

**TABLE 1**  
MERIDIAN PASSAGE AND DECLINATION  
OF THE SUN AT 12<sup>h</sup> UT

**TABLES 2 and 3**  
DEPRESSION OF SUN  
AT VARIOUS HEIGHTS

D a y	January		February		March		April		May		June		Height	TABLE 2 AT SUNRISE AND SUNSET		TABLE 3 AT CIVIL TWILIGHT	
	Mer. Pass.	Dec	Mer. Pass.	Dec	Mer. Pass.	Dec	Mer. Pass.	Dec	Mer. Pass.	Dec	Mer. Pass.	Dec		Feet	Depression	Diff. from 0°8	Depression
	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°					
1	+03	S23.0	+14	S17.1	+12	S 7.6	+04	N 4.5	-03	N 15.1	-02	N22.1					
2	+04	22.9	+14	16.8	+12	7.2	+04	4.9	-03	15.4	-02	22.2					
3	+04	22.8	+14	16.5	+12	6.8	+03	5.3	-03	15.7	-02	22.3					
4	+05	22.7	+14	16.2	+12	6.4	+03	5.7	-03	16.0	-02	22.4					
5	+05	22.6	+14	15.9	+12	6.0	+03	6.1	-03	16.3	-02	22.5					
6	+06	S22.5	+14	S15.6	+11	S 5.7	+02	N 6.5	-03	N 16.5	-01	N22.7					
7	+06	22.4	+14	15.3	+11	5.3	+02	6.8	-03	16.8	-01	22.8					
8	+07	22.2	+14	15.0	+11	4.9	+02	7.2	-03	17.1	-01	22.8					
9	+07	22.1	+14	14.7	+11	4.5	+02	7.6	-04	17.4	-01	22.9					
10	+07	22.0	+14	14.3	+10	4.1	+01	8.0	-04	17.6	-01	23.0					
11	+08	S21.8	+14	S14.0	+10	S 3.7	+01	N 8.3	-04	N 17.9	00	N23.1	1 000	1.5	0.7	6.0	5.2
12	+08	21.6	+14	13.7	+10	3.3	+01	8.7	-04	18.1	00	23.2	2 000	1.7	0.9	6.1	5.3
13	+09	21.5	+14	13.4	+10	2.9	+01	9.1	-04	18.4	00	23.2	3 000	1.9	1.1	6.1	5.3
14	+09	21.3	+14	13.0	+09	2.5	00	9.4	-04	18.6	00	23.3	4 000	2.1	1.3	6.1	5.3
15	+09	21.1	+14	12.7	+09	2.1	00	9.8	-04	18.9	00	23.3	5 000	2.2	1.4	6.2	5.4
16	+10	S20.9	+14	S12.3	+09	S 1.7	00	N10.1	-04	N 19.1	+01	N23.3	6 000	2.4	1.6	6.2	5.4
17	+10	20.7	+14	12.0	+08	1.3	00	10.5	-04	19.3	+01	23.4	7 000	2.5	1.7	6.2	5.4
18	+10	20.5	+14	11.6	+08	0.9	-01	10.8	-04	19.6	+01	23.4	8 000	2.6	1.8	6.3	5.5
19	+11	20.3	+14	11.3	+08	0.6	-01	11.2	-04	19.8	+01	23.4	9 000	2.7	1.9	6.3	5.5
20	+11	20.1	+14	10.9	+08	S 0.2	-01	11.5	-03	20.0	+02	23.4	10 000	2.8	2.0	6.3	5.5
21	+11	S19.9	+14	S10.6	+07	N 0.2	-01	N11.9	-03	N 20.2	+02	N23.4	15 000	3.2	2.4	6.5	5.7
22	+11	19.7	+13	10.2	+07	0.6	-01	12.2	-03	20.4	+02	23.4	20 000	3.6	2.8	6.6	5.8
23	+12	19.4	+13	9.8	+07	1.0	-02	12.5	-03	20.6	+02	23.4	25 000	3.9	3.1	6.8	6.0
24	+12	19.2	+13	9.5	+06	1.4	-02	12.9	-03	20.8	+02	23.4	30 000	4.2	3.4	6.9	6.1
25	+12	19.0	+13	9.1	+06	1.8	-02	13.2	-03	21.0	+03	23.4	35 000	4.4	3.6	7.1	6.3
26	+12	S18.7	+13	S 8.7	+06	N 2.2	-02	N13.5	-03	N21.1	+03	N23.4	40 000	4.7	3.9	7.2	6.4
27	+13	18.5	+13	8.3	+05	2.6	-02	13.8	-03	21.3	+03	23.3	45 000	4.9	4.1	7.3	6.5
28	+13	18.2	+13	S 8.0	+05	3.0	-02	14.2	-03	21.5	+03	23.3	50 000	5.1	4.3	7.5	6.7
29	+13	17.9			+05	3.4	-03	14.5	-03	21.6	+03	23.2	55 000	5.3	4.5	7.6	6.8
30	+13	17.7			+05	3.8	-03	N14.8	-02	21.8	+04	N23.2	60 000	5.5	4.7	7.7	6.9
31	+13	S17.4			+04	N 4.2			-02	N21.9							

An alternative method to those given on pages A12–A14 is to use the graphs to give the corrections to the tabulated times of sunrise and sunset at ground level; in this case it is adequate to use the graphs for the *nearest* tabular latitude and declination. The difference in hour angle is found between the hour angle for zero depression and the hour angle at the tabular depression minus 0°8. The difference in hour angle so found is then applied to the time of sunrise or sunset. The result will be less than 5<sup>m</sup> in error if the declination curve cuts all the depression lines.

*Example.* To find the times of sunrise and sunset on 2023 April 19 in latitude N65° 17', longitude W35° 15', at a height of 37 000 feet. From Table 1, Dec = N11°2; Table 2, Depression diff. from 0°8 = 3°7.

	Sunrise		Sunset	
	h	m	h	m
Page A134, N65° 17'	04	10	19	51
Page A147, Lat 66°, Dec 11° (same); diff. in HA from depression 0° to 3°7		-45		+45
LMT	03	25	20	36
Longitude W 35° 15'	2	21	2	21
UT	05	46	22	57

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**TABLES 2 and 3**  
DEPRESSION OF SUN  
AT VARIOUS HEIGHTS

D a y	July		August		September		October		November		December		Height	TABLE 2 AT SUNRISE AND SUNSET		TABLE 3 AT CIVIL TWILIGHT	
	Mer. Pass.	Dec	Mer. Pass.	Dec	Mer. Pass.	Dec	Mer. Pass.	Dec	Mer. Pass.	Dec	Mer. Pass.	Dec		Feet	Depression	Diff. from 0:8	Depression
	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°	12 <sup>h</sup> m	°		°	°	°	°
1	+04	N23.1	+06	N18.0	00	N 8.3	-10	S 3.2	-16	S14.4	-11	S21.8					
2	+04	23.0	+06	17.8	00	7.9	-11	3.6	-16	14.8	-11	22.0					
3	+04	23.0	+06	17.5	-01	7.5	-11	4.0	-16	15.1	-10	22.1					
4	+04	22.9	+06	17.2	-01	7.2	-11	4.4	-16	15.4	-10	22.2					
5	+05	22.8	+06	17.0	-01	6.8	-12	4.7	-16	15.7	-10	22.4					
6	+05	N22.7	+06	N16.7	-02	N 6.4	-12	S 5.1	-16	S16.0	-09	S22.5					
7	+05	22.6	+06	16.4	-02	6.1	-12	5.5	-16	16.3	-09	22.6					
8	+05	22.5	+06	16.1	-02	5.7	-12	5.9	-16	16.6	-08	22.7	0	0.8	—	6.0	5.2
9	+05	22.4	+06	15.8	-03	5.3	-13	6.3	-16	16.9	-08	22.8	500	1.3	0.5	6.0	5.2
10	+05	22.2	+05	15.6	-03	4.9	-13	6.6	-16	17.1	-07	22.9					
11	+06	N22.1	+05	N15.3	-03	N 4.5	-13	S 7.0	-16	S17.4	-07	S23.0	1 000	1.5	0.7	6.0	5.2
12	+06	22.0	+05	15.0	-04	4.2	-13	7.4	-16	17.7	-06	23.1	2 000	1.7	0.9	6.1	5.3
13	+06	21.8	+05	14.7	-04	3.8	-14	7.8	-16	18.0	-06	23.1	3 000	1.9	1.1	6.1	5.3
14	+06	21.7	+05	14.4	-04	3.4	-14	8.2	-16	18.2	-05	23.2	4 000	2.1	1.3	6.1	5.3
15	+06	21.5	+05	14.0	-05	3.0	-14	8.5	-15	18.5	-05	23.3	5 000	2.2	1.4	6.2	5.4
16	+06	N21.4	+04	N13.7	-05	N 2.6	-14	S 8.9	-15	S18.7	-05	S23.3	6 000	2.4	1.6	6.2	5.4
17	+06	21.2	+04	13.4	-05	2.2	-15	9.3	-15	19.0	-04	23.4	7 000	2.5	1.7	6.2	5.4
18	+06	21.0	+04	13.1	-06	1.9	-15	9.6	-15	19.2	-04	23.4	8 000	2.6	1.8	6.3	5.5
19	+06	20.8	+04	12.8	-06	1.5	-15	10.0	-15	19.5	-03	23.4	9 000	2.7	1.9	6.3	5.5
20	+06	20.7	+03	12.4	-06	1.1	-15	10.3	-14	19.7	-03	23.4	10 000	2.8	2.0	6.3	5.5
21	+06	N20.5	+03	N12.1	-07	N 0.7	-15	S10.7	-14	S19.9	-02	S23.4					
22	+06	20.3	+03	11.8	-07	N 0.3	-15	11.1	-14	20.1	-02	23.4	15 000	3.2	2.4	6.5	5.7
23	+07	20.1	+03	11.4	-08	S 0.1	-16	11.4	-14	20.3	-01	23.4	20 000	3.6	2.8	6.6	5.8
24	+07	19.9	+02	11.1	-08	0.5	-16	11.8	-13	20.5	-01	23.4	25 000	3.9	3.1	6.8	6.0
25	+07	19.6	+02	10.7	-08	0.9	-16	12.1	-13	20.7	00	23.4	30 000	4.2	3.4	6.9	6.1
													35 000	4.4	3.6	7.1	6.3
26	+07	N19.4	+02	N10.4	-09	S 1.3	-16	S12.4	-13	S20.9	00	S23.4					
27	+07	19.2	+02	10.1	-09	1.6	-16	12.8	-12	21.1	+01	23.3	40 000	4.7	3.9	7.2	6.4
28	+07	19.0	+01	9.7	-09	2.0	-16	13.1	-12	21.3	+01	23.3	45 000	4.9	4.1	7.3	6.5
29	+07	18.7	+01	9.3	-10	2.4	-16	13.5	-12	21.5	+02	23.2	50 000	5.1	4.3	7.5	6.7
30	+06	18.5	+01	9.0	-10	S 2.8	-16	13.8	-11	S21.6	+02	23.2	55 000	5.3	4.5	7.6	6.8
31	+06	N18.3	00	N 8.6			-16	S14.1			+03	S23.1	60 000	5.5	4.7	7.7	6.9

An example of the use of the above tables is given on page A151.