

This is an example of how the graph of precomputed altitudes is made for use in the standard “landfall” procedure. Fred Noonan most likely created a graph like this but used a different computation table, H.O. 208, while I will utilize the simpler method of H.O. 249.

July 2, 1937

Howland Island, 0° 48' North, 176° 38' West.

Declination of the sun at 1800 Z is 23° 02.5' North.

Greenwich Hour Angle at 1800 Z is 89° 02.5'

Assumed latitude is 1° North

Assumed longitude is 177° 02.5' West

	1800 Z	1820 Z	1840 Z
GHA	89° 02.5'		
	+ 360		
	449 02.5		
Alon	-177 02.5		
LHA	272°	277°	282°
Hc (tab)	2° 14' d=0 Z = 67°	6° 50' d=2 Z = 67	11° 26' d= - 4 Z = 67
corr	0	0	0
Hc	2° 14' ZN = 67°	6° 50' ZN=67	11° 26' ZN = 67

By choosing times exactly 20 minutes apart we know that the GHA of the sun will change 5° so we can use the same AP and only need to add 5° to each LHA.

This establishes the Hc at the AP but we need it from the destination so we plot a line through the AP that is parallel to the LOP, 157°-337°, then we measure the perpendicular distance from Howland to this line (18 NM = 18') and this is the adjustment we need to determine Hc at Howland. Since the sun is off to the northeast we can see that Howland is closer to the sun than the line so the altitude at Howland must be larger so we add the distance we just measured, 18', to each of the already calculated Hc's.

	1800 Z	1820 Z	1840 Z
Hc	2° 14'	6° 50'	11° 26'
Adj.	+ 18'	+ 18'	+ 18'
Hc	2° 32'	7° 08'	11° 44'

We can continue to use the same adjustment until the azimuth changes significantly which took a lot of time since the azimuth didn't change at all, remaining at 67° until 1847 Z and then stayed at 66° until 1923 Z and had changed only to 63°, a total change of only 4°, at the time of Earhart's last transmission at 2012 Z so the same adjustment can be used for the entire period.

We then have to account for refraction.

	1800 Z	1820 Z	1840 Z
Hc	2° 32'	7° 08'	11° 44'
Ref.	+ 16'	+ 7'	+ 5'
Hp	2° 48'	7° 15'	11° 49'

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In case you are wondering why the refraction correction was added when the normal marine practice is to subtract, for flight navigation it is important to be able to plot the fix as quickly as possible so as much as possible the calculations are done prior to taking the observation. To accomplish this we add the refraction correction to the Hc to calculate Hp (altitude precomputed) so all we have to do after taking the observation is to subtract the Hs from Hp to find the intercept. In marine practice we have to wait until after the observation to then look up the correction and subtract it from Hs to find Ho which we then subtract from Hc. Give it some thought and you will see that either method produces the same intercept.

We use these numbers to plot points on the graph and draw straight lines between the plotted points which gives us the Hp at intermediate times.