

**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	+13	S17-2	+12	S 7-3	+04	N 4-8	-03	N 15-3	-02	N22-2					
2	+04	22-9	+14	16-9	+12	6-9	+03	5-2	-03	15-6	-02	22-3					
3	+04	22-8	+14	16-6	+12	6-5	+03	5-6	-03	15-9	-02	22-4					
4	+05	22-7	+14	16-3	+12	6-1	+03	6-0	-03	16-2	-02	22-5					
5	+05	22-6	+14	16-0	+11	5-8	+03	6-4	-03	16-5	-01	22-6					
6	+06	S22-5	+14	S15-7	+11	S 5-4	+02	N 6-7	-03	N 16-8	-01	N22-7					
7	+06	22-4	+14	15-4	+11	5-0	+02	7-1	-03	17-0	-01	22-8					
8	+06	22-3	+14	15-1	+11	4-6	+02	7-5	-04	17-3	-01	22-9	0	0-8	—	6-0	5-2
9	+07	22-1	+14	14-7	+10	4-2	+01	7-9	-04	17-6	-01	23-0	500	1-3	0-5	6-0	5-2
10	+07	22-0	+14	14-4	+10	3-8	+01	8-2	-04	17-8	00	23-1					
11	+08	S21-8	+14	S14-1	+10	S 3-4	+01	N 8-6	-04	N 18-1	00	N23-1	1 000	1-5	0-7	6-0	5-2
12	+08	21-7	+14	13-8	+10	3-0	+01	9-0	-04	18-3	00	23-2	2 000	1-7	0-9	6-1	5-3
13	+08	21-5	+14	13-4	+09	2-6	00	9-3	-04	18-6	00	23-3	3 000	1-9	1-1	6-1	5-3
14	+09	21-3	+14	13-1	+09	2-2	00	9-7	-04	18-8	00	23-3	4 000	2-1	1-3	6-1	5-3
15	+09	21-2	+14	12-8	+09	1-8	00	10-0	-04	19-1	+01	23-3	5 000	2-2	1-4	6-2	5-4
16	+10	S21-0	+14	S12-4	+08	S 1-4	00	N10-4	-04	N 19-3	+01	N23-4	6 000	2-4	1-6	6-2	5-4
17	+10	20-8	+14	12-1	+08	1-0	-01	10-8	-04	19-5	+01	23-4	7 000	2-5	1-7	6-2	5-4
18	+10	20-6	+14	11-7	+08	0-6	-01	11-1	-04	19-7	+01	23-4	8 000	2-6	1-8	6-3	5-5
19	+11	20-4	+14	11-4	+08	S 0-2	-01	11-4	-03	19-9	+01	23-4	9 000	2-7	1-9	6-3	5-5
20	+11	20-2	+14	11-0	+07	N 0-1	-01	11-8	-03	20-1	+02	23-4	10 000	2-8	2-0	6-3	5-5
21	+11	S20-0	+14	S10-6	+07	N 0-5	-01	N12-1	-03	N 20-3	+02	N23-4					
22	+11	19-7	+14	10-3	+07	0-9	-02	12-5	-03	20-5	+02	23-4	15 000	3-2	2-4	6-5	5-7
23	+12	19-5	+13	9-9	+06	1-3	-02	12-8	-03	20-7	+02	23-4	20 000	3-6	2-8	6-6	5-8
24	+12	19-3	+13	9-5	+06	1-7	-02	13-1	-03	20-9	+03	23-4	25 000	3-9	3-1	6-8	6-0
25	+12	19-0	+13	9-2	+06	2-1	-02	13-4	-03	21-1	+03	23-4	30 000	4-2	3-4	6-9	6-1
													35 000	4-4	3-6	7-1	6-3
26	+12	S18-8	+13	S 8-8	+05	N 2-5	-02	N13-8	-03	N21-3	+03	N23-3	40 000	4-7	3-9	7-2	6-4
27	+13	18-5	+13	8-4	+05	2-9	-02	14-1	-03	21-4	+03	23-3	45 000	4-9	4-1	7-3	6-5
28	+13	18-3	+13	8-1	+05	3-3	-03	14-4	-03	21-6	+03	23-2	50 000	5-1	4-3	7-5	6-7
29	+13	18-0	+12	S 7-7	+05	3-7	-03	14-7	-03	21-7	+04	23-2	55 000	5-3	4-5	7-6	6-8
30	+13	17-7			+04	4-1	-03	N15-0	-02	21-9	+04	N23-1	60 000	5-5	4-7	7-7	6-9
31	+13	S17-4			+04	N 4-5			-02	N22-0							

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 2024 April 18 in latitude N 65° 17', longitude W 35° 15', at a height of 37 000 feet. From Table 1, Dec = N 11°1'; Table 2, Depression diff. from 0°8 = 3°7.

	Sunrise	Sunset
	h m	h m
Page A134, N65° 17'	04 11	19 51
Page A147, Lat 66°, Dec 11° (same); diff. in HA from depression 0° to 3°7	—45	+45
LMT	03 26	20 35
Longitude W 35° 15'	2 21	2 21
UT	05 47	22 56

**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	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	N17.8	00	N 8.0	-11	S 3.5	-16	S14.7	-11	S21.9					
2	+04	23.0	+06	17.6	00	7.6	-11	3.9	-16	15.0	-10	22.1					
3	+04	22.9	+06	17.3	-01	7.3	-11	4.3	-16	15.3	-10	22.2					
4	+05	22.8	+06	17.0	-01	6.9	-11	4.6	-16	15.6	-10	22.3					
5	+05	22.7	+06	16.8	-01	6.5	-12	5.0	-16	15.9	-09	22.5					
6	+05	N22.6	+06	N16.5	-02	N 6.1	-12	S 5.4	-16	S16.2	-09	S22.6					
7	+05	22.5	+06	16.2	-02	5.8	-12	5.8	-16	16.5	-08	22.7					
8	+05	22.4	+06	15.9	-02	5.4	-13	6.2	-16	16.8	-08	22.8	0	0.8	—	6.0	5.2
9	+05	22.3	+05	15.6	-03	5.0	-13	6.6	-16	17.1	-07	22.9	500	1.3	0.5	6.0	5.2
10	+05	22.1	+05	15.3	-03	4.6	-13	6.9	-16	17.4	-07	23.0					
11	+06	N22.0	+05	N15.0	-04	N 4.3	-13	S 7.3	-16	S17.6	-07	S23.1	1 000	1.5	0.7	6.0	5.2
12	+06	21.9	+05	14.7	-04	3.9	-14	7.7	-16	17.9	-06	23.1	2 000	1.7	0.9	6.1	5.3
13	+06	21.7	+05	14.4	-04	3.5	-14	8.1	-16	18.2	-06	23.2	3 000	1.9	1.1	6.1	5.3
14	+06	21.6	+05	14.1	-05	3.1	-14	8.4	-16	18.4	-05	23.3	4 000	2.1	1.3	6.1	5.3
15	+06	21.4	+04	13.8	-05	2.7	-14	8.8	-15	18.7	-05	23.3	5 000	2.2	1.4	6.2	5.4
16	+06	N21.2	+04	N13.5	-05	N 2.3	-15	S 9.2	-15	S18.9	-04	S23.3	6 000	2.4	1.6	6.2	5.4
17	+06	21.1	+04	13.2	-06	2.0	-15	9.5	-15	19.2	-04	23.4	7 000	2.5	1.7	6.2	5.4
18	+06	20.9	+04	12.8	-06	1.6	-15	9.9	-15	19.4	-03	23.4	8 000	2.6	1.8	6.3	5.5
19	+06	20.7	+04	12.5	-06	1.2	-15	10.3	-15	19.6	-03	23.4	9 000	2.7	1.9	6.3	5.5
20	+06	20.5	+03	12.2	-07	0.8	-15	10.6	-14	19.9	-02	23.4	10 000	2.8	2.0	6.3	5.5
21	+06	N20.3	+03	N11.9	-07	N 0.4	-15	S11.0	-14	S20.1	-02	S23.4					
22	+07	20.1	+03	11.5	-07	N 0.0	-16	11.3	-14	20.3	-01	23.4	15 000	3.2	2.4	6.5	5.7
23	+07	19.9	+02	11.2	-08	S 0.4	-16	11.7	-13	20.5	-01	23.4	20 000	3.6	2.8	6.6	5.8
24	+07	19.7	+02	10.8	-08	0.8	-16	12.0	-13	20.7	00	23.4	25 000	3.9	3.1	6.8	6.0
25	+07	19.5	+02	10.5	-09	1.2	-16	12.4	-13	20.9	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	N19.3	+02	N10.1	-09	S 1.5	-16	S12.7	-13	S21.1	+01	S23.3					
27	+07	19.0	+01	9.8	-09	1.9	-16	13.0	-12	21.3	+01	23.3	40 000	4.7	3.9	7.2	6.4
28	+07	18.8	+01	9.4	-10	2.3	-16	13.4	-12	21.4	+02	23.2	45 000	4.9	4.1	7.3	6.5
29	+06	18.6	+01	9.1	-10	2.7	-16	13.7	-12	21.6	+02	23.2	50 000	5.1	4.3	7.5	6.7
30	+06	18.3	00	8.7	-10	S 3.1	-16	14.0	-11	S21.8	+03	23.1	55 000	5.3	4.5	7.6	6.8
31	+06	N18.1	00	N 8.4			-16	S14.4			+03	S23.0	60 000	5.5	4.7	7.7	6.9

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