.4	40 01.7	84	49	109.0	40 27.0	84	49	108.7
4	38 41.8	85	49	108.7	39 07.2	84	49	108.4	39 32.4	84	49	108.1	39 57.6	84	49	107.7
55	38 12.5	84	49	107.8	38 37.7	84	49	107.4	39 03.0	84	49	107.1	39 28.1	84	49	106.7
6	37 43.0	84	49	106.8	38 08.2	84	50	106.4	38 33.3	84	50	106.1	38 58.4	84	50	105.7
7	37 13.3	84	50	105.8	37 38.5	84	50	105.5	38 03.6	84	50	105.1	38 28.6	83	50	104.8
8	36 43.5	84	50	104.9	37 08.6	84	50	104.5	37 33.7	83	50	104.2	37 58.7	83	50	103.8
9	36 13.6	84	50	103.9	36 38.6	84	50	103.6	37 03.7	83	50	103.2	37 28.6	83	50	102.9
60	35 43.5	84	50	103.0	36 08.5	83	50	102.6	36 33.5	83	50	102.3	36 58.4	83	50	101.9
1	35 13.3	83	50	102.0	35 38.3	83	51	101.7	36 03.3	83	50	101.3	36 28.2	83	51	101.0
2	34 43.1	83	51	101.1	35 08.0	83	51	100.8	35 32.9	83	51	100.4	35 57.8	83	51	100.1
3	34 12.7	83	51	100.2	34 37.6	83	51	99.8	35 02.5	83	51	99.5	35 27.3	83	51	99.1
4	33 42.2	83	51	99.3	34 07.1	83	51	98.9	34 32.0	83	51	98.6	34 56.8	83	51	98.2
65	33 11.7	83	51	98.3	33 36.6	83	51	98.0	34 01.4	83	51	97.7	34 26.1	82	51	97.3
6	32 41.1	83	51	97.4	33 05.9	83	51	97.1	33 30.7	83	51	96.8	33 55.5	82	51	96.4
7	32 10.4	83	51	96.5	32 35.2	83	51	96.2	33 00.0	82	51	95.9	33 24.7	82	51	95.5
8	31 39.7	83	51	95.7	32 04.5	83	51	95.3	32 29.2	82	51	95.0	32 53.9	82	51	94.7
9	31 08.9	83	51	94.8	31 33.7	83	51	94.4	31 58.4	82	51	94.1	32 23.1	82	51	93.8
70	30 38.1	83	51	93.9	31 02.9	83	51	93.6	31 27.6	82	52	93.2	31 52.3	82	51	92.9
1	30 07.2	83	52	93.0	30 32.0	82	51	92.7	30 56.7	82	52	92.4	31 21.4	82	51	92.0
2	29 36.4	83	52	92.1	30 01.1	82	51	91.8	30 25.9	82	52	91.5	30 50.5	82	52	91.2
3	29 05.5	83	52	91.3	29 30.2	82	52	91.0	29 55.0	82	52	90.6	30 19.6	82	52	90.3
4	28 34.6	83	52	90.4	28 59.3	82	52	90.1	29 24.1	82	52	89.8	29 48.7	82	52	89.4
75	28 03.7	83	52	89.6	28 28.4	82	52	89.2	28 53.2	82	52	88.9	29 17.8	82	51	88.6
6	27 32.8	83	52	88.7	27 57.5	82	51	88.4	28 22.3	82	52	88.1	28 46.9	82	51	87.7
7	27 01.9	83	52	87.9	27 26.7	82	51	87.5	27 51.4	82	52	87.2	28 16.1	82	51	86.9
8	26 31.0	83	51	87.0	26 55.8	83	51	86.7	27 20.5	82	51	86.4	27 45.2	82	51	86.1
9	26 00.2	83	51	86.2	26 25.0	83	51	85.9	26 49.7	82	51	85.5	27 14.4	82	51	85.2
80	25 29.4	83	51	85.3	25 54.2	83	51	85.0	26 18.9	82	51	84.7	26 43.6	82	51	84.4
1	24 58.6	83	51	84.5	25 23.4	83	51	84.2	25 48.2	83	51	83.9	26 12.9	82	51	83.6
2	24 27.8	83	51	83.7	24 52.7	83	51	83.4	25 17.5	83	51	83.0	25 42.2	82	51	82.7
3	23 57.2	83	51	82.8	24 22.0	83	51	82.5	24 46.8	83	51	82.2	25 11.6	83	51	81.9
4	23 26.5	83	51	82.0	23 51.4	83	51	81.7	24 16.2	83	51	81.4	24 41.0	83	51	81.1
85	22 56.0	83	51	81.2	23 20.9	83	51	80.9	23 45.7	83	51	80.6	24 10.5	83	51	80.3
6	22 25.5	83	51	80.4	22 50.4	83	51	80.1	23 15.3	83	51	79.8	23 40.1	83	51	79.4
7	21 55.0	83	50	79.5	22 20.0	83	51	79.2	22 44.9	83	50	78.9	23 09.8	83	50	78.6
8	21 24.7	83	50	78.7	21 49.7	83	50	78.4	22 14.6	83	50	78.1	22 39.5	83	50	77.8
9	20 54.4	83	50	77.9	21 19.4	83	50	77.6	21 44.4	83	50	77.3	22 09.4	83	50	77.0
90	20 24.3	84	50	77.1	20 49.3	83	50	76.8	21 14.3	83	50	76.5	21 39.3	83	50	76.2

H.A.	26° 00′				26° 30′				27° 00′				27° 30′			
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	57 00.0	1.0	01	180.0	57 30.0	1.0	01	180.0	58 00.0	1.0	01	180.0	58 30.0	1.0	01	180.0
1	56 59.6	1.0	02	178.4	57 29.6	1.0	02	178.3	57 59.5	1.0	02	178.3	58 29.5	1.0	02	178.3
2	56 58.2	1.0	04	176.7	57 28.2	1.0	04	176.7	57 58.2	1.0	04	176.6	58 28.2	1.0	04	176.6
3	56 56.0	1.0	05	175.1	57 26.0	1.0	05	175.0	57 55.9	1.0	05	175.0	58 25.9	1.0	05	174.9
4	56 52.9	1.0	07	173.4	57 22.8	1.0	07	173.3	57 52.8	1.0	07	173.3	58 22.7	1.0	07	173.2
05	56 48.9	1.0	08	171.8	57 18.8	1.0	08	171.7	57 48.7	1.0	08	171.6	58 18.6	1.0	08	171.5
6	56 44.1	1.0	10	170.1	57 13.9	1.0	10	170.0	57 43.8	99	10	170.0	58 13.6	99	10	169.9
7	56 38.3	99	11	168.5	57 08.1	99	11	168.4	57 37.9	99	11	168.3	58 07.7	99	11	168.2
8	56 31.7	99	12	166.9	57 01.5	99	12	166.8	57 31.2	99	13	166.6	58 00.9	99	13	166.5
9	56 24.3	99	14	165.3	56 54.0	99	14	165.1	57 23.7	99	14	165.0	57 53.3	99	14	164.9
10	56 16.0	99	15	163.7	56 45.6	99	15	163.5	57 15.2	99	16	163.4	57 44.8	99	16	163.2
1	56 06.9	98	16	162.1	56 36.5	98	17	161.9	57 06.0	98	17	161.8	57 35.5	98	17	161.6
2	55 57.0	98	18	160.5	56 26.5	98	18	160.3	56 55.9	98	18	160.2	57 25.3	98	18	160.0
3	55 46.3	98	19	158.9	56 15.7	98	19	158.7	56 45.0	98	20	158.6	57 14.3	98	20	158.4
4	55 34.8	98	20	157.4	56 04.1	97	21	157.2	56 33.3	97	21	157.0	57 02.5	97	21	156.8
15	55 22.6	97	22	155.8	55 51.7	97	22	155.6	56 20.8	97	22	155.4	56 49.9	97	22	155.2
6	55 09.5	97	23	154.3	55 38.6	97	23	154.1	56 07.6	97	23	153.9	56 36.6	97	24	153.6
7	54 55.8	97	24	152.8	55 24.7	96	24	152.6	55 53.6	96	24	152.3	56 22.5	96	25	152.1
8	54 41.3	96	25	151.3	55 10.1	96	26	151.0	55 38.9	96	26	150.8	56 07.7	96	26	150.5
9	54 26.1	96	26	149.8	54 54.8	96	27	149.5	55 23.5	96	27	149.3	55 52.1	95	27	149.0
20	54 10.2	95	28	148.3	54 38.8	95	28	148.1	55 07.3	95	28	147.8	55 35.9	95	28	147.5
1	53 53.6	95	29	146.9	54 22.1	95	29	146.6	54 50.5	95	29	146.3	55 18.9	95	29	146.0
2	53 36.4	95	30	145.4	54 04.8	94	30	145.1	54 33.1	94	30	144.9	55 01.3	94	30	144.6
3	53 18.6	94	31	144.0	53 46.8	94	31	143.7	54 15.0	94	31	143.4	54 43.1	94	31	143.1
4	53 00.1	94	32	142.6	53 28.2	94	32	142.3	53 56.2	93	32	142.0	54 24.3	93	32	141.7
25	52 41.0	93	33	141.2	53 09.0	93	33	140.9	53 36.9	93	33	140.6	54 04.8	93	33	140.3
6	52 21.4	93	34	139.8	52 49.2	93	34	139.5	53 17.0	93	34	139.2	53 44.8	92	34	138.9
7	52 01.1	93	34	138.5	52 28.9	92	35	138.2	52 56.5	92	35	137.8	53 24.2	92	35	137.5
8	51 40.4	92	36	137.1	52 08.0	92	36	136.8	52 35.5	92	36	136.5	53 03.0	92	36	136.2
9	51 19.1	92	36	135.8	51 46.6	91	37	135.5	52 14.0	91	37	135.1	52 41.4	91	37	134.8
30	50 57.3	91	37	134.5	51 24.7	91	37	134.2	51 51.9	91	38	133.8	52 19.2	91	38	133.5
1	50 35.0	91	38	133.2	51 02.2	91	38	132.9	51 29.4	90	38	132.5	51 56.5	90	39	132.2
2	50 12.2	90	39	131.9	50 39.4	90	39	131.6	51 06.4	90	39	131.2	51 33.4	90	39	130.9
3	49 49.0	90	39	130.7	50 16.0	90	40	130.3	50 42.9	90	40	130.0	51 09.8	89	40	129.6
4	49 25.4	90	40	129.4	49 52.2	89	40	129.1	50 19.0	89	40	128.7	50 45.8	89	41	128.4
35	49 01.3	89	41	128.2	49 28.0	89	41	127.8	49 54.7	89	41	127.5	50 21.3	89	41	127.1
6	48 36.8	89	42	127.0	49 03.4	89	42	126.6	49 30.0	88	42	126.3	49 56.5	88	42	125.9
7	48 11.9	89	42	125.8	48 38.4	88	42	125.4	49 04.9	88	42	125.0	49 31.3	88	43	124.7
8	47 46.6	88	43	124.6	48 13.1	88	43	124.2	48 39.4	88	43	123.9	49 05.7	87	43	123.5
9	47 21.0	88	43	123.4	47 47.3	88	43	123.0	48 13.6	87	44	122.7	48 39.7	87	44	122.3
40	46 55.0	87	44	122.2	47 21.2	87	44	121.9	47 47.4	87	44	121.5	48 13.5	87	44	121.1
1	46 28.7	87	44	121.1	46 54.8	87	45	120.7	47 20.9	87	45	120.4	47 46.9	86	45	120.0
2	46 02.1	87	45	120.0	46 28.1	87	45	119.6	46 54.1	86	45	119.2	47 19.9	86	45	118.9
3	45 35.2	86	45	118.8	46 01.1	86	46	118.5	46 27.0	86	46	118.1	46 52.7	86	46	117.7
4	45 08.0	86	46	117.7	45 33.8	86	46	117.4	45 59.6	86	46	117.0	46 25.2	85	46	116.6
45	44 40.5	86	46	116.7	45 06.2	86	46	116.3	45 31.9	85	46	115.9	45 57.5	85	47	115.5
6	44 12.8	86	47	115.6	44 38.4	85	47	115.2	45 04.0	85	47	114.8	45 29.5	85	47	114.5
7	43 44.8	85	47	114.5	44 10.3	85	47	114.1	44 35.8	85	47	113.8	45 01.2	85	47	113.4
8	43 16.5	85	47	113.4	43 42.0	85	48	113.1	44 07.4	85	48	112.7	44 32.8	84	48	112.3
9	42 48.1	85	48	112.4	43 13.5	85	48	112.0	43 38.8	84	48	111.7	44 04.1	84	48	111.3
50	42 19.4	85	48	111.4	42 44.7	84	48	111.0	43 10.0	84	48	110.6	43 35.2	84	48	110.3
1	41 50.5	84	48	110.3	42 15.8	84	49	110.0	42 41.0	84	49	109.6	43 06.1	84	49	109.2
2	41 21.5	84	49	109.3	41 46.7	84	49	109.0	42 11.8	84	49	108.6	42 36.8	83	49	108.2
3	40 52.2	84	49	108.3	41 17.3	84	49	108.0	41 42.4	83	49	107.6	42 07.4	83	49	107.2
4	40 22.8	84	49	107.3	40 47.9	83	49	107.0	41 12.9	83	50	106.6	41 37.8	83	50	106.2
55	39 53.2	84	50	106.4	40 18.2	83	50	106.0	40 43.2	83	50	105.6	41 08.1	83	50	105.3
6	39 23.5	83	50	105.4	39 48.5	83	50	105.0	40 13.4	83	50	104.7	40 38.2	83	50	104.3
7	38 53.6	83	50	104.4	39 18.5	83	50	104.1	39 43.4	83	50	103.7	40 08.2	83	50	103.3
8	38 23.6	83	50	103.5	38 48.5	83	50	103.1	39 13.3	83	50	102.7	39 38.1	82	50	102.4
9	37 53.5	83	50	102.5	38 18.4	83	50	102.2	38 43.1	82	50	101.8	39 07.8	82	51	101.4
60	37 23.3	83	50	101.6	37 48.1	83	51	101.2	38 12.8	82	51	100.9	38 37.5	82	51	100.5
1	36 53.0	83	51	100.6	37 17.7	82	51	100.3	37 42.4	82	51	99.9	38 07.1	82	51	99.6
2	36 22.6	83	51	99.7	36 47.3	82	51	99.4	37 12.0	82	51	99.0	37 36.5	82	51	98.6
3	35 52.1	82	51	98.8	36 16.8	82	51	98.4	36 41.4	82	51	98.1	37 06.0	82	51	97.7
4	35 21.5	82	51	97.9	35 46.2	82	51	97.5	36 10.8	82	51	97.2	36 35.3	82	51	96.8
65	34 50.8	82	51	97.0	35 15.5	82	51	96.6	35 40.1	82	51	96.3	36 04.6	82	51	95.9
6	34 20.1	82	51	96.1	34 44.8	82	51	95.7	35 09.3	82	51	95.4	35 33.8	82	51	95.0
7	33 49.4	82	51	95.2	34 14.0	82	51	94.9	34 38.5	82	51	94.5	35 03.0	82	51	94.2
8	33 18.6	82	51	94.3	33 43.2	82	51	94.0	34 07.7	82	52	93.6	34 32.2	81	51	93.3
9	32 47.8	82	52	93.4	33 12.3	82	51	93.1	33 36.9	82	52	92.7	34 01.3	81	51	92.4
70	32 16.9	82	52	92.6	32 41.5	82	52	92.2	33 06.0	82	52	91.9	33 30.4	81	52	91.5
1	31 46.0	82	52	91.7	32 10.6	82	52	91.3	32 35.1	82	52	91.0	32 59.6	81	52	90.7
2	31 15.1	82	52	90.8	31 39.7	82	52	90.5	32 04.2	82	52	90.1	32 28.6	81	52	89.8
3	30 44.2	82	52	90.0	31 08.8	82	52	89.6	31 33.3	82	52	89.3	31 57.8	81	51	89.0
4	30 13.3	82	52	89.1	30 37.9	82	51	88.8	31 02.4	82	52	88.4	31 26.9	81	51	88.1
75	29 42.4	82	52	88.3	30 07.0	82	51	87.9	30 31.5	82	52	87.6	30 56.0	81	51	87.3
6	29 11.6	82	52	87.4	29 36.1	82	51	87.1	30 00.7	82	51	86.8	30 25.1	81	51	86.4
7	28 40.7	82	51	86.6	29 05.3	82	51	86.2	29 29.8	82	51	85.9	29 54.3	82	51	85.6
8	28 09.9	82	51	85.7	28 34.5	82	51	85.4	28 59.0	82	51	85.1	29 23.5	82	51	84.7
9	27 39.1	82	51	84.9	28 03.7	82	51	84.6	28 28.2	82	51	84.2	28 52.8	82	51	83.9
80	27 08.3	82	51	84.1	27 32.9	82	51	83.7	27 57.5	82	51	83.4	28 22.1	82	51	83.1
1	26 37.6	82	51	83.2	27 02.2	82	51	82.9	27 26.8	82	51	82.6	27 51.4	82	51	82.3
2	26 06.9	82	51	82.4	26 31.6	82	51	82.1	26 56.2	82	51	81.8	27 20.8	82	51	81.5
3	25 36.3	82	51	81.6	26 01.0	82	51	81.3	26 25.7	82	51	81.0	26 50.3	82	51	80.6
4	25 05.8	82	51	80.8	25 30.5	82	51	80.5	25 55.2	82	51	80.1	26 19.8	82	51	79.8
85	24 35.3	83	51	80.0	25 00.1	82	51	79.6	25 24.8	82	50	79.3	25 49.5	82	50	79.0
6	24 04.9	83	50	79.1	24 29.7	83	50	78.8	24 54.5	82	50	78.5	25 19.2	82	50	78.2
7	23 34.6	83	50	78.3	23 59.4	83	50	78.0	24 24.2	83	50	77.7	24 49.0	82	50	77.4
8	23 04.4	83	50	77.5	23 29.3	83	50	77.2	23 54.1	83	50	76.9	24 18.8	83	50	76.6
9	22 34.3	83	50	76.7	22 59.2	83	50	76.4	23 24.0	83	50	76.1	23 48.8	83	50	75.8
90	22 04.3	83	50	75.9	22 29.2	83	50	75.6	22 54.1	83	50	75.3	23 18.9	83	50	75.0

Digitized by Google

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 59°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0	5 00.0	1.0 00	180.0										00
1	6 59.8	1.0 01	179.1	6 29.8	1.0 01	179.1	5 59.8	1.0 01	179.1	5 29.8	1.0 01	179.1													1
2	6 59.0	1.0 02	178.2	6 29.0	1.0 02	178.2	5 59.0	1.0 02	178.2	5 29.0	1.0 02	178.2													2
3	6 57.8	1.0 03	177.2	6 27.8	1.0 03	177.3	5 57.8	1.0 03	177.3	5 27.8	1.0 03	177.3													3
4	6 56.0	1.0 04	176.3	6 26.0	1.0 04	176.3	5 56.1	1.0 04	176.4	5 26.1	1.0 04	176.4													4
05	6 53.8	1.0 04	175.4	6 23.8	1.0 05	175.4	5 53.9	1.0 04	175.4	5 23.9	1.0 04	175.5													05
6	6 51.1	1.0 05	174.5	6 21.1	1.0 05	174.5	5 51.2	1.0 05	174.5	5 21.2	1.0 05	174.6													6
7	6 47.9	1.0 06	173.6	6 17.9	1.0 06	173.6	5 48.0	1.0 06	173.6	5 18.0	1.0 06	173.7													7
8	6 44.1	1.0 07	172.6	6 14.2	1.0 07	172.7	5 44.3	1.0 07	172.7	5 14.4	1.0 07	172.8													8
9	6 39.9	1.0 08	171.7	6 10.0	1.0 08	171.8	5 40.1	1.0 08	171.8	5 10.2	1.0 08	171.8													9
10	6 35.3	1.0 09	170.8	6 05.4	1.0 09	170.9	5 35.5	1.0 08	170.9	5 05.6	1.0 08	170.9													10
1	6 30.1	1.0 10	169.9	6 00.2	1.0 09	169.9	5 30.4	1.0 09	170.0	5 00.5	1.0 09	170.0													1
2	6 24.4	99 10	169.0	5 54.6	99 10	169.0	5 24.8	99 10	169.1																2
3	6 18.3	99 11	168.1	5 48.5	99 11	168.1	5 18.7	99 11	168.2																3
4	6 11.6	99 12	167.2	5 41.9	99 12	167.2	5 12.1	99 12	167.3																4
15	6 04.5	99 13	166.2	5 34.8	99 13	166.3	5 05.1	99 13	166.4																15
6	5 56.9	99 14	165.3	5 27.2	99 13	165.4																			6
7	5 48.9	99 14	164.4	5 19.2	99 14	164.5																			7
8	5 40.3	99 15	163.5	5 10.7	99 15	163.6																			8
9	5 31.3	99 16	162.6	5 01.8	99 16	162.7																			9
20	5 21.9	98 16	161.7																						20
1	5 11.9	98 17	160.8																						1
2	5 01.6	98 18	159.9																						2

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	19 54.2	84 50	76.3	20 19.3	84 50	76.0	20 44.3	83 50	75.7	21 09.4	83 50	75.4	21 34.4	83 50	75.1	21 59.3	83 50	74.8	22 24.2	83 50	74.5	22 49.1	83 49	74.2	91
2	19 24.2	84 50	75.5	19 49.3	84 50	75.2	20 14.4	84 50	74.9	20 39.5	84 50	74.6	21 04.5	83 50	74.3	21 29.6	83 49	74.0	21 54.5	83 49	73.7	22 19.5	83 49	73.4	2
3	18 54.4	84 50	74.6	19 19.5	84 50	74.4	19 44.7	84 50	74.1	20 09.8	84 49	73.8	20 34.9	84 49	73.5	20 59.9	83 49	73.2	21 24.9	83 49	72.9	21 49.9	83 49	72.6	3
4	18 24.6	84 49	73.8	18 49.8	84 49	73.6	19 15.0	84 49	73.3	19 40.2	84 49	73.0	20 05.3	84 49	72.7	20 30.4	84 49	72.4	20 55.5	84 49	72.1	21 20.5	83 49	71.8	4
95	17 55.0	84 49	73.0	18 20.3	84 49	72.7	18 45.5	84 49	72.5	19 10.7	84 49	72.2	19 35.9	84 49	71.9	20 01.0	84 49	71.6	20 26.1	84 49	71.3	20 51.2	84 49	71.0	95
6	17 25.5	84 49	72.2	17 50.8	84 49	71.9	18 16.1	84 49	71.7	18 41.3	84 49	71.4	19 06.6	84 49	71.1	19 31.7	84 49	70.8	19 56.9	84 48	70.5	20 22.1	84 48	70.2	6
7	16 56.2	85 49	71.4	17 21.5	84 49	71.1	17 46.8	84 48	70.9	18 12.1	84 48	70.6	18 37.4	84 48	70.3	19 02.6	84 48	70.0	19 27.9	84 48	69.7	19 53.1	84 48	69.4	7
8	16 26.9	85 48	70.6	16 52.3	85 48	70.3	17 17.7	85 48	70.0	17 43.0	84 48	69.8	18 08.4	84 48	69.5	18 33.7	84 48	69.2	18 58.9	84 48	68.9	19 24.2	84 48	68.6	8
9	15 57.9	85 48	69.8	16 23.3	85 48	69.5	16 48.7	85 48	69.2	17 14.1	85 48	69.0	17 39.5	85 48	68.7	18 04.9	84 48	68.4	18 30.2	84 48	68.1	18 55.5	84 48	67.8	9
100	15 28.9	85 48	69.0	15 54.4	85 48	68.7	16 19.9	85 48	68.4	16 45.4	85 48	68.2	17 10.8	85 48	67.9	17 36.2	85 47	67.6	18 01.6	85 47	67.3	18 27.0	85 47	67.1	100
1	15 00.2	85 48	68.2	15 25.7	85 48	67.9	15 51.2	85 48	67.6	16 16.8	85 47	67.4	16 42.2	85 47	67.1	17 07.7	85 47	66.8	17 33.2	85 47	66.5	17 58.6	85 47	66.3	1
2	14 31.6	85 47	67.4	14 57.2	85 47	67.1	15 22.7	85 47	66.8	15 48.3	85 47	66.6	16 13.9	85 47	66.3	16 39.4	85 47	66.0	17 04.9	85 47	65.7	17 30.4	85 47	65.5	2
3	14 03.1	86 47	66.6	14 28.8	86 47	66.3	14 54.4	85 47	66.0	15 20.0	85 47	65.8	15 45.7	85 47	65.5	16 11.2	85 47	65.2	16 36.8	85 46	65.0	17 02.4	85 46	64.7	3
4	13 34.8	86 47	65.8	14 00.6	86 47	65.5	14 26.3	86 47	65.2	14 52.0	86 46	65.0	15 17.6	86 46	64.7	15 43.3	85 46	64.4	16 08.9	85 46	64.2	16 34.5	85 46	63.9	4
105	13 06.8	86 46	65.0	13 32.5	86 46	64.7	13 58.3	86 46	64.4	14 24.0	86 46	64.2	14 49.8	86 46	63.9	15 15.5	86 46	63.6	15 41.2	86 46	63.4	16 06.9	86 46	63.1	105
6	12 38.8	86 46	64.2	13 04.7	86 46	63.9	13 30.5	86 46	63.6	13 56.3	86 46	63.4	14 22.1	86 46	63.1	14 47.9	86 46	62.8	15 13.7	86 46	62.6	15 39.4	86 45	62.3	6
7	12 11.1	86 46	63.4	12 37.0	86 46	63.1	13 02.9	86 46	62.8	13 28.8	86 46	62.6	13 54.7	86 46	62.3	14 20.5	86 45	62.1	14 46.3	86 45	61.8	15 12.1	86 45	61.5	7
8	11 43.6	87 46	62.5	12 09.6	87 45	62.3	12 35.5	86 45	62.0	13 01.5	86 45	61.8	13 27.4	86 45	61.5	13 53.3	86 45	61.3	14 19.2	86 45	61.0	14 45.1	86 45	60.7	8
9	11 16.3	87 45	61.7	11 42.3	87 45	61.5	12 08.3	87 45	61.2	12 34.3	87 45	61.0	13 00.3	87 45	60.7	13 26.3	87 45	60.5	13 52.3	87 44	60.2	14 18.2	86 44	59.9	9
110	10 49.2	87 45	60.9	11 15.3	87 45	60.7	11 41.4	87 45	60.4	12 07.4	87 44	60.2	12 33.5	87 44	59.9	12 59.5	87 44	59.7	13 25.6	87 44	59.4	13 51.6	87 44	59.2	110
1	10 22.3	87 44	60.1	10 48.4	87 44	59.9	11 14.6	87 44	59.6	11 40.7	87 44	59.4	12 06.9	87 44	59.1	12 33.0	87 44	58.9	12 59.1	87 44	58.6	13 25.2	87 44	58.4	1
2	9 55.6	87 44	59.3	10 21.8	87 44	59.1	10 48.0	87 44	58.8	11 14.3	87 44	58.6	11 40.5	87 44	58.3	12 06.6	87 44	58.1	12 32.8	87 44	57.8	12 59.0	87 43	57.6	2
3	9 29.1	88 44	58.5	9 55.4	88 44	58.2	10 21.7	88 44	58.0	10 48.0	88 43	57.8	11 14.3	88 43	57.5	11 40.5	88 43	57.3	12 06.8	87 43	57.0	12 33.0	87 43	56.8	3
4	9 02.9	88 43	57.7	9 29.3	88 43	57.4	9 55.6	88 43	57.2	10 22.0	88 43	57.0	10 48.3	88 43	56.7	11 14.7	88 43	56.5	11 41.0	88 43	56.2	12 07.3	88 42	56.0	4
115	8 36.9	88 43	56.9	9 03.3	88 43	56.6	9 29.8	88 43	56.4	9 56.2	88 43	56.1	10 22.6	88 43	55.9	10 49.0	88 42	55.7	11 15.4	88 42	55.4	11 41.8	88 42	55.2	115
6	8 11.1	88 42	56.1	8 37.7	88 42	55.8	9 04.2	88 42	55.6	9 30.7	88 42	55.3	9 57.1	88 42	55.1	10 23.6	88 42	54.9	10 50.1	88 42	54.6	11 16.5	88 42	54.4	6
7	7 45.6	89 42	55.2	8 12.2	89 42	55.0	8 38.8	89 42	54.8	9 05.4	89 42	54.5	9 31.9	89 42	54.3	9 58.5	88 41	54.1	10 25.0	88 41	53.8	10 51.5	88 41	53.6	7
8	7 20.4	89 42	54.4	7 47.0	89 42	54.2	8 13.7	89 41	54.0	8 40.3	89 41	53.7	9 07.0	89 41	53.5	9 33.6	89 41	53.3	10 00.2	89 41	53.0	10 26.8	89 41	52.8	8
9	6 55.4	89 41	53.6	7 22.1	89 41	53.4	7 48.8	89 41	53.1	8 15.5	89 41	52.9	8 42.2	89 41	52.7	9 08.9	89 41	52.4	9 35.6	89 40	52.2	10 02.3	89 40	52.0	9
120	6 30.6	89 41	52.8	6 57.4	89 41	52.6	7 24.2	89 40	52.3	7 51.0	89 40	52.1	8 17.8	89 40	51.9	8 44.6	89 40	51.6	9 11.4	89 40	51.4	9 38.1	89 40	51.2	120
1	6 06.2	90 40	52.0	6 33.0	90 40	51.7	6 59.9	90 40	51.5	7 26.8	90 40	51.3	7 53.6	90 40	51.1	8 20.5	89 40	50.8	8 47.3	89 40	50.6	9 14.2	89 39	50.4	1
2	5 42.0	90 40	51.1	6 08.9	90 40	50.9	6 35.9	90 40	50.7	7 02.8	90 39	50.5	7 29.7	90 39	50.2	7 56.7	90 39	50.0	8 23.6	90 39	49.8	8 50.5	90 39	49.6	2
3	5 18.0	90 40	50.3	5 45.1	90 39	50.1	6 12.1	90 39	49.9	6 39.1	90 39	49.6	7 06.1	90 39	49.4	7 33.1	90 39	49.2	8 00.1	90 39	49.0	8 27.1	90 38	48.8	3
4				5 21.5	90 39	49.3	5 48.6	90 39	49.0	6 15.7	90 39	48.8	6 42.8	90 38	48.6	7 09.9	90 38	48.4	7 37.0	90 38	48.2	8 04.0	90 38	48.0	4
125							5 25.4	91 38	48.2	5 52.6	91 38	48.0	6 19.8	91 38	47.8	6 46.9	91 38	47.6	7 14.1	91 38	47.4	7 41.2	90 38	47.2	125
6							5 02.5	91 38	47.4	5 29.8	91 38	47.2	5 57.0	91 37	47.0	6 24.2	91 37	46.8	6 51.5	91 37	46.6	7 18.7	91 37	46.3	6
7										5 07.3	91 37	46.4	5 34.6	91 37	46.2	6 01.9	91 37	45.9	6 29.2	91 37	45.7	6 56.5	91 36	45.5	7
8													5 12.4	91 37	45.3	5 39.8	91 36	45.1	6 07.2	91 36	44.9	6 34.6	91 36	44.7	8
9																5 18.1	92 36	44.3	5 45.6	92 36	44.1	6 13.0	92 35	43.9	9
130																			5 24.2	92 35	43.3	5 51.8	92 35	43.1	130
1																			5 03.2	92 35	42.5	5 30.8	92 34	42.3	1
2																						5 10.2	92 34	41.4	2

Digitized by Google

Lat. 59°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	59 00.0	1.0 01	180.0	59 30.0	1.0 01	180.0	60 00.0	1.0 01	180.0	61 00.0	1.0 01	180.0	63 00.0	1.0 01	180.0	65 00.0	1.0 01	180.0	65 30.0	1.0 01	180.0	66 30.0	1.0 01	180.0	00
1	58 59.5	1.0 02	178.3	59 29.5	1.0 02	178.3	59 59.5	1.0 02	178.3	60 59.5	1.0 02	178.2	62 59.5	1.0 03	178.1	64 59.5	1.0 03	178.0	65 29.5	1.0 03	178.0	66 29.4	1.0 03	178.0	1
2	58 58.2	1.0 04	176.6	59 28.1	1.0 04	176.5	59 58.1	1.0 04	176.5	60 58.1	1.0 04	176.4	62 58.0	1.0 04	176.3	64 57.9	1.0 04	176.1	65 27.9	1.0 04	176.0	66 27.8	1.0 05	175.9	2
3	58 55.8	1.0 05	174.9	59 25.8	1.0 05	174.8	59 55.8	1.0 06	174.8	60 55.7	1.0 06	174.6	62 55.5	1.0 06	174.4	64 55.2	1.0 06	174.1	65 25.2	1.0 06	174.0	66 25.1	1.0 06	173.9	3
4	58 52.6	1.0 07	173.2	59 22.5	1.0 07	173.1	59 52.5	1.0 07	173.0	60 52.3	1.0 07	172.9	62 52.0	1.0 08	172.5	64 51.6	1.0 08	172.2	65 21.5	1.0 08	172.1	66 21.2	1.0 08	171.9	4
05	58 48.5	1.0 08	171.5	59 18.4	1.0 08	171.4	59 48.2	1.0 08	171.3	60 48.0	1.0 09	171.1	62 47.5	1.0 09	170.7	64 46.8	99 10	170.2	65 16.7	99 10	170.1	66 16.3	99 10	169.8	05
6	58 43.4	99 10	169.8	59 13.3	99 10	169.7	59 43.1	99 10	169.6	60 42.8	99 10	169.3	62 42.0	99 11	168.9	64 41.1	99 11	168.3	65 10.8	99 11	168.2	66 10.3	99 12	167.8	6
7	58 37.5	99 11	168.1	59 07.3	99 11	168.0	59 37.0	99 12	167.8	60 36.6	99 12	167.6	62 35.5	99 12	167.0	64 34.3	99 13	166.4	65 04.0	99 13	166.2	66 03.3	99 13	165.9	7
8	58 30.7	99 13	166.4	59 00.4	99 13	166.3	59 30.1	99 13	166.1	60 29.5	99 13	165.8	62 28.1	99 14	165.2	64 26.5	99 15	164.5	64 56.1	99 15	164.3	65 55.2	98 15	163.9	8
9	58 23.0	99 14	164.7	58 52.6	99 14	164.6	59 22.2	99 15	164.4	60 21.4	99 15	164.1	62 19.7	98 15	163.4	64 17.8	98 16	162.6	64 47.3	98 16	162.4	65 46.1	98 17	161.9	9
10	58 14.4	99 16	163.1	58 43.9	99 16	162.9	59 13.5	98 16	162.7	60 12.5	98 16	162.4	62 10.5	98 17	161.6	64 08.1	98 18	160.7	64 37.4	98 18	160.5	65 36.1	98 18	160.0	10
1	58 05.0	98 17	161.4	58 34.4	98 17	161.2	59 03.9	98 17	161.1	60 02.7	98 18	160.7	62 00.3	98 18	159.8	63 57.4	97 19	158.9	64 26.6	97 20	158.6	65 25.0	97 20	158.1	1
2	57 54.7	98 18	159.8	58 24.1	98 19	159.6	58 53.4	98 19	159.4	59 52.1	98 19	159.0	61 49.2	97 20	158.1	63 45.8	97 21	157.1	64 14.9	97 21	156.8	65 13.0	97 22	156.2	2
3	57 43.6	98 20	158.2	58 12.9	98 20	158.0	58 42.1	97 20	157.7	59 40.6	97 21	157.3	61 37.2	97 21	156.3	63 33.3	97 22	155.2	64 02.3	96 23	154.9	65 00.9	96 23	154.3	3
4	57 31.7	97 21	156.6	58 00.9	97 21	156.3	58 30.0	97 22	156.1	59 28.2	97 22	155.6	61 24.4	97 23	154.6	63 19.9	96 24	153.5	63 48.7	96 24	153.1	64 46.2	96 24	152.5	4
15	57 19.0	97 22	155.0	57 48.1	97 23	154.7	58 17.1	97 23	154.5	59 15.1	97 23	154.0	61 10.7	96 24	152.9	63 05.7	96 25	151.7	63 34.4	95 25	151.4	64 31.5	95 26	150.7	15
6	57 05.6	97 24	153.4	57 34.5	96 24	153.1	58 03.4	96 24	152.9	59 01.2	96 25	152.4	60 56.2	96 25	151.2	62 50.6	95 26	150.0	63 19.1	95 27	149.6	64 15.9	95 27	148.9	6
7	56 51.3	96 25	151.8	57 20.2	96 25	151.6	57 49.0	96 25	151.3	58 46.4	96 26	150.8	60 41.0	95 27	149.6	62 34.8	95 28	148.2	63 03.1	94 28	147.9	63 59.6	94 29	147.1	7
8	56 36.4	96 26	150.3	57 05.1	96 26	150.0	57 33.8	95 26	149.7	58 31.0	95 27	149.2	60 24.9	95 28	147.9	62 18.1	94 29	146.6	62 46.3	94 29	146.2	63 42.4	93 30	145.4	8
9	56 20.7	95 27	148.8	56 49.3	95 28	148.5	57 17.8	95 28	148.2	58 14.8	95 28	147.6	60 08.2	94 29	146.3	62 00.7	93 30	144.9	62 28.7	93 30	144.5	63 24.5	93 31	143.7	9
20	56 04.3	95 28	147.2	56 32.8	95 29	147.0	57 01.2	95 29	146.7	57 57.9	94 29	146.1	59 50.7	94 30	144.7	61 42.6	93 31	143.3	62 10.4	93 32	142.9	63 05.8	92 32	142.0	20
1	55 47.3	94 30	145.8	56 15.6	94 30	145.5	56 43.9	94 30	145.2	57 40.3	94 30	144.5	59 32.5	93 31	143.2	61 23.7	92 33	141.6	61 51.4	92 33	141.2	62 46.5	92 33	140.4	1
2	55 29.6	94 31	144.3	55 57.7	94 31	144.0	56 25.9	94 31	143.7	57 22.0	93 32	143.0	59 13.6	93 33	141.6	61 04.2	92 34	140.1	61 31.7	91 34	139.6	62 26.4	91 34	138.8	2
3	55 11.2	94 32	142.8	55 39.3	93 32	142.5	56 07.3	93 32	142.2	57 03.1	93 33	141.5	58 54.1	92 34	140.1	60 44.1	91 35	138.5	61 11.4	91 35	138.1	62 05.7	90 36	137.2	3
4	54 52.2	93 33	141.4	55 20.1	93 33	141.1	55 48.0	93 33	140.7	56 43.6	92 34	140.1	58 34.0	92 35	138.6	60 23.3	91 36	137.0	60 50.4	90 36	136.5	61 44.4	90 37	135.6	4
25	54 32.6	93 34	140.0	55 00.4	93 34	139.6	55 28.1	92 34	139.3	56 23.4	92 35	138.6	58 13.2	91 36	137.1	60 01.9	90 37	135.5	60 28.9	90 37	135.0	61 22.5	89 37	134.1	25
6	54 12.5	92 34	138.6	54 40.1	92 35	138.2	55 07.7	92 35	137.9	56 02.7	91 35	137.2	57 51.9	91 36	135.7	59 39.9	89 38	134.0	60 06.7	89 38	133.5	61 00.0	88 38	132.6	6
7	53 51.7	92 36	137.2	54 19.3	92 36	136.8	54 46.7	91 36	136.5	55 41.4	91 36	135.8	57 30.1	90 37	134.2	59 17.4	89 38	132.5	59 44.1	89 39	132.1	60 37.0	88 39	131.1	7
8	53 30.5	91 36	135.8	53 57.8	91 37	135.5	54 25.2	91 37	135.1	55 19.6	91 37	134.4	57 07.7	90 38	132.8	58 54.4	88 39	131.1	59 20.9	88 40	130.6	60 13.5	87 40	129.7	8
9	53 08.7	91 37	134.5	53 35.9	91 37	134.1	54 03.1	91 38	133.8	54 57.3	90 38	133.0	56 44.7	89 39	131.4	58 30.9	88 40	129.7	58 57.2	87 40	129.2	59 49.5	87 41	128.3	9
30	52 46.4	90 38	133.1	53 13.5	90 38	132.8	53 40.5	90 38	132.4	54 34.4	90 39	131.7	56 21.3	89 40	130.1	58 06.9	87 41	128.3	58 33.0	87 41	127.8	59 25.0	86 42	126.9	30
1	52 23.6	90 39	131.8	52 50.6	90 39	131.5	53 17.5	90 39	131.1	54 11.1	89 40	130.3	55 57.4	88 41	128.7	57 42.4	87 42	126.9	58 08.4	86 42	126.5	59 00.0	86 42	125.5	1
2	52 00.3	90 40	130.5	52 27.2	89 40	130.2	52 54.0	89 40	129.8	53 47.3	89 40	129.0	55 33.1	88 41	127.4	57 17.5	86 42	125.6	57 43.3	86 42	125.1	58 34.7	85 43	124.2	2
3	51 36.6	89 40	129.3	52 03.3	89 40	128.9	52 30.0	89 41	128.5	53 23.1	88 41	127.7	55 08.3	87 42	126.1	56 52.1	86 43	124.3	57 17.8	85 43	123.8	58 08.9	85 44	122.8	3
4	51 12.5	89 41	128.0	51 39.1	89 41	127.6	52 05.6	88 41	127.2	52 58.5	88 42	126.5	54 43.2	87 43	124.8	56 26.4	85 44	123.0	56 52.0	85 44	122.5	57 42.7	84 44	121.5	4
35	50 47.9	88 42	126.7	51 14.4	88 42	126.4	51 40.8	88 42	126.0	52 33.4	87 42	125.2	54 17.6	86 43	123.5	56 00.3	85 44	121.7	56 25.7	85 44	121.3	57 16.2	84 45	120.3	35
6	50 22.9	88 42	125.5	50 49.3	88 42	125.1	51 15.6	88 43	124.8	52 08.0	87 43	124.0	53 51.7	86 44	122.3	55 33.9	84 45	120.5	55 59.1	84 45	120.0	56 49.4	83 45	119.0	6
7	49 57.6	88 43	124.3	50 23.9	87 43	123.9	50 50.0	87 43	123.5	51 42.2	87 44	122.8	53 25.4	85 44	121.1	55 07.1	84 45	119.3	55 32.2	84 45	118.8	56 22.2	83 46	117.8	7
8	49 31.9	87 43	123.1	49 58.0	87 44	122.7	50 24.1	87 44	122.4	51 16.0	86 44	121.6	52 58.7	85 45	119.9	54 39.9	84 46	118.1	55 05.0	83 46	117.6	55 54.7	82 46	116.6	8
9	49 05.8	87 44	121.9	49 31.9	87 44	121.6	49 57.8	86 44	121.2	50 49.5	86 45	120.4	52 31.8	85 45	118.7	54 12.5	83 46	116.9	54 37.4	83 46	116.4	55 26.9	82 47	115.4	9
40	48 39.5	87 44	120.8	49 05.4	86 45	120.4	49 31.2	86 45	120.0	50 22.7	85 45	119.2	52 04.5	84 46	117.5	53 44.8	83 47	115.7	54 09.6	82 47	115.2	54 58.9	82 47	114.2	40
1	48 12.7	86 45	119.6	48 38.6	86 45	119.2	49 04.3	86 45	118.9	49 55.5	85 46	118.0	51 37.0	84 46	116.4	53 16.8	82 47	114.5	53 41.5	82 47	114.1	54 30.6	81 48	113.1	1
2	47 45.7	86 46	118.5	48 11.5	86 46	118.1	48 37.1	85 46	117.7	49 28.1	85 46	116.9	51 09.2	84 47	115.2	52 48.6	82 47	113.4	53 13.2	82 48	112.9	54 02.0	81 48	111.9	2
3	47 18.4	86 46	117.4	47 44.1	85 46	117.0	48 09.6	85 46	116.6	49 00.4	84 47	115.8	50 41.1	83 47	114.1	52 20.1	82 48	112.3	52 44.6	81 48	111.8	53 33.2	81 48	110.8	3
4	46 50.9	85 46	116.3	47 16.4	85 47	115.9	47 41.8	85 47	115.5	48 32.5	84 47	114.7	50 12.7	83 48	113.0	51 51.4	82 48	111.2	52 15.8	81 48	110.7	53 04.3	80 49	109.7	4
45	46 23.0	85 47	115.2	46 48.5	85 47	114.8	47 13.8	84 47	114.4	48 04.3	84 47	113.6	49 44.2	83 48	111.9	51 22.5	81 49	110.1	51 46.8	81 49	109.6	52 35.1	80 49	108.7	45
6	45 54.9	85 47	114.1	46 20.3	84 47	113.7	46 45.5	84 48	113.3	47 35.9	84 48	112.5	49 15.4	82 48	110.8	50 53.4	81 49	109.0	51 17.6	81 49	108.6	52 05.7	80 49	107.6	6
7	45 26.6	84 48	113.0	45 51.9	84 48	112.6	46 17.1	84 48	112.2	47 07.2	83 48	111.4	48 46.4	82 49	109.8	50 24.1	81 49	108.0	50 48.2	80 49	107.5	51 36.2	80 50	106.5	7
8	44 58.0	84 48	112.0	45 23.2	84 48	111.6	45 48.3	84 48	111.2	46 38.3	83 48	110.4	48 17.2	82 49	108.7	49 54.6	80 49	106.9	50 18.7	80 50	106.5	51 06.5	79 50	105.5	8
9	44 29.3	84 48	110.9	44 54.4	84 48	110.5	45 19.4	83 48	110.1	46 09.3	83 49	109.3	47 47.9	82 49	107.7	49 24.9	80 50	105.9	49 48.9	80 50	105.4	50 36.6	79 50	104.5	9
50	44 00.3	84 49	109.9	44 25.4	83 49	109.5	44 50.3	83 49	109.1	45 40.0	83 49	108.3	47 18.4	81 49	106.7	48 55.1	80 50	104.9	49 19.1	80 50	104.4	50 06.6	79 50	103.5	50
1	43 31.2	83 49	108.9	43 56.1	83 49	108.5	44 21.0	83 49	108.1	45 10.6	82 49	107.3	46 48.7	81 50	105.6	48 25.2	80 50	103.9	48 49.1	79 50	103.4	49 36.5	79 50	102.5	1
2	43 01.8	83 49	107.9	43 26.7	83 49	107.5	43 51.6	83 49	107.1	44 41.0	82 50	106.3	46 18.8	81 50	104.6	47 55.2	80 50	102.9	48 19.0	79 50	102.4	49 06.3	78 51	101.5	2
3	42 32.3	83 50	106.9	42 57.2	83 50	106.5	43 22.0	82 50	106.1	44 11.3	82 50	105.3	45 48.9	81 50	103.7	47 25.0	79 50	101.9	47 48.7	79 51	101.5	48 35.9	78 51	100.5	3
4	42 02.7	83 50	105.9	42 27.5	83 50	105.5	42 52.2	82 50	105.1	43 41.4	82 50	104.3	45 18.8	81 50	102.7	46 54.7	79 51	100.9	47 18.4	79 51	100.5	48 05.5	78 51	99.6	4
55	41 32.9	83 50	104.9	41 57.6	82 50	104.5	42 22.3	82 50	104.1	43 11.4	82 50	103.3	44 48.6	80 51	101.7	46 24.3	79 51	100.0	46 48.0	79 51	99.5	47 35.0	78 51	98.6	55
6	41 03.0	82 50	103.9	41 27.7	82 50	103.5	41 52.3	82 50	103.2	42 41.3	81 50	102.4	44 18.3	80 51	100.8	45 53.8	79 51	99.0	46 17.5	79 51	98.6	47 04.4	78 51	97.7	6
7	40 32.9	82 50	103.0	40 57.6	82 50	102.6	41 22.1	82 50	102.2	42 11.0	81 51	101.4	43 47.9	80 51	99.8	45 23.3	79 51	98.1	45 46.9	79 51	97.7	46 33.8	78 51	96.8	7
8	40 02.7	82 50	102.0	40 27.3	82 51	101.6	40 51.9	82 51	101.3	41 40.7	81 51	100.5	43 17.4	80 51	98.9	44 52.6	79 51	97.2	45 16.2	78 51	96.7	46 03.0	78 51	95.8	8
9	39 32.5	82 51	101.1	39 57.0	82 51	100.7	40 21.5	82 51	100.3	41 10.3	81 51	99.5	42 46.8	80 51	97.9	44 21.9	79 51	96.3	44 45.5	78 51	95.8	45 32.3	78 51	94.9	9
60	39 02.1	82 51	100.1	39 26.6	82 51	99.8	39 51.1	81 51	99.4	40 39.7	81 51	98.6	42 16.2	80 51	97.0	43 51.2	79 51	95.4	44 14.7	78 51	94.9	45 01.5	78 51	94.0	60
1	38 31.6	82 51	99.2	38 56.1	82 51	98.8	39 20.5	81 51	98.5	40 09.2	81 51	97.7	41 45.5	80 51	96.1	43 20.4	79 51	94.5	43 43.9	78 51	94.0	44 30.6	78 51	93.2	1
2	38 01.1	82 51	98.3	38 25.5	81 51	97.9	38 49.9	81 51	97.5	39 38.5	81 51	96.8	41 14.7	80 51	95.2	42 49.6	78 51	93.6	43 13.1	78 51	93.1	43 59.8	77 51	92.3	2
3	37 30.5	82 51	97.4	37 54.9	81 51	97.0	38 19.3	81 51	96.6	39 07.8	81 51	95.9	40 43.9	80 51	94.3	42 18.7	78 51	92.7	42 42.2	78 51	92.3	43 28.9	77 52	91.4	3
4	36 59.8	81 51	96.5	37 24.2	81 51	96.1	37 48.5	81 51	95.7	38 37.0	81 51	95.0	40 13.1	80 51	93.4	41 47.9	78 52	91.8	42 11.3	78 52	91.4	42 58.0	77 52	90.5	4
65	36 29.1	81 51	95.6	36 53.4	81 51	95.2	37 17.8	81 51	94.8	38 06.2	81 51	94.1	39 42.2	79 51	92.6	41 17.0	78 52	90.9	41 40.4	78 52	90.5	42 27.1	77 52	89.7	65
6	35 58.3	81 51	94.7	36 22.7	81 51	94.3	36 47.0	81 51	94.0	37 35.4	80 51	93.2	39 11.4	79 52	91.7	40 46.1	78 52	90.1	41 09.5	78 52	89.7	41 56.2	77 52	88.8	6
7	35 27.5	81 51	93.8	35 51.8	81 51	93.4	36 16.1	81 52	93.1	37 04.5	80 51	92.3	38 40.5	79 52	90.8	40 15.2	78 51	89.2	40 38.6	78 51	88.8	41 25.3	77 51	88.0	7
8	34 56.6	81 52	92.9	35 21.0	81 51	92.6	35 45.3	81 52	92.2	36 33.6	80 52	91.5	38 09.6	79 52	90.0	39 44.3	78 51	88.4	40 07.7	78 51	88.0	40 54.4	78 51	87.1	8
9	34 25.7	81 52	92.0	34 50.1	81 52	91.7	35 14.4	81 52	91.3	36 02.7	80 52	90.6	37 38.7	79 51	89.1	39 13.4	78 51	87.5	39 36.9	78 51	87.1	40 23.6	78 51	86.3	9
70	33 54.8	81 52	91.2	34 19.2	81 52	90.8	34 43.5	81 52	90.5	35 31.8	80 52	89.7	37 07.8	79 51	88.3	38 42.5	78 51	86.7	39 06.0	78 51	86.3	39 52.7	78 51	85.5	70
1	33 23.9	81 52	90.3	33 48.3	81 52	90.0	34 12.6	81 52	89.6	35 00.9	80 51	88.9	36 36.9	79 51	87.4	38 11.7	78 51	85.9	38 35.2	78 51	85.5	39 22.0	78 51	84.7	1
2	32 53.0	81 52	89.5	33 17.4	81 51	89.1	33 41.7	81 52	88.8	34 30.0	80 51	88.0	36 06.0	80 51	86.6	37 40.9	79 51	85.0	38 04.4	78 51	84.6	38 51.2	78 51	83.8	2
3	32 22.1	81 52	88.6	32 46.5	81 51	88.3	33 10.8	81 52	87.9	33 59.2	80 51	87.2	35 35.2	80 51	85.7	37 10.1	79 51	84.2	37 33.7	78 51	83.8	38 20.5	78 51	83.0	3
4	31 51.3	81 52	87.8	32 15.6	81 51	87.4	32 39.9	81 52	87.1	33 28.3	80 51	86.4	35 04.4	80 51	84.9	36 39.4	79 51	83.4	37 03.0	78 51	83.0	37 49.9	78 51	82.2	4
75	31 20.4	81 52	86.9	31 44.8	81 51	86.6	32 09.1	81 51	86.2	32 57.5	81 51	85.5	34 33.6	80 51	84.1	36 08.7	79 51	82.6	36 32.3	79 51	82.2	37 19.3	78 51	81.4	75
6	30 49.6	81 51	86.1	31 13.9	81 51	85.7	31 38.2	81 51	85.4	32 26.7	81 51	84.7	34 02.9	80 51	83.3	35 38.1	79 51	81.8	36 01.7	79 51	81.4	36 48.7	78 51	80.6	6
7	30 18.7	81 51	85.2	30 43.1	81 51	84.9	31 07.5	81 51	84.6	31 56.0	81 51	83.9	33 32.3	80 51	82.5	35 07.5	79 51	81.0	35 31.2	79 51	80.6	36 18.3	78 51	79.8	7
8	29 48.0	81 51	84.4	30 12.4	81 51	84.1	30 36.7	81 51	83.7	31 25.2	81 51	83.1	33 01.6	80 51	81.6	34 37.1	79 51	80.2	35 00.7	79 51	79.8	35 47.9	78 50	79.1	8
9	29 17.2	81 51	83.6	29 41.6	81 51	83.3	30 06.0	81 51	82.9	30 54.6	81 51	82.2	32 31.1	80 51	80.8	34 06.6	79 51	79.4	34 30.4	79 50	79.0	35 17.6	79 50	78.3	9
80	28 46.5	82 51	82.8	29 11.0	81 51	82.4	29 35.4	81 51	82.1	30 24.0	81 51	81.4	32 00.6	80 51	80.0	33 36.3	79 50	78.6	34 00.1	79 50	78.2	34 47.4	79 50	77.5	80
1	28 15.9	82 51	81.9	28 40.4	81 51	81.6	29 04.8	81 51	81.3	29 53.5	81 51	80.6	31 30.2	80 51	79.2	33 06.1	79 50	77.8	33 29.9	79 50	77.4	34 17.3	79 50	76.7	1
2	27 45.4	82 51	81.1	28 09.8	82 51	80.8	28 34.3	81 51	80.5	29 23.0	81 51	79.8	30 59.9	80 50	78.4	32 35.9	80 50	77.0	32 59.7	79 50	76.7	33 47.3	79 50	75.9	2
3	27 14.9	82 51	80.3	27 39.4	82 51	80.0	28 03.9	82 51	79.7	28 52.7	81 50	79.0	30 29.7	81 50	77.6	32 05.8	80 50	76.2	32 29.7	80 50	75.9	33 17.3	79 50	75.2	3
4	26 44.4	82 51	79.5	27 09.0	82 51	79.2	27 33.5	82 50	78.9	28 22.4	81 50	78.2	29 59.5	81 50	76.9	31 35.9	80 50	75.5	31 59.8	80 50	75.1	32 47.5	79 50	74.4	4
85	26 14.1	82 50	78.7	26 38.7	82 50	78.4	27 03.2	82 50	78.1	27 52.2	81 50	77.4	29 29.5	81 50	76.1	31 06.0	80 50	74.7	31 30.0	80 50	74.3	32 17.8	79 49	73.6	85
6	25 43.8	82 50	77.9	26 08.4	82 50	77.6	26 33.0	82 50	77.3	27 22.1	82 50	76.6	28 59.6	81 50	75.3	30 36.3	80 49	73.9	31 00.3	80 49	73.6	31 48.2	80 49	72.9	6
7	25 13.7	82 50	77.1	25 38.3	82 50	76.8	26 02.9	82 50	76.5	26 52.0	82 50	75.8	28 29.7	81 50	74.5	30 06.6	80 49	73.1	30 30.7	80 49	72.8	31 18.7	80 49	72.1	7
8	24 43.6	82 50	76.3	25 08.3	82 50	76.0	25 32.9	82 50	75.7	26 22.1	82 50	75.0	28 00.0	81 49	73.7	29 37.1	81 49	72.4	30 01.3	80 49	72.0	30 49.4	80 49	71.3	8
9	24 13.6	83 50	75.5	24 38.4	82 50	75.2	25 03.1	82 50	74.9	25 52.3	82 49	74.2	27 30.4	81 49	72.9	29 07.7	81 49	71.6	29 31.9	81 49	71.3	30 20.2	80 48	70.6	9
90	23 43.8	83 50	74.7	24 08.5	83 50	74.4	24 33.3	82 49	74.1	25 22.7	82 49	73.4	27 00.9	82 49	72.2	28 38.5	81 49	70.8	29 02.7	81 48	70.5	29 51.1	80 48	69.8	90

Lat. 59°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	23 14.0	83 49	73.9	23 38.8	83 49	73.6	24 03.6	83 49	73.3	24 53.1	82 49	72.7	26 31.6	82 49	71.4	28 09.3	81 48	70.1	28 33.7	81 48	69.7	29 22.2	81 48	69.1	91
2	22 44.4	83 49	73.1	23 09.3	83 49	72.8	23 34.1	83 49	72.5	24 23.7	82 49	71.9	26 02.4	82 48	70.6	27 40.4	81 48	69.3	28 04.8	81 48	69.0	28 53.4	81 48	68.3	2
3	22 14.9	83 49	72.3	22 39.8	83 49	72.0	23 04.7	83 49	71.7	23 54.4	83 49	71.1	25 33.3	82 48	69.8	27 11.5	82 48	68.6	27 36.0	81 48	68.2	28 24.7	81 47	67.6	3
4	21 45.5	83 49	71.5	22 10.5	83 49	71.2	22 35.4	83 48	70.9	23 25.2	83 48	70.3	25 04.3	82 48	69.1	26 42.8	82 48	67.8	27 07.4	82 47	67.5	27 56.3	81 47	66.8	4
95	21 16.3	83 48	70.7	21 41.3	83 48	70.4	22 06.3	83 48	70.1	22 56.2	83 48	69.5	24 35.6	83 48	68.3	26 14.3	82 47	67.0	26 38.9	82 47	66.7	27 27.9	82 47	66.1	95
6	20 47.2	84 48	69.9	21 12.3	84 48	69.6	21 37.3	83 48	69.3	22 27.3	83 48	68.7	24 06.9	83 47	67.5	25 45.9	82 47	66.3	26 10.6	82 47	66.0	26 59.8	82 47	65.3	6
7	20 18.2	84 48	69.1	20 43.4	84 48	68.8	21 08.5	84 48	68.6	21 58.6	83 48	68.0	23 38.4	83 47	66.8	25 17.7	82 47	65.5	25 42.4	82 47	65.2	26 31.8	82 46	64.6	7
8	19 49.4	84 48	68.3	20 14.6	84 48	68.1	20 39.8	84 48	67.8	21 30.0	84 47	67.2	23 10.1	83 47	66.0	24 49.7	83 46	64.8	25 14.5	83 46	64.5	26 04.0	82 46	63.8	8
9	19 20.8	84 48	67.6	19 46.0	84 47	67.3	20 11.3	84 47	67.0	21 01.6	84 47	66.4	22 42.0	83 47	65.2	24 21.8	83 46	64.0	24 46.7	83 46	63.7	25 36.3	83 46	63.1	9
100	18 52.3	84 47	66.8	19 17.6	84 47	66.5	19 42.9	84 47	66.2	20 33.4	84 47	65.6	22 14.0	84 46	64.5	23 54.1	83 46	63.3	24 19.1	83 46	63.0	25 08.8	83 45	62.3	100
1	18 24.0	85 47	66.0	18 49.4	85 47	65.7	19 14.7	84 47	65.4	20 05.3	84 46	64.8	21 46.2	84 46	63.7	23 26.6	83 46	62.5	23 51.6	83 45	62.2	24 41.6	83 45	61.6	1
2	17 55.8	85 47	65.2	18 21.3	85 46	64.9	18 46.7	85 46	64.6	19 37.4	84 46	64.1	21 18.6	84 46	62.9	22 59.3	84 45	61.7	23 24.4	84 45	61.5	24 14.5	83 45	60.8	2
3	17 27.9	85 46	64.4	17 53.4	85 46	64.1	18 18.9	85 46	63.9	19 09.7	85 46	63.3	20 51.2	84 45	62.2	22 32.2	84 45	61.0	22 57.4	84 45	60.7	23 47.6	84 44	60.1	3
4	17 00.1	85 46	63.6	17 25.7	85 46	63.3	17 51.2	85 46	63.1	18 42.2	85 46	62.5	20 24.0	85 45	61.4	22 05.3	84 45	60.2	22 30.5	84 44	59.9	23 20.9	84 44	59.4	4
105	16 32.5	85 46	62.8	16 58.2	85 46	62.6	17 23.8	85 46	62.3	18 14.9	85 45	61.7	19 56.9	85 45	60.6	21 38.5	84 44	59.5	22 03.9	84 44	59.2	22 54.4	84 44	58.6	105
6	16 05.1	86 45	62.0	16 30.8	86 45	61.8	16 56.5	86 45	61.5	17 47.8	85 45	61.0	19 30.1	85 44	59.9	21 12.0	85 44	58.7	21 37.4	85 44	58.4	22 28.1	84 43	57.9	6
7	15 37.9	86 45	61.3	16 03.7	86 45	61.0	16 29.4	86 45	60.7	17 20.9	86 44	60.2	19 03.5	85 44	59.1	20 45.7	85 43	58.0	21 11.2	85 43	57.7	22 02.1	85 43	57.1	7
8	15 10.9	86 45	60.5	15 36.8	86 44	60.2	16 02.6	86 44	59.9	16 54.2	86 44	59.4	18 37.1	86 44	58.3	20 19.6	85 43	57.2	20 45.2	85 43	56.9	21 36.2	85 43	56.4	8
9	14 44.2	86 44	59.7	15 10.1	86 44	59.4	15 36.0	86 44	59.2	16 27.7	86 44	58.6	18 10.9	86 43	57.6	19 53.7	86 43	56.5	20 19.4	85 43	56.2	21 10.6	85 42	55.6	9
110	14 17.6	87 44	58.9	14 43.6	87 44	58.6	15 09.5	87 44	58.4	16 01.4	86 43	57.9	17 44.9	86 43	56.8	19 28.1	86 42	55.7	19 53.8	86 42	55.4	20 45.2	86 42	54.9	110
1	13 51.2	87 44	58.1	14 17.3	87 43	57.8	14 43.3	87 43	57.6	15 35.4	87 43	57.1	17 19.2	86 43	56.0	19 02.7	86 42	55.0	19 28.5	86 42	54.7	20 20.1	86 42	54.1	1
2	13 25.1	87 43	57.3	13 51.2	87 43	57.1	14 17.4	87 43	56.8	15 09.5	87 43	56.3	16 53.7	87 42	55.3	18 37.5	86 42	54.2	19 03.4	86 41	53.9	19 55.1	86 41	53.4	2
3	12 59.2	87 43	56.5	13 25.4	87 43	56.3	13 51.6	87 42	56.0	14 43.9	87 42	55.5	16 28.4	87 42	54.5	18 12.5	87 41	53.5	18 38.5	87 41	53.2	19 30.4	86 41	52.7	3
4	12 33.6	88 42	55.7	12 59.8	88 42	55.5	13 26.1	88 42	55.2	14 18.6	87 42	54.7	16 03.4	87 41	53.7	17 47.8	87 41	52.7	18 13.9	87 41	52.4	19 06.0	87 40	51.9	4
115	12 08.1	88 42	54.9	12 34.5	88 42	54.7	13 00.8	88 42	54.4	13 53.5	88 41	54.0	15 38.6	87 41	53.0	17 23.4	87 40	51.9	17 49.5	87 40	51.7	18 41.8	87 40	51.2	115
6	11 43.0	88 42	54.1	12 09.4	88 41	53.9	12 35.8	88 41	53.7	13 28.6	88 41	53.2	15 14.0	88 40	52.2	16 59.2	88 40	51.2	17 25.4	87 40	50.9	18 17.8	87 39	50.4	6
7	11 18.1	88 41	53.3	11 44.6	88 41	53.1	12 11.1	88 41	52.9	13 04.0	88 41	52.4	14 49.7	88 40	51.4	16 35.2	88 39	50.4	17 01.6	88 39	50.2	17 54.2	88 39	49.7	7
8	10 53.4	89 41	52.6	11 20.0	89 41	52.3	11 46.6	89 40	52.1	12 39.7	88 40	51.6	14 25.7	88 40	50.6	16 11.5	88 39	49.7	16 38.0	88 39	49.4	17 30.7	88 39	48.9	8
9	10 29.0	89 40	51.8	10 55.7	89 40	51.5	11 22.3	89 40	51.3	12 15.6	89 40	50.8	14 02.0	89 39	49.9	15 48.1	88 39	48.9	16 14.6	88 38	48.7	17 07.6	88 38	48.2	9
120	10 04.9	89 40	51.0	10 31.6	89 40	50.7	10 58.3	89 40	50.5	11 51.8	89 39	50.0	13 38.5	89 39	49.1	15 25.0	89 38	48.1	15 51.6	89 38	47.9	16 44.7	88 38	47.4	120
1	9 41.0	89 39	50.2	10 07.8	89 39	49.9	10 34.6	89 39	49.7	11 28.2	89 39	49.2	13 15.3	89 38	48.3	15 02.1	89 38	47.4	15 28.8	89 38	47.1	16 22.1	89 37	46.7	1
2	9 17.4	90 39	49.4	9 44.3	90 39	49.1	10 11.2	90 39	48.9	11 04.9	90 38	48.5	12 52.3	89 38	47.5	14 39.5	89 37	46.6	15 06.3	89 37	46.4	15 59.7	89 37	45.9	2
3	8 54.1	90 38	48.5	9 21.1	90 38	48.3	9 48.0	90 38	48.1	10 42.0	90 38	47.7	12 29.7	90 37	46.8	14 17.2	90 37	45.8	14 44.0	89 37	45.6	15 37.7	89 36	45.2	3
4	8 31.1	90 38	47.7	8 58.1	90 38	47.5	9 25.2	90 38	47.3	10 19.3	90 37	46.9	12 07.3	90 37	46.0	13 55.2	90 36	45.1	14 22.1	90 36	44.9	15 15.9	90 36	44.4	4
125	8 08.4	90 37	46.9	8 35.5	90 37	46.7	9 02.6	90 37	46.5	9 56.9	90 37	46.1	11 45.2	90 36	45.2	13 33.4	90 36	44.3	14 00.4	90 36	44.1	14 54.4	90 35	43.6	125
6	7 45.9	91 37	46.1	8 13.1	91 37	45.9	8 40.4	91 37	45.7	9 34.7	91 36	45.3	11 23.4	91 36	44.4	13 12.0	90 35	43.5	13 39.1	90 35	43.3	14 33.3	90 35	42.9	6
7	7 23.8	91 36	45.3	7 51.1	91 36	45.1	8 18.4	91 36	44.9	9 12.9	91 36	44.5	11 02.0	91 35	43.6	12 50.8	91 35	42.8	13 18.0	91 35	42.6	14 12.4	91 34	42.1	7
8	7 02.0	91 36	44.5	7 29.4	91 36	44.3	7 56.7	91 36	44.1	8 51.4	91 35	43.7	10 40.8	91 35	42.8	12 30.0	91 34	42.0	12 57.3	91 34	41.8	13 51.8	91 34	41.4	8
9	6 40.5	92 35	43.7	7 07.9	92 35	43.5	7 35.4	91 35	43.3	8 30.3	91 35	42.9	10 19.9	91 34	42.1	12 09.5	91 34	41.2	12 36.9	91 34	41.0	13 31.6	91 33	40.6	9
130	6 19.3	92 35	42.9	6 46.8	92 35	42.7	7 14.3	92 34	42.5	8 09.4	92 34	42.1	9 59.4	92 34	41.3	11 49.3	92 33	40.5	12 16.7	91 33	40.2	13 11.6	91 33	39.8	130
1	5 58.4	92 34	42.1	6 26.0	92 34	41.9	6 53.6	92 34	41.7	7 48.8	92 34	41.3	9 39.2	92 33	40.5	11 29.4	92 33	39.7	11 56.9	92 32	39.5	12 52.0	92 32	39.1	1
2	5 37.9	92 34	41.2	6 05.6	92 34	41.1	6 33.3	92 34	40.9	7 28.6	92 33	40.5	9 19.3	92 33	39.7	11 09.8	92 32	38.9	11 37.4	92 32	38.7	12 32.7	92 32	38.3	2
3	5 17.7	93 33	40.4	5 45.4	93 33	40.2	6 13.2	93 33	40.0	7 08.7	93 33	39.7	8 59.7	92 32	38.9	10 50.6	92 32	38.1	11 18.3	92 31	37.9	12 13.7	92 31	37.5	3
4				5 25.6	93 32	39.4	5 53.5	93 32	39.2	6 49.2	93 32	38.9	8 40.5	93 32	38.1	10 31.7	93 31	37.3	10 59.5	93 31	37.2	11 55.0	93 31	36.8	4
135				5 06.2	93 32	38.6	5 34.1	93 32	38.4	6 29.9	93 31	38.0	8 21.6	93 31	37.3	10 13.1	93 30	36.6	10 41.0	93 30	36.4	11 36.7	93 30	36.0	135
6							5 15.1	93 31	37.6	6 11.1	93 31	37.2	8 03.0	93 30	36.5	9 54.9	93 30	35.8	10 22.8	93 30	35.6	11 18.7	93 29	35.2	6
7										5 52.6	94 30	36.4	7 44.8	94 30	35.7	9 37.0	93 29	35.0	10 05.0	93 29	34.8	11 01.0	93 29	34.4	7
8										5 34.4	94 30	35.6	7 26.9	94 29	34.9	9 19.4	94 29	34.2	9 47.5	94 29	34.0	10 43.7	94 28	33.7	8
9										5 16.6	94 29	34.8	7 09.4	94 29	34.1	9 02.2	94 28	33.4	9 30.4	94 28	33.2	10 26.8	94 28	32.9	9
140													6 52.3	94 28	33.3	8 45.4	94 27	32.6	9 13.6	94 27	32.5	10 10.2	94 27	32.1	140
1													6 35.5	95 27	32.5	8 28.9	94 27	31.8	8 57.2	94 27	31.7	9 53.9	94 26	31.3	1
2													6 19.1	95 27	31.7	8 12.8	95 26	31.0	8 41.2	95 26	30.9	9 38.0	95 26	30.6	2
3													6 03.0	95 26	30.9	7 57.0	95 26	30.2	8 25.5	95 26	30.1	9 22.5	95 25	29.8	3
4													5 47.4	95 25	30.1	7 41.6	95 25	29.5	8 10.2	95 25	29.3	9 07.3	95 25	29.0	4
145													5 32.1	95 25	29.3	7 26.6	95 24	28.7	7 55.3	95 24	28.5	8 52.5	95 24	28.2	145
6													5 17.2	96 24	28.4	7 12.0	96 24	27.9	7 40.7	96 24	27.7	8 38.1	96 23	27.4	6
7													5 02.6	96 24	27.6	6 57.8	96 23	27.1	7 26.5	96 23	26.9	8 24.1	96 23	26.6	7
8																6 43.9	96 22	26.3	7 12.7	96 22	26.1	8 10.4	96 22	25.8	8
9																6 30.4	96 22	25.5	6 59.3	96 22	25.3	7 57.1	96 21	25.0	9
150																6 17.3	97 21	24.6	6 46.3	97 21	24.5	7 44.2	97 21	24.3	150
1																6 04.6	97 20	23.8	6 33.7	97 20	23.7	7 31.8	97 20	23.5	1
2																5 52.4	97 20	23.0	6 21.5	97 20	22.9	7 19.6	97 20	22.7	2
3																5 40.5	97 19	22.2	6 09.6	97 19	22.1	7 07.9	97 19	21.9	3
4																5 29.0	97 18	21.4	5 58.2	97 18	21.3	6 56.6	97 18	21.1	4
155																5 17.9	98 18	20.6	5 47.2	98 18	20.5	6 45.7	98 18	20.3	155
6																5 07.2	98 17	19.8	5 36.6	98 17	19.7	6 35.2	98 17	19.5	6
7																			5 26.4	98 16	18.9	6 25.1	98 16	18.7	7
8																			5 16.6	98 16	18.1	6 15.4	98 15	17.9	8
9																			5 07.2	98 15	17.2	6 06.2	98 15	17.1	9
160																						5 57.3	98 14	16.3	160
1																						5 48.9	99 13	15.5	1
2																						5 40.8	99 13	14.6	2
3																						5 33.2	99 12	13.8	3
4																						5 26.1	99 11	13.0	4
165																						5 19.3	99 11	12.2	165
6																						5 13.0	99 10	11.4	6
7																						5 07.1	99 09	10.6	7
8																						5 01.6	99 08	09.8	8

Digitized by Google

Lat. 59°

H.A.	36° 00′		37° 00′		38° 30′		40° 00′		42° 00′		42° 30′		43° 00′		45° 00′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	67 00.0 1.0 01	180.0	68 00.0 1.0 01	180.0	69 30.0 1.0 01	180.0	71 00.0 1.0 01	180.0	73 00.0 1.0 01	180.0	73 30.0 1.0 01	180.0	74 00.0 1.0 01	180.0	76 00.0 1.0 01	180.0	00
1	66 59.4 1.0 03	177.9	67 59.4 1.0 03	177.9	69 29.4 1.0 03	177.8	70 59.4 1.0 03	177.6	72 59.3 1.0 03	177.5	73 29.3 1.0 04	177.4	73 59.3 1.0 04	177.3	75 59.2 1.0 04	177.1	1
2	66 57.8 1.0 05	175.9	67 57.7 1.0 05	175.7	69 27.6 1.0 05	175.5	70 57.5 1.0 05	175.3	72 57.3 1.0 06	174.9	73 27.2 1.0 06	174.8	73 57.1 1.0 06	174.7	75 56.9 1.0 07	174.2	2
3	66 55.0 1.0 06	173.8	67 54.8 1.0 07	173.6	69 24.6 1.0 07	173.3	70 54.3 1.0 07	173.0	72 53.9 1.0 08	172.4	73 23.7 1.0 08	172.2	73 53.6 1.0 08	172.1	75 52.9 99 09	171.3	3
4	66 51.1 1.0 08	171.7	67 50.8 1.0 09	171.5	69 20.4 99 09	171.1	70 49.9 99 09	170.6	72 49.1 99 10	169.9	73 18.9 99 10	169.7	73 48.6 99 11	169.5	75 47.5 99 12	168.4	4
05	66 46.1 99 10	169.7	67 45.7 99 10	169.4	69 15.0 99 11	168.9	70 44.3 99 11	168.3	72 43.0 99 12	167.4	73 12.7 99 13	167.1	73 42.3 99 13	166.9	75 40.5 98 14	165.6	05
6	66 40.1 99 12	167.7	67 39.5 99 12	167.3	69 08.5 99 13	166.7	70 37.4 99 13	166.0	72 35.6 98 14	164.9	73 05.1 98 15	164.6	73 34.6 98 15	164.3	75 32.1 98 16	162.8	6
7	66 32.9 99 14	165.7	67 32.1 99 14	165.2	69 00.8 98 15	164.6	70 29.3 98 15	163.8	72 27.0 98 16	162.5	72 56.3 98 17	162.2	73 25.6 98 17	161.8	75 22.3 97 19	160.0	7
8	66 24.7 98 15	163.7	67 23.7 98 16	163.2	68 52.1 98 16	162.4	70 20.1 98 17	161.5	72 17.1 97 18	160.1	72 46.2 97 19	159.7	73 15.3 97 19	159.3	75 11.0 96 21	157.4	8
9	66 15.5 98 17	161.7	67 14.3 98 18	161.2	68 42.2 98 18	160.3	70 09.8 97 19	159.3	72 06.0 97 20	157.8	72 34.9 96 21	157.3	73 03.8 96 21	156.9	74 58.5 96 23	154.7	9
10	66 05.3 98 19	159.7	67 03.8 97 19	159.2	68 31.2 97 20	158.2	69 58.3 97 21	157.1	71 53.7 96 22	155.5	72 22.4 96 23	155.0	72 51.0 95 23	154.5	74 44.7 94 25	152.2	10
1	65 54.1 97 20	157.8	66 52.3 97 21	157.2	68 19.2 96 22	156.2	69 45.8 96 23	155.0	71 40.3 95 24	153.2	72 08.8 95 25	152.7	72 37.2 94 25	152.2	74 29.7 93 27	149.7	1
2	65 42.0 97 22	155.9	66 39.8 96 22	155.2	68 06.3 96 23	154.1	69 32.2 95 24	152.9	71 25.9 94 26	151.0	71 54.1 94 26	150.4	72 22.2 94 27	149.9	74 13.5 92 29	147.3	2
3	65 28.9 96 23	154.0	66 26.4 96 24	153.3	67 52.3 96 25	152.1	69 17.6 94 26	150.8	71 10.4 93 27	148.8	71 38.3 93 28	148.2	72 06.1 93 28	147.6	73 56.3 91 30	144.9	3
4	65 14.9 95 25	152.1	66 12.1 95 25	151.4	67 37.4 94 26	150.2	69 02.1 94 27	148.8	70 53.9 92 29	146.7	71 21.5 92 30	146.1	71 49.1 92 30	145.5	73 38.0 90 32	142.6	4
15	65 00.0 95 26	150.3	65 56.8 95 27	149.5	67 21.6 94 28	148.3	68 45.6 93 29	146.8	70 36.4 92 31	144.6	71 03.8 91 31	144.0	71 31.1 91 31	143.3	73 18.8 89 34	140.4	15
6	64 44.3 94 28	148.5	65 40.7 94 28	147.7	67 04.9 93 29	146.4	68 28.3 92 30	144.9	70 18.1 91 32	142.6	70 45.2 90 32	141.9	71 12.2 90 33	141.3	72 58.6 87 35	138.3	6
7	64 27.7 94 29	146.7	65 23.8 93 30	145.9	66 47.3 92 31	144.5	68 10.1 91 32	143.0	69 58.9 90 33	140.6	70 25.7 89 34	139.9	70 52.5 89 34	139.3	72 37.6 86 36	136.2	7
8	64 10.4 93 30	145.0	65 06.1 93 31	144.1	66 29.0 92 32	142.7	67 51.1 91 33	141.1	69 38.9 89 35	138.7	70 05.5 88 35	138.0	70 31.9 88 36	137.3	72 15.8 85 38	134.2	8
9	63 52.3 92 31	143.3	64 47.6 92 32	142.4	66 09.9 91 33	140.9	67 31.3 90 34	139.3	69 18.1 88 36	136.8	69 44.4 87 36	136.1	70 10.6 87 37	135.4	71 53.3 84 39	132.2	9
20	63 33.4 92 33	141.6	64 28.3 91 33	140.7	65 50.0 90 34	139.2	67 10.8 89 35	137.5	68 56.6 87 37	135.0	69 22.6 87 37	134.3	69 48.5 86 38	133.6	71 30.1 83 40	130.3	20
1	63 13.9 91 34	139.9	64 08.4 91 34	139.0	65 29.5 90 35	137.5	66 49.6 88 36	135.8	68 34.4 86 38	133.2	69 00.2 86 38	132.5	69 25.8 85 39	131.8	71 06.2 82 41	128.5	1
2	62 53.6 91 35	138.3	63 47.8 90 35	137.3	65 08.3 89 36	135.8	66 27.7 88 38	134.1	68 11.5 85 39	131.5	68 37.1 85 40	130.8	69 02.4 84 40	130.0	70 41.8 81 42	126.7	2
3	62 32.8 90 36	136.7	63 26.5 89 36	135.7	64 46.4 88 37	134.2	66 05.2 87 38	132.4	67 48.1 85 40	129.8	68 13.4 84 40	129.1	68 38.5 83 41	128.3	70 16.7 80 43	125.0	3
4	62 11.3 89 37	135.2	63 04.7 89 37	134.2	64 23.9 87 38	132.6	65 42.0 86 39	130.8	67 24.0 84 41	128.1	67 49.1 83 41	127.4	68 14.0 83 42	126.7	69 51.2 79 43	123.4	4
25	61 49.2 89 38	133.6	62 42.2 88 38	132.6	64 00.9 87 39	131.0	65 18.4 85 40	129.2	66 59.5 83 42	126.5	67 24.3 82 42	125.8	67 48.9 82 43	125.1	69 25.1 79 44	121.8	25
6	61 26.5 88 39	132.1	62 19.2 87 39	131.1	63 37.3 86 40	129.5	64 54.2 85 41	127.7	66 34.4 82 43	125.0	66 59.0 82 43	124.3	67 23.4 81 43	123.5	68 58.6 78 45	120.2	6
7	61 03.3 88 40	130.6	61 55.6 87 40	129.6	63 13.2 85 41	128.0	64 29.4 84 42	126.1	66 08.8 82 43	123.5	66 33.2 81 44	122.7	66 57.4 80 44	122.0	68 31.7 77 46	118.7	7
8	60 39.6 87 40	129.2	61 31.6 86 41	128.1	62 48.6 85 42	126.5	64 04.3 83 43	124.7	65 42.8 81 44	122.0	66 07.0 80 44	121.3	66 31.0 79 45	120.5	68 04.4 76 46	117.2	8
9	60 15.4 86 41	127.8	61 07.0 86 42	126.7	62 23.5 84 43	125.0	63 38.6 83 43	123.2	65 16.4 80 45	120.5	65 40.4 80 45	119.8	66 04.1 79 45	119.1	67 36.8 76 47	115.8	9
30	59 50.8 86 42	126.4	60 42.0 85 42	125.3	61 58.0 84 43	123.6	63 12.6 82 44	121.8	64 49.6 80 45	119.1	65 13.4 79 46	118.4	65 36.9 78 46	117.7	67 08.8 75 47	114.4	30
1	59 25.7 85 43	125.0	60 16.6 84 43	123.9	61 32.0 83 44	122.3	62 46.1 81 45	120.4	64 22.4 79 46	117.8	64 46.0 78 46	117.0	65 09.4 78 46	116.3	66 40.5 74 48	113.1	1
2	59 00.2 85 43	123.6	59 50.8 84 44	122.6	61 05.7 83 44	120.9	62 19.3 81 45	119.1	63 54.9 78 46	116.4	64 18.3 78 47	115.7	64 41.5 77 47	115.0	66 12.0 74 48	111.8	2
3	58 34.2 84 44	122.3	59 24.6 83 44	121.3	60 39.0 82 45	119.6	61 52.1 80 46	117.8	63 27.1 78 47	115.1	63 50.3 77 47	114.4	64 13.4 76 47	113.7	65 43.2 73 48	110.5	3
4	58 07.9 84 44	121.0	58 58.0 83 45	120.0	60 12.0 81 46	118.3	61 24.6 80 46	116.5	62 59.0 77 47	113.8	63 22.1 77 48	113.1	63 44.9 76 48	112.4	65 14.1 73 49	109.3	4
35	57 41.3 83 45	119.8	58 31.0 82 45	118.7	59 44.6 81 46	117.0	60 56.8 79 47	115.2	62 30.6 77 48	112.6	62 53.5 76 48	111.9	63 16.2 75 48	111.1	64 44.8 72 49	108.1	35
6	57 14.3 83 46	118.5	58 03.8 82 46	117.5	59 16.9 81 47	115.8	60 28.7 79 47	114.0	62 01.9 76 48	111.3	62 24.7 76 48	110.6	62 47.3 75 49	109.9	64 15.3 72 49	106.9	6
7	56 47.0 82 46	117.3	57 36.2 82 46	116.2	58 49.0 80 47	114.5	60 00.3 78 48	112.8	61 33.0 76 49	110.1	61 55.7 75 49	109.5	62 18.1 75 49	108.8	63 45.7 71 50	105.7	7
8	56 19.4 82 46	116.1	57 08.3 81 47	115.0	58 20.7 80 48	113.3	59 31.7 78 48	111.6	61 03.9 76 49	109.0	61 26.4 75 49	108.3	61 48.8 74 49	107.6	63 15.9 71 50	104.6	8
9	55 51.5 82 47	114.9	56 40.2 81 47	113.8	57 52.2 79 48	112.2	59 02.8 78 48	110.4	60 34.6 75 49	107.8	60 57.0 74 49	107.1	61 19.2 74 50	106.5	62 45.9 71 50	103.5	9
40	55 23.3 81 47	113.7	56 11.8 80 48	112.7	57 23.5 79 48	111.0	58 33.8 77 49	109.2	60 05.0 75 49	106.7	60 27.4 74 50	106.0	60 49.5 73 50	105.3	62 15.8 70 50	102.4	40
1	54 54.9 81 48	112.6	55 43.2 80 48	111.5	56 54.5 79 49	109.9	58 04.5 77 49	108.1	59 35.4 74 50	105.6	59 57.6 74 50	104.9	60 19.6 73 50	104.3	61 45.5 70 51	101.4	1
2	54 26.2 81 48	111.4	55 14.3 80 48	110.4	56 25.4 78 49	108.8	57 35.0 77 49	107.0	59 05.5 74 50	104.5	59 27.7 73 50	103.9	59 49.6 73 50	103.2	61 15.2 70 51	100.3	2
3	53 57.4 80 48	110.3	54 45.2 79 49	109.3	55 56.0 78 49	107.7	57 05.4 76 50	105.9	58 35.5 74 50	103.5	58 57.6 73 50	102.8	59 19.5 73 50	102.1	60 44.7 70 51	99.3	3
4	53 28.3 80 49	109.2	54 16.0 79 49	108.2	55 26.5 78 50	106.6	56 35.6 76 50	104.9	58 05.4 74 50	102.4	58 27.4 73 50	101.8	58 49.2 72 51	101.1	60 14.2 69 51	98.3	4
45	52 59.0 80 49	108.2	53 46.5 79 49	107.1	54 56.8 77 50	105.5	56 05.7 76 50	103.8	57 35.2 73 51	101.4	57 57.1 73 51	100.7	58 18.8 72 51	100.1	59 43.6 69 51	97.3	45
6	52 29.6 79 49	107.1	53 16.9 78 50	106.1	54 26.9 77 50	104.5	55 35.6 76 50	102.8	57 04.8 73 51	100.4	57 26.7 73 51	99.7	57 48.3 72 51	99.1	59 12.9 69 51	96.4	6
7	52 00.0 79 50	106.0	52 47.2 78 50	105.0	53 56.9 77 50	103.4	55 05.4 75 51	101.8	56 34.4 73 51	99.4	56 56.2 72 51	98.8	57 17.8 72 51	98.1	58 42.2 69 51	95.4	7
8	51 30.2 79 50	105.0	52 17.2 78 50	104.0	53 26.8 77 50	102.4	54 35.1 75 51	100.8	56 03.9 73 51	98.4	56 25.6 72 51	97.8	56 47.2 72 51	97.2	58 11.4 69 51	94.5	8
9	51 00.3 79 50	104.0	51 47.2 78 50	103.0	52 56.6 76 51	101.4	54 04.7 75 51	99.8	55 33.3 73 51	97.4	55 55.0 72 51	96.8	56 16.5 71 51	96.2	57 40.6 69 51	93.6	9
50	50 30.2 78 50	103.0	51 17.0 78 50	102.0	52 26.3 76 51	100.5	53 34.2 75 51	98.8	55 02.6 73 51	96.5	55 24.2 72 51	95.9	55 45.7 71 51	95.3	57 09.7 69 51	92.7	50
1	50 00.0 78 50	102.0	50 46.7 77 51	101.0	51 55.8 76 51	99.5	53 03.6 75 51	97.9	54 31.9 72 51	95.6	54 53.5 72 51	95.0	55 14.9 71 51	94.4	56 38.8 69 51	91.8	1
2	49 29.8 78 51	101.0	50 16.4 77 51	100.0	51 25.3 76 51	98.5	52 33.0 74 51	96.9	54 01.1 72 51	94.6	54 22.7 72 51	94.0	54 44.1 71 51	93.4	56 07.9 69 52	90.9	2
3	48 59.4 78 51	100.1	49 45.9 77 51	99.1	50 54.7 76 51	97.6	52 02.3 74 51	96.0	53 30.2 72 51	93.7	53 51.8 72 51	93.1	54 13.2 71 51	92.6	55 37.0 69 52	90.1	3
4	48 28.9 78 51	99.1	49 15.3 77 51	98.1	50 24.0 76 51	96.6	51 31.5 74 51	95.1	52 59.4 72 51	92.8	53 21.0 72 51	92.3	53 42.4 71 51	91.7	55 06.1 69 51	89.2	4
55	47 58.4 78 51	98.2	48 44.7 77 51	97.2	49 53.3 76 51	95.7	51 00.7 74 51	94.2	52 28.5 72 51	92.0	52 50.1 72 52	91.4	53 11.5 71 51	90.8	54 35.2 69 51	88.4	55
6	47 27.7 78 51	97.2	48 14.0 77 51	96.3	49 22.5 75 51	94.8	50 29.9 74 51	93.3	51 57.6 72 51	91.1	52 19.2 72 52	90.5	52 40.6 71 51	89.9	54 04.3 69 51	87.5	6
7	46 57.0 77 51	96.3	47 43.3 77 51	95.4	48 51.7 75 51	93.9	49 59.0 74 51	92.4	51 26.7 72 51	90.2	51 48.3 72 52	89.7	52 09.7 71 51	89.1	53 33.5 69 51	86.7	7
8	46 26.3 77 51	95.4	47 12.5 77 51	94.5	48 20.9 75 51	93.0	49 28.1 74 51	91.5	50 55.8 72 51	89.4	51 17.4 72 51	88.8	51 38.8 71 51	88.2	53 02.6 69 51	85.9	8
9	45 55.5 77 51	94.5	46 41.7 77 51	93.6	47 50.0 75 52	92.1	48 57.2 74 51	90.6	50 24.9 72 51	88.5	50 46.5 72 51	88.0	51 07.9 71 51	87.4	52 31.8 69 51	85.1	9
60	45 24.7 77 51	93.6	46 10.8 76 51	92.7	47 19.1 75 52	91.3	48 26.3 74 51	89.8	49 54.0 72 51	87.7	50 15.6 72 51	87.1	50 37.0 71 51	86.6	52 01.1 69 51	84.3	60
1	44 53.8 77 51	92.7	45 39.9 76 52	91.8	46 48.2 75 52	90.4	47 55.4 74 51	88.9	49 23.2 72 51	86.8	49 44.8 72 51	86.3	50 06.2 71 51	85.8	51 30.3 69 51	83.5	1
2	44 23.0 77 52	91.8	45 09.0 76 52	90.9	46 17.3 75 52	89.5	47 24.5 74 51	88.1	48 52.3 72 51	86.0	49 13.9 72 51	85.5	49 35.4 71 51	85.0	50 59.7 69 51	82.7	2
3	43 52.1 77 52	91.0	44 38.1 76 52	90.1	45 46.4 75 51	88.7	46 53.7 74 51	87.2	48 21.5 72 51	85.2	48 43.2 72 51	84.7	49 04.6 71 51	84.2	50 29.0 69 51	82.0	3
4	43 21.2 77 52	90.1	44 07.2 76 52	89.2	45 15.5 75 51	87.8	46 22.8 74 51	86.4	47 50.8 72 51	84.4	48 12.4 72 51	83.9	48 33.9 71 51	83.4	49 58.5 69 51	81.2	4
65	42 50.3 77 52	89.2	43 36.3 76 51	88.4	44 44.7 75 51	87.0	45 52.0 74 51	85.6	47 20.0 73 51	83.6	47 41.7 72 51	83.1	48 03.2 72 51	82.6	49 28.0 70 51	80.4	65
6	42 19.4 77 51	88.4	43 05.5 76 51	87.5	44 13.8 75 51	86.2	45 21.2 74 51	84.8	46 49.3 73 51	82.8	47 11.1 72 51	82.3	47 32.6 72 51	81.8	48 57.5 70 51	79.7	6
7	41 48.5 77 51	87.6	42 34.6 77 51	86.7	43 43.0 75 51	85.4	44 50.4 74 51	84.0	46 18.7 73 51	82.0	46 40.5 72 51	81.5	47 02.1 72 51	81.0	48 27.2 70 50	78.9	7
8	41 17.6 77 51	86.7	42 03.8 77 51	85.9	43 12.2 76 51	84.5	44 19.7 74 51	83.2	45 48.1 73 51	81.3	46 09.9 72 51	80.8	46 31.6 72 51	80.3	47 56.9 70 50	78.2	8
9	40 46.8 77 51	85.9	41 33.0 77 51	85.0	42 41.5 76 51	83.7	43 49.1 75 51	82.4	45 17.6 73 51	80.5	45 39.5 73 51	80.0	46 01.2 72 51	79.5	47 26.7 70 50	77.4	9
70	40 16.0 77 51	85.1	41 02.2 77 51	84.2	42 10.8 76 51	82.9	43 18.5 75 51	81.6	44 47.2 73 51	79.7	45 09.1 73 51	79.2	45 30.8 72 50	78.7	46 56.5 71 50	76.7	70
1	39 45.2 77 51	84.3	40 31.5 77 51	83.4	41 40.1 76 51	82.1	42 47.9 75 51	80.8	44 16.8 73 50	78.9	44 38.7 73 50	78.5	45 00.6 72 50	78.0	46 26.5 71 50	76.0	1
2	39 14.5 77 51	83.4	40 00.8 77 51	82.6	41 09.6 76 51	81.3	42 17.5 75 51	80.0	43 46.5 73 50	78.2	44 08.5 73 50	77.7	44 30.4 73 50	77.2	45 56.6 71 50	75.3	2
3	38 43.8 78 51	82.6	39 30.2 77 51	81.8	40 39.0 76 51	80.6	41 47.1 75 51	79.2	43 16.3 74 50	77.4	43 38.4 73 50	77.0	44 00.3 73 50	76.5	45 26.7 71 50	74.5	3
4	38 13.2 78 51	81.8	38 59.6 77 51	81.0	40 08.6 76 51	79.8	41 16.7 75 50	78.5	42 46.2 74 50	76.7	43 08.3 73 50	76.2	43 30.3 73 50	75.8	44 57.0 71 49	73.8	4
75	37 42.6 78 51	81.0	38 29.1 77 51	80.2	39 38.2 76 50	79.0	40 46.5 75 50	77.7	42 16.2 74 50	75.9	42 38.3 74 50	75.5	43 00.4 73 50	75.0	44 27.4 72 49	73.1	75
6	37 12.1 78 51	80.2	37 58.7 77 51	79.4	39 07.9 76 50	78.2	40 16.4 76 50	77.0	41 46.2 74 50	75.2	42 08.5 74 50	74.7	42 30.6 74 49	74.3	43 57.9 72 49	72.4	6
7	36 41.7 78 51	79.5	37 28.4 77 50	78.7	38 37.7 77 50	77.5	39 46.3 76 50	76.2	41 16.4 74 50	74.5	41 38.7 74 49	74.0	42 00.9 74 49	73.6	43 28.5 72 49	71.7	7
8	36 11.4 78 50	78.7	36 58.1 78 50	77.9	38 07.6 77 50	76.7	39 16.3 76 50	75.4	40 46.7 75 49	73.7	41 09.0 74 49	73.3	41 31.3 74 49	72.8	42 59.2 73 49	71.0	8
9	35 41.1 78 50	77.9	36 27.9 78 50	77.1	37 37.6 77 50	75.9	38 46.5 76 50	74.7	40 17.1 75 49	73.0	40 39.5 75 49	72.6	41 01.8 74 49	72.1	42 30.0 73 48	70.3	9
80	35 11.0 78 50	77.1	35 57.9 78 50	76.3	37 07.7 77 50	75.2	38 16.7 76 49	73.9	39 47.6 75 49	72.3	40 10.1 75 49	71.8	40 32.5 74 49	71.4	42 01.0 73 48	69.6	80
1	34 40.9 79 50	76.3	35 27.9 78 50	75.6	36 37.8 77 50	74.4	37 47.1 77 49	73.2	39 18.2 75 49	71.5	39 40.8 75 49	71.1	40 03.3 75 48	70.7	41 32.1 73 48	68.9	1
2	34 10.9 79 50	75.6	34 58.0 78 50	74.8	36 08.1 78 49	73.7	37 17.6 77 49	72.5	38 49.0 76 49	70.8	39 11.6 75 48	70.4	39 34.2 75 48	70.0	41 03.3 74 48	68.2	2
3	33 41.0 79 50	74.8	34 28.2 78 49	74.1	35 38.5 78 49	72.9	36 48.2 77 49	71.7	38 19.9 76 48	70.1	38 42.6 76 48	69.7	39 05.2 75 48	69.3	40 34.7 74 47	67.5	3
4	33 11.3 79 49	74.0	33 58.6 79 49	73.3	35 09.1 78 49	72.2	36 18.9 77 49	71.0	37 50.9 76 48	69.4	38 13.7 76 48	69.0	38 36.4 76 48	68.6	40 06.2 74 47	66.8	4
85	32 41.6 79 49	73.3	33 29.0 79 49	72.5	34 39.7 78 49	71.4	35 49.7 77 48	70.3	37 22.0 76 48	68.7	37 44.9 76 48	68.3	38 07.7 76 48	67.8	39 37.9 73 47	66.2	85
6	32 12.1 79 49	72.5	32 59.6 79 49	71.8	34 10.5 78 48	70.7	35 20.7 78 48	69.5	36 53.3 77 48	68.0	37 16.2 76 48	67.6	37 39.1 76 47	67.1	39 09.7 75 47	65.5	6
7	31 42.7 80 49	71.7	32 30.3 79 49	71.0	33 41.4 79 48	69.9	34 51.8 78 48	68.8	36 24.7 77 47	67.2	36 47.8 77 47	66.8	37 10.7 76 47	66.4	38 41.7 75 46	64.8	7
8	31 13.4 80 49	71.0	32 01.2 79 48	70.3	33 12.4 79 48	69.2	34 23.1 78 48	68.1	35 56.3 77 47	66.5	36 19.4 77 47	66.1	36 42.5 77 47	65.7	38 13.8 76 46	64.1	8
9	30 44.2 80 48	70.2	31 32.2 80 48	69.5	32 43.6 79 48	68.5	33 54.5 78 47	67.4	35 28.0 77 47	65.8	35 51.2 77 47	65.4	36 14.4 77 47	65.0	37 46.1 76 46	63.4	9
90	30 15.2 80 48	69.5	31 03.3 80 48	68.8	32 14.9 79 48	67.7	33 26.0 79 47	66.6	34 59.9 78 47	65.1	35 23.2 78 46	64.7	35 46.4 77 46	64.3	37 18.5 76 46	62.8	90

Lat. 59°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	29 46.4	81 48	68.7	30 34.5	80 48	68.0	31 46.4	80 47	67.0	32 57.8	79 47	65.9	34 32.0	78 46	64.4	34 55.3	78 46	64.0	35 18.7	78 46	63.7	36 51.1	77 45	62.1	91
2	29 17.6	81 48	68.0	30 06.0	80 47	67.3	31 18.1	80 47	66.3	32 29.6	79 47	65.2	34 04.2	78 46	63.7	34 27.6	78 46	63.3	34 51.0	78 46	63.0	36 23.9	77 45	61.4	2
3	28 49.1	81 47	67.2	29 37.5	81 47	66.6	30 49.8	80 47	65.5	32 01.7	79 46	64.5	33 36.6	79 46	63.0	34 00.1	78 46	62.6	34 23.6	78 45	62.3	35 56.9	77 45	60.7	3
4	28 20.6	81 47	66.5	29 09.3	81 47	65.8	30 21.8	80 46	64.8	31 33.9	80 46	63.7	33 09.1	79 45	62.3	33 32.8	79 45	61.9	33 56.3	79 45	61.6	35 30.0	78 44	60.0	4
95	27 52.4	81 47	65.7	28 41.2	81 47	65.1	29 53.9	81 46	64.1	31 06.2	80 46	63.0	32 41.8	79 45	61.6	33 05.6	79 45	61.2	33 29.3	79 45	60.9	35 03.3	78 44	59.4	95
6	27 24.3	82 47	65.0	28 13.2	81 46	64.3	29 26.2	81 46	63.3	30 38.8	80 45	62.3	32 14.7	80 45	60.9	32 38.6	79 45	60.5	33 02.4	79 45	60.2	34 36.8	78 44	58.7	6
7	26 56.4	82 46	64.3	27 45.4	82 46	63.6	28 58.7	81 46	62.6	30 11.5	81 45	61.6	31 47.8	80 45	60.2	32 11.8	80 44	59.9	32 35.6	79 44	59.5	34 10.5	79 44	58.0	7
8	26 28.6	82 46	63.5	27 17.8	82 46	62.9	28 31.3	81 45	61.9	29 44.4	81 45	60.9	31 21.1	80 44	59.5	31 45.1	80 44	59.2	32 09.1	80 44	58.8	33 44.4	79 43	57.4	8
9	26 01.1	82 46	62.8	26 50.4	82 45	62.1	28 04.2	82 45	61.2	29 17.5	81 45	60.2	30 54.6	81 44	58.8	31 18.7	80 44	58.5	31 42.8	80 44	58.1	33 18.5	79 43	56.7	9
100	25 33.7	83 45	62.0	26 23.2	82 45	61.4	27 37.2	82 45	60.4	28 50.8	82 44	59.5	30 28.2	81 44	58.1	30 52.5	81 43	57.8	31 16.6	80 43	57.4	32 52.7	80 43	56.0	100
1	25 06.5	83 45	61.3	25 56.2	83 45	60.7	27 10.4	82 44	59.7	28 24.3	82 44	58.7	30 02.1	81 43	57.4	30 26.4	81 43	57.1	30 50.7	81 43	56.7	32 27.2	80 42	55.3	1
2	24 39.5	83 45	60.5	25 29.3	83 44	59.9	26 43.8	83 44	59.0	27 58.0	82 44	58.0	29 36.1	82 43	56.7	30 00.6	81 43	56.4	30 24.9	81 43	56.1	32 01.9	80 42	54.7	2
3	24 12.7	84 44	59.8	25 02.7	83 44	59.2	26 17.4	83 44	58.3	27 31.8	82 43	57.3	29 10.4	82 43	56.0	29 34.9	82 42	55.7	29 59.4	82 42	55.4	31 36.8	81 42	54.0	3
4	23 46.1	84 44	59.1	24 36.3	84 44	58.5	25 51.3	83 43	57.5	27 05.9	83 43	56.6	28 44.9	82 42	55.3	29 09.5	82 42	55.0	29 34.1	82 42	54.7	31 11.9	81 41	53.3	4
105	23 19.7	84 44	58.3	24 10.0	84 43	57.7	25 25.3	83 43	56.8	26 40.2	83 42	55.9	28 19.6	82 42	54.6	28 44.3	82 42	54.3	29 09.0	82 42	54.0	30 47.2	82 41	52.7	105
6	22 53.5	84 43	57.6	23 44.0	84 43	57.0	24 59.5	84 43	56.1	26 14.8	83 42	55.2	27 54.5	83 41	53.9	28 19.3	83 41	53.6	28 44.1	83 41	53.3	30 22.8	82 40	52.0	6
7	22 27.5	85 43	56.8	23 18.2	84 43	56.3	24 34.0	84 42	55.4	25 49.5	84 42	54.5	27 29.6	83 41	53.2	27 54.6	83 41	52.9	28 19.4	83 41	52.6	29 58.5	82 40	51.3	7
8	22 01.7	85 43	56.1	22 52.6	85 42	55.5	24 08.7	84 42	54.7	25 24.5	84 41	53.8	27 05.0	84 41	52.5	27 30.0	83 41	52.2	27 55.0	83 40	51.9	29 34.5	83 40	50.6	8
9	21 36.2	85 42	55.4	22 27.2	85 42	54.8	23 43.6	85 41	53.9	24 59.7	84 41	53.0	26 40.6	84 40	51.8	27 05.7	84 40	51.5	27 30.8	84 40	51.2	29 10.7	83 39	50.0	9
110	21 10.9	85 42	54.6	22 02.1	85 42	54.1	23 18.7	85 41	53.2	24 35.1	85 41	52.3	26 16.4	84 40	51.1	26 41.6	84 40	50.8	27 06.8	84 40	50.5	28 47.2	83 39	49.3	110
1	20 45.8	86 41	53.9	21 37.2	86 41	53.3	22 54.1	85 41	52.5	24 10.7	85 40	51.6	25 52.4	85 40	50.5	26 17.8	84 39	50.2	26 43.1	84 39	49.9	28 23.9	84 38	48.6	1
2	20 21.0	86 41	53.1	21 12.5	86 41	52.6	22 29.7	86 40	51.8	23 46.6	85 40	50.9	25 28.7	85 39	49.8	25 54.2	85 39	49.5	26 19.6	85 39	49.2	28 00.8	84 38	48.0	2
3	19 56.4	86 41	52.4	20 48.1	86 40	51.9	22 05.6	86 40	51.0	23 22.8	86 39	50.2	25 05.3	85 39	49.1	25 30.8	85 38	48.8	25 56.3	85 38	48.5	27 38.0	84 38	47.3	3
4	19 32.0	87 40	51.6	20 23.9	86 40	51.1	21 41.7	86 39	50.3	22 59.1	86 39	49.5	24 42.0	86 38	48.4	25 07.7	85 38	48.1	25 33.3	85 38	47.8	27 15.4	85 37	46.6	4
115	19 07.9	87 40	50.9	20 00.0	87 39	50.4	21 18.0	87 39	49.6	22 35.8	86 39	48.8	24 19.1	86 38	47.7	24 44.8	86 38	47.4	25 10.5	86 38	47.1	26 53.1	85 37	45.9	115
6	18 44.0	87 39	50.2	19 36.3	87 39	49.6	20 54.6	87 39	48.8	22 12.7	87 38	48.0	23 56.4	86 37	47.0	24 22.2	86 37	46.7	24 48.0	86 37	46.4	26 31.0	86 36	45.3	6
7	18 20.4	88 39	49.4	19 12.9	87 39	48.9	20 31.5	87 38	48.1	21 49.8	87 38	47.3	23 33.9	87 37	46.3	23 59.9	86 37	46.0	24 25.8	86 37	45.7	26 09.2	86 36	44.6	7
8	17 57.1	88 38	48.7	18 49.8	88 38	48.2	20 08.6	87 38	47.4	21 27.2	87 37	46.6	23 11.7	87 37	45.5	23 37.8	87 36	45.3	24 03.8	87 36	45.0	25 47.6	86 36	43.9	8
9	17 34.0	88 38	47.9	18 26.9	88 38	47.4	19 46.0	88 37	46.7	21 04.9	88 37	45.9	22 49.8	87 36	44.8	23 16.0	87 36	44.6	23 42.1	87 36	44.3	25 26.3	87 35	43.2	9
120	17 11.2	88 38	47.2	18 04.2	88 37	46.7	19 23.6	88 37	45.9	20 42.8	88 36	45.2	22 28.1	88 36	44.1	22 54.4	87 35	43.9	23 20.6	87 35	43.6	25 05.3	87 35	42.5	120
1	16 48.7	89 37	46.4	17 41.9	89 37	45.9	19 01.6	88 36	45.2	20 21.1	88 36	44.5	22 06.8	88 35	43.4	22 33.1	88 35	43.2	22 59.5	88 35	42.9	24 44.5	87 34	41.9	1
2	16 26.5	89 37	45.7	17 19.8	89 36	45.2	18 39.8	89 36	44.5	19 59.6	89 35	43.7	21 45.6	88 35	42.7	22 12.1	88 35	42.5	22 38.5	88 34	42.2	24 24.1	88 34	41.2	2
3	16 04.5	89 36	44.9	16 58.1	89 36	44.4	18 18.3	89 35	43.7	19 38.3	89 35	43.0	21 24.8	89 34	42.0	21 51.4	89 34	41.8	22 17.9	88 34	41.5	24 03.8	88 33	40.5	3
4	15 42.8	90 36	44.2	16 36.6	90 35	43.7	17 57.1	89 35	43.0	19 17.4	89 34	42.3	21 04.3	89 34	41.3	21 30.9	89 34	41.1	21 57.6	89 33	40.8	23 43.9	88 33	39.8	4
125	15 21.4	90 35	43.4	16 15.4	90 35	43.0	17 36.1	90 34	42.3	18 56.8	90 34	41.6	20 44.0	89 33	40.6	21 10.8	89 33	40.4	21 37.5	89 33	40.1	23 24.3	89 32	39.1	125
6	15 00.3	90 35	42.7	15 54.4	90 34	42.2	17 15.5	90 34	41.5	18 36.4	90 33	40.8	20 24.0	90 33	39.9	20 50.9	90 33	39.7	21 17.7	89 32	39.4	23 04.9	89 32	38.5	6
7	14 39.6	91 34	41.9	15 33.8	90 34	41.5	16 55.2	90 33	40.8	18 16.3	90 33	40.1	20 04.4	90 32	39.2	20 31.3	90 32	39.0	20 58.3	90 32	38.7	22 45.8	89 31	37.8	7
8	14 19.1	91 34	41.1	15 13.5	91 33	40.7	16 35.1	91 33	40.1	17 56.6	90 32	39.4	19 45.0	90 32	38.5	20 12.0	90 32	38.2	20 39.1	90 31	38.0	22 27.1	90 31	37.1	8
9	13 58.9	91 33	40.4	14 53.5	91 33	40.0	16 15.4	91 32	39.3	17 37.1	91 32	38.7	19 25.9	91 31	37.8	19 53.1	90 31	37.5	20 20.2	90 31	37.3	22 08.6	90 30	36.4	9
130	13 39.0	91 33	39.6	14 33.8	91 32	39.2	15 56.0	91 32	38.6	17 18.0	91 31	37.9	19 07.1	91 31	37.0	19 34.4	91 31	36.8	20 01.6	91 30	36.6	21 50.4	91 30	35.7	130
1	13 19.5	92 32	38.9	14 14.5	92 32	38.5	15 36.9	91 31	37.8	16 59.1	91 31	37.2	18 48.7	91 30	36.3	19 16.0	91 30	36.1	19 43.4	91 30	35.9	21 32.5	91 29	35.0	1
2	13 00.2	92 32	38.1	13 55.4	92 31	37.7	15 18.1	92 31	37.1	16 40.6	92 30	36.5	18 30.5	91 30	35.6	18 58.0	91 30	35.4	19 25.4	91 29	35.2	21 14.9	91 29	34.3	2
3	12 41.3	92 31	37.3	13 36.7	92 31	36.9	14 59.6	92 30	36.3	16 22.4	92 30	35.7	18 12.7	92 29	34.9	18 40.2	92 29	34.7	19 07.7	92 29	34.5	20 57.7	92 28	33.6	3
4	12 22.8	93 30	36.6	13 18.3	92 30	36.2	14 41.4	92 30	35.6	16 04.5	92 29	35.0	17 55.2	92 29	34.2	18 22.8	92 28	34.0	18 50.4	92 28	33.8	20 40.7	92 28	32.9	4
135	12 04.5	93 30	35.8	13 00.2	93 30	35.4	14 23.6	93 29	34.8	15 47.0	93 29	34.3	17 38.0	92 28	33.5	18 05.7	92 28	33.3	18 33.4	92 28	33.1	20 24.1	92 27	32.2	135
6	11 46.6	93 29	35.0	12 42.4	93 29	34.7	14 06.1	93 29	34.1	15 29.7	93 28	33.5	17 21.1	93 28	32.7	17 48.9	93 27	32.5	18 16.7	93 27	32.3	20 07.7	92 27	31.5	6
7	11 29.0	93 29	34.3	12 25.0	93 28	33.9	13 49.0	93 28	33.3	15 12.8	93 28	32.8	17 04.5	93 27	32.0	17 32.4	93 27	31.8	18 00.3	93 27	31.6	19 51.7	93 26	30.8	7
8	11 11.8	94 28	33.5	12 08.0	94 28	33.1	13 32.2	94 27	32.6	14 56.3	93 27	32.0	16 48.3	93 26	31.3	17 16.3	93 26	31.1	17 44.3	93 26	30.9	19 36.0	93 26	30.1	8
9	10 54.9	94 28	32.7	11 51.3	94 27	32.4	13 15.7	94 27	31.8	14 40.1	94 26	31.3	16 32.4	94 26	30.6	17 00.5	94 26	30.4	17 28.6	94 26	30.2	19 20.7	93 25	29.4	9
140	10 38.4	94 27	31.9	11 34.9	94 27	31.6	12 59.6	94 26	31.1	14 24.2	94 26	30.6	16 16.9	94 25	29.8	16 45.0	94 25	29.7	17 13.2	94 25	29.5	19 05.7	94 24	28.7	140
1	10 22.2	94 26	31.2	11 18.9	94 26	30.8	12 43.8	94 26	30.3	14 08.6	94 25	29.8	16 01.7	94 25	29.1	16 29.9	94 25	28.9	16 58.1	94 24	28.8	18 51.0	94 24	28.0	1
2	10 06.4	95 26	30.4	11 03.2	95 26	30.1	12 28.4	95 25	29.6	13 53.5	95 25	29.1	15 46.8	94 24	28.4	16 15.1	94 24	28.2	16 43.4	94 24	28.0	18 36.6	94 23	27.3	2
3	9 51.0	95 25	29.6	10 47.9	95 25	29.3	12 13.3	95 25	28.8	13 38.6	95 24	28.3	15 32.3	95 24	27.7	16 00.7	95 24	27.5	16 29.1	95 23	27.3	18 22.6	95 23	26.6	3
4	9 35.9	95 25	28.8	10 33.0	95 24	28.5	11 58.6	95 24	28.0	13 24.1	95 24	27.6	15 18.1	95 23	26.9	15 46.6	95 23	26.8	16 15.1	95 23	26.6	18 08.9	95 22	25.9	4
145	9 21.2	95 24	28.1	10 18.4	95 24	27.7	11 44.2	95 23	27.3	13 10.0	95 23	26.8	15 04.3	95 22	26.2	15 32.9	95 22	26.0	16 01.4	95 22	25.9	17 55.5	95 22	25.2	145
6	9 06.8	96 23	27.3	10 04.2	96 23	27.0	11 30.2	96 23	26.5	12 56.2	96 22	26.1	14 50.8	95 22	25.5	15 19.5	95 22	25.3	15 48.1	95 22	25.2	17 42.5	95 21	24.5	6
7	8 52.8	96 23	26.5	9 50.4	96 22	26.2	11 16.6	96 22	25.8	12 42.8	96 22	25.3	14 37.7	96 21	24.7	15 06.4	96 21	24.6	15 35.1	96 21	24.4	17 29.9	96 21	23.8	7
8	8 39.3	96 22	25.7	9 36.9	96 22	25.4	11 03.4	96 21	25.0	12 29.8	96 21	24.6	14 25.0	96 21	24.0	14 53.8	96 21	23.8	15 22.5	96 20	23.7	17 17.6	96 20	23.1	8
9	8 26.0	96 21	24.9	9 23.8	96 21	24.6	10 50.5	96 21	24.2	12 17.1	96 20	23.8	14 12.6	96 20	23.3	14 41.5	96 20	23.1	15 10.3	96 20	23.0	17 05.6	96 19	22.4	9
150	8 13.2	97 21	24.1	9 11.1	97 21	23.9	10 38.0	97 20	23.5	12 04.9	96 20	23.1	14 00.6	96 19	22.5	14 29.5	96 19	22.4	14 58.4	96 19	22.2	16 54.0	96 19	21.7	150
1	8 00.8	97 20	23.3	8 58.8	97 20	23.1	10 25.9	97 20	22.7	11 52.9	97 19	22.3	13 48.9	97 19	21.8	14 17.9	97 19	21.6	14 46.9	97 19	21.5	16 42.8	97 18	21.0	1
2	7 48.7	97 19	22.5	8 46.9	97 19	22.3	10 14.2	97 19	21.9	11 41.4	97 19	21.5	13 37.7	97 18	21.0	14 06.7	97 18	20.9	14 35.8	97 18	20.8	16 31.9	97 18	20.3	2
3	7 37.1	97 19	21.7	8 35.4	97 19	21.5	10 02.8	97 18	21.2	11 30.2	97 18	20.8	13 26.7	97 18	20.3	13 55.9	97 17	20.2	14 25.0	97 17	20.0	16 21.4	97 17	19.5	3
4	7 25.8	97 18	21.0	8 24.3	97 18	20.7	9 51.9	97 18	20.4	11 19.5	97 17	20.0	13 16.2	97 17	19.6	13 45.4	97 17	19.4	14 14.6	97 17	19.3	16 11.2	97 16	18.8	4
155	7 15.0	98 17	20.2	8 13.5	98 17	19.9	9 41.3	98 17	19.6	11 09.1	98 17	19.3	13 06.1	97 16	18.8	13 35.3	97 16	18.7	14 04.5	97 16	18.6	16 01.5	97 16	18.1	155
6	7 04.5	98 17	19.4	8 03.2	98 17	19.2	9 31.1	98 16	18.8	10 59.1	98 16	18.5	12 56.3	98 16	18.1	13 25.6	98 16	18.0	13 54.9	98 15	17.8	15 52.0	98 15	17.4	6
7	6 54.5	98 16	18.6	7 53.2	98 16	18.4	9 21.4	98 16	18.1	10 49.5	98 15	17.7	12 46.9	98 15	17.3	13 16.2	98 15	17.2	13 45.6	98 15	17.1	15 43.0	98 14	16.7	7
8	6 44.9	98 15	17.8	7 43.7	98 15	17.6	9 12.0	98 15	17.3	10 40.2	98 15	17.0	12 37.9	98 14	16.6	13 07.3	98 14	16.5	13 36.7	98 14	16.4	15 34.3	98 14	16.0	8
9	6 35.6	98 15	17.0	7 34.6	98 15	16.8	9 03.0	98 14	16.5	10 31.4	98 14	16.2	12 29.3	98 14	15.8	12 58.7	98 14	15.7	13 28.2	98 14	15.6	15 26.0	98 13	15.2	9
160	6 26.8	98 14	16.2	7 25.9	98 14	16.0	8 54.4	98 14	15.7	10 23.0	98 13	15.4	12 21.0	98 13	15.1	12 50.5	98 13	15.0	13 20.0	98 13	14.9	15 18.0	98 13	14.5	160
1	6 18.4	99 13	15.4	7 17.6	99 13	15.2	8 46.3	99 13	14.9	10 15.0	99 13	14.7	12 13.2	99 12	14.3	12 42.7	99 12	14.2	13 12.3	99 12	14.2	15 10.5	98 12	13.8	1
2	6 10.4	99 13	14.6	7 09.7	99 12	14.4	8 38.5	99 12	14.2	10 07.3	99 12	13.9	12 05.7	99 12	13.6	12 35.3	99 12	13.5	13 04.9	99 12	13.4	15 03.3	99 11	13.1	2
3	6 02.9	99 12	13.8	7 02.2	99 12	13.6	8 31.1	99 12	13.4	10 00.1	99 11	13.1	11 58.7	99 11	12.8	12 28.3	99 11	12.8	12 58.0	99 11	12.7	14 56.5	99 11	12.4	3
4	5 55.7	99 11	13.0	6 55.1	99 11	12.8	8 24.2	99 11	12.6	9 53.3	99 11	12.4	11 52.0	99 10	12.1	12 21.7	99 10	12.0	12 51.4	99 10	11.9	14 50.1	99 10	11.6	4
165	5 49.0	99 10	12.2	6 48.5	99 10	12.0	8 17.7	99 10	11.8	9 46.8	99 10	11.6	11 45.7	99 10	11.3	12 15.5	99 10	11.3	12 45.2	99 10	11.2	14 44.0	99 09	10.9	165
6	5 42.7	99 10	11.3	6 42.3	99 10	11.2	8 11.5	99 10	11.0	9 40.8	99 09	10.8	11 39.9	99 09	10.6	12 09.6	99 09	10.5	12 39.4	99 09	10.4	14 38.4	99 09	10.2	6
7	5 36.9	99 09	10.5	6 36.5	99 09	10.4	8 05.8	99 09	10.2	9 35.2	99 09	10.1	11 34.4	99 08	09.8	12 04.2	99 08	09.8	12 34.0	99 08	09.7	14 33.1	99 08	09.5	7
8	5 31.4	99 08	09.7	6 31.1	99 08	09.6	8 00.6	99 08	09.5	9 30.0	99 08	09.3	11 29.3	99 08	09.1	11 59.1	99 08	09.0	12 29.0	99 08	09.0	14 28.2	99 08	08.7	8
9	5 26.4	1.0 08	08.9	6 26.1	1.0 08	08.8	7 55.7	1.0 07	08.7	9 25.2	1.0 07	08.5	11 24.6	99 07	08.3	11 54.5	99 07	08.3	12 24.3	99 07	08.2	14 23.7	99 07	08.0	9
170	5 21.9	1.0 07	08.1	6 21.6	1.0 07	08.0	7 51.2	1.0 07	07.9	9 20.9	1.0 07	07.7	11 20.4	1.0 06	07.6	11 50.3	1.0 06	07.5	12 20.1	1.0 06	07.5	14 19.6	1.0 06	07.3	170
1	5 17.7	1.0 06	07.3	6 17.5	1.0 06	07.2	7 47.2	1.0 06	07.1	9 16.9	1.0 06	07.0	11 16.5	1.0 06	06.8	11 46.4	1.0 06	06.8	12 16.3	1.0 06	06.7	14 15.9	1.0 06	06.6	1
2	5 14.0	1.0 05	06.5	6 13.8	1.0 05	06.4	7 43.6	1.0 05	06.3	9 13.4	1.0 06	06.2	11 13.0	1.0 05	06.1	11 43.0	1.0 05	06.0	12 12.9	1.0 05	06.0	14 12.6	1.0 05	05.8	2
3	5 10.7	1.0 05	05.7	6 10.6	1.0 05	05.6	7 40.4	1.0 05	05.5	9 10.2	1.0 05	05.4	11 10.0	1.0 04	05.3	11 39.9	1.0 04	05.3	12 09.9	1.0 04	05.2	14 09.6	1.0 04	05.1	3
4	5 07.9	1.0 04	04.9	6 07.8	1.0 04	04.8	7 37.7	1.0 04	04.7	9 07.5	1.0 04	04.7	11 07.3	1.0 04	04.5	11 37.3	1.0 04	04.5	12 07.3	1.0 04	04.5	14 07.1	1.0 04	04.4	4
175	5 05.5	1.0 03	04.1	6 05.4	1.0 03	04.0	7 35.3	1.0 03	03.9	9 05.2	1.0 03	03.9	11 05.1	1.0 03	03.8	11 35.1	1.0 03	03.8	12 05.0	1.0 03	03.7	14 04.9	1.0 03	03.6	175
6	5 03.5	1.0 03	03.2	6 03.5	1.0 03	03.2	7 33.4	1.0 02	03.2	9 03.3	1.0 02	03.1	11 03.3	1.0 02	03.0	11 33.2	1.0 02	03.0	12 03.2	1.0 02	03.0	14 03.1	1.0 02	02.9	6
7	5 02.0	1.0 02	02.4	6 01.9	1.0 02	02.4	7 31.9	1.0 02	02.4	9 01.9	1.0 02	02.3	11 01.8	1.0 02	02.3	11 31.8	1.0 02	02.3	12 01.8	1.0 02	02.2	14 01.8	1.0 02	02.2	7
8	5 00.9	1.0 01	01.6	6 00.9	1.0 01	01.6	7 30.9	1.0 01	01.6	9 00.8	1.0 01	01.6	11 00.8	1.0 01	01.5	11 30.8	1.0 01	01.5	12 00.8	1.0 01	01.5	14 00.8	1.0 01	01.5	8
9	5 00.2	1.0 00	00.8	6 00.2	1.0 00	00.8	7 30.2	1.0 00	00.8	9 00.2	1.0 00	00.8	11 00.2	1.0 00	00.8	11 30.2	1.0 00	00.8	12 00.2	1.0 00	00.7	14 00.2	1.0 00	00.7	9
180	5 00.0	1.0 00	00.0	6 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	9 00.0	1.0 00	00.0	11 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 00.0	1.0 00	00.0	14 00.0	1.0 00	00.0	180

Lat. 59°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	77 00.0	1.0 01	180.0	78 00.0	1.0 01	180.0	79 30.0	1.0 02	180.0	80 30.0	1.0 02	180.0	81 30.0	1.0 02	180.0	82 30.0	1.0 02	180.0	83 30.0	1.0 02	180.0	85 00.0	1.0 03	180.0	00
1	76 59.2	1.0 04	176.9	77 59.1	1.0 04	176.7	79 29.0	1.0 05	176.4	80 28.9	1.0 05	176.1	81 28.8	1.0 06	175.7	82 28.7	1.0 06	175.2	83 28.6	1.0 07	174.6	84 58.2	99 09	173.3	1
2	76 56.7	1.0 07	173.8	77 56.5	1.0 07	173.5	79 26.1	1.0 08	172.8	80 25.8	99 09	172.2	81 25.4	99 10	171.4	82 24.9	99 11	170.5	83 24.2	99 12	169.3	84 52.8	98 15	166.7	2
3	76 52.5	99 10	170.8	77 52.1	99 10	170.2	79 21.2	99 11	169.2	80 20.5	99 12	168.3	81 19.7	98 13	167.2	82 18.6	98 14	165.9	83 17.2	97 16	164.2	84 44.1	96 20	160.4	3
4	76 46.8	99 12	167.8	77 46.0	99 13	167.0	79 14.5	98 14	165.7	80 13.3	98 15	164.5	81 11.8	97 17	163.1	82 09.9	96 18	161.4	83 07.5	95 20	159.2	84 32.2	93 24	154.5	4
05	76 39.5	98 15	164.8	77 38.2	98 16	163.9	79 06.0	97 17	162.2	80 04.1	97 18	160.8	81 01.8	96 20	159.2	81 58.9	95 22	157.1	82 55.3	93 24	154.5	84 17.6	89 28	149.0	05
6	76 30.6	97 17	161.9	77 28.8	97 18	160.8	78 55.7	96 20	158.9	79 53.0	95 21	157.3	80 49.8	94 23	155.3	81 45.9	93 25	153.0	82 40.9	91 27	150.0	84 00.5	86 32	143.9	6
7	76 20.2	96 20	159.0	77 17.9	96 21	157.8	78 43.7	95 23	155.6	79 40.2	94 24	153.8	80 36.0	92 26	151.7	81 30.9	91 28	149.1	82 24.5	88 30	145.8	83 41.3	82 35	139.3	7
8	76 08.5	95 22	156.2	77 05.5	95 23	154.9	78 30.2	93 25	152.4	79 25.8	92 27	150.5	80 20.5	90 28	148.2	81 14.2	88 31	145.3	82 06.3	85 33	141.9	83 20.3	79 38	135.2	8
9	75 55.3	94 24	153.5	76 51.7	94 25	152.0	78 15.1	92 27	149.4	79 09.8	90 29	147.3	80 03.5	88 31	144.8	80 55.8	86 33	141.8	81 46.4	83 35	138.3	82 57.8	75 40	131.4	9
10	75 40.9	93 26	150.8	76 36.5	92 27	149.2	77 58.7	90 30	146.5	78 52.4	89 31	144.2	79 45.0	86 33	141.6	80 36.0	84 35	138.6	81 25.2	80 37	134.9	82 34.0	72 42	127.9	10
1	75 25.2	92 28	148.2	76 20.1	91 29	146.6	77 41.0	89 32	143.6	78 33.7	87 33	141.3	79 25.2	84 35	138.6	80 15.0	81 37	135.5	81 02.7	78 39	131.7	82 09.1	69 43	124.8	1
2	75 08.4	91 30	145.7	76 02.5	90 31	144.0	77 22.1	87 33	141.0	78 13.8	85 35	138.5	79 04.2	83 37	135.8	79 52.7	79 39	132.6	80 39.1	75 41	128.8	81 43.3	67 44	121.9	2
3	74 50.4	90 32	143.3	75 43.8	88 33	141.5	77 02.1	86 35	138.4	77 52.8	83 37	135.9	78 42.1	81 38	133.1	79 29.5	77 40	129.8	80 14.6	73 42	126.1	81 16.7	65 45	119.3	3
4	74 31.4	88 33	141.0	75 24.1	87 34	139.1	76 41.1	84 37	135.9	77 30.9	82 38	133.4	78 19.0	79 40	130.5	79 05.3	75 42	127.3	79 49.2	71 44	123.6	80 49.4	62 46	116.9	4
15	74 11.5	87 35	138.7	75 03.4	86 36	136.8	76 19.1	83 38	133.5	77 08.0	80 40	131.0	77 55.1	77 41	128.1	78 40.3	73 43	124.9	79 23.1	69 45	121.2	80 21.6	61 47	114.7	15
6	73 50.7	86 36	136.5	74 41.8	84 37	134.6	75 56.3	81 39	131.3	76 44.2	79 41	128.7	77 30.5	75 42	125.9	78 14.6	72 44	122.6	78 56.4	67 46	119.0	79 53.3	59 48	112.7	6
7	73 29.0	85 37	134.4	74 19.4	83 39	132.4	75 32.7	80 41	129.1	76 19.8	77 42	126.5	77 05.1	74 43	123.7	77 48.3	70 45	120.5	78 29.1	66 46	116.9	79 24.6	57 48	110.8	7
8	73 06.5	84 39	132.4	73 56.2	82 40	130.4	75 08.4	78 42	127.0	75 54.6	76 43	124.5	76 39.1	72 44	121.6	77 21.4	69 46	118.5	78 01.3	64 47	115.0	78 55.5	56 49	109.0	8
9	72 43.4	83 40	130.4	73 32.3	81 41	128.4	74 43.4	77 43	125.0	75 28.8	74 44	122.5	76 12.5	71 45	119.7	76 54.0	67 46	116.6	77 33.1	63 48	113.2	78 26.2	55 49	107.3	9
20	72 19.5	81 41	128.5	73 07.8	79 42	126.5	74 17.8	76 44	123.1	75 02.5	73 45	120.6	75 45.4	70 46	117.8	76 26.2	66 47	114.8	77 04.5	62 48	111.4	77 56.5	54 50	105.8	20
1	71 55.0	80 42	126.7	72 42.7	78 43	124.7	73 51.6	75 44	121.3	74 35.7	72 46	118.8	75 17.8	69 47	116.1	75 57.9	65 48	113.1	76 35.6	61 49	109.8	77 26.7	53 50	104.3	1
2	71 29.9	79 43	124.9	72 17.0	77 44	122.9	73 25.0	74 45	119.6	74 08.4	71 46	117.1	74 49.9	68 47	114.4	75 29.3	64 48	111.5	76 06.4	60 49	108.3	76 56.7	52 50	102.9	2
3	71 04.3	78 44	123.2	71 50.8	76 44	121.2	72 57.9	73 46	117.9	73 40.7	70 47	115.5	74 21.6	67 48	112.8	75 00.4	63 49	109.9	75 36.9	59 49	106.8	76 26.5	51 51	101.6	3
4	70 38.2	78 44	121.5	71 24.1	75 45	119.6	72 30.4	72 46	116.3	73 12.6	69 47	113.9	73 52.9	66 48	111.3	74 31.2	62 49	108.4	75 07.2	58 50	105.4	75 56.1	51 51	100.3	4
25	70 11.7	77 45	120.0	70 57.0	75 46	118.0	72 02.5	71 47	114.7	72 44.1	68 48	112.4	73 24.0	65 49	109.8	74 01.8	61 49	107.0	74 37.3	57 50	104.0	75 25.7	50 51	99.1	25
6	69 44.7	76 46	118.4	70 29.6	74 46	116.5	71 34.3	70 48	113.2	72 15.4	67 48	110.9	72 54.8	64 49	108.4	73 32.1	60 50	105.7	74 07.2	56 50	102.8	74 55.1	50 51	98.0	6
7	69 17.3	75 46	116.9	70 01.7	73 47	115.0	71 05.7	69 48	111.8	71 46.4	66 49	109.5	72 25.3	63 49	107.0	73 02.3	60 50	104.4	73 37.0	56 51	101.5	74 24.5	49 51	96.9	7
8	68 49.6	74 47	115.5	69 33.5	72 47	113.5	70 36.9	69 48	110.4	71 17.2	66 49	108.1	71 55.7	63 50	105.7	72 32.3	59 50	103.1	73 06.7	55 51	100.3	73 53.8	49 51	95.8	8
9	68 21.5	74 47	114.0	69 05.1	71 48	112.2	70 07.8	68 49	109.1	70 47.7	65 49	106.8	71 25.9	62 50	104.4	72 02.1	59 50	101.9	72 36.2	55 51	99.2	73 23.0	49 51	94.8	9
30	67 53.2	73 48	112.7	68 36.3	71 48	110.8	69 38.5	67 49	107.8	70 18.0	65 50	105.6	70 55.9	62 50	103.2	71 31.8	58 51	100.7	72 05.7	55 51	98.1	72 52.2	49 51	93.8	30
1	67 24.5	72 48	111.4	68 07.3	70 49	109.5	69 08.9	67 50	106.5	69 48.2	64 50	104.3	70 25.7	61 50	102.0	71 01.4	58 51	99.6	71 35.0	54 51	97.0	72 21.3	48 51	92.9	1
2	66 55.6	72 49	110.1	67 38.1	70 49	108.2	68 39.2	66 50	105.3	69 18.1	64 50	103.2	69 55.4	61 51	100.9	70 30.9	57 51	98.5	71 04.4	54 51	96.0	71 50.4	48 52	91.9	2
3	66 26.5	71 49	108.8	67 08.6	69 49	107.0	68 09.3	66 50	104.1	68 48.0	63 50	102.0	69 25.0	60 51	99.8	70 00.3	57 51	97.5	70 33.6	54 51	95.0	71 19.6	48 52	91.1	3
4	65 57.1	71 49	107.6	66 39.0	69 50	105.8	67 39.3	65 50	102.9	68 17.7	63 51	100.9	68 54.5	60 51	98.7	69 29.6	57 51	96.4	70 02.8	54 51	94.0	70 48.7	48 52	90.2	4
35	65 27.6	70 50	106.4	66 09.1	68 50	104.6	67 09.1	65 50	101.8	67 47.3	62 51	99.8	68 23.9	60 51	97.7	68 58.9	57 51	95.4	69 31.9	54 51	93.1	70 17.8	48 52	89.3	35
6	64 57.8	70 50	105.2	65 39.2	68 50	103.5	66 38.8	65 51	100.7	67 16.8	62 51	98.7	67 53.3	59 51	96.7	68 28.1	57 51	94.5	69 01.1	53 51	92.2	69 46.9	48 51	88.5	6
7	64 27.9	69 50	104.1	65 09.1	68 50	102.4	66 08.4	64 51	99.7	66 46.2	62 51	97.7	67 22.6	59 51	95.7	67 57.2	56 51	93.5	68 30.2	53 52	91.3	69 16.0	48 51	87.7	7
8	63 57.9	69 50	103.0	64 38.8	67 51	101.3	65 37.9	64 51	98.6	66 15.6	62 51	96.7	66 51.8	59 51	94.7	67 26.4	56 51	92.6	67 59.3	53 52	90.4	68 45.1	48 51	86.9	8
9	63 27.7	69 50	101.9	64 08.5	67 51	100.3	65 07.3	64 51	97.6	65 44.8	61 51	95.7	66 21.0	59 51	93.8	66 55.5	56 52	91.7	67 28.4	53 52	89.5	68 14.3	49 51	86.1	9
40	62 57.4	69 51	100.9	63 38.0	67 51	99.2	64 36.6	64 51	96.6	65 14.1	61 51	94.8	65 50.1	59 51	92.8	66 24.6	56 52	90.8	66 57.5	53 51	88.7	67 43.4	49 51	85.4	40
1	62 27.0	68 51	99.8	63 07.4	66 51	98.2	64 05.9	63 51	95.6	64 43.3	61 51	93.8	65 19.2	59 52	91.9	65 53.7	56 52	89.9	66 26.6	53 51	87.9	67 12.7	49 51	84.6	1
2	61 56.5	68 51	98.8	62 36.8	66 51	97.2	63 35.1	63 51	94.7	64 12.4	61 51	92.9	64 48.3	59 52	91.0	65 22.8	56 52	89.1	65 55.7	53 51	87.1	66 41.9	49 51	83.9	2
3	61 26.0	68 51	97.8	62 06.1	66 51	96.2	63 04.3	63 51	93.8	63 41.5	61 52	92.0	64 17.4	59 52	90.2	64 51.9	56 51	88.3	65 24.9	54 51	86.3	66 11.2	49 51	83.1	3
4	60 55.3	68 51	96.8	61 35.4	66 51	95.3	62 33.4	63 51	92.8	63 10.6	61 52	91.1	63 46.5	59 52	89.3	64 21.0	56 51	87.5	64 54.0	54 51	85.5	65 40.6	50 51	82.4	4
45	60 24.6	68 51	95.9	61 04.6	66 51	94.4	62 02.6	63 51	91.9	62 39.7	61 52	90.2	63 15.6	59 51	88.5	63 50.2	56 51	86.7	64 23.3	54 51	84.7	65 09.9	50 51	81.7	45
6	59 53.8	67 51	94.9	60 33.8	66 51	93.4	61 31.7	63 52	91.1	62 08.8	61 51	89.4	62 44.8	59 51	87.7	63 19.3	56 51	85.9	63 52.5	54 51	84.0	64 39.4	50 51	81.0	6
7	59 23.0	67 51	94.0	60 02.9	66 51	92.5	61 00.8	63 52	90.2	61 37.9	61 51	88.6	62 13.9	59 51	86.9	62 48.5	57 51	85.1	63 21.8	54 51	83.2	64 08.9	50 51	80.4	7
8	58 52.2	67 51	93.1	59 32.0	66 52	91.6	60 29.9	63 51	89.3	61 07.1	61 51	87.7	61 43.0	59 51	86.1	62 17.8	57 51	84.3	62 51.1	54 51	82.5	63 38.5	51 51	79.7	8
9	58 21.3	67 51	92.2	59 01.1	66 52	90.8	59 59.0	63 51	88.5	60 36.2	61 51	86.9	61 12.2	59 51	85.3	61 47.0	57 51	83.6	62 20.5	55 51	81.8	63 08.1	51 51	79.0	9
50	57 50.4	67 52	91.3	58 30.2	66 52	89.9	59 28.1	63 51	87.7	60 05.3	61 51	86.1	60 41.5	59 51	84.5	61 16.4	57 51	82.8	61 50.0	55 51	81.1	62 37.8	51 50	78.4	50
1	57 19.5	67 52	90.4	57 59.3	66 52	89.0	58 57.2	63 51	86.9	59 34.5	61 51	85.3	60 10.7	59 51	83.7	60 45.7	57 51	82.1	61 19.5	55 51	80.4	62 07.6	52 50	77.7	1
2	56 48.6	67 52	89.6	57 28.4	66 51	88.2	58 26.4	63 51	86.0	59 03.7	61 51	84.5	59 40.0	60 51	83.0	60 15.1	58 51	81.4	60 49.0	55 51	79.7	61 37.4	52 50	77.1	2
3	56 17.7	67 51	88.7	56 57.6	66 51	87.4	57 55.6	63 51	85.3	58 33.0	62 51	83.8	59 09.4	60 51	82.2	59 44.6	58 51	80.6	60 18.7	56 50	79.0	61 07.3	52 50	76.4	3
4	55 46.8	67 51	87.9	56 26.7	66 51	86.6	57 24.8	63 51	84.5	58 02.3	62 51	83.0	58 38.8	60 51	81.5	59 14.2	58 51	79.9	59 48.4	56 50	78.3	60 37.3	53 50	75.8	4
55	55 16.0	67 51	87.1	55 55.9	66 51	85.8	56 54.1	63 51	83.7	57 31.7	62 51	82.3	58 08.3	60 51	80.8	58 43.8	58 51	79.2	59 18.1	56 50	77.6	60 07.4	53 50	75.1	55
6	54 45.1	67 51	86.3	55 25.1	66 51	85.0	56 23.4	64 51	82.9	57 01.1	62 51	81.5	57 37.8	60 51	80.0	58 13.4	59 50	78.5	58 48.0	57 50	77.0	59 37.6	54 50	74.5	6
7	54 14.3	67 51	85.5	54 54.3	66 51	84.2	55 52.7	64 51	82.2	56 30.5	62 51	80.8	57 07.4	61 51	79.3	57 43.2	59 50	77.8	58 17.9	57 50	76.3	59 07.9	54 49	73.9	7
8	53 43.5	67 51	84.7	54 23.6	66 51	83.4	55 22.1	64 51	81.4	56 00.1	62 51	80.0	56 37.0	61 50	78.6	57 13.0	59 50	77.2	57 47.9	57 50	75.6	58 38.2	54 49	73.3	8
9	53 12.8	68 51	83.9	53 52.9	66 51	82.6	54 51.6	64 51	80.7	55 29.7	63 51	79.3	56 06.8	61 50	77.9	56 42.9	59 50	76.5	57 18.1	58 50	75.0	58 08.7	55 49	72.7	9
60	52 42.0	68 51	83.1	53 22.3	66 51	81.9	54 21.1	64 51	79.9	54 59.3	63 50	78.6	55 36.6	61 50	77.2	56 12.9	60 50	75.8	56 48.3	58 50	74.3	57 39.2	55 49	72.1	60
1	52 11.4	68 51	82.3	52 51.7	67 51	81.1	53 50.8	65 51	79.2	54 29.1	63 50	77.9	55 06.5	62 50	76.5	55 43.0	60 50	75.1	56 18.5	58 49	73.7	57 09.9	56 49	71.5	1
2	51 40.8	68 51	81.6	52 21.2	67 51	80.4	53 20.4	65 50	78.5	53 58.9	63 50	77.2	54 36.5	62 50	75.9	55 13.2	60 50	74.5	55 48.9	59 49	73.1	56 40.6	56 49	70.9	2
3	51 10.3	68 51	80.8	51 50.8	67 51	79.6	52 50.2	65 50	77.8	53 28.8	64 50	76.5	54 06.6	62 50	75.2	54 43.5	61 49	73.8	55 19.4	59 49	72.4	56 11.5	57 48	70.3	3
4	50 39.8	68 51	80.1	51 20.4	67 50	78.9	52 20.0	65 50	77.1	52 58.8	64 50	75.8	53 36.8	63 50	74.5	54 13.8	61 49	73.2	54 50.0	59 49	71.8	55 42.4	57 48	69.7	4
65	50 09.4	68 51	79.3	50 50.1	67 50	78.2	51 50.0	66 50	76.4	52 28.9	64 50	75.1	53 07.0	63 49	73.8	53 44.3	61 49	72.5	54 20.7	60 49	71.2	55 13.5	57 48	69.1	65
6	49 39.1	69 50	78.6	50 19.9	68 50	77.4	51 20.0	66 50	75.7	51 59.1	65 50	74.4	52 37.4	63 49	73.2	53 14.9	62 49	71.9	53 51.5	60 48	70.6	54 44.7	58 48	68.5	6
7	49 08.8	69 50	77.8	49 49.8	68 50	76.7	50 50.1	66 50	75.0	51 29.4	65 49	73.8	52 07.9	64 49	72.5	52 45.6	62 49	71.2	53 22.4	61 48	69.9	54 16.0	58 48	67.9	7
8	48 38.6	69 50	77.1	49 19.8	68 50	76.0	50 20.3	66 50	74.3	50 59.7	65 49	73.1	51 38.4	64 49	71.9	52 16.4	63 48	70.6	52 53.5	61 48	69.3	53 47.5	59 47	67.3	8
9	48 08.6	69 50	76.4	48 49.9	68 50	75.3	49 50.6	67 49	73.6	50 30.2	65 49	72.4	51 09.1	64 49	71.2	51 47.3	63 48	70.0	52 24.6	62 48	68.7	53 19.0	59 47	66.7	9
70	47 38.6	70 50	75.7	48 20.0	69 50	74.6	49 21.0	67 49	72.9	50 00.8	66 49	71.8	50 39.9	65 48	70.6	51 18.3	63 48	69.3	51 55.9	62 48	68.1	52 50.7	60 47	66.1	70
1	47 08.7	70 50	74.9	47 50.3	69 49	73.9	48 51.5	67 49	72.2	49 31.5	66 49	71.1	50 10.8	65 48	69.9	50 49.4	64 48	68.7	51 27.3	62 47	67.5	52 22.5	60 47	65.6	1
2	46 38.9	70 50	74.2	47 20.6	69 49	73.2	48 22.1	68 49	71.6	49 02.4	66 48	70.4	49 41.9	65 48	69.3	50 20.7	64 48	68.1	50 58.8	63 47	66.9	51 54.4	61 47	65.0	2
3	46 09.2	70 49	73.5	46 51.1	69 49	72.5	47 52.9	68 49	70.9	48 33.3	67 48	69.8	49 13.0	66 48	68.6	49 52.1	65 47	67.5	50 30.4	63 47	66.3	51 26.5	61 46	64.4	3
4	45 39.6	71 49	72.8	46 21.7	70 49	71.8	47 23.8	68 48	70.2	48 04.4	67 48	69.1	48 44.3	66 48	68.0	49 23.6	65 47	66.8	50 02.2	64 47	65.7	50 58.7	62 46	63.8	4
75	45 10.2	71 49	72.1	45 52.4	70 49	71.1	46 54.7	69 48	69.5	47 35.6	68 48	68.5	48 15.7	66 47	67.4	48 55.3	65 47	66.2	49 34.1	64 47	65.1	50 31.0	62 46	63.2	75
6	44 40.8	71 49	71.4	45 23.2	70 48	70.4	46 25.8	69 48	68.9	47 06.9	68 48	67.8	47 47.3	67 47	66.7	48 27.1	66 47	65.6	49 06.2	65 46	64.4	50 03.5	63 46	62.7	6
7	44 11.6	71 49	70.7	44 54.2	71 48	69.7	45 57.1	69 48	68.2	46 38.3	68 47	67.2	47 19.0	67 47	66.1	47 59.0	66 47	65.0	48 38.4	65 46	63.8	49 36.1	63 45	62.1	7
8	43 42.5	72 48	70.0	44 25.2	71 48	69.1	45 28.5	70 47	67.6	46 09.9	69 47	66.5	46 50.8	68 47	65.5	47 31.1	67 46	64.4	48 10.7	66 46	63.3	49 08.9	64 45	61.5	8
9	43 13.5	72 48	69.4	43 56.4	71 48	68.4	45 00.0	70 47	66.9	45 41.6	69 47	65.9	46 22.8	68 46	64.8	47 03.3	67 46	63.8	47 43.2	66 46	62.7	48 41.8	64 45	60.9	9
80	42 44.6	72 48	68.7	43 27.8	72 48	67.7	44 31.6	70 47	66.3	45 13.5	69 47	65.2	45 54.9	68 46	64.2	46 35.6	67 46	63.1	47 15.8	66 45	62.1	48 14.9	65 45	60.4	80
1	42 15.9	73 48	68.0	42 59.3	72 47	67.1	44 03.4	71 47	65.6	44 45.5	70 46	64.6	45 27.1	69 46	63.6	46 08.1	68 46	62.5	46 48.6	67 45	61.5	47 48.1	65 44	59.8	1
2	41 47.3	73 47	67.3	42 30.9	72 47	66.4	43 35.3	71 47	64.9	44 17.7	70 46	64.0	44 59.5	69 46	63.0	45 40.8	68 45	61.9	46 21.5	67 45	60.9	47 21.5	66 44	59.2	2
3	41 18.9	73 47	66.6	42 02.6	73 47	65.7	43 07.4	71 46	64.3	43 50.0	71 46	63.3	44 32.1	70 46	62.3	45 13.6	69 45	61.3	45 54.6	68 45	60.3	46 55.0	66 44	58.7	3
4	40 50.6	74 47	66.0	41 34.5	73 47	65.0	42 39.6	72 46	63.7	43 22.4	71 46	62.7	44 04.8	70 45	61.7	44 46.6	69 45	60.7	45 27.8	68 44	59.7	46 28.7	67 44	58.1	4
85	40 22.5	74 47	65.3	41 06.6	73 46	64.4	42 12.0	72 46	63.0	42 55.1	71 45	62.1	43 37.6	71 45	61.1	44 19.7	70 44	60.1	45 01.2	69 44	59.1	46 02.5	67 43	57.5	85
6	39 54.5	74 46	64.6	40 38.8	74 46	63.7	41 44.6	73 46	62.4	42 27.8	72 45	61.4	43 10.7	71 45	60.5	43 53.0	70 44	59.5	44 34.8	69 44	58.5	45 36.5	68 43	56.9	6
7	39 26.6	75 46	63.9	40 11.2	74 46	63.1	41 17.3	73 45	61.7	42 00.8	72 45	60.8	42 43.9	71 44	59.9	43 26.5	71 44	58.9	44 08.6	70 43	57.9	45 10.7	68 43	56.4	7
8	38 58.9	75 46	63.3	39 43.7	74 46	62.4	40 50.1	73 45	61.1	41 33.9	73 45	60.2	42 17.2	72 44	59.2	43 00.1	71 44	58.3	43 42.5	70 43	57.3	44 45.1	69 42	55.8	8
9	38 31.4	75 46	62.6	39 16.4	75 45	61.7	40 23.2	74 45	60.4	41 07.2	73 44	59.5	41 50.8	72 44	58.6	42 33.9	71 43	57.7	43 16.5	71 43	56.7	44 19.6	69 42	55.2	9
90	38 04.1	76 45	61.9	38 49.3	75 45	61.1	39 56.4	74 44	59.8	40 40.6	73 44	58.9	41 24.5	73 44	58.0	42 07.9	72 43	57.1	42 50.8	71 43	56.1	43 54.3	70 42	54.7	90

Digitized by Google

Lat. 59°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	37 36.9	76 45	61.3	38 22.3	75 45	60.4	39 29.8	74 44	59.2	40 14.3	74 44	58.3	40 58.3	73 43	57.4	41 42.0	72 43	56.5	42 25.2	72 42	55.5	43 29.2	70 42	54.1	91
2	37 09.9	76 45	60.6	37 55.5	76 44	59.8	39 03.3	75 44	58.5	39 48.1	74 43	57.7	40 32.4	74 43	56.8	41 16.3	73 42	55.9	41 59.8	72 42	54.9	43 04.2	71 41	53.5	2
3	36 43.0	77 44	59.9	37 28.9	76 44	59.1	38 37.1	75 43	57.9	39 22.0	75 43	57.0	40 06.6	74 43	56.2	40 50.8	73 42	55.3	41 34.6	73 42	54.4	42 39.5	71 41	53.0	3
4	36 16.4	77 44	59.3	37 02.5	77 44	58.5	38 11.0	76 43	57.2	38 56.2	75 43	56.4	39 41.1	74 42	55.5	40 25.5	74 42	54.7	41 09.6	73 41	53.8	42 14.9	72 41	52.4	4
95	35 49.9	77 44	58.6	36 36.2	77 43	57.8	37 45.1	76 43	56.6	38 30.6	76 42	55.8	39 15.7	75 42	54.9	40 00.4	74 42	54.1	40 44.8	74 41	53.2	41 50.5	73 40	51.8	95
6	35 23.6	78 44	57.9	36 10.2	77 43	57.2	37 19.4	76 43	56.0	38 05.1	76 42	55.1	38 50.5	75 42	54.3	39 35.5	75 41	53.5	40 20.1	74 41	52.6	41 26.3	73 40	51.2	6
7	34 57.6	78 43	57.3	35 44.3	78 43	56.5	36 53.9	77 42	55.3	37 39.8	76 42	54.5	38 25.5	76 41	53.7	39 10.8	75 41	52.9	39 55.7	75 40	52.0	41 02.3	74 40	50.7	7
8	34 31.7	79 43	56.6	35 18.6	78 42	55.9	36 28.6	77 42	54.7	37 14.8	77 41	53.9	38 00.7	76 41	53.1	38 46.2	76 41	52.2	39 31.4	75 40	51.4	40 38.5	74 39	50.1	8
9	34 05.9	79 42	56.0	34 53.2	78 42	55.2	36 03.4	78 42	54.1	36 49.9	77 41	53.3	37 36.1	77 41	52.5	38 21.9	76 40	51.6	39 07.4	76 40	50.8	40 14.9	75 39	49.5	9
100	33 40.4	79 42	55.3	34 27.9	79 42	54.5	35 38.5	78 41	53.4	36 25.3	78 41	52.6	37 11.7	77 40	51.8	37 57.8	77 40	51.0	38 43.5	76 39	50.2	39 51.5	75 39	48.9	100
1	33 15.1	80 42	54.6	34 02.8	79 41	53.9	35 13.8	79 41	52.8	36 00.8	78 40	52.0	36 47.5	78 40	51.2	37 33.8	77 40	50.4	38 19.9	76 39	49.6	39 28.3	76 38	48.4	1
2	32 50.0	80 41	54.0	33 37.9	80 41	53.2	34 49.3	79 40	52.1	35 36.5	78 40	51.4	36 23.5	78 40	50.6	37 10.1	77 39	49.8	37 56.5	77 39	49.0	39 05.3	76 38	47.8	2
3	32 25.2	80 41	53.3	33 13.3	80 41	52.6	34 25.0	79 40	51.5	35 12.5	79 40	50.8	35 59.7	78 39	50.0	36 46.6	78 39	49.2	37 33.2	77 38	48.4	38 42.5	77 38	47.2	3
4	32 00.5	81 41	52.6	32 48.9	80 40	51.9	34 00.9	80 40	50.9	34 48.7	79 39	50.1	35 36.1	79 39	49.4	36 23.3	78 38	48.6	37 10.2	78 38	47.8	38 20.0	77 37	46.6	4
105	31 36.0	81 40	52.0	32 24.6	81 40	51.3	33 37.1	80 39	50.2	34 25.1	80 39	49.5	35 12.8	79 39	48.8	36 00.2	79 38	48.0	36 47.4	78 38	47.2	37 57.6	78 37	46.1	105
6	31 11.8	82 40	51.3	32 00.6	81 40	50.6	33 13.4	81 39	49.6	34 01.7	80 39	48.9	34 49.7	80 38	48.1	35 37.4	79 38	47.4	36 24.8	79 37	46.6	37 35.5	78 37	45.5	6
7	30 47.8	82 40	50.7	31 36.8	82 39	50.0	32 50.0	81 39	49.0	33 38.5	81 38	48.2	34 26.8	80 38	47.5	35 14.8	80 37	46.8	36 02.5	79 37	46.1	37 13.5	79 36	44.9	7
8	30 24.0	82 39	50.0	31 13.3	82 39	49.3	32 26.8	81 38	48.3	33 15.6	81 38	47.6	34 04.1	81 37	46.9	34 52.3	80 37	46.2	35 40.3	80 36	45.5	36 51.8	79 36	44.3	8
9	30 00.5	83 39	49.3	30 50.0	82 38	48.7	32 03.9	82 38	47.7	32 52.9	81 37	47.0	33 41.6	81 37	46.3	34 30.2	81 37	45.6	35 18.4	80 36	44.9	36 30.3	80 35	43.7	9
110	29 37.1	83 38	48.7	30 26.9	83 38	48.0	31 41.1	82 38	47.0	32 30.4	82 37	46.4	33 19.4	82 37	45.7	34 08.2	81 36	45.0	34 56.7	81 36	44.3	36 09.1	80 35	43.2	110
1	29 14.0	83 38	48.0	30 04.0	83 38	47.4	31 18.6	83 37	46.4	32 08.1	82 37	45.7	32 57.4	82 36	45.0	33 46.5	82 36	44.4	34 35.3	81 35	43.7	35 48.1	81 35	42.6	1
2	28 51.2	84 38	47.3	29 41.4	84 37	46.7	30 56.4	83 37	45.7	31 46.1	83 36	45.1	32 35.7	82 36	44.4	33 25.0	82 35	43.7	34 14.1	82 35	43.1	35 27.3	81 34	42.0	2
3	28 28.6	84 37	46.7	29 19.0	84 37	46.1	30 34.4	83 36	45.1	31 24.4	83 36	44.5	32 14.2	83 35	43.8	33 03.7	82 35	43.1	33 53.1	82 35	42.5	35 06.7	81 34	41.4	3
4	28 06.2	85 37	46.0	28 56.9	84 36	45.4	30 12.6	84 36	44.5	31 02.8	84 35	43.8	31 52.9	83 35	43.2	32 42.7	83 35	42.5	33 32.4	83 34	41.9	34 46.4	82 33	40.8	4
115	27 44.1	85 36	45.3	28 35.0	85 36	44.7	29 51.1	84 35	43.8	30 41.6	84 35	43.2	31 31.9	84 35	42.6	32 22.0	83 34	41.9	33 11.9	83 34	41.2	34 26.3	82 33	40.2	115
6	27 22.3	85 36	44.7	28 13.4	85 36	44.1	29 29.8	85 35	43.2	30 20.5	84 35	42.6	31 11.1	84 34	41.9	32 01.4	84 34	41.3	32 51.6	83 33	40.6	34 06.5	83 33	39.6	6
7	27 00.7	86 36	44.0	27 52.0	85 35	43.4	29 08.8	85 35	42.5	29 59.8	85 34	41.9	30 50.6	85 34	41.3	31 41.2	84 33	40.7	32 31.6	84 33	40.0	33 46.9	83 32	39.1	7
8	26 39.3	86 35	43.3	27 30.9	86 35	42.8	28 48.0	85 34	41.9	29 39.2	85 34	41.3	30 30.3	85 33	40.7	31 21.2	85 33	40.1	32 11.9	84 32	39.4	33 27.5	84 32	38.5	8
9	26 18.3	86 35	42.7	27 10.1	86 34	42.1	28 27.5	86 34	41.2	29 19.0	86 33	40.7	30 10.3	85 33	40.1	31 01.4	85 32	39.4	31 52.4	85 32	38.8	33 08.4	84 31	37.9	9
120	25 57.5	87 34	42.0	26 49.5	87 34	41.4	28 07.3	86 33	40.6	28 59.0	86 33	40.0	29 50.5	86 32	39.4	30 41.9	85 32	38.8	31 33.1	85 32	38.2	32 49.6	85 31	37.3	120
1	25 36.9	87 34	41.3	26 29.2	87 33	40.8	27 47.3	87 33	39.9	28 39.2	86 32	39.4	29 31.0	86 32	38.8	30 22.7	86 32	38.2	31 14.1	86 31	37.6	32 31.0	85 31	36.7	1
2	25 16.6	88 33	40.7	26 09.1	87 33	40.1	27 27.6	87 32	39.3	28 19.8	87 32	38.7	29 11.8	87 32	38.2	30 03.7	86 31	37.6	30 55.4	86 31	37.0	32 12.7	86 30	36.1	2
3	24 56.7	88 33	40.0	25 49.4	88 32	39.5	27 08.2	87 32	38.6	28 00.6	87 32	38.1	28 52.8	87 31	37.5	29 45.0	87 31	37.0	30 36.9	86 30	36.4	31 54.6	86 30	35.5	3
4	24 36.9	88 32	39.3	25 29.9	88 32	38.8	26 49.0	88 31	38.0	27 41.6	88 31	37.5	28 34.1	87 31	36.9	29 26.5	87 30	36.3	30 18.7	87 30	35.8	31 36.8	87 29	34.9	4
125	24 17.5	89 32	38.6	25 10.6	88 32	38.1	26 30.1	88 31	37.3	27 23.0	88 31	36.8	28 15.7	88 30	36.3	29 08.3	88 30	35.7	30 00.8	87 29	35.2	31 19.2	87 29	34.3	125
6	23 58.4	89 31	38.0	24 51.7	89 31	37.5	26 11.5	89 31	36.7	27 04.6	88 30	36.2	27 57.6	88 30	35.6	28 50.4	88 29	35.1	29 43.1	88 29	34.5	31 01.9	87 28	33.7	6
7	23 39.5	89 31	37.3	24 33.1	89 31	36.8	25 53.2	89 30	36.0	26 46.5	89 30	35.5	27 39.7	89 29	35.0	28 32.8	88 29	34.5	29 25.7	88 29	33.9	30 44.9	88 28	33.1	7
8	23 20.9	90 30	36.6	24 14.7	90 30	36.1	25 35.2	89 30	35.4	26 28.7	89 29	34.9	27 22.1	89 29	34.4	28 15.4	89 28	33.8	29 08.6	89 28	33.3	30 28.2	88 27	32.5	8
9	23 02.6	90 30	35.9	23 56.6	90 30	35.4	25 17.4	90 29	34.7	26 11.2	90 29	34.2	27 04.8	89 28	33.7	27 58.4	89 28	33.2	28 51.8	89 28	32.7	30 11.7	89 27	31.9	9
130	22 44.7	90 29	35.2	23 38.9	90 29	34.8	25 00.0	90 29	34.1	25 54.0	90 28	33.6	26 47.8	90 28	33.1	27 41.6	90 28	32.6	28 35.2	89 27	32.1	29 55.5	89 27	31.3	130
1	22 27.0	91 29	34.6	23 21.4	91 29	34.1	24 42.8	90 28	33.4	25 37.0	90 28	32.9	26 31.1	90 27	32.4	27 25.1	90 27	32.0	28 19.0	90 27	31.5	29 39.6	89 26	30.7	1
2	22 09.6	91 28	33.9	23 04.2	91 28	33.4	24 26.0	91 28	32.7	25 20.4	91 27	32.3	26 14.7	90 27	31.8	27 08.9	90 27	31.3	28 03.0	90 26	30.8	29 24.0	90 26	30.1	2
3	21 52.5	91 28	33.2	22 47.3	91 28	32.8	24 09.4	91 27	32.1	25 04.0	91 27	31.6	25 58.5	91 26	31.2	26 53.0	91 26	30.7	27 47.3	90 26	30.2	29 08.6	90 25	29.5	3
4	21 35.8	92 27	32.5	22 30.8	92 27	32.1	23 53.1	91 27	31.4	24 47.9	91 26	31.0	25 42.7	91 26	30.5	26 37.3	91 26	30.1	27 31.9	91 25	29.6	28 53.5	91 25	28.9	4
135	21 19.3	92 27	31.8	22 14.5	92 27	31.4	23 37.2	92 26	30.8	24 32.2	92 26	30.3	25 27.1	92 25	29.9	26 22.0	91 25	29.4	27 16.8	91 25	29.0	28 38.8	91 24	28.3	135
6	21 03.2	92 26	31.1	21 58.6	92 26	30.7	23 21.5	92 26	30.1	24 16.7	92 25	29.7	25 11.9	92 25	29.2	26 07.0	92 25	28.8	27 02.0	92 24	28.3	28 24.3	91 24	27.7	6
7	20 47.4	93 26	30.4	21 42.9	93 26	30.0	23 06.2	92 25	29.4	24 01.6	92 25	29.0	24 57.0	92 24	28.6	25 52.2	92 24	28.2	26 47.4	92 24	27.7	28 10.1	92 23	27.0	7
8	20 31.9	93 25	29.8	21 27.6	93 25	29.4	22 51.2	93 25	28.8	23 46.8	93 24	28.4	24 42.3	93 24	27.9	25 37.8	92 24	27.5	26 33.2	92 23	27.1	27 56.2	92 23	26.4	8
9	20 16.7	93 25	29.1	21 12.6	93 24	28.7	22 36.5	93 24	28.1	23 32.3	93 24	27.7	24 28.0	93 23	27.3	25 23.7	93 23	26.9	26 19.3	93 23	26.5	27 42.6	92 22	25.8	9
140	20 01.8	94 24	28.4	20 58.0	94 24	28.0	22 22.1	93 23	27.4	23 18.1	93 23	27.0	24 14.0	93 23	26.6	25 09.9	93 22	26.2	26 05.7	93 22	25.8	27 29.3	93 22	25.2	140
1	19 47.3	94 24	27.7	20 43.6	94 23	27.3	22 08.0	94 23	26.8	23 04.2	94 23	26.4	24 00.3	93 22	26.0	24 56.4	93 22	25.6	25 52.4	93 22	25.2	27 16.2	93 21	24.6	1
2	19 33.1	94 23	27.0	20 29.6	94 23	26.6	21 54.2	94 22	26.1	22 50.6	94 22	25.7	23 46.9	94 22	25.3	24 43.2	94 21	25.0	25 39.4	94 21	24.6	27 03.5	93 21	24.0	2
3	19 19.3	94 23	26.3	20 15.9	94 22	25.9	21 40.8	94 22	25.4	22 37.4	94 22	25.1	23 33.8	94 21	24.7	24 30.3	94 21	24.3	25 26.7	94 21	23.9	26 51.1	94 20	23.4	3
4	19 05.7	95 22	25.6	20 02.6	95 22	25.3	21 27.7	95 21	24.7	22 24.4	94 21	24.4	23 21.1	94 21	24.0	24 17.7	94 20	23.7	25 14.3	94 20	23.3	26 39.0	94 20	22.7	4
145	18 52.6	95 21	24.9	19 49.5	95 21	24.6	21 14.9	95 21	24.1	22 11.8	95 20	23.7	23 08.7	95 20	23.4	24 05.5	95 20	23.0	25 02.2	95 20	22.7	26 27.2	94 19	22.1	145
6	18 39.7	95 21	24.2	19 36.9	95 21	23.9	21 02.5	95 20	23.4	21 59.6	95 20	23.1	22 56.6	95 20	22.7	23 53.5	95 19	22.4	24 50.5	95 19	22.0	26 15.8	95 19	21.5	6
7	18 27.2	96 20	23.5	19 24.5	95 20	23.2	20 50.4	95 20	22.7	21 47.6	95 19	22.4	22 44.8	95 19	22.1	23 41.9	95 19	21.7	24 39.0	95 19	21.4	26 04.6	95 18	20.9	7
8	18 15.1	96 20	22.8	19 12.5	96 19	22.5	20 38.7	96 19	22.0	21 36.0	96 19	21.7	22 33.4	96 19	21.4	23 30.7	95 18	21.1	24 27.9	95 18	20.8	25 53.7	95 18	20.3	8
9	18 03.3	96 19	22.1	19 00.9	96 19	21.8	20 27.2	96 18	21.4	21 24.8	96 18	21.1	22 22.2	96 18	20.7	23 19.7	96 18	20.4	24 17.1	96 17	20.1	25 43.2	96 17	19.6	9
150	17 51.8	96 18	21.4	18 49.6	96 18	21.1	20 16.1	96 18	20.7	21 13.8	96 18	20.4	22 11.5	96 17	20.1	23 09.1	96 17	19.8	24 06.7	96 17	19.5	25 33.0	96 17	19.0	150
1	17 40.7	97 18	20.7	18 38.6	96 18	20.4	20 05.4	96 17	20.0	21 03.2	96 17	19.7	22 01.0	96 17	19.4	22 58.8	96 17	19.1	23 56.5	96 16	18.8	25 23.1	96 16	18.4	1
2	17 30.0	97 17	20.0	18 28.0	97 17	19.7	19 55.0	97 17	19.3	20 53.0	97 17	19.0	21 50.9	97 16	18.8	22 48.8	96 16	18.5	23 46.7	96 16	18.2	25 13.5	96 15	17.8	2
3	17 19.6	97 17	19.3	18 17.7	97 16	19.0	19 44.9	97 16	18.6	20 43.1	97 16	18.4	21 41.1	97 16	18.1	22 39.2	97 16	17.8	23 37.2	97 15	17.6	25 04.2	97 15	17.1	3
4	17 09.6	97 16	18.6	18 07.8	97 16	18.3	19 35.2	97 16	18.0	20 33.5	97 15	17.7	21 31.7	97 15	17.4	22 29.9	97 15	17.2	23 28.1	97 15	16.9	24 55.3	97 14	16.5	4
155	16 59.9	97 16	17.9	17 58.3	97 15	17.6	19 25.9	97 15	17.3	20 24.3	97 15	17.0	21 22.6	97 15	16.8	22 20.9	97 14	16.5	23 19.2	97 14	16.3	24 46.6	97 14	15.9	155
6	16 50.6	98 15	17.2	17 49.1	98 15	16.9	19 16.9	98 14	16.6	20 15.4	97 14	16.4	21 13.9	97 14	16.1	22 12.3	97 14	15.9	23 10.8	97 14	15.6	24 38.4	97 13	15.2	6
7	16 41.6	98 14	16.5	17 40.3	98 14	16.2	19 08.2	98 14	15.9	20 06.9	98 14	15.7	21 05.5	98 13	15.4	22 04.0	98 13	15.2	23 02.6	98 13	15.0	24 30.4	98 13	14.6	7
8	16 33.1	98 14	15.8	17 31.8	98 14	15.5	19 00.0	98 13	15.2	19 58.7	98 13	15.0	20 57.4	98 13	14.8	21 56.1	98 13	14.6	22 54.8	98 12	14.3	24 22.8	98 12	14.0	8
9	16 24.9	98 13	15.0	17 23.7	98 13	14.8	18 52.0	98 13	14.5	19 50.9	98 12	14.3	20 49.7	98 12	14.1	21 48.5	98 12	13.9	22 47.3	98 12	13.7	24 15.5	98 12	13.4	9
160	16 17.0	98 12	14.3	17 16.0	98 12	14.1	18 44.4	98 12	13.8	19 43.4	98 12	13.6	20 42.3	98 12	13.4	21 41.2	98 12	13.2	22 40.2	98 11	13.0	24 08.5	98 11	12.7	160
1	16 09.6	98 12	13.6	17 08.6	98 12	13.4	18 37.2	98 11	13.2	19 36.3	98 11	13.0	20 35.3	98 11	12.8	21 34.3	98 11	12.6	22 33.3	98 11	12.4	24 01.8	98 10	12.1	1
2	16 02.5	99 11	12.9	17 01.6	99 11	12.7	18 30.4	99 11	12.5	19 29.5	99 11	12.3	20 28.7	99 10	12.1	21 27.8	99 10	11.9	22 26.9	99 10	11.7	23 55.5	98 10	11.5	2
3	15 55.8	99 11	12.2	16 55.0	99 10	12.0	18 23.9	99 10	11.8	19 23.1	99 10	11.6	20 22.3	99 10	11.4	21 21.6	99 10	11.3	22 20.8	99 10	11.1	23 49.6	99 09	10.8	3
4	15 49.4	99 10	11.5	16 48.8	99 10	11.3	18 17.8	99 10	11.1	19 17.1	99 09	10.9	20 16.4	99 09	10.8	21 15.7	99 09	10.6	22 15.0	99 09	10.4	23 43.9	99 09	10.2	4
165	15 43.5	99 09	10.8	16 42.9	99 09	10.6	18 12.0	99 09	10.4	19 11.4	99 09	10.3	20 10.8	99 09	10.1	21 10.2	99 09	09.9	22 09.6	99 08	09.8	23 38.6	99 08	09.6	165
6	15 37.9	99 09	10.0	16 37.4	99 09	09.9	18 06.6	99 08	09.7	19 06.1	99 08	09.6	20 05.6	99 08	09.4	21 05.0	99 08	09.3	22 04.5	99 08	09.1	23 33.7	99 08	08.9	6
7	15 32.7	99 08	09.3	16 32.2	99 08	09.2	18 01.6	99 08	09.0	19 01.1	99 08	08.9	20 00.7	99 08	08.8	21 00.2	99 07	08.6	21 59.7	99 07	08.5	23 29.0	99 07	08.3	7
8	15 27.9	99 07	08.6	16 27.5	99 07	08.5	17 56.9	99 07	08.3	18 56.5	99 07	08.2	19 56.1	99 07	08.1	20 55.8	99 07	08.0	21 55.4	99 07	07.8	23 24.7	99 07	07.7	8
9	15 23.4	99 07	07.9	16 23.1	99 07	07.8	17 52.6	99 07	07.6	18 52.3	99 06	07.5	19 52.0	99 06	07.4	20 51.6	99 06	07.3	21 51.3	99 06	07.2	23 20.8	99 06	07.0	9
170	15 19.4	1.0 06	07.2	16 19.1	1.0 06	07.1	17 48.7	1.0 06	06.9	18 48.4	1.0 06	06.8	19 48.2	1.0 06	06.7	20 47.9	1.0 06	06.6	21 47.6	1.0 06	06.5	23 17.2	1.0 05	06.4	170
1	15 15.7	1.0 05	06.5	16 15.5	1.0 05	06.4	17 45.2	1.0 05	06.2	18 44.9	1.0 05	06.2	19 44.7	1.0 05	06.1	20 44.5	1.0 05	06.0	21 44.3	1.0 05	05.9	23 13.9	1.0 05	05.7	1
2	15 12.4	1.0 05	05.7	16 12.2	1.0 05	05.7	17 42.0	1.0 05	05.6	18 41.8	1.0 05	05.5	19 41.6	1.0 05	05.4	20 41.5	1.0 04	05.3	21 41.3	1.0 04	05.2	23 11.0	1.0 04	05.1	2
3	15 09.5	1.0 04	05.0	16 09.4	1.0 04	05.0	17 39.2	1.0 04	04.9	18 39.0	1.0 04	04.8	19 38.9	1.0 04	04.7	20 38.8	1.0 04	04.7	21 38.6	1.0 04	04.6	23 08.4	1.0 04	04.5	3
4	15 07.0	1.0 04	04.3	16 06.9	1.0 04	04.3	17 36.7	1.0 03	04.2	18 36.6	1.0 03	04.1	19 36.5	1.0 03	04.0	20 36.4	1.0 03	04.0	21 36.3	1.0 03	03.9	23 06.2	1.0 03	03.8	4
175	15 04.8	1.0 03	03.6	16 04.8	1.0 03	03.5	17 34.7	1.0 03	03.5	18 34.6	1.0 03	03.4	19 34.5	1.0 03	03.4	20 34.5	1.0 03	03.3	21 34.4	1.0 03	03.3	23 04.3	1.0 03	03.2	175
6	15 03.1	1.0 02	02.9	16 03.1	1.0 02	02.8	17 33.0	1.0 02	02.8	18 33.0	1.0 02	02.7	19 32.9	1.0 02	02.7	20 32.9	1.0 02	02.7	21 32.8	1.0 02	02.6	23 02.8	1.0 02	02.6	6
7	15 01.7	1.0 02	02.2	16 01.7	1.0 02	02.1	17 31.7	1.0 02	02.1	18 31.7	1.0 02	02.1	19 31.6	1.0 02	02.0	20 31.6	1.0 02	02.0	21 31.6	1.0 01	02.0	23 01.6	1.0 01	01.9	7
8	15 00.8	1.0 01	01.4	16 00.8	1.0 01	01.4	17 30.7	1.0 01	01.4	18 30.7	1.0 01	01.4	19 30.7	1.0 01	01.3	20 30.7	1.0 01	01.3	21 30.7	1.0 01	01.3	23 00.7	1.0 01	01.3	8
9	15 00.2	1.0 00	00.7	16 00.2	1.0 00	00.7	17 30.2	1.0 00	00.7	18 30.2	1.0 00	00.7	19 30.2	1.0 00	00.7	20 30.2	1.0 00	00.7	21 30.2	1.0 00	00.7	23 00.2	1.0 00	00.6	9
180	15 00.0	1.0 00	00.0	16 00.0	1.0 00	00.0	17 30.0	1.0 00	00.0	18 30.0	1.0 00	00.0	19 30.0	1.0 00	00.0	20 30.0	1.0 00	00.0	21 30.0	1.0 00	00.0	23 00.0	1.0 00	00.0	180

Lat. 59°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	85 30.0	1.0 03	180.0	86 00.0	1.0 04	180.0	87 00.0	1.0 05	180.0	87 30.0	1.0 06	180.0	88 00.0	1.0 07	180.0	88 30.0	1.0 09	180.0	90 00.0	.. 51	....	89 30.0	1.0 22	00.0	00
1	85 28.0	99 10	172.6	85 57.8	99 11	171.8	86 57.2	99 14	169.4	87 26.6	98 16	167.5	87 55.9	97 19	164.7	88 24.6	95 24	160.2	89 29.1	01 52	89.6	89 17.1	69 42	45.2	1
2	85 22.1	97 16	165.5	85 51.3	97 17	163.9	86 48.8	95 22	159.4	87 16.9	93 25	156.0	87 44.2	89 29	151.2	88 10.0	83 34	144.1	88 58.2	01 52	89.1	88 51.7	43 47	63.1	2
3	85 12.6	95 21	158.7	85 40.8	93 23	156.5	86 35.7	89 28	150.5	87 01.9	85 32	146.1	87 26.8	80 36	140.2	87 49.4	70 41	132.3	88 27.3	02 52	88.7	88 23.2	29 49	70.7	3
4	84 59.8	91 26	152.3	85 26.8	89 28	149.7	86 18.6	83 34	142.7	86 42.8	78 37	137.8	87 05.2	71 40	131.6	87 25.0	60 44	123.8	87 56.4	03 51	88.3	87 53.7	21 50	74.5	4
05	84 44.0	87 30	146.5	85 09.8	85 32	143.6	86 58.5	77 38	136.0	86 20.7	71 40	131.0	86 40.9	63 44	124.9	86 58.4	53 47	117.5	87 25.5	04 51	87.9	87 23.7	15 50	76.8	05
6	84 25.8	83 34	141.3	84 50.3	80 36	138.2	85 36.0	71 41	130.4	85 56.4	65 43	125.4	86 14.8	57 46	119.6	86 30.4	47 48	112.8	86 54.6	04 51	87.4	86 53.6	12 50	78.2	6
7	84 05.5	79 37	136.6	84 28.8	76 39	133.4	85 11.6	66 43	125.6	85 30.5	60 45	120.8	85 47.3	52 47	115.3	86 01.5	42 49	109.2	86 23.8	05 51	87.0	86 23.3	09 51	79.0	7
8	83 43.4	76 39	132.3	84 05.5	72 41	129.1	84 45.8	62 45	121.5	85 03.4	55 47	116.9	85 19.0	48 48	111.8	85 32.0	39 50	106.2	85 52.9	06 51	86.6	85 52.9	06 51	79.6	8
9	83 19.9	72 41	128.5	83 40.9	68 43	125.4	84 19.0	58 46	118.0	84 35.5	52 48	113.6	84 50.0	45 49	108.9	85 02.2	36 50	103.7	85 22.1	07 51	86.1	85 22.5	04 51	79.9	9
10	82 55.2	69 43	125.1	83 15.2	65 44	122.0	83 51.3	55 47	114.9	84 06.9	49 49	110.8	84 20.6	42 50	106.4	84 32.0	34 51	101.6	84 51.3	07 51	85.7	84 52.0	02 51	80.1	10
1	82 29.4	66 44	122.0	82 48.6	62 46	119.0	83 23.0	52 48	112.2	83 37.8	46 49	108.3	83 50.8	40 50	104.2	84 01.7	33 51	99.8	84 20.5	08 51	85.3	84 21.6	01 51	80.2	1
2	82 02.8	63 46	119.2	82 21.2	59 47	116.3	82 54.1	50 49	109.8	83 08.3	44 50	106.2	83 20.7	38 50	102.3	83 31.2	32 51	98.2	83 49.7	09 51	84.9	83 51.2	01 51	80.2	2
3	81 35.5	61 46	116.7	81 53.2	57 47	113.9	82 24.8	48 49	107.7	82 38.4	43 50	104.2	82 50.4	37 51	100.6	83 00.5	31 51	96.8	83 18.9	10 51	84.4	83 20.7	02 51	80.1	3
4	81 07.6	59 47	114.4	81 24.8	55 48	111.7	81 55.2	46 50	105.7	82 08.4	41 50	102.5	82 19.9	36 51	99.1	82 29.8	30 51	95.5	82 48.2	10 51	84.0	82 50.3	04 51	80.0	4
15	80 39.2	57 48	112.3	80 55.8	53 49	109.6	81 25.4	45 50	104.0	81 38.1	40 51	100.9	81 49.4	35 51	97.7	81 59.0	29 51	94.3	82 17.4	11 51	83.6	82 19.8	05 51	79.8	15
6	80 10.5	55 49	110.3	80 26.6	52 49	107.8	80 55.3	44 50	102.4	81 07.7	39 51	99.4	81 18.7	34 51	96.4	81 28.2	29 51	93.2	81 46.8	12 51	83.1	81 49.4	06 51	79.6	6
7	79 41.3	54 49	108.5	79 57.0	51 50	106.1	80 25.0	43 51	100.9	80 37.2	38 51	98.1	80 47.9	34 51	95.2	80 57.3	29 52	92.2	81 16.1	13 51	82.7	81 19.0	07 51	79.4	7
8	79 11.9	53 50	106.8	79 27.2	49 50	104.5	79 54.6	42 51	99.5	80 06.5	38 51	96.8	80 17.1	33 51	94.1	80 26.4	29 52	91.3	80 45.4	13 51	82.3	80 48.7	08 51	79.2	8
9	78 42.1	52 50	105.2	78 57.2	48 50	103.0	79 24.1	41 51	98.2	79 35.8	37 51	95.7	79 46.3	33 51	93.1	79 55.5	28 52	90.4	80 14.8	14 51	81.8	80 18.4	09 51	78.9	9
20	78 12.2	51 50	103.7	78 27.0	48 51	101.6	78 53.4	41 51	97.0	79 05.0	37 51	94.6	79 15.4	33 51	92.1	79 24.6	28 52	89.5	79 44.3	15 51	81.4	79 48.0	10 50	78.6	20
1	77 42.1	50 50	102.3	77 56.6	47 51	100.2	78 22.7	40 51	95.8	78 34.2	36 51	93.5	78 44.5	33 52	91.1	78 53.7	29 51	88.7	79 13.7	16 51	81.0	79 17.8	11 50	78.3	1
2	77 11.8	49 51	101.0	77 26.2	46 51	99.0	77 52.0	40 51	94.8	78 03.3	36 51	92.5	78 13.6	33 52	90.3	78 22.8	29 51	87.9	78 43.2	16 51	80.5	78 47.5	12 50	78.0	2
3	76 41.4	49 51	99.7	76 55.6	46 51	97.8	77 21.1	39 51	93.7	77 32.5	36 52	91.6	77 42.7	33 52	89.4	77 52.0	29 51	87.2	78 12.8	17 51	80.1	78 17.3	13 50	77.7	3
4	76 10.9	48 51	98.5	76 24.9	45 51	96.7	76 50.3	39 51	92.7	77 01.6	36 52	90.7	77 11.8	33 51	88.6	77 21.1	29 51	86.4	77 42.3	18 51	79.7	77 47.1	14 50	77.3	4
25	75 40.3	48 51	97.4	75 54.2	45 51	95.6	76 19.4	39 51	91.8	76 30.7	36 52	89.8	76 41.0	33 51	87.8	76 50.3	29 51	85.7	77 12.0	19 51	79.2	77 17.0	15 50	77.0	25
6	75 09.6	47 51	96.3	75 23.4	45 51	94.5	75 48.5	39 52	90.9	75 59.8	36 51	89.0	76 10.1	33 51	87.0	76 19.5	30 51	85.0	76 41.6	19 50	78.8	76 46.9	16 50	76.7	6
7	74 38.9	47 51	95.2	74 52.6	44 51	93.6	75 17.6	39 52	90.0	75 28.9	36 51	88.2	75 39.2	33 51	86.3	75 48.7	30 51	84.4	76 11.3	20 50	78.4	76 16.9	17 50	76.3	7
8	74 08.1	47 51	94.2	74 21.7	44 51	92.6	74 46.7	39 51	89.2	74 58.0	36 51	87.4	75 08.4	33 51	85.6	75 18.0	30 51	83.7	75 41.1	21 50	77.9	75 46.9	18 50	75.9	8
9	73 37.3	46 51	93.3	73 50.9	44 51	91.7	74 15.8	39 51	88.4	74 27.1	36 51	86.6	74 37.6	34 51	84.9	74 47.3	31 51	83.1	75 10.9	22 50	77.5	75 16.9	18 50	75.6	9
30	73 06.4	46 51	92.3	73 20.0	44 52	90.8	73 44.9	39 51	87.6	73 56.3	37 51	85.9	74 06.9	34 51	84.2	74 16.6	31 51	82.5	74 40.7	22 50	77.1	74 47.0	19 50	75.2	30
1	72 35.5	46 52	91.4	72 49.1	44 52	89.9	73 14.1	39 51	86.8	73 25.5	37 51	85.2	73 36.1	34 51	83.5	73 46.0	32 51	81.9	74 10.7	23 50	76.6	74 17.2	20 50	74.8	1
2	72 04.6	46 52	90.5	72 18.2	44 51	89.1	72 43.2	39 51	86.0	72 54.7	37 51	84.5	73 05.4	35 51	82.9	73 15.4	32 51	81.3	73 40.6	24 50	76.2	73 47.4	21 50	74.5	2
3	71 33.7	46 52	89.7	71 47.3	44 51	88.2	72 12.4	40 51	85.3	72 24.0	37 51	83.8	72 34.8	35 51	82.2	72 44.9	32 51	80.7	73 10.6	25 50	75.8	73 17.6	22 49	74.1	3
4	71 02.8	46 51	88.8	71 16.4	44 51	87.4	71 41.6	40 51	84.6	71 53.3	38 51	83.1	72 04.2	35 51	81.6	72 14.4	33 51	80.1	72 40.7	25 50	75.3	72 47.9	23 49	73.7	4
35	70 31.9	46 51	88.0	70 45.5	44 51	86.7	71 10.9	40 51	83.9	71 22.6	38 51	82.5	71 33.7	36 51	81.0	71 44.0	33 51	79.5	72 10.9	26 50	74.9	72 18.3	24 49	73.3	35
6	70 01.1	46 51	87.2	70 14.7	44 51	85.9	70 40.2	40 51	83.2	70 52.0	38 51	81.8	71 03.2	36 51	80.4	71 13.7	34 50	78.9	71 41.1	27 50	74.4	71 48.7	24 49	72.9	6
7	69 30.2	47 51	86.4	69 43.9	45 51	85.2	70 09.5	41 51	82.5	70 21.4	39 51	81.2	70 32.7	37 51	79.8	70 43.4	34 50	78.4	71 11.3	28 49	74.0	71 19.2	25 49	72.5	7
8	68 59.4	47 51	85.7	69 13.1	45 51	84.4	69 38.9	41 51	81.9	69 50.9	39 51	80.5	70 02.3	37 51	79.2	70 13.1	35 50	77.8	70 41.6	28 49	73.6	70 49.8	26 49	72.1	8
9	68 28.6	47 51	84.9	68 42.4	45 51	83.7	69 08.3	41 51	81.2	69 20.5	39 51	79.9	69 32.0	38 50	78.6	69 43.0	35 50	77.3	70 12.0	29 49	73.1	70 20.4	27 49	71.7	9
40	67 57.8	47 51	84.2	68 11.7	45 51	83.0	68 37.8	42 51	80.6	68 50.1	40 51	79.3	69 01.8	38 50	78.0	69 12.9	36 50	76.7	69 42.5	30 49	72.7	69 51.1	28 49	71.3	40
1	67 27.1	47 51	83.5	67 41.0	46 51	82.3	68 07.4	42 51	79.9	68 19.7	40 50	78.7	68 31.6	38 50	77.4	68 42.8	37 50	76.2	69 13.0	31 49	72.2	69 21.9	28 49	70.9	1
2	66 56.4	48 51	82.8	67 10.4	46 51	81.6	67 37.0	43 51	79.3	67 49.5	41 50	78.1	68 01.4	39 50	76.9	68 12.9	37 50	75.6	68 43.7	31 49	71.8	68 52.7	29 48	70.5	2
3	66 25.8	48 51	82.1	66 39.9	46 51	80.9	67 06.6	43 50	78.7	67 19.3	41 50	77.5	67 31.4	39 50	76.3	67 43.0	38 50	75.1	68 14.3	32 49	71.3	68 23.6	30 48	70.1	3
4	65 55.2	48 51	81.4	66 09.4	47 51	80.3	66 36.4	43 50	78.1	66 49.1	42 50	76.9	67 01.4	40 50	75.7	67 13.1	38 50	74.6	67 45.1	33 49	70.9	67 54.6	31 48	69.6	4
45	65 24.7	48 51	80.7	65 39.0	47 51	79.6	66 06.2	44 50	77.4	66 19.1	42 50	76.3	66 31.5	41 50	75.2	66 43.4	39 49	74.0	67 15.9	33 48	70.5	67 25.7	32 48	69.2	45
6	64 54.2	49 51	80.0	65 08.6	47 50	79.0	65 36.0	44 50	76.8	65 49.1	43 50	75.7	66 01.6	41 50	74.6	66 13.7	39 49	73.5	66 46.8	34 48	70.0	66 56.8	32 48	68.8	6
7	64 23.8	49 51	79.4	64 38.3	48 50	78.3	65 06.0	45 50	76.2	65 19.2	43 50	75.2	65 31.9	42 49	74.1	65 44.1	40 49	73.0	66 17.9	35 48	69.6	66 28.1	33 48	68.4	7
8	63 53.5	49 50	78.7	64 08.1	48 50	77.7	64 36.0	45 50	75.7	64 49.3	44 50	74.6	65 02.2	42 49	73.5	65 14.6	41 49	72.5	65 48.9	36 48	69.1	65 59.4	34 48	68.0	8
9	63 23.2	50 50	78.1	63 37.9	48 50	77.1	64 06.1	46 50	75.1	64 19.6	44 49	74.0	64 32.6	43 49	73.0	64 45.2	41 49	71.9	65 20.1	36 48	68.7	65 30.8	35 48	67.5	9
50	62 53.0	50 50	77.4	63 07.8	49 50	76.5	63 36.3	46 50	74.5	63 49.9	45 49	73.5	64 03.1	43 49	72.5	64 15.9	42 49	71.4	64 51.4	37 48	68.2	65 02.3	35 47	67.1	50
1	62 22.9	50 50	76.8	62 37.8	49 50	75.8	63 06.6	47 49	73.9	63 20.3	45 49	72.9	63 33.7	44 49	71.9	63 46.6	42 49	70.9	64 22.7	38 48	67.8	64 33.8	36 47	66.7	1
2	61 52.8	51 50	76.1	62 07.9	50 50	75.2	62 36.9	47 49	73.3	62 50.8	46 49	72.4	63 04.3	44 49	71.4	63 17.4	43 48	70.4	63 54.2	39 47	67.3	64 05.5	37 47	66.3	2
3	61 22.9	51 50	75.5	61 38.1	50 50	74.6	62 07.4	48 49	72.8	62 21.4	46 49	71.8	62 35.1	45 49	70.9	62 48.4	44 48	69.9	63 25.7	39 47	66.9	63 37.3	38 47	65.8	3
4	60 53.0	52 50	74.9	61 08.3	50 49	74.0	61 37.9	48 49	72.2	61 52.1	47 49	71.3	62 06.0	46 48	70.3	62 19.4	44 48	69.4	62 57.3	40 47	66.4	63 09.1	39 47	65.4	4
55	60 23.2	52 50	74.3	60 38.7	51 49	73.4	61 08.5	49 49	71.6	61 22.9	47 49	70.7	61 36.9	46 48	69.8	61 50.5	45 48	68.9	62 29.1	41 47	66.0	62 41.1	39 47	65.0	55
6	59 53.5	52 49	73.7	60 09.1	51 49	72.8	60 39.2	49 49	71.1	60 53.8	48 48	70.2	61 08.0	47 48	69.3	61 21.8	45 48	68.3	62 00.9	41 47	65.5	62 13.1	40 46	64.5	6
7	59 23.9	53 49	73.1	59 39.6	52 49	72.2	60 10.0	50 48	70.5	60 24.8	48 48	69.6	60 39.1	47 48	68.7	60 53.1	46 48	67.8	61 32.8	42 47	65.0	61 45.3	41 46	64.1	7
8	58 54.4	53 49	72.5	59 10.2	52 49	71.6	59 41.0	50 48	70.0	59 55.8	49 48	69.1	60 10.4	48 48	68.2	60 24.5	47 47	67.3	61 04.9	43 46	64.6	61 17.5	42 46	63.6	8
9	58 25.0	54 49	71.9	58 40.9	53 49	71.1	59 12.0	51 48	69.4	59 27.0	50 48	68.6	59 41.7	48 48	67.7	59 56.1	47 47	66.8	60 37.0	44 46	64.1	60 49.9	42 46	63.2	9
60	57 55.6	54 49	71.3	58 11.8	53 48	70.5	58 43.1	51 48	68.9	58 58.3	50 48	68.0	59 13.2	49 47	67.2	59 27.7	48 47	66.3	60 09.3	44 46	63.7	60 22.4	43 46	62.8	60
1	57 26.4	55 48	70.7	57 42.7	54 48	69.9	58 14.3	52 48	68.3	58 29.7	51 47	67.5	58 44.8	50 47	66.7	58 59.5	49 47	65.8	59 41.6	45 46	63.2	59 55.0	44 46	62.3	1
2	56 57.3	55 48	70.1	57 13.7	54 48	69.3	57 45.7	52 48	67.8	58 01.2	51 47	66.9	58 16.4	50 47	66.1	58 31.3	49 47	65.3	59 14.1	46 46	62.7	59 27.6	45 45	61.9	2
3	56 28.3	56 48	69.5	56 44.9	55 48	68.8	57 17.1	53 47	67.2	57 32.8	52 47	66.4	57 48.2	51 47	65.6	58 03.3	50 47	64.8	58 46.7	47 46	62.3	59 00.4	45 45	61.4	3
4	55 59.4	56 48	68.9	56 16.1	55 48	68.2	56 48.7	53 47	66.7	57 04.6	52 47	65.9	57 20.1	51 47	65.1	57 35.4	50 46	64.3	58 19.4	47 45	61.8	58 33.4	46 45	61.0	4
65	55 30.6	57 48	68.3	55 47.5	56 48	67.6	56 20.4	54 47	66.1	56 36.4	53 47	65.4	56 52.2	52 46	64.6	57 07.6	51 46	63.8	57 52.2	48 45	61.4	58 06.4	47 45	60.5	65
6	55 02.0	57 48	67.8	55 19.0	56 47	67.0	55 52.2	54 47	65.6	56 08.4	54 46	64.8	56 24.3	53 46	64.1	56 40.0	52 46	63.3	57 25.1	49 45	60.9	57 39.6	48 45	60.1	6
7	54 33.4	58 47	67.2	54 50.6	57 47	66.5	55 24.1	55 47	65.0	55 40.5	54 46	64.3	55 56.6	53 46	63.5	56 12.4	52 46	62.8	56 58.2	49 45	60.4	57 12.8	48 44	59.6	7
8	54 05.0	58 47	66.6	54 22.3	57 47	65.9	54 56.2	56 46	64.5	55 12.7	55 46	63.8	55 29.0	54 46	63.0	55 45.0	53 45	62.3	56 31.4	50 44	60.0	56 46.2	49 44	59.2	8
9	53 36.7	59 47	66.0	53 54.2	58 47	65.4	54 28.3	56 46	63.9	54 45.1	55 46	63.2	55 01.5	54 46	62.5	55 17.7	54 45	61.8	56 04.7	51 44	59.5	56 19.8	50 44	58.7	9
70	53 08.5	59 47	65.5	53 26.1	58 46	64.8	54 00.6	57 46	63.4	54 17.5	56 46	62.7	54 34.2	55 45	62.0	54 50.6	54 45	61.3	55 38.1	51 44	59.0	55 53.4	51 44	58.3	70
1	52 40.5	60 47	64.9	52 58.2	59 46	64.2	53 33.1	57 46	62.9	53 50.1	56 45	62.2	54 07.0	56 45	61.5	54 23.5	55 45	60.8	55 11.7	52 44	58.6	55 27.2	51 43	57.8	1
2	52 12.6	60 46	64.3	52 30.5	59 46	63.7	53 05.6	58 46	62.3	53 22.9	57 45	61.6	53 39.9	56 45	61.0	53 56.6	55 45	60.3	54 45.4	53 44	58.1	55 01.1	52 43	57.3	2
3	51 44.8	61 46	63.8	52 02.9	60 46	63.1	52 38.3	58 45	61.8	52 55.8	58 45	61.1	53 12.9	57 45	60.4	53 29.9	56 44	59.7	54 19.2	54 43	57.6	54 35.2	53 43	56.9	3
4	51 17.1	61 46	63.2	51 35.4	60 46	62.6	52 11.2	59 45	61.3	52 28.8	58 45	60.6	52 46.1	57 44	59.9	53 03.3	57 44	59.2	53 53.2	54 43	57.1	54 09.3	53 43	56.4	4
75	50 49.6	62 46	62.6	51 08.0	61 45	62.0	51 44.2	60 45	60.7	52 01.9	59 44	60.1	52 19.5	58 44	59.4	52 36.8	57 44	58.7	53 27.3	55 43	56.7	53 43.7	54 43	56.0	75
6	50 22.2	62 45	62.1	50 40.8	61 45	61.4	51 17.3	60 45	60.2	51 35.2	59 44	59.5	51 52.9	59 44	58.9	52 10.4	58 44	58.2	53 01.6	56 43	56.2	53 18.1	55 42	55.5	6
7	49 55.0	63 45	61.5	50 13.7	62 45	60.9	50 50.5	61 44	59.6	51 08.6	60 44	59.0	51 26.5	59 44	58.4	51 44.2	59 43	57.7	52 36.0	56 42	55.7	52 52.7	56 42	55.0	7
8	49 27.9	63 45	60.9	49 46.8	63 45	60.3	50 23.9	61 44	59.1	50 42.2	61 44	58.5	51 00.3	60 43	57.8	51 18.2	59 43	57.2	52 10.5	57 42	55.2	52 27.5	56 42	54.6	8
9	49 01.0	64 45	60.4	49 20.0	63 44	59.8	49 57.5	62 44	58.6	50 16.0	61 44	58.0	50 34.2	61 43	57.3	50 52.3	60 43	56.7	51 45.2	58 42	54.8	52 02.4	57 42	54.1	9
80	48 34.2	64 44	59.8	48 53.4	64 44	59.2	49 31.2	62 44	58.0	49 49.8	62 43	57.4	50 08.3	61 43	56.8	50 26.5	60 43	56.2	51 20.0	58 42	54.3	51 37.4	58 41	53.6	80
1	48 07.6	65 44	59.2	48 26.9	64 44	58.7	49 05.1	63 43	57.5	49 23.9	62 43	56.9	49 42.5	62 43	56.3	50 00.9	61 42	55.7	50 55.0	59 41	53.8	51 12.6	58 41	53.1	1
2	47 41.1	65 44	58.7	48 00.6	65 44	58.1	48 39.1	64 43	57.0	48 58.1	63 43	56.4	49 16.9	62 42	55.8	49 35.5	62 42	55.2	50 30.2	60 41	53.3	50 48.0	59 41	52.7	2
3	47 14.8	66 44	58.1	47 34.5	65 43	57.6	48 13.3	64 43	56.4	48 32.4	64 42	55.8	48 51.4	63 42	55.2	49 10.2	62 42	54.7	50 05.5	60 41	52.8	50 23.5	60 41	52.2	3
4	46 48.6	66 43	57.5	47 08.5	66 43	57.0	47 47.6	65 42	55.9	48 06.9	64 42	55.3	48 26.1	64 42	54.7	48 45.1	63 42	54.1	49 40.9	61 41	52.3	49 59.1	60 40	51.7	4
85	46 22.6	67 43	57.0	46 42.6	66 43	56.4	47 22.1	65 42	55.3	47 41.6	65 42	54.8	48 00.9	64 42	54.2	48 20.1	64 41	53.6	49 16.5	62 40	51.9	49 35.0	61 40	51.2	85
6	45 56.8	67 43	56.4	46 17.0	67 42	55.9	46 56.8	66 42	54.8	47 16.5	65 42	54.2	47 36.0	65 41	53.7	47 55.3	64 41	53.1	48 52.3	62 40	51.4	49 10.9	62 40	50.8	6
7	45 31.2	68 42	55.9	45 51.5	67 42	55.3	46 31.6	66 42	54.3	46 51.5	66 41	53.7	47 11.2	65 41	53.2	47 30.7	65 41	52.6	48 28.3	63 40	50.9	48 47.1	63 40	50.3	7
8	45 05.7	68 42	55.3	45 26.1	68 42	54.8	46 06.6	67 41	53.7	46 26.6	66 41	53.2	46 46.5	66 41	52.6	47 06.2	65 40	52.1	48 04.4	64 40	50.4	48 23.4	63 39	49.8	8
9	44 40.3	69 42	54.7	45 01.0	69 42	54.2	45 41.8	68 41	53.2	46 02.0	67 41	52.6	46 22.0	67 40	52.1	46 41.9	66 40	51.6	47 40.6	64 39	49.9	47 59.9	64 39	49.3	9
90	44 15.2	69 42	54.2	44 36.0	69 41	53.7	45 17.1	68 41	52.6	45 37.5	68 40	52.1	45 57.7	67 40	51.6	46 17.8	67 40	51.0	47 17.1	65 39	49.4	47 36.5	65 39	48.8	90

Digitized by Google

Lat. 59°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	43 50.2	70 41	53.6	44 11.2	70 41	53.1	44 52.7	69 40	52.1	45 13.2	68 40	51.6	45 33.6	68 40	51.1	45 53.9	67 40	50.5	46 53.7	66 39	48.9	47 13.4	65 38	48.3	91
2	43 25.5	71 41	53.0	43 46.6	70 41	52.6	44 28.4	69 40	51.6	44 49.1	69 40	51.0	45 09.7	68 40	50.5	45 30.1	68 39	50.0	46 30.5	66 38	48.4	46 50.4	66 38	47.9	2
3	43 00.9	71 41	52.5	43 22.1	71 40	52.0	44 04.3	70 40	51.0	44 25.1	69 40	50.5	44 45.9	69 39	50.0	45 06.5	68 39	49.5	46 07.5	67 38	47.9	46 27.5	67 38	47.4	3
4	42 36.4	72 40	51.9	42 57.9	71 40	51.4	43 40.3	70 40	50.5	44 01.4	70 39	50.0	44 22.3	70 39	49.5	44 43.1	69 39	49.0	45 44.7	68 38	47.4	46 04.9	67 37	46.9	4
95	42 12.2	72 40	51.3	42 33.8	72 40	50.9	43 16.6	71 39	49.9	43 37.8	71 39	49.4	43 58.9	70 39	48.9	44 19.9	70 38	48.4	45 22.0	68 37	46.9	45 42.4	68 37	46.4	95
6	41 48.2	73 40	50.8	42 09.9	72 39	50.3	42 53.1	72 39	49.4	43 14.4	71 39	48.9	43 35.7	71 38	48.4	43 56.9	70 38	47.9	44 59.5	69 37	46.4	45 20.1	68 37	45.9	6
7	41 24.3	73 39	50.2	41 46.2	73 39	49.8	42 29.7	72 39	48.8	42 51.3	72 38	48.4	43 12.7	71 38	47.9	43 34.0	71 38	47.4	44 37.2	70 37	45.9	44 58.0	69 36	45.4	7
8	41 00.7	74 39	49.6	41 22.7	73 39	49.2	42 06.5	73 38	48.3	42 28.3	72 38	47.8	42 49.9	72 38	47.3	43 11.4	71 37	46.9	44 15.1	70 36	45.4	44 36.1	70 36	44.9	8
9	40 37.2	74 39	49.1	40 59.4	74 38	48.6	41 43.6	73 38	47.7	42 05.5	73 38	47.3	42 27.2	72 37	46.8	42 48.9	72 37	46.3	43 53.2	71 36	44.9	44 14.4	70 36	44.4	9
100	40 14.0	75 38	48.5	40 36.4	74 38	48.1	41 20.8	74 38	47.2	41 42.9	73 37	46.7	42 04.8	73 37	46.3	42 26.7	73 37	45.8	43 31.5	71 36	44.4	43 52.9	71 36	43.9	100
1	39 50.9	75 38	47.9	40 13.5	75 38	47.5	40 58.2	74 37	46.6	41 20.5	74 37	46.2	41 42.6	74 37	45.7	42 04.6	73 36	45.3	43 10.0	72 36	43.9	43 31.6	72 35	43.4	1
2	39 28.1	76 38	47.4	39 50.8	75 37	46.9	40 35.9	75 37	46.1	40 58.3	74 37	45.6	41 20.6	74 36	45.2	41 42.7	74 36	44.8	42 48.7	73 35	43.4	43 10.4	72 35	42.9	2
3	39 05.5	76 37	46.8	39 28.3	76 37	46.4	40 13.7	75 37	45.5	40 36.3	75 36	45.1	40 58.7	75 36	44.7	41 21.1	74 36	44.2	42 27.5	73 35	42.9	42 49.5	73 35	42.4	3
4	38 43.0	77 37	46.2	39 06.0	77 37	45.8	39 51.8	76 36	45.0	40 14.5	76 36	44.6	40 37.1	75 36	44.1	40 59.6	75 35	43.7	42 06.6	74 35	42.3	42 28.7	74 34	41.9	4
105	38 20.8	77 37	45.7	38 44.0	77 36	45.3	39 30.0	76 36	44.4	39 52.9	76 36	44.0	40 15.7	76 35	43.6	40 38.4	76 35	43.2	41 45.9	75 34	41.8	42 08.2	74 34	41.4	105
6	37 58.8	78 36	45.1	38 22.1	78 36	44.7	39 08.5	77 36	43.9	39 31.5	77 35	43.5	39 54.5	76 35	43.0	40 17.4	76 35	42.6	41 25.4	75 34	41.3	41 47.9	75 34	40.9	6
7	37 37.1	78 36	44.5	38 00.5	78 36	44.1	38 47.2	78 35	43.3	39 10.4	77 35	42.9	39 33.5	77 35	42.5	39 56.6	77 34	42.1	41 05.1	76 34	40.8	41 27.8	75 33	40.4	7
8	37 15.5	79 36	43.9	37 39.1	79 35	43.6	38 26.1	78 35	42.8	38 49.5	78 35	42.4	39 12.8	77 34	42.0	39 36.0	77 34	41.5	40 45.0	76 33	40.3	41 07.9	76 33	39.9	8
9	36 54.2	79 35	43.4	37 17.9	79 35	43.0	38 05.2	79 34	42.2	38 28.8	78 34	41.8	38 52.2	78 34	41.4	39 15.6	78 34	41.0	40 25.1	77 33	39.8	40 48.2	77 32	39.3	9
110	36 33.1	80 35	42.8	36 57.0	80 35	42.4	37 44.6	79 34	41.6	38 08.3	79 34	41.3	38 31.9	79 34	40.9	38 55.4	78 33	40.5	40 05.5	77 32	39.2	40 28.7	77 32	38.8	110
1	36 12.2	80 34	42.2	36 36.3	80 34	41.8	37 24.2	80 34	41.1	37 48.0	79 33	40.7	38 11.8	79 33	40.3	38 35.5	79 33	39.9	39 46.0	78 32	38.7	40 09.4	78 32	38.3	1
2	35 51.5	81 34	41.6	36 15.8	81 34	41.3	37 04.0	80 33	40.5	37 28.0	80 33	40.1	37 51.9	80 33	39.8	38 15.7	79 32	39.4	39 26.8	79 32	38.2	39 50.4	78 31	37.8	2
3	35 31.1	81 34	41.1	35 55.5	81 33	40.7	36 44.0	81 33	40.0	37 08.2	80 33	39.6	37 32.2	80 32	39.2	37 56.2	80 32	38.8	39 07.8	79 31	37.7	39 31.5	79 31	37.3	3
4	35 11.0	82 33	40.5	35 35.5	82 33	40.1	36 24.3	81 32	39.4	36 48.6	81 32	39.0	37 12.8	81 32	38.7	37 37.0	80 32	38.3	38 49.1	80 31	37.1	39 12.9	79 31	36.8	4
115	34 51.0	82 33	39.9	35 15.7	82 33	39.5	36 04.8	82 32	38.8	36 29.2	81 32	38.5	36 53.6	81 32	38.1	37 17.9	81 31	37.7	38 30.5	80 31	36.6	38 54.5	80 30	36.2	115
6	34 31.3	83 32	39.3	34 56.1	83 32	39.0	35 45.5	82 32	38.3	36 10.1	82 31	37.9	36 34.7	82 31	37.6	36 59.1	81 31	37.2	38 12.2	81 30	36.1	38 36.4	81 30	35.7	6
7	34 11.9	83 32	38.7	34 36.8	83 32	38.4	35 26.5	83 31	37.7	35 51.3	82 31	37.4	36 15.9	82 31	37.0	36 40.6	82 31	36.6	37 54.1	81 30	35.6	38 18.5	81 29	35.2	7
8	33 52.7	84 32	38.1	34 17.7	83 31	37.8	35 07.7	83 31	37.1	35 32.6	83 31	36.8	35 57.5	83 30	36.4	36 22.3	83 30	36.1	37 36.2	82 29	35.0	38 00.8	82 29	34.7	8
9	33 33.7	84 31	37.6	33 58.9	84 31	37.2	34 49.2	84 30	36.6	35 14.2	83 30	36.2	35 39.2	83 30	35.9	36 04.2	83 30	35.5	37 18.6	82 29	34.5	37 43.3	82 29	34.1	9
120	33 15.0	85 31	37.0	33 40.3	84 31	36.6	34 30.9	84 30	36.0	34 56.1	84 30	35.7	35 21.2	84 30	35.3	35 46.3	84 29	35.0	37 01.2	83 29	34.0	37 26.1	83 28	33.6	120
1	32 56.5	85 30	36.4	33 22.0	85 30	36.1	34 12.9	85 30	35.4	34 38.2	84 29	35.1	35 03.5	84 29	34.8	35 28.7	84 29	34.4	36 44.1	83 28	33.4	37 09.1	83 28	33.1	1
2	32 38.3	85 30	35.8	33 04.0	85 30	35.5	33 55.1	85 29	34.9	34 20.6	85 29	34.5	34 46.0	85 29	34.2	35 11.4	85 28	33.9	36 27.2	84 28	32.9	36 52.4	84 28	32.6	2
3	32 20.4	86 29	35.2	32 46.2	86 29	34.9	33 37.5	85 29	34.3	34 03.2	85 29	34.0	34 28.7	85 28	33.6	34 54.3	85 28	33.3	36 10.5	84 27	32.4	36 35.9	84 27	32.0	3
4	32 02.7	86 29	34.6	32 28.6	86 29	34.3	33 20.3	86 28	33.7	33 46.0	86 28	33.4	34 11.7	86 28	33.1	34 37.4	85 28	32.8	35 54.1	85 27	31.8	36 19.6	85 27	31.5	4
125	31 45.3	87 29	34.0	32 11.3	87 28	33.7	33 03.2	86 28	33.1	33 29.1	86 28	32.8	33 55.0	86 27	32.5	34 20.8	86 27	32.2	35 38.0	85 27	31.3	36 03.6	85 26	31.0	125
6	31 28.1	87 28	33.4	31 54.3	87 28	33.1	32 46.5	87 27	32.6	33 12.5	87 27	32.3	33 38.5	87 27	32.0	34 04.5	86 27	31.7	35 22.0	86 26	30.7	35 47.8	86 26	30.4	6
7	31 11.2	88 28	32.8	31 37.5	88 27	32.5	32 30.0	87 27	32.0	32 56.2	87 27	31.7	33 22.3	87 27	31.4	33 48.4	87 26	31.1	35 06.4	86 26	30.2	35 32.3	86 25	29.9	7
8	30 54.6	88 27	32.2	31 21.0	88 27	32.0	32 13.8	88 27	31.4	32 40.1	88 26	31.1	33 06.3	87 26	30.8	33 32.6	87 26	30.5	34 51.0	87 25	29.6	35 17.0	87 25	29.3	8
9	30 38.3	89 27	31.6	31 04.8	88 27	31.4	31 57.8	88 26	30.8	32 24.2	88 26	30.5	32 50.6	88 26	30.3	33 17.0	88 26	30.0	34 35.8	87 25	29.1	35 02.0	87 25	28.8	9
130	30 22.2	89 26	31.0	30 48.9	89 26	30.8	31 42.1	89 26	30.2	32 08.7	88 26	30.0	32 35.2	88 25	29.7	33 01.7	88 25	29.4	34 20.9	88 24	28.5	34 47.3	88 24	28.3	130
1	30 06.4	89 26	30.4	30 33.2	89 26	30.2	31 26.7	89 25	29.6	31 53.4	89 25	29.4	32 20.0	89 25	29.1	32 46.6	89 25	28.8	34 06.3	88 24	28.0	34 32.8	88 24	27.7	1
2	29 50.9	90 25	29.8	30 17.8	90 25	29.6	31 11.5	89 25	29.1	31 38.3	89 25	28.8	32 05.1	89 24	28.5	32 31.9	89 24	28.3	33 51.9	89 24	27.4	34 18.5	89 23	27.2	2
3	29 35.7	90 25	29.2	30 02.7	90 25	29.0	30 56.7	90 24	28.5	31 23.6	90 24	28.2	31 50.5	90 24	28.0	32 17.4	90 24	27.7	33 37.8	89 23	26.9	34 04.5	89 23	26.6	3
4	29 20.7	91 24	28.6	29 47.9	90 24	28.4	30 42.1	90 24	27.9	31 09.1	90 24	27.6	31 36.1	90 23	27.4	32 03.1	90 23	27.1	33 23.9	90 23	26.3	33 50.8	89 22	26.1	4
135	29 06.1	91 24	28.0	29 33.3	91 24	27.8	30 27.7	91 23	27.3	30 54.9	91 23	27.1	31 22.1	90 23	26.8	31 49.2	90 23	26.6	33 10.4	90 22	25.8	33 37.4	90 22	25.5	135
6	28 51.7	91 23	27.4	29 19.0	91 23	27.2	30 13.7	91 23	26.7	30 41.0	91 23	26.5	31 08.3	91 23	26.2	31 35.5	91 22	26.0	32 57.1	90 22	25.2	33 24.2	90 22	25.0	6
7	28 37.6	92 23	26.8	29 05.1	92 23	26.6	30 00.0	91 22	26.1	30 27.4	91 22	25.9	30 54.8	91 22	25.7	31 22.1	91 22	25.4	32 44.0	91 21	24.7	33 11.3	91 21	24.4	7
8	28 23.8	92 22	26.2	28 51.4	92 22	26.0	29 46.5	92 22	25.5	30 14.0	92 22	25.3	30 41.5	92 22	25.1	31 09.0	92 21	24.8	32 31.2	91 21	24.1	32 58.6	91 21	23.9	8
9	28 10.3	92 22	25.6	28 38.0	92 22	25.4	29 33.3	92 21	24.9	30 01.0	92 21	24.7	30 28.6	92 21	24.5	30 56.1	92 21	24.3	32 18.8	92 20	23.6	32 46.2	92 20	23.3	9
140	27 57.1	93 22	25.0	28 24.9	93 21	24.8	29 20.4	93 21	24.4	29 48.2	92 21	24.1	30 15.9	92 21	23.9	30 43.6	92 20	23.7	32 06.5	92 20	23.0	32 34.1	92 20	22.8	140
1	27 44.2	93 21	24.4	28 12.1	93 21	24.2	29 07.8	93 20	23.8	29 35.7	93 20	23.5	30 03.5	93 20	23.3	30 31.3	93 20	23.1	31 54.6	92 19	22.4	32 22.3	92 19	22.2	1
2	27 31.6	93 21	23.8	27 59.6	93 20	23.6	28 55.5	93 20	23.2	29 23.5	93 20	23.0	29 51.4	93 20	22.7	30 19.3	93 20	22.5	31 42.9	93 19	21.9	32 10.8	93 19	21.7	2
3	27 19.3	94 20	23.2	27 47.4	94 20	23.0	28 43.5	94 20	22.6	29 11.6	93 19	22.4	29 39.6	93 19	22.2	30 07.6	93 19	22.0	31 31.6	93 18	21.3	31 59.5	93 18	21.1	3
4	27 07.3	94 20	22.6	27 35.5	94 19	22.4	28 31.8	94 19	22.0	29 00.0	94 19	21.8	29 28.1	94 19	21.6	29 56.2	94 19	21.4	31 20.5	94 18	20.8	31 48.5	93 18	20.6	4
145	26 55.6	94 19	21.9	27 23.9	94 19	21.7	28 20.4	94 18	21.4	28 48.7	94 18	21.2	29 16.9	94 18	21.0	29 45.1	94 18	20.8	31 09.7	94 18	20.2	31 37.8	94 17	20.0	145
6	26 44.2	95 18	21.3	27 12.6	95 18	21.1	28 09.3	95 18	20.8	28 37.6	94 18	20.6	29 06.0	94 18	20.4	29 34.3	94 18	20.2	30 59.1	94 17	19.6	31 27.4	94 17	19.4	6
7	26 33.1	95 18	20.7	27 01.6	95 18	20.5	27 58.5	95 18	20.2	28 26.9	95 17	20.0	28 55.3	95 17	19.8	29 23.8	95 17	19.6	30 48.9	95 17	19.1	31 17.2	94 16	18.9	7
8	26 22.3	95 17	20.1	26 50.9	95 17	19.9	27 48.0	95 17	19.6	28 16.5	95 17	19.4	28 45.0	95 17	19.2	29 13.5	95 17	19.0	30 38.9	95 16	18.5	31 07.4	95 16	18.3	8
9	26 11.9	96 17	19.5	26 40.5	95 17	19.3	27 37.8	95 16	19.0	28 06.4	95 16	18.8	28 35.0	95 16	18.6	29 03.6	95 16	18.5	30 29.3	95 16	17.9	30 57.8	95 15	17.7	9
150	26 01.7	96 16	18.9	26 30.4	96 16	18.7	27 27.9	96 16	18.4	27 56.6	96 16	18.2	28 25.3	96 16	18.0	28 54.0	96 16	17.9	30 19.9	95 15	17.4	30 48.5	95 15	17.2	150
1	25 51.9	96 16	18.2	26 20.7	96 16	18.1	27 18.3	96 15	17.8	27 47.1	96 15	17.6	28 15.9	96 15	17.4	28 44.6	96 15	17.3	30 10.8	96 15	16.8	30 39.6	96 14	16.6	1
2	25 42.4	96 15	17.6	26 11.3	96 15	17.5	27 09.0	96 15	17.2	27 37.9	96 15	17.0	28 06.8	96 15	16.9	28 35.6	96 15	16.7	30 02.1	96 14	16.2	30 30.9	96 14	16.1	2
3	25 33.2	97 15	17.0	26 02.2	97 15	16.8	27 00.1	96 14	16.6	27 29.0	96 14	16.4	27 58.0	96 14	16.3	28 26.9	96 14	16.1	29 53.6	96 14	15.6	30 22.5	96 14	15.5	3
4	25 24.3	97 14	16.4	25 53.4	97 14	16.2	26 51.4	97 14	15.9	27 20.4	97 14	15.8	27 49.5	97 14	15.7	28 18.5	97 14	15.5	29 45.4	97 13	15.1	30 14.4	97 13	14.9	4
155	25 15.8	97 14	15.7	25 44.9	97 14	15.6	26 43.1	97 13	15.3	27 12.2	97 13	15.2	27 41.3	97 13	15.1	28 10.3	97 13	14.9	29 37.5	97 13	14.5	30 06.6	97 13	14.4	155
6	25 07.5	97 13	15.1	25 36.7	97 13	15.0	26 35.1	97 13	14.7	27 04.2	97 13	14.6	27 33.4	97 13	14.5	28 02.5	97 12	14.3	29 29.9	97 12	13.9	29 59.0	97 12	13.8	6
7	24 59.6	98 13	14.5	25 28.9	97 13	14.4	26 27.4	97 12	14.1	26 56.6	97 12	14.0	27 25.8	97 12	13.9	27 55.0	97 12	13.7	29 22.6	97 12	13.4	29 51.8	97 12	13.2	7
8	24 52.1	98 12	13.9	25 21.4	98 12	13.8	26 20.0	98 12	13.5	26 49.3	98 12	13.4	27 18.6	98 12	13.3	27 47.9	98 11	13.2	29 15.7	98 11	12.8	29 44.9	97 11	12.6	8
9	24 44.8	98 12	13.2	25 14.2	98 11	13.1	26 12.9	98 11	12.9	26 42.3	98 11	12.8	27 11.6	98 11	12.7	27 41.0	98 11	12.6	29 09.0	98 11	12.2	29 38.3	98 11	12.1	9
160	24 37.9	98 11	12.6	25 07.3	98 11	12.5	26 06.2	98 11	12.3	26 35.6	98 11	12.2	27 05.0	98 10	12.1	27 34.4	98 10	12.0	29 02.6	98 10	11.6	29 32.0	98 10	11.5	160
1	24 31.3	98 10	12.0	25 00.8	98 10	11.9	25 59.8	98 10	11.7	26 29.2	98 10	11.6	26 58.7	98 10	11.5	27 28.2	98 10	11.4	28 56.5	98 10	11.0	29 26.0	98 10	10.9	1
2	24 25.1	98 10	11.4	24 54.6	98 10	11.3	25 53.7	98 10	11.1	26 23.2	98 10	11.0	26 52.7	98 09	10.9	27 22.2	98 09	10.8	28 50.7	98 09	10.5	29 20.2	98 09	10.4	2
3	24 19.1	99 09	10.7	24 48.7	99 09	10.6	25 47.9	99 09	10.5	26 17.5	99 09	10.4	26 47.0	99 09	10.3	27 16.6	99 09	10.2	28 45.3	99 09	09.9	29 14.8	98 08	09.8	3
4	24 13.6	99 09	10.1	24 43.2	99 09	10.0	25 42.4	99 09	09.8	26 12.1	99 08	09.8	26 41.7	99 08	09.7	27 11.3	99 08	09.6	28 40.1	99 08	09.3	29 09.7	99 08	09.2	4
165	24 08.3	99 08	09.5	24 38.0	99 08	09.4	25 37.3	99 08	09.2	26 07.0	99 08	09.2	26 36.7	99 08	09.1	27 06.3	99 08	09.0	28 35.3	99 08	08.7	29 04.9	99 07	08.6	165
6	24 03.4	99 08	08.8	24 33.1	99 08	08.8	25 32.5	99 07	08.6	26 02.2	99 07	08.5	26 31.9	99 07	08.5	27 01.6	99 07	08.4	28 30.8	99 07	08.2	29 00.4	99 07	08.1	6
7	23 58.8	99 07	08.2	24 28.5	99 07	08.2	25 28.1	99 07	08.0	25 57.8	99 07	07.9	26 27.6	99 07	07.9	26 57.3	99 07	07.8	28 26.5	99 06	07.6	28 56.3	99 06	07.5	7
8	23 54.5	99 06	07.6	24 24.3	99 06	07.5	25 23.9	99 06	07.4	25 53.7	99 06	07.3	26 23.5	99 06	07.3	26 53.3	99 06	07.2	28 22.6	99 06	07.0	28 52.4	99 06	06.9	8
9	23 50.6	99 06	07.0	24 20.5	99 06	06.9	25 20.1	99 06	06.8	25 49.9	99 06	06.7	26 19.7	99 06	06.7	26 49.6	99 06	06.6	28 19.0	99 05	06.4	28 48.8	99 05	06.3	9
170	23 47.1	1.0 05	06.3	24 16.9	1.0 05	06.3	25 16.6	1.0 05	06.2	25 46.5	1.0 05	06.1	26 16.3	1.0 05	06.1	26 46.2	99 05	06.0	28 15.7	99 05	05.8	28 45.6	99 05	05.8	170
1	23 43.8	1.0 05	05.7	24 13.7	1.0 05	05.6	25 13.5	1.0 05	05.5	25 43.3	1.0 05	05.5	26 13.2	1.0 05	05.4	26 43.1	1.0 05	05.4	28 12.7	1.0 04	05.2	28 42.6	1.0 04	05.2	1
2	23 40.9	1.0 04	05.1	24 10.8	1.0 04	05.0	25 10.6	1.0 04	04.9	25 40.5	1.0 04	04.9	26 10.4	1.0 04	04.8	26 40.4	1.0 04	04.8	28 10.1	1.0 04	04.7	28 40.0	1.0 04	04.6	2
3	23 38.4	1.0 04	04.4	24 08.3	1.0 04	04.4	25 08.1	1.0 04	04.3	25 38.1	1.0 04	04.3	26 08.0	1.0 04	04.2	26 37.9	1.0 04	04.2	28 07.7	1.0 03	04.1	28 37.6	1.0 03	04.0	3
4	23 36.1	1.0 03	03.8	24 06.1	1.0 03	03.8	25 06.0	1.0 03	03.7	25 35.9	1.0 03	03.7	26 05.9	1.0 03	03.6	26 35.8	1.0 03	03.6	28 05.7	1.0 03	03.5	28 35.6	1.0 03	03.5	4
175	23 34.3	1.0 03	03.2	24 04.2	1.0 03	03.1	25 04.2	1.0 02	03.1	25 34.1	1.0 02	03.1	26 04.1	1.0 02	03.0	26 34.0	1.0 02	03.0	28 03.9	1.0 02	02.9	28 33.9	1.0 02	02.9	175
6	23 32.7	1.0 02	02.5	24 02.7	1.0 02	02.5	25 02.7	1.0 02	02.5	25 32.6	1.0 02	02.4	26 02.6	1.0 02	02.4	26 32.6	1.0 02	02.4	28 02.5	1.0 02	02.3	28 32.5	1.0 02	02.3	6
7	23 31.5	1.0 01	01.9	24 01.5	1.0 01	01.9	25 01.5	1.0 01	01.9	25 31.5	1.0 01	01.8	26 01.5	1.0 01	01.8	26 31.5	1.0 01	01.8	28 01.4	1.0 01	01.7	28 31.4	1.0 01	01.7	7
8	23 30.7	1.0 01	01.3	24 00.7	1.0 01	01.3	25 00.7	1.0 01	01.2	25 30.7	1.0 01	01.2	26 00.7	1.0 01	01.2	26 30.6	1.0 01	01.2	28 00.6	1.0 01	01.2	28 30.6	1.0 01	01.2	8
9	23 30.2	1.0 00	00.6	24 00.2	1.0 00	00.6	25 00.2	1.0 00	00.6	25 30.2	1.0 00	00.6	26 00.2	1.0 00	00.6	26 30.2	1.0 00	00.6	28 00.2	1.0 00	00.6	28 30.2	1.0 00	00.6	9
180	23 30.0	1.0 00	00.0	24 00.0	1.0 00	00.0	25 00.0	1.0 00	00.0	25 30.0	1.0 00	00.0	26 00.0	1.0 00	00.0	26 30.0	1.0 00	00.0	28 00.0	1.0 00	00.0	28 30.0	1.0 00	00.0	180

Lat. 59°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	89 00.0	1.0 12	00.0	88 30.0	1.0 08	00.0	87 00.0	1.0 04	00.0	86 30.0	1.0 03	00.0	86 00.0	1.0 03	00.0	80 00.0	1.0 01	00.0	79 30.0	1.0 01	00.0	74 30.0	1.0 00	00.0	00
1	88 52.8	89 30	26.5	88 25.1	95 22	18.1	86 57.6	99 12	08.9	86 28.0	99 10	07.5	85 58.3	99 09	06.5	79 59.4	1.0 03	02.1	79 29.5	1.0 03	01.9	74 29.7	1.0 01	01.0	1
2	88 34.5	89 40	44.6	88 11.6	82 32	33.0	86 50.6	95 19	17.3	86 22.0	96 16	14.7	85 53.1	97 14	12.8	79 57.8	99 05	04.1	79 27.9	1.0 04	03.8	74 28.9	1.0 02	02.0	2
3	88 10.7	53 44	55.4	87 52.3	69 38	43.9	86 39.4	89 24	24.9	86 12.4	91 21	21.4	85 44.7	93 19	18.7	79 55.0	99 06	06.1	79 25.4	99 06	05.7	74 27.6	99 03	03.0	3
4	87 44.2	41 46	62.1	87 29.3	57 42	51.6	86 24.8	82 29	31.6	85 59.6	86 26	27.4	85 33.4	89 23	24.1	79 51.2	98 08	08.2	79 21.8	98 08	07.6	74 25.7	99 04	04.0	4
05	87 16.4	33 48	66.4	87 04.2	48 44	57.1	86 07.3	75 33	37.2	85 44.1	80 30	32.8	85 19.6	83 27	29.0	79 46.3	97 10	10.1	79 17.2	97 09	09.5	74 23.3	99 05	05.0	05
6	86 47.8	27 48	69.3	86 37.6	40 46	61.0	85 47.6	68 36	42.0	85 26.3	74 33	37.4	85 03.5	78 30	33.4	79 40.3	95 12	12.1	79 11.6	96 11	11.3	74 20.4	98 06	05.9	6
7	86 18.7	22 49	71.3	86 10.2	34 47	64.0	85 26.1	61 38	46.0	85 06.7	68 35	41.3	84 45.6	73 32	37.3	79 33.4	94 13	13.9	79 05.1	94 12	13.0	74 16.9	97 07	06.9	7
8	85 49.3	18 49	72.7	85 42.2	29 47	66.2	85 03.2	56 40	49.3	84 45.6	62 37	44.7	84 26.2	67 35	40.7	79 25.4	92 15	15.8	78 57.7	93 14	14.7	74 12.9	96 07	07.9	8
9	85 19.7	15 50	73.8	85 13.7	25 48	67.8	84 39.3	50 41	52.0	84 23.3	57 39	47.6	84 05.4	62 36	43.6	79 16.6	90 16	17.5	78 49.4	91 15	16.4	74 08.4	96 08	08.8	9
10	84 49.9	12 50	74.6	84 45.0	21 48	69.1	84 14.6	45 42	54.4	84 00.0	52 40	50.1	83 43.6	57 38	46.2	79 06.8	88 18	19.2	78 40.2	89 17	18.0	74 03.5	95 09	09.7	10
1	84 20.1	09 50	75.1	84 16.0	18 49	70.1	83 49.2	41 43	56.3	83 35.9	47 41	52.2	83 20.9	53 39	48.4	78 56.2	86 19	20.9	78 30.3	87 18	19.6	73 58.0	93 10	10.6	1
2	83 50.2	07 50	75.5	83 46.9	15 49	70.9	83 23.2	37 44	57.9	83 11.2	43 42	54.0	82 57.4	49 40	50.3	78 44.8	84 20	22.4	78 19.5	85 19	21.1	73 52.1	92 11	11.5	2
3	83 20.3	05 50	75.8	83 17.6	13 49	71.5	82 56.8	33 45	59.3	82 45.9	39 43	55.6	82 33.3	45 41	52.0	78 32.6	81 22	23.9	78 08.1	83 20	22.5	73 45.6	91 11	12.4	3
4	82 50.3	03 50	76.0	82 48.2	10 49	72.0	82 30.1	30 45	60.5	82 20.2	36 43	56.9	82 08.7	41 42	53.5	78 19.7	79 23	25.4	77 55.9	80 21	23.9	73 38.8	90 12	13.3	4
15	82 20.3	02 50	76.1	82 18.8	08 49	72.3	82 03.0	27 45	61.5	81 54.2	32 44	58.0	81 43.7	38 42	54.8	78 06.2	76 24	26.7	77 43.0	78 22	25.2	73 31.5	88 13	14.1	15
6	81 50.3	00 50	76.1	81 49.4	06 49	72.6	81 35.8	24 46	62.3	81 27.8	29 44	59.0	81 18.3	34 43	55.9	77 51.9	74 25	28.0	77 29.6	76 23	26.5	73 23.7	87 14	14.9	6
7	81 20.3	01 50	76.1	81 19.9	04 49	72.8	81 08.3	21 46	63.0	81 01.2	26 45	59.9	80 52.6	31 43	56.8	77 37.1	71 26	29.3	77 15.5	73 24	27.7	73 15.5	85 14	15.7	7
8	80 50.3	03 50	76.0	80 50.3	03 49	72.9	80 40.7	19 46	63.6	80 34.4	24 45	60.6	80 26.6	28 44	57.7	77 21.8	69 26	30.4	77 00.9	71 25	28.8	73 07.0	84 15	16.5	8
9	80 20.3	04 50	75.9	80 20.8	01 49	72.9	80 13.0	16 46	64.1	80 07.4	21 45	61.2	80 00.3	26 44	58.4	77 05.9	66 27	31.5	76 45.7	68 26	29.9	72 58.0	82 16	17.3	9
20	79 50.4	05 50	75.8	79 51.2	00 49	73.0	79 45.1	14 47	64.5	79 40.2	19 45	61.7	79 33.9	23 44	59.0	76 49.5	63 28	32.5	76 30.1	66 27	30.9	72 48.6	80 16	18.0	20
1	79 20.4	07 50	75.6	79 21.7	02 49	72.9	79 17.2	12 47	64.8	79 13.0	16 46	62.2	79 07.4	21 45	59.6	76 32.6	61 29	33.5	76 14.0	63 28	31.8	72 38.9	79 17	18.7	1
2	78 50.5	08 50	75.4	78 52.2	03 49	72.9	78 49.2	10 47	65.1	78 45.6	14 46	62.5	78 40.7	19 45	60.0	76 15.4	58 29	34.4	75 57.5	61 28	32.7	72 28.8	77 17	19.4	2
3	78 20.6	09 50	75.2	78 22.6	05 49	72.8	78 21.1	08 47	65.3	78 18.1	12 46	62.9	78 13.8	16 45	60.4	75 57.7	56 30	35.3	75 40.6	58 29	33.6	72 18.3	75 18	20.1	3
4	77 50.7	10 50	75.0	77 53.1	06 49	72.6	77 53.0	06 47	65.5	77 50.6	10 46	63.1	77 46.9	14 45	60.8	75 39.7	53 31	36.1	75 23.3	56 29	34.4	72 07.5	73 18	20.7	4
25	77 20.9	11 50	74.8	77 23.7	07 49	72.5	77 24.9	04 47	65.6	77 23.0	08 46	63.3	77 19.9	12 45	61.0	75 21.4	51 31	36.8	75 05.7	53 30	35.1	71 56.4	71 19	21.4	25
6	76 51.1	12 50	74.5	76 54.2	08 49	72.3	76 56.8	03 47	65.7	76 55.4	07 46	63.5	76 52.8	10 45	61.3	75 02.7	48 32	37.5	74 47.8	51 30	35.8	71 45.0	69 20	22.0	6
7	76 21.4	13 50	74.2	76 24.8	10 49	72.1	76 28.6	01 47	65.7	76 27.7	05 46	63.6	76 25.7	08 45	61.4	74 43.7	46 32	38.1	74 29.6	48 31	36.5	71 33.3	67 20	22.5	7
8	75 51.6	14 49	73.9	75 55.4	11 49	71.9	76 00.4	00 47	65.7	76 00.0	03 46	63.6	75 58.6	07 45	61.6	74 24.5	44 32	38.8	74 11.0	46 31	37.1	71 21.3	65 20	23.1	8
9	75 22.0	15 49	73.6	75 26.0	12 49	71.7	75 32.3	02 47	65.7	75 32.3	02 46	63.7	75 31.4	05 45	61.7	74 05.1	41 33	39.3	73 52.3	44 32	37.7	71 09.1	63 21	23.6	9
30	74 52.3	16 49	73.3	74 56.7	13 49	71.4	75 04.1	03 47	65.6	75 04.6	00 46	63.7	75 04.2	03 45	61.8	73 45.4	39 33	39.8	73 33.3	42 32	38.2	70 56.5	61 21	24.2	30
1	74 22.8	17 49	73.0	74 27.5	14 49	71.2	74 36.0	06 47	65.6	74 36.9	02 46	63.7	74 36.9	02 45	61.8	73 25.5	37 33	40.3	73 14.1	39 32	38.7	70 43.8	59 22	24.6	1
2	73 53.2	18 49	72.7	73 58.2	15 49	70.9	74 07.8	08 47	65.5	74 09.2	03 46	63.7	74 09.7	00 45	61.8	73 05.4	35 34	40.8	72 54.6	37 33	39.2	70 30.8	58 22	25.1	2
3	73 23.8	19 49	72.4	73 29.1	16 49	70.6	73 39.7	07 47	65.4	73 41.5	05 46	63.6	73 42.4	02 45	61.8	72 45.1	32 34	41.2	72 35.0	35 33	39.6	70 17.5	56 22	25.6	3
4	72 54.3	20 49	72.0	72 59.9	17 48	70.3	73 11.7	09 47	65.2	73 13.9	06 46	63.5	73 15.2	03 45	61.8	72 24.7	30 34	41.5	72 15.3	33 33	40.0	70 04.1	54 23	26.0	4
35	72 25.0	21 49	71.7	72 30.8	18 48	70.1	72 43.6	10 47	65.1	72 46.2	07 46	63.4	72 48.0	04 45	61.7	72 04.1	28 34	41.9	71 55.3	31 33	40.3	69 50.4	51 23	26.4	35
6	71 55.7	22 49	71.3	72 01.8	19 48	69.7	72 15.6	11 47	64.9	72 18.6	09 46	63.3	72 20.8	06 45	61.6	71 43.4	26 35	42.2	71 35.2	29 34	40.7	69 36.6	49 23	26.8	6
7	71 26.4	23 49	71.0	71 32.9	20 48	69.4	71 47.7	13 47	64.7	71 51.0	10 46	63.1	71 53.6	07 45	61.5	71 22.6	24 35	42.5	71 15.0	26 34	41.0	69 22.6	47 24	27.2	7
8	70 57.2	24 49	70.6	71 04.0	21 48	69.1	71 19.7	14 46	64.5	71 23.5	11 46	63.0	71 26.5	09 45	61.4	71 01.7	22 35	42.7	70 54.7	24 34	41.2	69 08.4	46 24	27.5	8
9	70 28.1	25 48	70.3	70 35.1	22 48	68.8	70 51.9	15 46	64.3	70 56.0	12 46	62.8	70 59.3	10 45	61.3	70 40.7	20 35	43.0	70 34.3	22 34	41.5	68 54.0	44 24	27.9	9
40	69 59.1	26 48	69.9	70 06.3	23 48	68.5	70 24.0	16 46	64.1	70 28.5	14 46	62.6	70 32.3	11 45	61.1	70 19.6	18 35	43.2	70 13.8	21 34	41.7	68 39.5	42 24	28.2	40
1	69 30.1	26 48	69.5	69 37.6	24 48	68.1	69 56.3	17 46	63.9	70 01.1	15 46	62.4	70 05.2	13 45	61.0	69 58.4	16 35	43.4	69 53.2	19 34	41.9	68 24.9	40 25	28.5	1
2	69 01.2	27 48	69.1	69 09.0	25 48	67.8	69 28.5	18 46	63.6	69 33.7	16 46	62.2	69 38.2	14 45	60.8	69 37.2	14 36	43.5	69 32.5	17 35	42.1	68 10.1	38 25	28.7	2
3	68 32.3	28 48	68.8	68 40.4	26 48	67.4	69 00.9	19 46	63.4	69 06.4	17 45	62.0	69 11.3	15 45	60.6	69 15.8	13 36	43.7	69 11.7	15 35	42.3	67 55.2	36 25	29.0	3
4	68 03.6	29 48	68.4	68 11.9	27 47	67.1	68 33.3	21 46	63.1	68 39.1	18 45	61.8	68 44.4	16 45	60.4	68 54.5	11 36	43.8	68 50.9	13 35	42.4	67 40.1	34 25	29.2	4
45	67 34.9	30 48	68.0	67 43.5	28 47	66.7	68 05.8	22 46	62.9	68 11.9	20 45	61.5	68 17.5	17 45	60.2	68 33.1	09 36	43.9	68 30.1	11 35	42.5	67 25.0	32 25	29.5	45
6	67 06.3	31 48	67.6	67 15.1	29 47	66.4	67 38.3	23 46	62.6	67 44.8	21 45	61.3	67 50.7	19 45	60.0	68 11.7	07 36	43.9	68 09.2	09 35	42.6	67 09.7	30 26	29.7	6
7	66 37.7	31 47	67.2	66 46.9	30 47	66.0	67 10.9	24 46	62.3	67 17.7	22 45	61.0	67 24.0	20 44	59.8	67 50.2	06 36	44.0	67 48.2	08 35	42.7	66 54.4	28 26	29.9	7
8	66 09.3	32 47	66.8	66 18.7	30 47	65.6	66 43.6	25 45	62.0	66 50.7	23 45	60.8	66 57.3	21 44	59.5	67 28.7	04 36	44.1	67 27.3	06 35	42.7	66 38.9	26 26	30.1	8
9	65 40.9	33 47	66.4	65 50.6	31 47	65.2	66 16.3	26 45	61.7	66 23.8	24 45	60.5	66 30.7	22 44	59.3	67 07.2	02 36	44.1	67 06.3	04 35	42.8	66 23.4	24 26	30.2	9
50	65 12.7	34 47	66.0	65 22.6	32 47	64.9	65 49.1	27 45	61.4	65 56.9	25 45	60.2	66 04.2	23 44	59.0	66 45.7	00 36	44.1	66 45.3	03 35	42.8	66 07.8	22 26	30.4	50
1	64 44.5	35 47	65.6	64 54.6	33 46	64.5	65 22.1	28 45	61.1	65 30.2	26 45	59.9	65 37.7	24 44	58.8	66 24.2	01 36	44.1	66 24.3	01 35	42.8	65 52.1	20 26	30.5	1
2	64 16.4	35 47	65.2	64 26.8	34 46	64.1	64 55.0	29 45	60.8	65 03.5	27 44	59.6	65 11.3	25 44	58.5	66 02.7	03 36	44.1	66 03.3	01 35	42.8	65 36.4	19 26	30.7	2
3	63 48.4	36 47	64.8	63 59.0	35 46	63.7	64 28.1	30 45	60.4	64 36.8	28 44	59.3	64 45.0	26 44	58.2	65 41.2	04 36	44.0	65 42.3	02 35	42.8	65 20.6	17 26	30.8	3
4	63 20.5	37 46	64.4	63 31.4	35 46	63.3	64 01.3	31 45	60.1	64 10.3	29 44	59.0	64 18.8	28 44	57.9	65 19.8	06 36	44.0	65 21.3	04 35	42.8	65 04.8	15 26	30.9	4
55	62 52.7	38 46	63.9	63 03.8	36 46	62.9	63 34.5	32 44	59.8	63 43.8	30 44	58.7	63 52.7	29 43	57.6	64 58.3	07 36	43.9	65 00.3	06 35	42.8	64 48.9	13 27	31.0	55
6	62 25.0	39 46	63.5	62 36.3	37 46	62.5	63 07.9	33 44	59.4	63 17.5	31 44	58.4	63 26.6	30 43	57.3	64 36.9	09 36	43.9	64 39.3	07 35	42.7	64 33.0	11 27	31.0	6
7	61 57.3	39 46	63.1	62 09.0	38 45	62.1	62 41.3	34 44	59.1	62 51.2	32 44	58.1	63 00.6	31 43	57.0	64 15.5	10 36	43.8	64 18.4	09 35	42.6	64 17.0	10 27	31.1	7
8	61 29.8	40 46	62.7	61 41.7	39 45	61.7	62 14.8	35 44	58.8	62 25.0	33 43	57.7	62 34.8	32 43	56.7	63 54.1	12 36	43.7	63 57.4	10 35	42.6	64 01.1	08 27	31.2	8
9	61 02.4	41 46	62.3	61 14.5	40 45	61.3	61 48.5	36 44	58.4	61 58.9	34 43	57.4	62 09.0	33 43	56.4	63 32.8	13 36	43.6	63 36.5	12 35	42.5	63 45.1	06 27	31.2	9
60	60 35.1	42 45	61.8	60 47.5	41 45	60.9	61 22.2	37 44	58.1	61 32.9	35 43	57.1	61 43.3	34 43	56.1	63 11.5	15 35	43.5	63 15.7	13 35	42.4	63 29.1	04 27	31.2	60
1	60 07.9	43 45	61.4	60 20.5	41 45	60.5	60 56.0	37 43	57.7	61 07.1	36 43	56.7	61 17.7	35 42	55.8	62 50.3	16 35	43.4	62 54.9	15 35	42.3	63 13.0	03 27	31.2	1
2	59 40.8	43 45	61.0	59 53.7	42 45	60.1	60 30.0	38 43	57.3	60 41.3	37 43	56.4	60 52.2	36 42	55.4	62 29.1	18 35	43.2	62 34.1	16 35	42.2	62 57.0	01 27	31.3	2
3	59 13.9	44 45	60.6	59 27.0	43 44	59.7	60 04.0	39 43	57.0	60 15.6	38 43	56.0	60 26.8	37 42	55.1	62 07.9	19 35	43.1	62 13.4	17 34	42.0	62 41.0	01 27	31.3	3
4	58 47.0	45 45	60.1	59 00.3	44 44	59.3	59 38.2	40 43	56.6	59 50.0	39 42	55.7	60 01.5	38 42	54.8	61 46.9	20 35	42.9	61 52.7	19 34	41.9	62 24.9	02 27	31.2	4
65	58 20.3	46 44	59.7	58 33.8	45 44	58.8	59 12.4	41 43	56.2	59 24.5	40 42	55.3	59 36.3	39 42	54.4	61 25.8	22 35	42.8	61 32.1	20 34	41.8	62 08.9	04 27	31.2	65
6	57 53.7	47 44	59.3	58 07.5	45 44	58.4	58 46.8	42 43	55.8	58 59.2	41 42	55.0	59 11.2	40 42	54.1	61 04.9	23 35	42.6	61 11.6	22 34	41.6	61 52.9	06 27	31.2	6
7	57 27.2	47 44	58.8	57 41.2	46 44	58.0	58 21.3	43 42	55.5	58 33.9	42 42	54.6	58 46.3	40 41	53.7	60 44.0	24 35	42.4	60 51.1	23 34	41.4	61 36.9	07 27	31.2	7
8	57 00.8	48 44	58.4	57 15.1	47 43	57.6	57 55.9	44 42	55.1	58 08.8	43 42	54.2	58 21.4	41 41	53.4	60 23.2	26 35	42.3	60 30.7	24 34	41.3	61 20.9	09 27	31.1	8
9	56 34.5	49 44	57.9	56 49.0	48 43	57.1	57 30.6	45 42	54.7	57 43.8	43 42	53.8	57 56.7	42 41	53.0	60 02.4	27 34	42.1	60 10.3	26 34	41.1	61 05.0	11 27	31.1	9
70	56 08.4	50 43	57.5	56 23.1	49 43	56.7	57 05.4	45 42	54.3	57 18.9	44 41	53.5	57 32.1	43 41	52.6	59 41.8	28 34	41.9	59 50.1	27 34	40.9	60 49.0	12 26	31.0	70
1	55 42.4	50 43	57.0	55 57.4	49 43	56.3	56 40.4	46 42	53.9	56 54.2	45 41	53.1	57 07.6	44 41	52.3	59 21.2	30 34	41.7	59 29.9	28 34	40.7	60 33.1	14 26	30.9	1
2	55 16.6	51 43	56.6	55 31.7	50 42	55.8	56 15.5	47 41	53.5	56 29.5	46 41	52.7	56 43.2	45 40	51.9	59 00.7	31 34	41.4	59 09.7	29 33	40.5	60 17.3	15 26	30.8	2
3	54 50.8	52 43	56.1	55 06.2	51 42	55.4	55 50.7	48 41	53.1	56 05.0	47 41	52.3	56 18.9	46 40	51.5	58 40.3	32 34	41.2	58 49.7	31 33	40.3	60 01.4	17 26	30.8	3
4	54 25.2	53 42	55.7	54 40.9	52 42	55.0	55 26.1	49 41	52.7	55 40.6	48 40	51.9	55 54.8	47 40	51.1	58 20.0	33 34	41.0	58 29.7	32 33	40.1	59 45.6	18 26	30.7	4
75	53 59.8	53 42	55.2	54 15.6	52 42	54.5	55 01.6	50 41	52.3	55 16.3	49 40	51.5	55 30.8	48 40	50.8	57 59.7	34 34	40.8	58 09.9	33 33	39.9	59 29.9	20 26	30.6	75
6	53 34.5	54 42	54.8	53 50.5	53 42	54.1	54 37.2	51 40	51.9	54 52.2	50 40	51.1	55 06.9	49 40	50.4	57 39.6	36 33	40.5	57 50.1	34 33	39.7	59 14.2	21 26	30.5	6
7	53 09.3	55 42	54.3	53 25.6	54 41	53.6	54 13.0	51 40	51.5	54 28.2	50 40	50.7	54 43.2	50 39	50.0	57 19.6	37 33	40.3	57 30.4	36 33	39.4	58 58.6	23 26	30.3	7
8	52 44.2	55 41	53.9	53 00.8	55 41	53.2	53 48.8	52 40	51.1	54 04.4	51 40	50.3	54 19.6	50 39	49.6	56 59.6	38 33	40.1	57 10.9	37 32	39.2	58 43.0	24 26	30.2	8
9	52 19.4	56 41	53.4	52 36.1	55 41	52.7	53 24.9	53 40	50.6	53 40.6	52 39	49.9	53 56.1	51 39	49.2	56 39.8	39 33	39.8	56 51.4	38 32	39.0	58 27.5	26 26	30.1	9
80	51 54.6	57 41	53.0	52 11.6	56 41	52.3	53 01.1	54 39	50.2	53 17.1	53 39	49.5	53 32.8	52 39	48.8	56 20.1	40 33	39.5	56 32.0	39 32	38.7	58 12.0	27 26	30.0	80
1	51 30.0	58 41	52.5	51 47.2	57 40	51.8	52 37.4	55 39	49.8	52 53.6	54 39	49.1	53 09.6	53 38	48.4	56 00.4	41 32	39.3	56 12.7	40 32	38.5	57 56.6	29 26	29.8	1
2	51 05.6	58 40	52.0	51 23.0	58 40	51.4	52 13.9	55 39	49.4	52 30.3	55 39	48.7	52 46.6	54 38	48.0	55 40.9	43 32	39.0	55 53.6	42 32	38.2	57 41.3	30 25	29.7	2
3	50 41.3	59 40	51.6	50 58.9	58 40	50.9	51 50.5	56 39	49.0	52 07.2	55 38	48.3	52 23.7	55 38	47.6	55 21.5	44 32	38.7	55 34.5	43 32	37.9	57 26.0	31 25	29.5	3
4	50 17.2	60 40	51.1	50 35.0	59 40	50.5	51 27.2	57 38	48.5	51 44.2	56 38	47.9	52 01.0	55 38	47.2	55 02.3	45 32	38.5	55 15.6	44 31	37.7	57 10.8	33 25	29.4	4
85	49 53.2	60 40	50.6	50 11.3	60 39	50.0	51 04.2	58 38	48.1	51 21.4	57 38	47.4	51 38.4	56 37	46.8	54 43.1	46 32	38.2	54 56.7	45 31	37.4	56 55.7	34 25	29.2	85
6	49 29.4	61 39	50.2	49 47.7	61 39	49.5	50 41.2	59 38	47.7	50 58.7	58 38	47.0	51 15.9	57 37	46.4	54 24.1	47 32	37.9	54 38.0	46 31	37.1	56 40.7	35 25	29.0	6
7	49 05.8	62 39	49.7	49 24.2	61 39	49.1	50 18.5	59 38	47.2	50 36.2	59 37	46.6	50 53.6	58 37	46.0	54 05.1	48 31	37.6	54 19.4	47 31	36.8	56 25.7	37 25	28.9	7
8	48 42.3	63 39	49.2	49 01.0	62 38	48.6	49 55.9	60 37	46.8	50 13.8	59 37	46.2	50 31.5	59 37	45.5	53 46.3	49 31	37.3	54 01.0	48 31	36.6	56 10.8	38 25	28.7	8
9	48 19.0	63 39	48.7	48 37.8	63 38	48.2	49 33.4	61 37	46.4	49 51.6	60 37	45.7	50 09.5	59 36	45.1	53 27.7	50 31	37.0	53 42.6	49 30	36.3	55 56.1	39 24	28.5	9
90	47 55.8	64 38	48.3	48 14.9	63 38	47.7	49 11.2	62 37	45.9	49 29.5	61 36	45.3	49 47.7	60 36	44.7	53 09.2	51 31	36.7	53 24.4	50 30	36.0	55 41.4	41 24	28.3	90

Digitized by Google

Lat. 59°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	47 32.8	65 38	47.8	47 52.1	64 38	47.2	48 49.0	62 37	45.5	49 07.6	62 36	44.9	49 26.1	61 36	44.3	52 50.8	52 30	36.4	53 06.3	51 30	35.7	55 26.8	42 24	28.1	91
2	47 10.0	65 38	47.3	47 29.6	65 37	46.7	48 27.1	63 36	45.0	48 45.9	62 36	44.4	49 04.6	62 36	43.8	52 32.5	53 30	36.1	52 48.3	52 30	35.4	55 12.2	43 24	27.9	2
3	46 47.4	66 37	46.8	47 07.1	65 37	46.3	48 05.3	64 36	44.6	48 24.4	63 36	44.0	48 43.3	63 35	43.4	52 14.4	54 30	35.8	52 30.5	53 29	35.1	54 57.8	44 24	27.7	3
4	46 25.0	67 37	46.3	46 44.9	66 37	45.8	47 43.7	65 36	44.1	48 03.0	64 35	43.6	48 22.1	63 35	43.0	51 56.4	55 30	35.4	52 12.8	54 29	34.8	54 43.5	46 24	27.5	4
95	46 02.7	67 37	45.9	46 22.8	67 36	45.3	47 22.3	65 35	43.7	47 41.8	65 35	43.1	48 01.1	64 35	42.5	51 38.5	56 30	35.1	51 55.3	55 29	34.4	54 29.3	47 24	27.3	95
6	45 40.6	68 36	45.4	46 00.9	68 36	44.8	47 01.0	66 35	43.2	47 20.8	65 35	42.7	47 40.3	65 34	42.1	51 20.8	57 29	34.8	51 37.9	56 29	34.1	54 15.2	48 28	27.1	6
7	45 18.7	69 36	44.9	45 39.2	68 36	44.4	46 40.0	67 35	42.8	46 59.9	66 34	42.2	47 19.7	66 34	41.7	51 03.3	58 29	34.5	51 20.6	57 29	33.8	54 01.2	49 23	26.8	7
8	44 57.0	69 36	44.4	45 17.7	69 36	43.9	46 19.1	67 34	42.3	46 39.2	67 34	41.8	46 59.2	66 34	41.2	50 45.8	59 29	34.1	51 03.5	58 28	33.5	53 47.3	50 23	26.6	8
9	44 35.5	70 36	43.9	44 56.4	70 35	43.4	45 58.4	68 34	41.8	46 18.7	68 34	41.3	46 38.9	67 34	40.8	50 28.6	60 29	33.8	50 46.5	59 28	33.2	53 33.5	52 23	26.4	9
100	44 14.1	71 35	43.4	44 35.3	70 35	42.9	45 37.8	69 34	41.4	45 58.4	68 34	40.9	46 18.9	68 33	40.3	50 11.5	61 28	33.5	50 29.7	60 28	32.8	53 19.8	53 23	26.1	100
1	43 53.0	71 35	42.9	44 14.3	71 35	42.4	45 17.5	70 34	40.9	45 38.3	69 33	40.4	45 58.9	69 33	39.9	49 54.5	62 28	33.1	50 13.0	61 28	32.5	53 06.3	54 22	25.9	1
2	43 32.1	72 35	42.4	43 53.6	72 34	41.9	44 57.4	70 33	40.5	45 18.4	70 33	40.0	45 39.2	69 33	39.4	49 37.7	63 28	32.8	49 56.5	62 27	32.2	52 52.8	55 22	25.7	2
3	43 11.3	73 34	41.9	43 33.0	72 34	41.5	44 37.4	71 33	40.0	44 58.6	70 33	39.5	45 19.7	70 32	39.0	49 21.1	64 27	32.4	49 40.1	63 27	31.8	52 39.5	56 22	25.4	3
4	42 50.8	73 34	41.4	43 12.6	73 34	41.0	44 17.6	72 33	39.5	44 39.0	71 32	39.0	45 00.3	71 32	38.5	49 04.6	65 27	32.1	49 23.9	64 27	31.5	52 26.3	57 22	25.2	4
105	42 30.4	74 34	40.9	42 52.5	73 33	40.5	43 58.1	72 32	39.1	44 19.7	72 32	38.6	44 41.2	71 32	38.1	48 48.3	66 27	31.7	49 07.8	65 26	31.1	52 13.2	58 22	24.9	105
6	42 10.3	74 33	40.4	42 32.5	74 33	40.0	43 38.7	73 32	38.6	44 00.5	73 32	38.1	44 22.2	72 31	37.6	48 32.1	66 27	31.3	48 51.9	66 26	30.8	52 00.2	59 21	24.7	6
7	41 50.3	75 33	39.9	42 12.8	75 33	39.5	43 19.5	74 32	38.1	43 41.5	73 31	37.6	44 03.4	73 31	37.2	48 16.1	67 26	31.0	48 36.2	67 26	30.4	51 47.4	60 21	24.4	7
8	41 30.6	76 33	39.4	41 53.2	75 32	39.0	43 00.5	74 31	37.6	43 22.8	74 31	37.2	43 44.9	73 31	36.7	48 00.3	68 26	30.6	48 20.6	68 26	30.1	51 34.7	62 21	24.1	8
9	41 11.1	76 32	38.9	41 33.9	76 32	38.5	42 41.8	75 31	37.2	43 04.2	75 31	36.7	43 26.5	74 30	36.2	47 44.6	69 26	30.3	48 05.2	68 25	29.7	51 22.1	63 21	23.9	9
110	40 51.8	77 32	38.4	41 14.8	77 32	38.0	42 23.2	76 31	36.7	42 45.8	75 30	36.2	43 08.3	75 30	35.8	47 29.1	70 26	29.9	47 50.0	69 25	29.4	51 09.7	64 21	23.6	110
1	40 32.7	77 31	37.9	40 55.9	77 31	37.5	42 04.9	76 30	36.2	42 27.7	76 30	35.8	42 50.4	75 30	35.3	47 13.8	71 25	29.5	47 34.9	70 25	29.0	50 57.4	65 20	23.3	1
2	40 13.8	78 31	37.4	40 37.2	78 31	37.0	41 46.7	77 30	35.7	42 09.7	76 30	35.3	42 32.6	76 29	34.8	46 58.7	71 25	29.1	47 20.0	71 25	28.6	50 45.2	66 20	23.1	2
3	39 55.2	79 31	36.9	40 18.7	78 30	36.5	41 28.8	77 30	35.2	41 52.0	77 29	34.8	42 15.1	77 29	34.4	46 43.7	72 25	28.8	47 05.3	72 24	28.3	50 33.2	67 20	22.8	3
4	39 36.7	79 30	36.4	40 00.4	79 30	36.0	41 11.1	78 29	34.7	41 34.4	78 29	34.3	41 57.7	77 29	33.9	46 28.9	73 24	28.4	46 50.8	73 24	27.9	50 21.3	68 20	22.5	4
115	39 18.5	80 30	35.8	39 42.4	79 30	35.5	40 53.6	79 29	34.3	41 17.1	78 29	33.8	41 40.6	78 28	33.4	46 14.3	74 24	28.0	46 36.4	73 24	27.5	50 09.5	68 19	22.2	115
6	39 00.5	80 30	35.3	39 24.6	80 29	34.9	40 36.3	79 28	33.8	41 00.0	79 28	33.4	41 23.7	79 28	33.0	45 59.9	75 24	27.6	46 22.2	74 23	27.1	49 57.9	69 19	21.9	6
7	38 42.8	81 29	34.8	39 07.0	81 29	34.4	40 19.2	80 28	33.3	40 43.1	80 28	32.9	41 07.0	79 27	32.5	45 45.7	75 23	27.2	46 08.2	75 23	26.8	49 46.5	70 19	21.6	7
8	38 25.2	81 29	34.3	38 49.6	81 29	33.9	40 02.4	80 28	32.8	40 26.5	80 27	32.4	40 50.5	80 27	32.0	45 31.6	76 23	26.8	45 54.4	76 23	26.4	49 35.1	71 19	21.3	8
9	38 07.9	82 28	33.8	38 32.5	82 28	33.4	39 45.8	81 27	32.3	40 10.0	81 27	31.9	40 34.2	81 27	31.5	45 17.8	77 23	26.5	45 40.8	76 22	26.0	49 24.0	72 18	21.0	9
120	37 50.9	83 28	33.3	38 15.6	82 28	32.9	39 29.4	82 27	31.8	39 53.8	81 27	31.4	40 18.2	81 26	31.0	45 04.1	78 22	26.1	45 27.3	77 22	25.6	49 12.9	73 18	20.8	120
1	37 34.1	83 28	32.7	37 58.9	83 27	32.4	39 13.2	82 27	31.3	39 37.8	82 26	30.9	40 02.4	82 26	30.6	44 50.6	78 22	25.7	45 14.0	78 22	25.2	49 02.1	74 18	20.5	1
2	37 17.5	84 27	32.2	37 42.5	83 27	31.9	38 57.3	83 26	30.8	39 22.1	83 26	30.4	39 46.8	82 26	30.1	44 37.3	79 22	25.3	45 01.0	79 21	24.8	48 51.3	75 18	20.1	2
3	37 01.1	84 27	31.7	37 26.3	84 27	31.3	38 41.6	83 26	30.3	39 06.5	83 26	29.9	39 31.4	83 25	29.6	44 24.2	80 22	24.9	44 48.1	79 21	24.5	48 40.8	76 17	19.8	3
4	36 45.0	85 26	31.2	37 10.4	84 26	30.8	38 26.1	84 25	29.8	38 51.2	84 25	29.4	39 16.3	83 25	29.1	44 11.3	80 21	24.5	44 35.4	80 21	24.1	48 30.4	76 17	19.5	4
125	36 29.1	85 26	30.6	36 54.7	85 26	30.3	38 10.8	84 25	29.3	38 36.1	84 25	28.9	39 01.4	84 24	28.6	43 58.6	81 21	24.1	44 22.9	81 20	23.7	48 20.1	77 17	19.2	125
6	36 13.5	86 26	30.1	36 39.2	85 25	29.8	37 55.8	85 25	28.8	38 21.3	85 24	28.4	38 46.7	85 24	28.1	43 46.1	82 20	23.7	44 10.6	81 20	23.3	48 10.0	78 17	18.9	6
7	35 58.2	86 25	29.6	36 24.0	86 25	29.2	37 41.1	85 24	28.3	38 06.7	85 24	27.9	38 32.2	85 24	27.6	43 33.8	82 20	23.3	43 58.5	82 20	22.9	48 00.1	79 16	18.6	7
8	35 43.0	87 25	29.0	36 09.0	86 25	28.7	37 26.6	86 24	27.8	37 52.3	86 24	27.4	38 18.0	86 23	27.1	43 21.7	83 20	22.9	43 46.5	83 20	22.5	47 50.3	80 16	18.3	8
9	35 28.2	87 24	28.5	35 54.3	87 24	28.2	37 12.3	86 23	27.3	37 38.2	86 23	26.9	38 04.1	86 23	26.6	43 09.8	84 20	22.4	43 34.8	83 19	22.1	47 40.7	80 16	18.0	9
130	35 13.5	88 24	28.0	35 39.8	87 24	27.7	36 58.3	87 23	26.8	37 24.3	87 23	26.4	37 50.3	87 22	26.1	42 58.1	84 19	22.0	43 23.3	84 19	21.7	47 31.2	81 15	17.6	130
1	34 59.2	88 24	27.4	35 25.6	88 23	27.1	36 44.5	87 23	26.2	37 10.7	87 22	25.9	37 36.8	87 22	25.6	42 46.6	85 19	21.6	43 12.0	85 18	21.3	47 22.0	82 15	17.3	1
2	34 45.1	88 23	26.9	35 11.6	88 23	26.6	36 30.9	88 22	25.7	36 57.3	88 22	25.4	37 23.6	88 22	25.1	42 35.3	85 18	21.2	43 00.9	85 18	20.9	47 12.8	83 15	17.0	2
3	34 31.2	89 23	26.3	34 57.9	89 22	26.1	36 17.6	88 22	25.2	36 44.1	88 22	24.9	37 10.6	88 21	24.6	42 24.2	86 18	20.8	42 50.0	86 18	20.4	47 03.9	83 15	16.7	3
4	34 17.6	89 22	25.8	34 44.4	89 22	25.5	36 04.6	89 21	24.7	36 31.2	89 21	24.4	36 57.8	89 21	24.1	42 13.4	87 18	20.4	42 39.3	86 17	20.0	46 55.1	84 14	16.3	4
135	34 04.3	90 22	25.3	34 31.3	90 22	25.0	35 51.8	89 21	24.2	36 18.6	89 21	23.9	36 45.3	89 20	23.6	42 02.7	87 17	20.0	42 28.9	87 17	19.6	46 46.5	85 14	16.0	135
6	33 51.3	90 21	24.7	34 18.3	90 21	24.5	35 39.3	90 20	23.7	36 06.2	90 20	23.4	36 33.1	90 20	23.1	41 52.3	88 17	19.5	42 18.6	88 17	19.2	46 38.0	85 14	15.7	6
7	33 38.5	91 21	24.2	34 05.7	91 21	23.9	35 27.0	90 20	23.1	35 54.1	90 20	22.9	36 21.1	90 20	22.6	41 42.1	88 17	19.1	42 08.5	88 16	18.8	46 29.8	86 14	15.4	7
8	33 26.0	91 20	23.6	33 53.3	91 20	23.4	35 15.0	91 20	22.6	35 42.2	91 19	22.4	36 09.3	90 19	22.1	41 32.1	89 16	18.7	41 58.7	89 16	18.4	46 21.7	87 13	15.0	8
9	33 13.7	91 20	23.1	33 41.1	91 20	22.8	35 03.2	91 19	22.1	35 30.6	91 19	21.8	35 57.8	91 19	21.6	41 22.3	89 16	18.3	41 49.0	89 16	18.0	46 13.8	87 13	14.7	9
140	33 01.7	92 20	22.5	33 29.3	92 19	22.3	34 51.7	91 19	21.6	35 19.2	91 19	21.3	35 46.6	91 18	21.1	41 12.7	90 16	17.8	41 39.6	90 15	17.5	46 06.0	88 13	14.3	140
1	32 50.0	92 19	22.0	33 17.7	92 19	21.8	34 40.5	92 18	21.1	35 08.1	92 18	20.8	35 35.6	92 18	20.6	41 03.4	90 15	17.4	41 30.4	90 15	17.1	45 58.5	88 12	14.0	1
2	32 38.6	93 19	21.4	33 06.4	93 18	21.2	34 29.5	92 18	20.5	34 57.2	92 18	20.3	35 24.9	92 17	20.1	40 54.2	91 15	17.0	41 21.4	91 15	16.7	45 51.1	89 12	13.7	2
3	32 27.4	93 18	20.9	32 55.3	93 18	20.7	34 18.8	93 17	20.0	34 46.6	93 17	19.8	35 14.4	93 17	19.5	40 45.3	91 14	16.5	41 12.7	91 14	16.3	45 43.9	90 12	13.3	3
4	32 16.5	93 18	20.3	32 44.5	93 18	20.1	34 08.4	93 17	19.5	34 36.3	93 17	19.3	35 04.2	93 17	19.0	40 36.6	92 14	16.1	41 04.1	92 14	15.8	45 36.8	90 11	13.0	4
145	32 05.9	94 17	19.8	32 34.0	94 17	19.6	33 58.2	93 16	18.9	34 26.3	93 16	18.7	34 54.2	93 16	18.5	40 28.2	92 14	15.7	40 55.8	92 14	15.4	45 30.0	91 11	12.6	145
6	31 55.6	94 17	19.2	32 23.8	94 17	19.0	33 48.3	94 16	18.4	34 16.5	94 16	18.2	34 44.6	94 16	18.0	40 19.9	93 13	15.2	40 47.7	92 13	15.0	45 23.3	91 11	12.3	6
7	31 45.6	94 16	18.7	32 13.9	94 16	18.5	33 38.7	94 16	17.9	34 06.9	94 15	17.7	34 35.2	94 15	17.5	40 11.9	93 13	14.8	40 39.8	93 13	14.6	45 16.8	92 10	11.9	7
8	31 35.8	95 16	18.1	32 04.2	95 16	17.9	33 29.4	94 15	17.4	33 57.7	94 15	17.2	34 26.0	94 15	17.0	40 04.1	93 13	14.4	40 32.1	93 12	14.1	45 10.5	92 10	11.6	8
9	31 26.3	95 15	17.6	31 54.9	95 15	17.4	33 20.3	95 15	16.8	33 48.7	95 14	16.6	34 17.1	95 14	16.4	39 56.6	94 12	13.9	40 24.7	94 12	13.7	45 04.4	93 10	11.2	9
150	31 17.2	95 15	17.0	31 45.8	95 15	16.8	33 11.5	95 14	16.3	33 40.0	95 14	16.1	34 08.5	95 14	15.9	39 49.3	94 12	13.5	40 17.5	94 12	13.3	44 58.5	93 10	10.9	150
1	31 08.3	96 14	16.5	31 37.0	96 14	16.3	33 02.9	95 14	15.8	33 31.6	95 14	15.6	34 00.2	95 13	15.4	39 42.2	95 11	13.1	40 10.5	95 11	12.8	44 52.7	94 09	10.5	1
2	30 59.7	96 14	15.9	31 28.4	96 14	15.7	32 54.7	96 13	15.2	33 23.4	96 13	15.0	33 52.1	96 13	14.9	39 35.3	95 11	12.6	40 03.8	95 11	12.4	44 47.2	94 09	10.2	2
3	30 51.3	96 13	15.3	31 20.2	96 13	15.2	32 46.7	96 13	14.7	33 15.5	96 13	14.5	33 44.3	96 13	14.4	39 28.7	95 11	12.2	39 57.2	95 10	12.0	44 41.8	94 09	09.8	3
4	30 43.3	96 13	14.8	31 12.3	96 13	14.6	32 39.0	96 12	14.1	33 07.9	96 12	14.0	33 36.8	96 12	13.8	39 22.3	96 10	11.7	39 51.0	96 10	11.5	44 36.6	95 08	09.5	4
155	30 35.6	97 12	14.2	31 04.6	97 12	14.1	32 31.6	97 12	13.6	33 00.6	97 12	13.5	33 29.5	97 12	13.3	39 16.1	96 10	11.3	39 44.9	96 10	11.1	44 31.6	95 08	09.1	155
6	30 28.1	97 12	13.6	30 57.2	97 12	13.5	32 24.5	97 11	13.1	32 53.5	97 11	12.9	33 22.6	97 11	12.8	39 10.2	96 10	10.8	39 39.1	96 09	10.7	44 26.8	96 08	08.8	6
7	30 21.0	97 11	13.1	30 50.2	97 11	12.9	32 17.6	97 11	12.5	32 46.8	97 11	12.4	33 15.9	97 11	12.2	39 04.5	97 09	10.4	39 33.5	97 09	10.2	44 22.2	96 07	08.4	7
8	30 14.2	97 11	12.5	30 43.4	97 11	12.4	32 11.1	97 10	12.0	32 40.3	97 10	11.9	33 09.5	97 10	11.7	38 59.0	97 09	09.9	39 28.1	97 09	09.8	44 17.8	96 07	08.0	8
9	30 07.6	98 10	12.0	30 36.9	98 10	11.8	32 04.8	98 10	11.5	32 34.1	98 10	11.3	33 03.3	98 10	11.2	38 53.8	97 08	09.5	39 23.0	97 08	09.3	44 13.6	97 07	07.7	9
160	30 01.3	98 10	11.4	30 30.7	98 10	11.3	31 58.8	98 10	10.9	32 28.1	98 09	10.8	32 57.5	98 09	10.7	38 48.8	97 08	09.1	39 18.1	97 08	08.9	44 09.6	97 06	07.3	160
1	29 55.4	98 09	10.8	30 24.8	98 09	10.7	31 53.1	98 09	10.4	32 22.5	98 09	10.3	32 51.9	98 09	10.1	38 44.1	98 08	08.6	39 13.4	98 07	08.5	44 05.7	97 06	07.0	1
2	29 49.7	98 09	10.3	30 19.2	98 09	10.2	31 47.7	98 09	09.8	32 17.1	98 08	09.7	32 46.6	98 08	09.6	38 39.6	98 07	08.2	39 09.0	98 07	08.0	44 02.1	98 06	06.6	2
3	29 44.4	98 08	09.7	30 13.9	98 08	09.6	31 42.5	98 08	09.3	32 12.1	98 08	09.2	32 41.6	98 08	09.1	38 35.3	98 07	07.7	39 04.8	98 07	07.6	43 58.6	98 05	06.2	3
4	29 39.3	99 08	09.1	30 08.9	99 08	09.0	31 37.7	99 08	08.7	32 07.3	99 08	08.6	32 36.8	99 07	08.5	38 31.3	98 06	07.3	39 00.8	98 06	07.1	43 55.4	98 05	05.9	4
165	29 34.6	99 07	08.6	30 04.2	99 07	08.5	31 33.1	99 07	08.2	32 02.8	99 07	08.1	32 32.4	99 07	08.0	38 27.5	99 06	06.8	38 57.1	99 06	06.7	43 52.3	98 05	05.5	165
6	29 30.1	99 07	08.0	29 59.8	99 07	07.9	31 28.9	99 07	07.7	31 58.6	99 07	07.6	32 28.2	99 06	07.5	38 24.0	99 06	06.4	38 53.6	99 05	06.2	43 49.4	98 04	05.1	6
7	29 26.0	99 06	07.4	29 55.7	99 06	07.3	31 24.9	99 06	07.1	31 54.6	99 06	07.0	32 24.3	99 06	06.9	38 20.7	99 05	05.9	38 50.4	99 05	05.8	43 46.8	99 04	04.8	7
8	29 22.2	99 06	06.9	29 51.9	99 06	06.8	31 21.2	99 06	06.6	31 51.0	99 06	06.5	32 20.8	99 06	06.4	38 17.6	99 05	05.4	38 47.3	99 05	05.4	43 44.3	99 04	04.4	8
9	29 18.6	99 05	06.3	29 48.4	99 05	06.2	31 17.8	99 05	06.0	31 47.6	99 05	06.0	32 17.4	99 05	05.9	38 14.8	99 04	05.0	38 44.6	99 04	04.9	43 42.0	99 03	04.0	9
170	29 15.4	99 05	05.7	29 45.2	99 05	05.7	31 14.8	99 05	05.5	31 44.6	99 05	05.4	32 14.4	99 05	05.3	38 12.2	99 04	04.5	38 42.1	99 04	04.5	43 39.9	99 03	03.7	170
1	29 12.5	1.0 04	05.1	29 42.3	1.0 04	05.1	31 12.0	1.0 04	04.9	31 41.8	1.0 04	04.9	32 11.7	1.0 04	04.8	38 09.9	99 03	04.1	38 39.8	99 03	04.0	43 38.0	99 03	03.3	1
2	29 09.9	1.0 04	04.6	29 39.8	1.0 04	04.5	31 09.4	1.0 04	04.4	31 39.3	1.0 04	04.3	32 09.2	1.0 04	04.3	38 07.8	1.0 03	03.6	38 37.7	1.0 03	03.6	43 36.4	1.0 02	02.9	2
3	29 07.5	1.0 03	04.0	29 37.5	1.0 03	04.0	31 07.2	1.0 03	03.8	31 37.2	1.0 03	03.8	32 07.1	1.0 03	03.7	38 06.0	1.0 03	03.2	38 35.9	1.0 03	03.1	43 34.9	1.0 02	02.6	3
4	29 05.5	1.0 03	03.4	29 35.5	1.0 03	03.4	31 05.3	1.0 03	03.3	31 35.3	1.0 03	03.2	32 05.2	1.0 03	03.2	38 04.4	1.0 02	02.7	38 34.3	1.0 02	02.7	43 33.6	1.0 02	02.2	4
175	29 03.9	1.0 02	02.9	29 33.8	1.0 02	02.8	31 03.7	1.0 02	02.7	31 33.7	1.0 02	02.7	32 03.6	1.0 02	02.7	38 03.1	1.0 02	02.3	38 33.0	1.0 02	02.2	43 32.5	1.0 02	01.8	175
6	29 02.5	1.0 02	02.3	29 32.4	1.0 02	02.3	31 02.4	1.0 02	02.2	31 32.3	1.0 02	02.2	32 02.3	1.0 02	02.1	38 02.0	1.0 01	01.8	38 31.9	1.0 01	01.8	43 31.6	1.0 01	01.5	6
7	29 01.4	1.0 01	01.7	29 31.4	1.0 01	01.7	31 01.3	1.0 01	01.6	31 31.3	1.0 01	01.6	32 01.3	1.0 01	01.6	38 01.1	1.0 01	01.4	38 31.1	1.0 01	01.3	43 30.9	1.0 01	01.1	7
8	29 00.6	1.0 01	01.1	29 30.6	1.0 01	01.1	31 00.6	1.0 01	01.1	31 30.6	1.0 01	01.1	32 00.6	1.0 01	01.1	38 00.5	1.0 01	00.9	38 30.5	1.0 01	00.9	43 30.4	1.0 00	00.7	8
9	29 00.2	1.0 00	00.6	29 30.2	1.0 00	00.6	31 00.1	1.0 00	00.5	31 30.1	1.0 00	00.5	32 00.1	1.0 00	00.5	38 00.1	1.0 00	00.5	38 30.1	1.0 00	00.4	43 30.1	1.0 00	00.4	9
180	29 00.0	1.0 00	00.0	29 30.0	1.0 00	00.0	31 00.0	1.0 00	00.0	31 30.0	1.0 00	00.0	32 00.0	1.0 00	00.0	38 00.0	1.0 00	00.0	38 30.0	1.0 00	00.0	43 30.0	1.0 00	00.0	180

www.navtech.com

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 59°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	35	180	39	180	43	180	47	180	51	180	55	180	59	180	63	180	67	180	71	180	75	180	00
4	35	175	39	175	43	175	47	174	51	174	55	174	59	173	63	173	67	172	71	171	75	169	4
8	35	170	39	170	43	169	47	169	51	168	55	167	59	166	62	165	66	164	70	162	74	158	8
12	34	165	38	165	42	164	46	163	50	162	54	161	58	160	62	158	66	156	70	153	73	149	12
16	34	161	38	160	41	159	45	158	49	157	53	155	57	153	61	151	65	148	68	145	72	140	16
20	33	156	37	155	41	154	45	153	48	151	52	149	56	147	60	145	64	142	67	138	71	132	20
24	32	151	36	150	40	149	44	147	47	146	51	144	55	141	59	139	62	135	66	131	69	125	24
28	31	147	35	146	39	144	42	142	46	140	50	138	54	136	57	133	61	129	64	125	67	119	28
32	30	143	33	141	37	139	41	138	45	136	48	133	52	131	56	127	59	124	62	119	65	113	32
36	28	138	32	137	36	135	40	133	43	131	47	128	50	126	54	122	57	119	60	114	64	108	36
40	27	134	31	132	34	130	38	128	42	126	45	124	49	121	52	118	55	114	59	109	62	104	40
44	25	130	29	128	33	126	36	124	40	122	43	119	47	116	50	113	53	109	57	105	60	100	44
48	24	126	27	124	31	122	35	120	38	117	42	115	45	112	48	109	52	105	55	101	57	96	48
52	22	122	26	120	29	118	33	116	36	113	40	111	43	108	46	105	49	101	53	97	55	92	52
56	20	118	24	116	27	114	31	112	34	109	38	107	41	104	44	101	47	97	50	93	53	89	56
60	18	114	22	112	25	110	29	108	32	106	36	103	39	100	42	97	45	94	48	90	51	85	60
64	17	111	20	109	24	107	27	104	30	102	34	99	37	96	40	93	43	90	46	86	49	82	64
68	15	107	18	105	22	103	25	101	28	98	32	96	35	93	38	90	41	87	44	83	47	79	68
72	13	104	16	101	20	99	23	97	26	95	30	92	33	89	36	87	39	83	42	80	45	76	72
76	11	100	14	98	17	96	21	94	24	91	28	89	31	86	34	83	37	80	40	77	43	73	76
80	09	97	12	94	15	92	19	90	22	88	25	85	29	83	32	80	35	77	38	74	41	71	80
84	07	93	10	91	13	89	17	87	20	84	23	82	27	80	30	77	33	74	36	71	39	68	84
88	04	90	08	88	11	85	15	83	18	81	21	79	25	76	28	74	31	71	34	68	37	65	88
92	02	86	06	84	09	82	13	80	16	78	19	75	23	73	26	71	29	68	32	65	36	62	92
96	00	83	04	81	07	79	11	77	14	74	17	72	21	70	24	68	27	65	31	62	34	59	96
100	*02*	79	02	77	05	75	09	73	12	71	15	69	19	67	22	64	26	62	29	59	32	57	100
104	*04*	76	*00*	74	03	72	07	70	10	68	14	66	17	64	20	61	24	59	27	57	30	54	104
108	*06*	72	*02*	70	01	69	05	67	08	65	12	63	15	60	19	58	22	56	25	54	29	51	108
112	*08*	69	*04*	67	*01*	65	03	63	06	61	10	59	13	57	17	55	20	53	24	51	27	49	112
116	*10*	65	*06*	63	*02*	62	01	60	05	58	08	56	12	54	15	52	19	50	22	48	26	46	116
120	*11*	62	*08*	60	*04*	58	*01*	56	03	55	07	53	10	51	14	49	17	47	21	45	24	43	120
124	*13*	58	*10*	56	*06*	55	*02*	53	01	51	05	49	09	48	12	46	16	44	19	42	23	40	124
128	*15*	54	*11*	53	*08*	51	*04*	49	*00*	48	03	46	07	45	11	43	14	41	18	39	22	38	128
132	*16*	51	*13*	49	*09*	47	*05*	46	*02*	44	02	43	06	41	09	40	13	38	17	36	20	35	132
136	*18*	47	*14*	45	*11*	44	*07*	42	*03*	41	01	39	04	38	08	37	12	35	15	34	19	32	136
140	*19*	43	*16*	41	*12*	40	*08*	39	*04*	37	*01*	36	03	35	07	33	11	32	14	31	18	29	140
144	*21*	39	*17*	38	*13*	36	*09*	35	*06*	34	*02*	32	02	31	06	30	10	29	13	28	17	26	144
148	*22*	35	*18*	34	*14*	32	*11*	31	*07*	30	*03*	29	01	28	05	27	09	26	12	25	16	23	148
152	*23*	31	*19*	30	*15*	28	*12*	27	*08*	26	*04*	25	00	24	04	24	08	23	12	22	16	21	152
156	*24*	26	*20*	25	*16*	24	*13*	24	*09*	23	*05*	22	*01*	21	03	20	07	19	11	19	15	18	156
160	*25*	22	*21*	21	*17*	20	*13*	20	*09*	19	*05*	18	*01*	18	03	17	06	16	10	15	14	15	160
164	*26*	18	*22*	17	*18*	16	*14*	16	*10*	15	*06*	15	*02*	14	02	14	06	13	10	12	14	12	164
168	*26*	13	*22*	13	*18*	12	*14*	12	*10*	11	*06*	11	*02*	11	02	10	06	10	10	09	13	09	168
172	*27*	09	*23*	09	*19*	08	*15*	08	*11*	08	*07*	07	*03*	07	01	07	05	06	09	06	13	06	172
176	*27*	04	*23*	04	*19*	04	*15*	04	*11*	04	*07*	04	*03*	04	01	03	05	03	09	03	13	03	176
180	*27*	00	*23*	00	*19*	00	*15*	00	*11*	00	*07*	00	*03*	00	01	00	05	00	09	00	13	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

10—15036

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

STAR IDENTIFICATION TABLE

Lat. 59°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	79	180	83	180	87	180	89	00	85	00	81	00	77	00	73	00	69	00	65	00	61	00	00
4	79	166	83	160	86	143	88	62	85	19	81	09	77	05	73	03	69	02	65	01	61	00	4
8	78	153	82	144	85	121	86	73	84	34	80	18	77	11	73	07	69	04	65	02	61	01	8
12	77	142	80	131	83	110	84	76	82	44	80	25	76	16	72	10	69	06	65	03	61	01	12
16	76	132	79	121	81	102	82	76	81	50	79	31	76	20	72	13	68	07	65	04	61	01	16
20	74	124	77	113	79	97	80	76	79	54	77	36	75	24	72	15	68	09	65	05	61	01	20
24	72	117	75	107	77	93	78	75	78	56	76	40	74	27	71	18	68	11	64	06	61	02	24
28	70	111	73	102	75	89	76	74	76	57	75	42	73	30	70	20	67	12	64	06	61	02	28
32	68	106	71	97	73	86	74	73	74	58	73	44	72	32	70	22	67	14	64	07	61	02	32
36	66	102	69	93	71	83	72	71	72	58	72	45	71	33	69	23	66	15	64	08	61	02	36
40	64	98	67	90	69	81	70	70	71	58	70	46	70	35	68	25	66	16	63	09	61	03	40
44	62	94	65	86	67	78	68	68	69	58	69	47	68	36	67	26	65	17	63	09	60	03	44
48	60	90	63	83	65	76	66	67	67	57	67	47	67	36	66	26	65	18	63	10	60	03	48
52	58	87	61	81	63	73	64	65	65	56	66	47	66	37	65	27	64	18	62	10	60	03	52
56	56	84	59	78	61	71	62	64	64	55	65	46	65	37	64	28	63	19	62	11	60	03	56
60	54	81	57	75	59	69	61	62	62	54	63	46	63	37	63	28	63	19	62	11	60	03	60
64	52	78	55	72	57	67	59	60	60	53	62	45	62	37	62	28	62	19	61	11	60	04	64
68	50	75	53	70	55	64	57	58	59	52	60	44	61	36	61	28	61	20	61	11	60	04	68
72	48	72	51	67	53	62	55	57	57	50	59	43	60	36	60	28	61	20	60	12	60	04	72
76	46	69	49	65	51	60	54	55	56	49	57	42	59	35	60	28	60	20	60	12	59	04	76
80	44	67	47	63	50	58	52	53	54	47	56	41	57	34	59	27	59	20	60	12	59	04	80
84	42	64	45	60	48	56	50	51	53	46	55	40	56	34	58	27	59	19	59	12	59	04	84
88	40	62	43	58	46	54	49	49	51	44	53	39	55	33	57	26	58	19	59	12	59	04	88
92	39	59	42	55	44	52	47	47	50	43	52	37	54	32	56	25	57	19	58	11	59	04	92
96	37	56	40	53	43	49	46	45	48	41	51	36	53	31	55	25	57	18	58	11	59	04	96
100	35	54	38	51	41	47	44	43	47	39	50	35	52	30	54	24	56	18	57	11	59	04	100
104	34	51	37	48	40	45	43	41	46	38	48	33	51	28	53	23	55	17	57	11	58	04	104
108	32	49	35	46	38	43	42	39	44	36	47	32	50	27	52	22	55	17	57	10	58	04	108
112	31	46	34	43	37	41	40	37	43	34	46	30	49	26	52	21	54	16	56	10	58	04	112
116	29	43	32	41	36	38	39	35	42	32	45	29	48	25	51	20	54	15	56	10	58	03	116
120	28	41	31	39	35	36	38	33	41	30	44	27	47	23	50	19	53	14	56	09	58	03	120
124	26	38	30	36	33	34	37	31	40	28	43	25	47	22	50	18	53	14	55	09	58	03	124
128	25	36	29	34	32	31	36	29	39	26	43	24	46	20	49	17	52	13	55	08	58	03	128
132	24	33	28	31	31	29	35	27	38	25	42	22	45	19	48	16	52	12	55	08	58	03	132
136	23	30	27	29	30	27	34	25	37	23	41	20	44	18	48	15	51	11	54	07	58	03	136
140	22	28	26	26	29	24	33	23	37	21	40	18	44	16	47	13	51	10	54	07	57	02	140
144	21	25	25	23	29	22	32	20	36	19	40	17	43	14	47	12	51	09	54	06	57	02	144
148	20	22	24	21	28	20	32	18	35	17	39	15	43	13	47	11	50	08	54	05	57	02	148
152	19	19	23	18	27	17	31	16	35	15	39	13	42	11	46	09	50	07	54	05	57	02	152
156	19	17	23	16	27	15	30	14	34	12	38	11	42	10	46	08	50	06	53	04	57	02	156
160	18	14	22	13	26	12	30	11	34	10	38	09	42	08	46	07	49	05	53	03	57	01	160
164	18	11	22	11	26	10	30	09	34	08	38	07	41	07	45	05	49	04	53	03	57	01	164
168	17	08	21	08	25	07	29	07	33	06	37	06	41	05	45	04	49	03	53	02	57	01	168
172	17	06	21	05	25	05	29	05	33	04	37	04	41	03	45	03	49	02	53	01	57	01	172
176	17	03	21	03	25	02	29	02	33	02	37	02	41	02	45	01	49	01	53	01	57	00	176
180	17	00	21	00	25	00	29	00	33	00	37	00	41	00	45	00	49	00	53	00	57	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Digitized by Google

ALTITUDE CORRECTION FOR D. R. LATITUDE

Az.		LATITUDE DIFFERENCE (minutes of arc)														Az.		LAT. DIFF. (tenths of minutes of arc)									Az.	
°	°	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	°	°	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	°	°
0	180	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	0	180	0. 1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0	180
1	179	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	1	179										1	179
2	178	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	2	178										2	178
3	177	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	3	177										3	177
4	176	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	4	176										4	176
5	175	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	13.9	14 9	5	175	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	5	175
6	174	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	9.9	10.9	11.9	12.9	13.9	14.9	6	174										6	174
7	173	1.0	2.0	3.0	4.0	5.0	6.0	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	7	173										7	173
8	172	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	8	172										8	172
9	171	1.0	2.0	3.0	4.0	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.8	13.8	14.8	9	171										9	171
10	170	1.0	2.0	3.0	3.9	4.9	5.9	6.9	7.9	8.9	9.8	10.8	11.8	12.8	13.8	14.8	10	170	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	10	170
11	169	1.0	2.0	2.9	3.9	4.9	5.9	6.9	7.9	8.8	9.8	10.8	11.8	12.8	13.7	14.7	11	169										11	169
12	168	1.0	2.0	2.9	3.9	4.9	5.9	6.8	7.8	8.8	9.8	10.8	11.7	12.7	13.7	14.7	12	168										12	168
13	167	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.8	9.7	10.7	11.7	12.6	13.6	14.6	13	167										13	167
14	166	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	10.7	11.6	12.6	13.6	14.6	14	166										14	166
15	165	1.0	1.9	2.9	3.9	4.8	5.8	6.8	7.7	8.7	9.7	10.6	11.6	12.6	13.5	14.5	15	165	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	15	165
16	164	1.0	1.9	2.9	3.8	4.8	5.8	6.7	7.7	8.7	9.6	10.6	11.5	12.5	13.5	14.4	16	164										16	164
17	163	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.7	8.6	9.6	10.5	11.5	12.4	13.4	14.3	17	163										17	163
18	162	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5	11.4	12.4	13.3	14.3	18	162										18	162
19	161	0.9	1.9	2.8	3.8	4.7	5.7	6.6	7.6	8.5	9.5	10.4	11.3	12.3	13.2	14.2	19	161									0.9	19	161
20	160	0.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5	9.4	10.3	11.3	12.2	13.2	14.1	20	160	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	20	160
21	159	0.9	1.9	2.8	3.7	4.7	5.6	6.5	7.5	8.4	9.3	10.3	11.2	12.1	13.1	14.0	21	159							0.7	0.7		21	159
22	158	0.9	1.9	2.8	3.7	4.6	5.6	6.5	7.4	8.3	9.3	10.2	11.1	12.1	13.0	13.9	22	158							0.6			22	158
23	157	0.9	1.8	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	23	157						0.6				23	157
24	156	0.9	1.8	2.7	3.7	4.6	5.5	6.4	7.3	8.2	9.1	10.0	11.0	11.9	12.8	13.7	24	156						0.5				24	156
25	155	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.3	8.2	9.1	10.0	10.9	11.8	12.7	13.6	25	155	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	25	155
26	154	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	26	154					0.4					26	154
27	153	0.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	8.9	9.8	10.7	11.6	12.5	13.4	27	153										27	153
28	152	0.9	1.8	2.6	3.5	4.4	5.3	6.2	7.1	7.9	8.8	9.7	10.6	11.5	12.4	13.2	28	152				0.4						28	152
29	151	0.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.9	8.7	9.6	10.5	11.4	12.2	13.1	29	151				0.3						29	151
30	150	0.9	1.7	2.6	3.5	4.3	5.2	6.1	7.0	7.8	8.7	9.5	10.4	11.3	12.1	13.0	30	150	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	30	150
31	149	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.9	7.7	8.6	9.4	10.3	11.1	12.0	12.9	31	149										31	149
32	148	0.8	1.7	2.5	3.4	4.2	5.1	5.9	6.8	7.6	8.5	9.3	10.2	11.0	11.9	12.7	32	148										32	148
33	147	0.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.5	8.4	9.2	10.1	10.9	11.7	12.6	33	147			0.3						0.8	33	147
34	146	0.8	1.7	2.5	3.3	4.1	5.0	5.8	6.6	7.5	8.3	9.1	9.9	10.8	11.6	12.4	34	146			0.2						0.7	34	146
35	145	0.8	1.6	2.5	3.3	4.1	4.9	5.7	6.6	7.4	8.2	9.0	9.8	10.6	11.5	12.3	35	145	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	35	145
36	144	0.8	1.6	2.4	3.2	4.0	4.9	5.7	6.5	7.3	8.1	8.9	9.7	10.5	11.3	12.1	36	144							0.6			36	144
37	143	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	37	143										37	143
38	142	0.8	1.6	2.4	3.2	3.9	4.7	5.5	6.3	7.1	7.9	8.7	9.5	10.2	11.0	11.8	38	142							0.6			38	142
39	141	0.8	1.6	2.3	3.1	3.9	4.7	5.4	6.2	7.0	7.8	8.5	9.3	10.1	10.9	11.7	39	141							0.5			39	141
40	140	0.8	1.5	2.3	3.1	3.8	4.6	5.4	6.1	6.9	7.7	8.4	9.2	10.0	10.7	11.5	40	140	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	40	140
41	139	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	8.3	9.1	9.8	10.6	11.3	41	139		0.2				0.5				41	139
42	138	0.7	1.5	2.2	3.0	3.7	4.5	5.2	5.9	6.7	7.4	8.2	8.9	9.7	10.4	11.1	42	138		0.1				0.4				42	138
43	137	0.7	1.5	2.2	2.9	3.7	4.4	5.1	5.9	6.6	7.3	8.0	8.8	9.5	10.2	11.0	43	137									0.7	43	137
44	136	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8	44	136									0.6	44	136
45	135	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.7	6.4	7.1	7.8	8.5	9.2	9.9	10.6	45	135	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	45	135
46	134	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	6.9	7.6	8.3	9.0	9.7	10.4	46	134					0.3			0.6		46	134
47	133	0.7	1.4	2.0	2.7	3.4	4.1	4.8	5.5	6.1	6.8	7.5	8.2	8.9	9.5	10.2	47	133								0.5		47	133
48	132	0.7	1.3	2.0	2.7	3.3	4.0	4.7	5.4	6.0	6.7	7.4	8.0	8.7	9.4	10.0	48	132										48	132
49	131	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.6	7.2	7.9	8.5	9.2	9.8	49	131							0.5			49	131
50	130	0.6	1.3	1.9	2.6	3.2	3.9	4.5	5.1	5.8	6.4	7.1	7.7	8.4	9.0	9.6	50	130	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	50	130
51	129	0.6	1.3	1.9	2.5	3.1	3.8	4.4	5.0	5.7	6.3	6.9	7.6	8.2	8.8	9.4	51	129				0.3						51	129
52	128	0.6	1.2	1.8	2.5	3.1	3.7	4.3	4.9	5.5	6.2	6.8	7.4	8.0	8.6	9.2	52	128				0.2					0.6	52	128
53	127	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	53	127									0.5	53	127
54	126	0.6	1.2	1.8	2.4	2.9	3.5	4.1	4.7	5.3	5.9	6.5	7.1	7.6	8.2	8.8	54	126						0.4				54	126
55	125	0.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.2	5.7	6.3	6.9	7.5	8.0	8.6	55	125	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	55	125
56	124	0.6	1.1	1.7	2.2	2.8	3.4	3.9	4.5	5.0	5.6	6.2	6.7	7.3	7.8	8.4	56	124								0.4		56	124
57	123	0.5	1.1	1.6	2.2	2.7	3.3	3.8	4.4	4.9	5.4	6.0	6.5	7.1	7.6	8.2	57	123										57	123
58	122	0.5	1.1	1.6	2.1	2.6	3.2	3.7	4.2	4.8	5.3	5.8	6.4	7.0	7.4	7.9	58	122										58	122
59	121	0.5	1.0	1.5	2.1	2.6	3.1	3.6	4.1	4.6	5.2	5.7	6.2	6.7	7.2	7.7	59	121	0.1								0.5	59	121
60	120	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	60	120	0.0	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4	60	120
61	119	0.5	1.0	1.5	1.9	2.4	2.9	3.4	3.9	4.4	4.8	5.3	5.8	6.3	6.8	7.3	61	119			0.1				0.3			61	119
62	118	0.5	0.9	1.4	1.9	2.3	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.1	6.6	7.0	62	118										62	118
63	117	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.4	5.9	6.4	6.8	63	117										63	117
64	116	0.4	0.9	1.3	1.8	2.2	2.6	3.1	3.5	3.9	4.4	4.8	5.3	5.7	6.1	6.6	64	116								0.4		64	116
65	115	0.4	0.8	1.3	1.7	2.1	2.5	3.0	3.4	3.8	4.2	4.6	5.1	5.5	5.9	6.3	65	115	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	65	115
66	114	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.1	66	114						0.2			0.4	66	114
67	113	0.4	0.8	1.2	1.6	2.0	2.3	2.7	3.1	3.5	3.9	4.3	4.7	5.1	5.5	5.9	67	113				0.2					0.4	67	113
68	112	0.4	0.7	1.1	1.5	1.9	2.2	2.6	3.0	3.4	3.7	4.1	4.5	4.9	5.2	5.6	68	112				0.1					0.3	68	112
69	111	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	3.9	4.3	4.7	5.0	5.4	69	111								0.3		69	111
70	110	0.3	0.7	1.0	1.4	1.7	2.1	2.4	2.7	3.1	3.4	3.8	4.1	4.4	4.8	5.1	70	110	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	70	110
71	109	0.3	0.7	1.0	1.3	1.6	2.0	2.3	2.6	2.9	3.3	3.6	3.9	4.2	4.6	4.9	71	109								0.3		71	109
72	108	0.3	0.6	0.9	1.2	1.5	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3	4.6	72	108					0.2			0.2		72	108
73	107	0.3	0.6	0.9	1.2	1.5	1.8	2.0	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4	73	107					0.1				0.3	73	107
74	106	0.3	0.6	0.8	1.1	1.4	1.7	1.9	2.2	2.5	2.8	3.0	3.3	3.6	3.9	4.1	74	106									0.2	74	106
75	105	0.3	0.5	0.8	1.0	1.3	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.4	3.6	3.9	75	105	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	75	105
76	104	0.2	0.5	0.7	1.0	1.2	1.5	1.7	1.9	2.2	2.4	2.7	2.9	3.1	3.4	3.6	76	104		0.0				0.1				76	104
77	103	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2	2.5	2.7	2.9	3.1	3.4	77	103							0.2			77	103
78	102	0.2	0.4	0.6	0.8	1.0	1.2	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	78	102							0.1			78	102
79	101	0.2	0.4	0.6	0.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	79	101								0.2		79	101
80	100	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.6	1.7	1.9	2.1	2.3	2.4	2.6	80	100	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	80	100
81	99	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.3	1.4	1.6	1.7	1.9	2.0	2.2	2.3	81	99			0.0						0.1	81	99
82	98	0.1	0.3	0.4	0.6	0.7	0.8	1.0	1.1	1.3	1.4	1.5	1.7	1.8	1.9	2.1	82	98				0.1						82	98
83	97	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2	1.3	1.5	1.6	1.7	1.8	83	97				0.0						83	97
84	96	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.4	1.5	1.6	84	96					0.1					84	96
85	95	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.3	85	95	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	85	95
86	94	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.0	86	94						0.0	0.0	0.1	0.1	86	94
87	93	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	87	93								0.0	0.0	87	93
88	92	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	88	92										88	92
89	91	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	89	91										89	91
90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90	90
Az.		1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	Az.		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Az.	

When the D. R. latitude is greater than the chosen tabulated latitude, the correction for ΔL is *minus*, but when the D. R. latitude is less than the tabulated latitude, the correction for ΔL is *plus*, providing the azimuth is greater than 90°. The reverse correction is applied when the azimuth is less than 90°.

16—18086

Digitized by Google

Az.		LATITUDE DIFFERENCE (minutes of arc)															Az.		LAT. DIFF. (tenths of minutes of arc)									Az.	
°	°	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′	°	°	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	°	°
0	180	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	0	180	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0	180
1	179	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	1	179										1	179
2	178	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	2	178										2	178
3	177	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	3	177										3	177
4	176	16.0	17.0	18.0	19.0	20.0	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.9	28.9	29.9	4	176										4	176
5	175	15.9	16.9	17.9	18.9	19.9	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.9	28.9	29.9	5	175	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	5	175
6	174	15.9	16.9	17.9	18.9	19.9	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.8	28.8	29.8	6	174										6	174
7	173	15.9	16.9	17.9	18.9	19.9	20.8	21.8	22.8	23.8	24.8	25.8	26.8	27.8	28.8	29.8	7	173										7	173
8	172	15.8	16.8	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.8	25.7	26.7	27.7	28.7	29.7	8	172										8	172
9	171	15.8	16.8	17.8	18.8	19.8	20.7	21.7	22.7	23.7	24.7	25.7	26.7	27.7	28.6	29.6	9	171										9	171
10	170	15.8	16.7	17.7	18.7	19.7	20.7	21.7	22.7	23.6	24.6	25.6	26.6	27.6	28.6	29.5	10	170	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	10	170
11	169	15.7	16.7	17.7	18.7	19.6	20.6	21.6	22.6	23.6	24.5	25.5	26.5	27.5	28.5	29.4	11	169										11	169
12	168	15.7	16.6	17.6	18.6	19.6	20.5	21.5	22.5	23.5	24.5	25.4	26.4	27.4	28.4	29.3	12	168										12	168
13	167	15.6	16.6	17.5	18.5	19.5	20.5	21.4	22.4	23.4	24.4	25.3	26.3	27.3	28.3	29.2	13	167										13	167
14	166	15.5	16.5	17.5	18.4	19.4	20.4	21.3	22.3	23.3	24.3	25.2	26.2	27.2	28.1	29.1	14	166										14	166
15	165	15.5	16.4	17.4	18.4	19.3	20.3	21.3	22.2	23.2	24.1	25.1	26.1	27.0	28.0	29.0	15	165	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	15	165
16	164	15.4	16.3	17.3	18.3	19.2	20.2	21.1	22.1	23.1	24.0	25.0	26.0	26.9	27.9	28.8	16	164										16	164
17	163	15.3	16.3	17.2	18.2	19.1	20.1	21.0	22.0	23.0	23.9	24.9	25.8	26.8	27.7	28.7	17	163										17	163
18	162	15.2	16.2	17.1	18.1	19.0	20.0	20.9	21.9	22.8	23.8	24.7	25.7	26.6	27.6	28.5	18	162										18	162
19	161	15.1	16.1	17.0	18.0	18.9	19.9	20.8	21.7	22.7	23.6	24.6	25.5	26.5	27.4	28.4	19	161									0.9	19	161
20	160	15.0	16.0	16.9	17.9	18.8	19.7	20.7	21.6	22.6	23.5	24.4	25.4	26.3	27.3	28.2	20	160	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	20	160
21	159	14.9	15.9	16.8	17.7	18.7	19.6	20.5	21.5	22.4	23.3	24.3	25.2	26.1	27.1	28.0	21	159							0.7	0.7		21	159
22	158	14.8	15.8	16.7	17.6	18.5	19.5	20.4	21.3	22.3	23.2	24.1	25.0	26.0	26.9	27.8	22	158							0.6			22	158
23	157	14.7	15.6	16.6	17.5	18.4	19.3	20.3	21.2	22.1	23.0	23.9	24.9	25.8	26.7	27.6	23	157						0.6				23	157
24	156	14.6	15.5	16.4	17.4	18.3	19.2	20.1	21.0	21.9	22.8	23.8	24.7	25.6	26.5	27.4	24	156						0.5				24	156
25	155	14.5	15.4	16.3	17.2	18.1	19.0	19.9	20.8	21.8	22.7	23.6	24.5	25.4	26.3	27.2	25	155	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	25	155
26	154	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	26	154					0.4					26	154
27	153	14.3	15.1	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.3	23.2	24.1	24.9	25.8	26.7	27	153										27	153
28	152	14.1	15.0	15.9	16.8	17.7	18.5	19.4	20.3	21.2	22.1	23.0	23.8	24.7	25.6	26.5	28	152				0.4						28	152
29	151	14.0	14.9	15.7	16.6	17.5	18.4	19.2	20.1	21.0	21.9	22.7	23.6	24.5	25.4	26.2	29	151				0.3						29	151
30	150	13.9	14.7	15.6	16.5	17.3	18.2	19.1	19.9	20.8	21.7	22.5	23.4	24.2	25.1	26.0	30	150	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	30	150
31	149	13.7	14.6	15.4	16.3	17.1	18.0	18.9	19.7	20.6	21.4	22.3	23.1	24.0	24.9	25.7	31	149										31	149
32	148	13.6	14.4	15.3	16.1	17.0	17.8	18.7	19.5	20.4	21.2	22.0	22.9	23.7	24.6	25.4	32	148										32	148
33	147	13.4	14.3	15.1	15.9	16.8	17.6	18.5	19.3	20.1	21.0	21.8	22.6	23.5	24.3	25.2	33	147				0.3					0.8	33	147
34	146	13.3	14.1	14.9	15.8	16.6	17.4	18.2	19.1	19.9	20.7	21.6	22.4	23.2	24.0	24.9	34	146				0.2					0.7	34	146
35	145	13.1	13.9	14.7	15.6	16.4	17.2	18.0	18.8	19.7	20.5	21.3	22.1	22.9	23.8	24.6	35	145	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	35	145
36	144	12.9	13.8	14.6	15.4	16.2	17.0	17.8	18.6	19.4	20.2	21.0	21.8	22.7	23.5	24.3	36	144								0.6		36	144
37	143	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2	24.0	37	143										37	143
38	142	12.6	13.4	14.2	15.0	15.8	16.5	17.3	18.1	18.9	19.7	20.5	21.3	22.1	22.9	23.6	38	142							0.6			38	142
39	141	12.4	13.2	14.0	14.8	15.5	16.3	17.1	17.9	18.7	19.4	20.2	21.0	21.8	22.5	23.3	39	141							0.5			39	141
40	140	12.3	13.0	13.8	14.6	15.3	16.1	16.9	17.6	18.4	19.2	19.9	20.7	21.4	22.2	23.0	40	140	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	40	140
41	139	12.1	12.8	13.6	14.3	15.1	15.8	16.6	17.4	18.1	18.9	19.6	20.4	21.1	21.9	22.6	41	139		0.2				0.5				41	139
42	138	11.9	12.6	13.4	14.1	14.9	15.6	16.3	17.1	17.8	18.6	19.3	20.1	20.8	21.6	22.3	42	138		0.1				0.4				42	138
43	137	11.7	12.4	13.2	13.9	14.6	15.4	16.1	16.8	17.6	18.3	19.0	19.7	20.5	21.2	21.9	43	137									0.7	43	137
44	136	11.5	12.2	13.0	13.7	14.4	15.1	15.8	16.5	17.3	18.0	18.7	19.4	20.1	20.9	21.6	44	136									0.6	44	136
45	135	11.3	12.0	12.7	13.4	14.1	14.8	15.6	16.3	17.0	17.7	18.4	19.1	19.8	20.5	21.2	45	135	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	45	135
46	134	11.1	11.8	12.5	13.2	13.9	14.6	15.3	16.0	16.7	17.4	18.1	18.8	19.5	20.1	20.8	46	134					0.3			0.6		46	134
47	133	10.9	11.6	12.3	13.0	13.6	14.3	15.0	15.7	16.4	17.1	17.7	18.4	19.1	19.8	20.5	47	133								0.5		47	133
48	132	10.7	11.4	12.0	12.7	13.4	14.1	14.7	15.4	16.1	16.7	17.4	18.1	18.7	19.4	20.1	48	132										48	132
49	131	10.5	11.2	11.8	12.5	13.1	13.8	14.4	15.1	15.7	16.4	17.1	17.7	18.4	19.0	19.7	49	131							0.5			49	131
50	130	10.3	10.9	11.6	12.2	12.9	13.5	14.1	14.8	15.4	16.1	16.7	17.4	18.0	18.6	19.3	50	130	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	50	130
51	129	10.1	10.7	11.3	12.0	12.6	13.2	13.8	14.5	15.1	15.7	16.4	17.0	17.6	18.3	18.9	51	129				0.3					0.6	51	129
52	128	9.9	10.5	11.1	11.7	12.3	12.9	13.5	14.2	14.8	15.4	16.0	16.6	17.2	17.9	18.5	52	128				0.2					0.6	52	128
53	127	9.6	10.2	10.8	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.6	16.2	16.9	17.5	18.1	53	127									0.5	53	127
54	126	9.4	10.0	10.6	11.2	11.8	12.3	12.9	13.5	14.1	14.7	15.3	15.9	16.5	17.0	17.6	54	126						0.4				54	126
55	125	9.2	9.8	10.3	10.9	11.5	12.0	12.6	13.2	13.8	14.3	14.9	15.5	16.1	16.6	17.2	55	125	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	55	125
56	124	8.9	9.5	10.1	10.6	11.2	11.7	12.3	12.9	13.4	14.0	14.5	15.1	15.7	16.2	16.8	56	124								0.4		56	124
57	123	8.7	9.3	9.8	10.3	10.9	11.4	12.0	12.5	13.1	13.6	14.2	14.7	15.2	15.8	16.3	57	123										57	123
58	122	8.5	9.0	9.5	10.1	10.6	11.1	11.7	12.2	12.7	13.2	13.8	14.3	14.8	15.4	15.9	58	122										58	122
59	121	8.2	8.8	9.3	9.8	10.3	10.8	11.3	11.8	12.4	12.9	13.4	13.9	14.4	14.9	15.5	59	121	0.1				0.3				0.5	59	121
60	120	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	60	120	0.0	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4	60	120
61	119	7.8	8.2	8.7	9.2	9.7	10.2	10.7	11.2	11.6	12.1	12.6	13.1	13.6	14.1	14.5	61	119				0.1			0.3			61	119
62	118	7.5	8.0	8.5	8.9	9.4	9.9	10.3	10.8	11.3	11.7	12.2	12.7	13.1	13.6	14.1	62	118										62	118
63	117	7.3	7.7	8.2	8.6	9.1	9.5	10.0	10.4	10.9	11.3	11.8	12.3	12.7	13.2	13.6	63	117										63	117
64	116	7.0	7.5	7.9	8.3	8.8	9.2	9.6	10.1	10.5	11.0	11.4	11.8	12.3	12.7	13.2	64	116								0.4		64	116
65	115	6.8	7.2	7.6	8.0	8.5	8.9	9.3	9.7	10.1	10.6	11.0	11.4	11.8	12.3	12.7	65	115	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	65	115
66	114	6.5	6.9	7.3	7.7	8.1	8.5	8.9	9.4	9.8	10.2	10.6	11.0	11.4	11.8	12.2	66	114						0.2				66	114
67	113	6.3	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.2	10.5	10.9	11.3	11.7	67	113				0.2					0.4	67	113
68	112	6.0	6.4	6.7	7.1	7.5	7.9	8.2	8.6	9.0	9.4	9.7	10.1	10.5	10.9	11.2	68	112				0.1					0.3	68	112
69	111	5.7	6.1	6.5	6.8	7.2	7.5	7.9	8.2	8.6	9.0	9.3	9.7	10.0	10.4	10.8	69	111							0.3			69	111
70	110	5.5	5.8	6.2	6.5	6.8	7.2	7.5	7.9	8.2	8.6	9.0	9.2	9.6	9.9	10.3	70	110	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	70	110
71	109	5.2	5.5	5.9	6.2	6.5	6.8	7.2	7.5	7.8	8.1	8.5	8.8	9.1	9.4	9.8	71	109								0.3		71	109
72	108	4.9	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.7	8.0	8.3	8.7	9.0	9.3	72	108					0.2			0.2		72	108
73	107	4.7	5.0	5.3	5.6	5.8	6.1	6.4	6.7	7.0	7.3	7.6	7.9	8.2	8.5	8.8	73	107					0.1				0.3	73	107
74	106	4.4	4.7	5.0	5.2	5.5	5.8	6.1	6.3	6.6	6.9	7.2	7.4	7.7	8.0	8.3	74	106									0.2	74	106
75	105	4.1	4.4	4.7	4.9	5.2	5.4	5.7	6.0	6.2	6.5	6.7	7.0	7.2	7.5	7.8	75	105	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	75	105
76	104	3.9	4.1	4.4	4.6	4.8	5.1	5.3	5.6	5.8	6.0	6.3	6.5	6.8	7.0	7.3	76	104			0.0			0.1				76	104
77	103	3.6	3.8	4.0	4.3	4.5	4.7	5.0	5.2	5.4	5.6	5.8	6.1	6.3	6.5	6.7	77	103							0.2			77	103
78	102	3.3	3.5	3.7	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2	78	102							0.1			78	102
79	101	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.3	5.5	5.7	79	101								0.2		79	101
80	100	2.8	3.0	3.1	3.3	3.5	3.6	3.8	4.0	4.2	4.3	4.5	4.7	4.9	5.0	5.2	80	100	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	80	100
81	99	2.5	2.7	2.8	3.0	3.1	3.3	3.4	3.6	3.8	3.9	4.1	4.2	4.4	4.5	4.7	81	99			0.0						0.1	81	99
82	98	2.2	2.4	2.5	2.6	2.8	2.9	3.1	3.2	3.3	3.5	3.6	3.8	3.9	4.0	4.2	82	98				0.1						82	98
83	97	1.9	2.1	2.2	2.3	2.4	2.6	2.7	2.8	2.9	3.0	3.2	3.3	3.4	3.5	3.7	83	97				0.0						83	97
84	96	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	84	96					0.1					84	96
85	95	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.4	2.5	2.6	85	95	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	85	95
86	94	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.0	2.1	86	94						0.0	0.0	0.1	0.1	86	94
87	93	0.8	0.9	0.9	1.0	1.0	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.7	87	93								0.0	0.0	87	93
88	92	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	88	92										88	92
89	91	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	89	91										89	91
90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90	90
Az.		16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′	Az.		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Az.	

When the D. R. latitude is greater than the chosen tabulated latitude, the correction for ΔL is *minus*, but when the D. R. latitude is less than the tabulated latitude, the correction for ΔL is plus, providing the azimuth is greater than 90°. The reverse correction is applied when the azimuth is less than 90°.

16—15936

Digitized by Google

MULTIPLICATION TABLE

Δ	DEC. DIFF. OR H. A. DIFF. (minutes of arc)															DEC. DIFF. OR H. A. DIFF. (tenths of minutes)										Δ
	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	
01	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	01
2	.0	.0	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2	.3	.3	.3	2										2
3	.0	.1	.1	.1	.2	.2	.2	.2	.3	.3	.3	.4	.4	.4	.5	3										3
4	.0	.1	.1	.2	.2	.2	.3	.3	.4	.4	.4	.5	.5	.6	.6	4										4
05	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	05
6	.1	.1	.2	.2	.3	.4	.4	.5	.5	.6	.7	.7	.8	.8	.9	6								0.0	0.1	6
7	.1	.1	.2	.3	.4	.4	.5	.6	.6	.7	.8	.8	.9	1.0	1.1	7							0.0	0.1		7
8	.1	.2	.2	.3	.4	.5	.6	.6	.7	.8	.9	1.0	1.0	1.1	1.2	8						0.0	0.1			8
9	.1	.2	.3	.4	.5	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	9					0.0	0.1				9
10	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	10	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	10
1	.1	.2	.3	.4	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	1.7	1										1
2	.1	.2	.4	.5	.6	.7	.8	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	2				0.0						2
3	.1	.3	.4	.5	.7	.8	.9	1.0	1.2	1.3	1.4	1.6	1.7	1.8	2.0	3				0.1						3
4	.1	.3	.4	.6	.7	.8	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.1	4										4
15	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1	2.3	15	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	15
6	.2	.3	.5	.6	.8	1.0	1.1	1.3	1.4	1.6	1.8	1.9	2.1	2.2	2.4	6				0.0					0.1	6
7	.2	.3	.5	.7	.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	2.2	2.4	2.6	7				0.1					0.2	7
8	.2	.4	.5	.7	.9	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.3	2.5	2.7	8								0.1		8
9	.2	.4	.6	.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	9								0.2		9
20	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	20	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	20
1	.2	.4	.6	.8	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.2	1							0.1			1
2	.2	.4	.7	.9	1.1	1.3	1.5	1.8	2.0	2.2	2.4	2.6	2.9	3.1	3.3	2							0.2			2
3	.2	.5	.7	.9	1.2	1.4	1.6	1.8	2.1	2.3	2.5	2.8	3.0	3.2	3.5	3										3
4	.2	.5	.7	1.0	1.2	1.4	1.7	1.9	2.2	2.4	2.6	2.9	3.1	3.4	3.6	4			0.0			0.1				4
25	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	25	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	25
6	.3	.5	.8	1.0	1.3	1.6	1.8	2.1	2.3	2.6	2.9	3.1	3.4	3.6	3.9	6									0.2	6
7	.3	.5	.8	1.1	1.4	1.6	1.9	2.2	2.4	2.7	3.0	3.2	3.5	3.8	4.1	7									0.3	7
8	.3	.6	.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.6	3.9	4.2	8										8
9	.3	.6	.9	1.2	1.5	1.7	2.0	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4	9					0.1					9
30	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	30	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	30
1	.3	.6	.9	1.2	1.6	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3	4.7	1								0.2		1
2	.3	.6	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	3.5	3.8	4.2	4.5	4.8	2								0.3		2
3	.3	.7	1.0	1.3	1.7	2.0	2.3	2.6	3.0	3.3	3.6	4.0	4.3	4.6	5.0	3										3
4	.3	.7	1.0	1.4	1.7	2.0	2.4	2.7	3.1	3.4	3.7	4.1	4.4	4.8	5.1	4										4
35	0.4	0.7	1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	3.9	4.2	4.6	4.9	5.3	35	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	35
6	.4	.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0	4.3	4.7	5.0	5.4	6							0.3			6
7	.4	.7	1.1	1.5	1.9	2.2	2.6	3.0	3.3	3.7	4.1	4.4	4.8	5.2	5.6	7				0.1						7
8	.4	.8	1.1	1.5	1.9	2.3	2.7	3.0	3.4	3.8	4.2	4.6	4.9	5.3	5.7	8				0.2					0.3	8
9	.4	.8	1.2	1.6	2.0	2.3	2.7	3.1	3.5	3.9	4.3	4.7	5.1	5.5	5.9	9									0.4	9
40	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.0	40	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	40
1	.4	.8	1.2	1.6	2.1	2.5	2.9	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.2	1						0.2				1
2	.4	.8	1.3	1.7	2.1	2.5	2.9	3.4	3.8	4.2	4.6	5.0	5.5	5.9	6.3	2						0.3				2
3	.4	.9	1.3	1.7	2.2	2.6	3.0	3.4	3.9	4.3	4.8	5.2	5.6	6.0	6.5	3								0.3		3
4	.4	.9	1.3	1.8	2.2	2.6	3.1	3.5	4.0	4.4	4.8	5.3	5.7	6.2	6.6	4								0.4		4
45	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.4	5.9	6.3	6.8	45	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	45
6	.5	.9	1.4	1.8	2.3	2.8	3.2	3.7	4.1	4.6	5.1	5.5	6.0	6.4	6.9	6										6
7	.5	.9	1.4	1.9	2.4	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.1	6.6	7.1	7										7
8	.5	1.0	1.4	1.9	2.4	2.9	3.4	3.8	4.3	4.8	5.3	5.8	6.2	6.7	7.2	8										8
9	.5	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4	4.9	5.4	5.9	6.4	6.9	7.4	9	0.0		0.1		0.2		0.3		0.4	9
50	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	50	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	50
1	.5	1.0	1.5	2.0	2.6	3.1	3.6	4.1	4.6	5.1	5.6	6.1	6.6	7.1	7.7	1										1
2	.5	1.0	1.6	2.1	2.6	3.1	3.6	4.2	4.7	5.2	5.7	6.2	6.8	7.3	7.8	2										2
3	.5	1.1	1.6	2.1	2.7	3.2	3.7	4.2	4.8	5.3	5.8	6.4	6.9	7.4	8.0	3										3
4	.5	1.1	1.6	2.2	2.7	3.2	3.8	4.3	4.9	5.4	5.9	6.5	7.0	7.6	8.1	4										4
55	0.6	1.1	1.7	2.2	2.8	3.3	3.9	4.4	5.0	5.5	6.1	6.6	7.2	7.7	8.3	55	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	55
6	.6	1.1	1.7	2.2	2.8	3.4	3.9	4.5	5.0	5.6	6.2	6.7	7.3	7.8	8.4	6								0.4		6
7	.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.1	5.7	6.3	6.8	7.4	8.0	8.6	7								0.5		7
8	.6	1.2	1.7	2.3	2.9	3.5	4.1	4.6	5.2	5.8	6.4	7.0	7.5	8.1	8.7	8						0.3				8
9	.6	1.2	1.8	2.4	3.0	3.5	4.1	4.7	5.3	5.9	6.5	7.1	7.7	8.3	8.9	9						0.4				9
60	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	60	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	60
1	.6	1.2	1.8	2.4	3.1	3.7	4.3	4.9	5.5	6.1	6.7	7.3	7.9	8.5	9.2	1									0.5	1
2	.6	1.2	1.9	2.5	3.1	3.7	4.3	5.0	5.6	6.2	6.8	7.4	8.1	8.7	9.3	2				0.2					0.6	2
3	.6	1.3	1.9	2.5	3.2	3.8	4.4	5.0	5.7	6.3	6.9	7.6	8.2	8.8	9.5	3				0.3						3
4	.6	1.3	1.9	2.6	3.2	3.8	4.5	5.1	5.8	6.4	7.0	7.7	8.3	9.0	9.6	4							0.4			4
65	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.5	7.2	7.8	8.5	9.1	9.8	65	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	65
6	.7	1.3	2.0	2.6	3.3	4.0	4.6	5.3	5.9	6.6	7.3	7.9	8.6	9.2	9.9	6										6
7	.7	1.3	2.0	2.7	3.4	4.0	4.7	5.4	6.0	6.7	7.4	8.0	8.7	9.4	10.1	7								0.5		7
8	.7	1.4	2.0	2.7	3.4	4.1	4.8	5.4	6.1	6.8	7.5	8.2	8.8	9.5	10.2	8								0.6		8
9	.7	1.4	2.1	2.8	3.5	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0	9.7	10.4	9					0.3					9
70	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5	70	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	70
1	.7	1.4	2.1	2.8	3.6	4.3	5.0	5.7	6.4	7.1	7.8	8.5	9.2	9.9	10.7	1									0.6	1
2	.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8	2									0.7	2
3	.7	1.5	2.2	2.9	3.7	4.4	5.1	5.8	6.6	7.3	8.0	8.8	9.5	10.2	11.0	3										3
4	.7	1.5	2.2	3.0	3.7	4.4	5.2	5.9	6.7	7.4	8.1	8.9	9.6	10.4	11.1	4			0.1			0.4				4
75	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	8.3	9.0	9.8	10.5	11.3	75	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	75
6	.8	1.5	2.3	3.0	3.8	4.6	5.3	6.1	6.8	7.6	8.4	9.1	9.9	10.6	11.4	6										6
7	.8	1.5	2.3	3.1	3.9	4.6	5.4	6.2	6.9	7.7	8.5	9.2	10.0	10.8	11.6	7										7
8	.8	1.6	2.3	3.1	3.9	4.7	5.5	6.2	7.0	7.8	8.6	9.4	10.1	10.9	11.7	8							0.5			8
9	.8	1.6	2.4	3.2	4.0	4.7	5.5	6.3	7.1	7.9	8.7	9.5	10.3	11.1	11.9	9							0.6			9
80	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	80	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	80
1	.8	1.6	2.4	3.2	4.1	4.9	5.7	6.5	7.3	8.1	8.9	9.7	10.5	11.3	12.2	1								0.6		1
2	.8	1.6	2.5	3.3	4.1	4.9	5.7	6.6	7.4	8.2	9.0	9.8	10.7	11.5	12.3	2								0.7		2
3	.8	1.7	2.5	3.3	4.2	5.0	5.8	6.6	7.5	8.3	9.1	10.0	10.8	11.6	12.5	3				0.2					0.7	3
4	.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.6	8.4	9.2	10.1	10.9	11.8	12.6	4				0.3					0.8	4
85	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.5	9.4	10.2	11.1	11.9	12.8	85	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	85
6	.9	1.7	2.6	3.4	4.3	5.2	6.0	6.9	7.7	8.6	9.5	10.3	11.2	12.0	12.9	6										6
7	.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.8	8.7	9.6	10.4	11.3	12.2	13.1	7				0.3						7
8	.9	1.8	2.6	3.5	4.4	5.3	6.2	7.0	7.9	8.8	9.7	10.6	11.4	12.3	13.2	8				0.4						8
9	.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	8.9	9.8	10.7	11.6	12.5	13.4	9					0.4					9
90	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	90	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	90
1	.9	1.8	2.7	3.6	4.6	5.5	6.4	7.3	8.2	9.1	10.0	10.9	11.8	12.7	13.7	1						0.5				1
2	.9	1.8	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	2						0.6	0.6			2
3	.9	1.9	2.8	3.7	4.7	5.6	6.5	7.4	8.4	9.3	10.2	11.2	12.1	13.0	14.0	3							0.7	0.7		3
4	.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5	9.4	10.3	11.3	12.2	13.2	14.1	4								0.8	0.8	4
95	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5	11.4	12.4	13.3	14.3	95	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	95
6	1.0	1.9	2.9	3.8	4.8	5.8	6.7	7.7	8.6	9.6	10.6	11.5	12.5	13.4	14.4	6										6
7	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	10.7	11.6	12.6	13.6	14.6	7										7
8	1.0	2.0	2.9	3.9	4.9	5.9	6.9	7.8	8.8	9.8	10.8	11.8	12.7	13.7	14.7	8										8
99	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	99										99
Δ	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	Δ	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Δ

Δd or Δt

16—15636

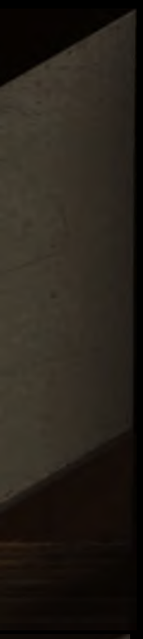
Digitized by Google

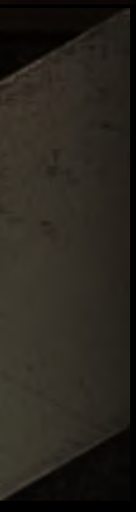
MULTIPLICATION TABLE

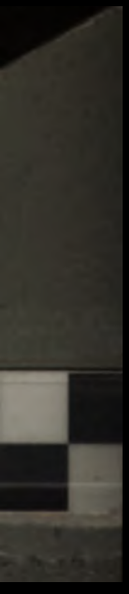
Δ	DEC. DIFF. OR H. A. DIFF. (minutes of arc)															Δ	DEC. DIFF. OR H. A. DIFF. (tenths of minutes)									Δ
	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	
01	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	01
2	.3	.3	.4	.4	.4	.4	.4	.5	.5	.5	.5	.5	.6	.6	.6	2										2
3	.5	.5	.5	.6	.6	.6	.7	.7	.7	.8	.8	.8	.8	.9	.9	3										3
4	.6	.7	.7	.8	.8	.8	.9	.9	1.0	1.0	1.0	1.1	1.1	1.2	1.2	4										4
05	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.5	05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	05
6	1.0	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.7	1.8	6								0.0	0.1	6
7	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.1	7					0.0		0.0	0.1		7
8	1.3	1.4	1.4	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4	8					0.1	0.0				8
9	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.6	2.7	9						0.1				9
10	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	10	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	10
1	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.3	1										1
2	1.9	2.0	2.2	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.4	3.5	3.6	2				0.0						2
3	2.1	2.2	2.3	2.5	2.6	2.7	2.9	3.0	3.1	3.3	3.4	3.5	3.6	3.8	3.9	3				0.1						3
4	2.2	2.4	2.5	2.7	2.8	2.9	3.1	3.2	3.4	3.5	3.6	3.8	3.9	4.1	4.2	4										4
15	2.4	2.6	2.7	2.9	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	4.5	15	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	15
6	2.6	2.7	2.9	3.0	3.2	3.4	3.5	3.7	3.8	4.0	4.2	4.3	4.5	4.6	4.8	6			0.0						0.1	6
7	2.7	2.9	3.1	3.2	3.4	3.6	3.7	3.9	4.1	4.3	4.4	4.6	4.8	4.9	5.1	7			0.1						0.2	7
8	2.9	3.1	3.2	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.0	5.2	5.4	8							0.1			8
9	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.9	5.1	5.3	5.5	5.7	9							0.2			9
20	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	20	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	20
1	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.3	5.5	5.7	5.9	6.1	6.3	1							0.1			1
2	3.5	3.7	4.0	4.2	4.4	4.6	4.8	5.1	5.3	5.5	5.7	5.9	6.2	6.4	6.6	2							0.2			2
3	3.7	3.9	4.1	4.4	4.6	4.8	5.1	5.3	5.5	5.8	6.0	6.2	6.4	6.7	6.9	3										3
4	3.8	4.1	4.3	4.6	4.8	5.0	5.3	5.5	5.8	6.0	6.2	6.5	6.7	7.0	7.2	4						0.1				4
25	4.0	4.3	4.5	4.8	5.0	5.3	5.5	5.8	6.0	6.3	6.5	6.8	7.0	7.3	7.5	25	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	25
6	4.2	4.4	4.7	4.9	5.2	5.5	5.7	6.0	6.2	6.5	6.8	7.0	7.3	7.5	7.8	6										6
7	4.3	4.6	4.9	5.1	5.4	5.7	5.9	6.2	6.5	6.8	7.0	7.3	7.6	7.8	8.1	7								0.2		7
8	4.5	4.8	5.0	5.3	5.6	5.9	6.2	6.4	6.7	7.0	7.3	7.6	7.8	8.1	8.4	8								0.3		8
9	4.6	4.9	5.2	5.5	5.8	6.1	6.4	6.7	7.0	7.3	7.5	7.8	8.1	8.4	8.7	9							0.1			9
30	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1	8.4	8.7	9.0	30	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	30
1	5.0	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.8	8.1	8.4	8.7	9.0	9.3	1								0.2		1
2	5.1	5.4	5.8	6.1	6.4	6.7	7.0	7.4	7.7	8.0	8.3	8.6	9.0	9.3	9.6	2								0.3		2
3	5.3	5.6	5.9	6.3	6.6	6.9	7.3	7.6	7.9	8.3	8.6	8.9	9.2	9.6	9.9	3										3
4	5.4	5.8	6.1	6.5	6.8	7.1	7.5	7.8	8.2	8.5	8.8	9.2	9.5	9.9	10.2	4										4
35	5.6	6.0	6.3	6.7	7.0	7.4	7.7	8.1	8.4	8.8	9.1	9.5	9.8	10.2	10.5	35	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	35
6	5.8	6.1	6.5	6.8	7.2	7.6	7.9	8.3	8.6	9.0	9.4	9.7	10.1	10.4	10.8	6							0.3			6
7	5.9	6.3	6.7	7.0	7.4	7.8	8.1	8.5	8.9	9.3	9.6	10.0	10.4	10.7	11.1	7				0.1						7
8	6.1	6.5	6.8	7.2	7.6	8.0	8.4	8.7	9.1	9.5	9.9	10.3	10.6	11.0	11.4	8				0.2					0.3	8
9	6.2	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.1	10.5	10.9	11.3	11.7	9									0.4	9
40	6.4	6.8	7.2	7.6	8.0	8.4	8.8	9.2	9.6	10.0	10.4	10.8	11.2	11.6	12.0	40	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	40
1	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.3	10.7	11.1	11.5	11.9	12.3	1						0.2				1
2	6.7	7.1	7.6	8.0	8.4	8.8	9.2	9.7	10.1	10.5	10.9	11.3	11.8	12.2	12.6	2						0.3				2
3	6.9	7.3	7.7	8.2	8.6	9.0	9.5	9.9	10.3	10.8	11.2	11.6	12.0	12.5	12.9	3								0.3		3
4	7.0	7.5	7.9	8.4	8.8	9.2	9.7	10.1	10.6	11.0	11.4	11.9	12.3	12.8	13.2	4								0.4		4
45	7.2	7.7	8.1	8.6	9.0	9.5	9.9	10.4	10.8	11.3	11.7	12.2	12.6	13.1	13.5	45	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	45
6	7.4	7.8	8.3	8.7	9.2	9.7	10.1	10.6	11.0	11.5	12.0	12.4	12.9	13.3	13.8	6										6
7	7.5	8.0	8.5	8.9	9.4	9.9	10.3	10.8	11.3	11.8	12.2	12.7	13.2	13.6	14.1	7										7
8	7.7	8.2	8.6	9.1	9.6	10.1	10.6	11.0	11.5	12.0	12.5	13.0	13.4	13.9	14.4	8										8
9	7.8	8.3	8.8	9.3	9.8	10.3	10.8	11.3	11.8	12.3	12.7	13.2	13.7	14.2	14.7	9				0.1		0.2			0.4	9
50	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	50	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	50
1	8.2	8.7	9.2	9.7	10.2	10.7	11.2	11.7	12.2	12.8	13.3	13.8	14.3	14.8	15.3	1										1
2	8.3	8.8	9.4	9.9	10.4	10.9	11.4	12.0	12.5	13.0	13.5	14.0	14.6	15.1	15.6	2										2
3	8.5	9.0	9.5	10.1	10.6	11.1	11.7	12.2	12.7	13.3	13.8	14.3	14.8	15.4	15.9	3										3
4	8.6	9.2	9.7	10.3	10.8	11.3	11.9	12.4	13.0	13.5	14.0	14.6	15.1	15.7	16.2	4										4
55	8.8	9.4	9.9	10.5	11.0	11.6	12.1	12.7	13.2	13.8	14.3	14.9	15.4	16.0	16.5	55	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	55
6	9.0	9.5	10.1	10.6	11.2	11.8	12.3	12.9	13.4	14.0	14.6	15.1	15.7	16.2	16.8	6								0.4		6
7	9.1	9.7	10.3	10.8	11.4	12.0	12.5	13.1	13.7	14.3	14.8	15.4	16.0	16.5	17.1	7								0.5		7
8	9.3	9.9	10.4	11.0	11.6	12.2	12.8	13.3	13.9	14.5	15.1	15.7	16.2	16.8	17.4	8						0.3				8
9	9.4	10.0	10.6	11.2	11.8	12.4	13.0	13.6	14.2	14.8	15.3	15.9	16.5	17.1	17.7	9						0.4				9
60	9.6	10.2	10.8	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.6	16.2	16.8	17.4	18.0	60	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	60
1	9.8	10.4	11.0	11.6	12.2	12.8	13.4	14.0	14.6	15.3	15.9	16.5	17.1	17.7	18.3	1									0.5	1
2	9.9	10.5	11.2	11.8	12.4	13.0	13.6	14.3	14.9	15.5	16.1	16.7	17.4	18.0	18.6	2				0.2					0.6	2
3	10.1	10.7	11.3	12.0	12.6	13.2	13.9	14.5	15.1	15.8	16.4	17.0	17.6	18.3	18.9	3				0.3						3
4	10.2	10.9	11.5	12.2	12.8	13.4	14.1	14.7	15.4	16.0	16.6	17.3	17.9	18.6	19.2	4							0.4			4
65	10.4	11.1	11.7	12.4	13.0	13.7	14.3	15.0	15.6	16.3	16.9	17.6	18.2	18.9	19.5	65	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	65
6	10.6	11.2	11.9	12.5	13.2	13.9	14.5	15.2	15.8	16.5	17.2	17.8	18.5	19.1	19.8	6										6
7	10.7	11.4	12.1	12.7	13.4	14.1	14.7	15.4	16.1	16.8	17.4	18.1	18.8	19.4	20.1	7										7
8	10.9	11.6	12.2	12.9	13.6	14.3	15.0	15.6	16.3	17.0	17.7	18.4	19.0	19.7	20.4	8								0.5		8
9	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6	17.3	17.9	18.6	19.3	20.0	20.7	9						0.3		0.6		9
70	11.2	11.9	12.6	13.3	14.0	14.7	15.4	16.1	16.8	17.5	18.2	18.9	19.6	20.3	21.0	70	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	70
1	11.4	12.1	12.8	13.5	14.2	14.9	15.6	16.3	17.0	17.8	18.5	19.2	19.9	20.6	21.3	1									0.6	1
2	11.5	12.2	13.0	13.7	14.4	15.1	15.8	16.6	17.3	18.0	18.7	19.4	20.2	20.9	21.6	2									0.7	2
3	11.7	12.4	13.1	13.9	14.6	15.3	16.1	16.8	17.5	18.3	19.0	19.7	20.4	21.2	21.9	3										3
4	11.8	12.6	13.3	14.1	14.8	15.5	16.3	17.0	17.8	18.5	19.2	20.0	20.7	21.5	22.2	4				0.1		0.4				4
75	12.0	12.8	13.5	14.3	15.0	15.8	16.5	17.3	18.0	18.8	19.5	20.3	21.0	21.8	22.5	75	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	75
6	12.2	12.9	13.7	14.4	15.2	16.0	16.7	17.5	18.2	19.0	19.8	20.5	21.3	22.0	22.8	6										6
7	12.3	13.1	13.9	14.6	15.4	16.2	16.9	17.7	18.5	19.3	20.0	20.8	21.6	22.3	23.1	7										7
8	12.5	13.3	14.0	14.8	15.6	16.4	17.2	17.9	18.7	19.5	20.3	21.1	21.8	22.6	23.4	8							0.5			8
9	12.6	13.4	14.2	15.0	15.8	16.6	17.4	18.2	19.0	19.8	20.5	21.3	22.1	22.9	23.7	9							0.6			9
80	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2	24.0	80	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	80
1	13.0	13.8	14.6	15.4	16.2	17.0	17.8	18.6	19.4	20.3	21.1	21.9	22.7	23.5	24.3	1								0.6		1
2	13.1	13.9	14.8	15.6	16.4	17.2	18.0	18.9	19.7	20.5	21.3	22.1	23.0	23.8	24.6	2								0.7		2
3	13.3	14.1	14.9	15.8	16.6	17.4	18.3	19.1	19.9	20.8	21.6	22.4	23.2	24.1	24.9	3				0.2						3
4	13.4	14.3	15.1	16.0	16.8	17.6	18.5	19.3	20.2	21.0	21.8	22.7	23.5	24.4	25.2	4				0.3					0.7	4
85	13.6	14.5	15.3	16.2	17.0	17.9	18.7	19.6	20.4	21.3	22.1	23.0	23.8	24.7	25.5	85	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	85
6	13.8	14.6	15.5	16.3	17.2	18.1	18.9	19.8	20.6	21.5	22.4	23.2	24.1	24.9	25.8	6										6
7	13.9	14.8	15.7	16.5	17.4	18.3	19.1	20.0	20.9	21.8	22.6	23.5	24.4	25.2	26.1	7				0.3						7
8	14.1	15.0	15.8	16.7	17.6	18.5	19.4	20.2	21.1	22.0	22.9	23.8	24.6	25.5	26.4	8				0.4						8
9	14.2	15.1	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.3	23.1	24.0	24.9	25.8	26.7	9					0.4					9
90	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	90	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	90
1	14.6	15.5	16.4	17.3	18.2	19.1	20.0	20.9	21.8	22.8	23.7	24.6	25.5	26.4	27.3	1						0.5				1
2	14.7	15.6	16.6	17.5	18.4	19.3	20.2	21.2	22.1	23.0	23.9	24.8	25.8	26.7	27.6	2						0.6	0.6			2
3	14.9	15.8	16.7	17.7	18.6	19.5	20.5	21.4	22.3	23.3	24.2	25.1	26.0	27.0	27.9	3							0.7	0.7		3
4	15.0	16.0	16.9	17.9	18.8	19.7	20.7	21.6	22.6	23.5	24.4	25.4	26.3	27.3	28.2	4								0.8	0.8	4
95	15.2	16.2	17.1	18.1	19.0	20.0	20.9	21.9	22.8	23.8	24.7	25.7	26.6	27.6	28.5	95	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	95
6	15.4	16.3	17.3	18.2	19.2	20.2	21.1	22.1	23.0	24.0	25.0	25.9	26.9	27.8	28.8	6										6
7	15.5	16.5	17.5	18.4	19.4	20.4	21.3	22.3	23.3	24.3	25.2	26.2	27.2	28.1	29.1	7										7
8	15.7	16.7	17.6	18.6	19.6	20.6	21.6	22.5	23.5	24.5	25.5	26.5	27.4	28.4	29.4	8										8
99	15.8	16.8	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.8	25.7	26.7	27.7	28.7	29.7	99										99
Δ	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′	Δ	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Δ

Δd or Δt

Digitized by Google







Digitized by Google