June 17, 1896 noon sight

Sun's declination at Greenwich mean noon June 17 is given in the 1896 American Ephemerides as N 23°24'50.2", increasing 3.55" per hour. Local noon at 138°35' W longitude makes GMT some 9.2^h (astronomical time) giving an increment of 33" in declination, let's say 23°25'. Semidiameter of the sun 16' to the nearest minute of arc.

h_i	55°19'	
i	- 2	
Θ	- 3	(guessed dip value)
h_a	55 14	
r	- 1	
sd	+ 16	(LL assumed)
H	55 29	
δ	23 25 N	
	89 60	
H+δ	78 54	
φ	11 6 S	(by DR 11°0')

June 17, 1896 pm time sight

The Ephemerides gives Equation of Time 45.61^s at Gwch mean noon, increasing 0.54^s per hour. GMT at this time must be around 12^h, making EoT 52^s, to be "Subtracted from Mean Time", i.e. added to apparent time. The declination have increased to 23°26' but in order to keep the sum (called 2s below) even to avoid interpolation in the log tables we stick to 23°25'. It affects the result by a few seconds of time but compared with the uncertainty in the GMT obtained by the lunar the error is insignificant.

h_i	38°39'		
i	- 2		
Θ	- 3		
h_a	38 34		
r	- 1		
sd	+ 16	(LL assumed)	
h	38 49		
φ	11 6	log sec	0.00820
p	113 25	log csc	0.03733
2s	162 80		
s	81 40	log cos	9.16116
h	38 49		
s-h	42 51	log sin	9.83256
			19.03925
½LAT	$1^h17^m17^s$	log sin	9.51963
LAT	2 34 34 pm		
EoT	52		
LMT	2 35 26 pm	(17^{th})	
GMT	11 50 48	(astro 17^{th})	
longitude	$9^h15^m22^s$ W		
	138°51'	(by DR 138°46')	

If a table of log $\sin^2(x/2)$ with time argument is available the sum of logs (19.03925) can be used to find LAT directly. Then the possible error introduced when halving the log and doubling the time is eliminated.