

OCCULTATIONS

OF

PLANETS AND STARS BY THE MOON,

DURING THE YEAR

1853.

COMPUTED BY JOHN DOWNES,

AT THE

EXPENSE OF THE FUND APPROPRIATED BY CONGRESS

FOR THE ESTABLISHMENT OF A

Nautical Almanac,

AND PUBLISHED BY THE SMITHSONIAN INSTITUTION.

WASHINGTON.

1853.

Smithsonian Institution.

PREFACE.

FOR the purpose of facilitating the accurate determination of the geographical position of important points in the United States, the Regents of the Smithsonian Institution authorized the preparation of lists of occultations and co-ordinates of reduction to particular places for the years 1848 and 1849. Congress has, since, ordered the publication of an American Nautical Almanac; and, as lists of Occultations will form a regular part of this ephemeris, Mr. Preston, the late Secretary of the Navy, directed that the expense of computing these tables for 1850 should be defrayed from the appropriation for the almanac—the printing and distribution to be done by the Smithsonian Institution. A similar order has been given by Mr. Kennedy, the present Secretary of the Navy, relative to the tables for 1853.

Copies of these elements will be forwarded to all persons disposed to advance the science of geography, with the request, that the results of the observations which may be made, be sent to the Smithsonian Institution, or published in some accessible scientific journal.

The following remarks will give a more definite idea of the nature and object of this publication.

JOSEPH HENRY, *Secretary S. I.*

CHARLES H. DAVIS, *Superintendent of the Nautical Almanac.*

The present lists of occultations are very much extended by the introduction of occultations visible on any part of the earth. The form of the list is also somewhat altered; that which is now adopted will probably be retained in the astronomical ephemeris.

Bessel's formulæ (Astron. Nachr., No. 145, and Astron. Jahrbuch for 1831) are preserved unaltered. The several columns of the general list now contain, 1, the date; 2, the star's name; 3, the star's magnitude; 4, the limiting parallels of visibility; 5, Washington mean time of the moon's true conjunction with the star in right ascension; 6, Washington hour angle, in time, of the star at the time of true conjunction; 7, co-ordinate q at the time of true conjunction; 8, hourly variation p' of co-ordinate p ; 9, hourly variation q' of co-ordinate q ; 10, logarithmic sine of the star's declination; 11, logarithmic cosine of the star's declination.

At the time of true conjunction $p = 0$; for any other time $\sigma + (t)$, $p = (t)p'$, and $q = y + (t)q'$.

H being for true conjunction, $h = H +$ sidereal equivalent of (t) , and, for the same reason, $T = \sigma + (t)$. The notation is made to correspond to these changes.

The sign $+$ will hereafter be given to west longitudes, and the sign $-$ to east longitudes. The value of the constant k has been changed by retaining Mr. Airy's correction of the lunar parallax, and rejecting the correction of $\frac{1}{500}$ part of semi-diameter, which was before applied. The small table containing the values of $\log. A = \frac{1 - e^2}{\sqrt{1 - e^2 \sin^2 \phi}}$ and of $\log. B = \frac{1}{\sqrt{1 - e^2 \sin^2 \phi}}$ is retained.

The object in increasing the general list is, to provide the means of frequent determinations of the longitude throughout the earth; to make it especially useful to geographers in general, to the boundary and other surveys of the Government in the interior, to the coast survey of the United States on both oceans, and to the explorers of unknown parts of the continent.

At the close of the general list will be found Bessel's formulæ, and an example of their use, together with some suggestions as to the manner in which the lists may be rendered more convenient to those who resort to them habitually.

CHARLES HENRY DAVIS, *Superintendent.*

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of \odot .	At Washington Mean Time of \odot .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
Jan. 1	π Virginis	5	-15	-83	0 05.9	+ 6 57 40	-0.9927	0.5396	-.2321	+9.1119	9.9963
1	σ Virginis	5	+53	-28	9 20.5	+ 8 05 49	+0.2242	.5404	-.2378	+8.8577	.9989
1	η Virginis	6	-30	-83	4 27.6	+11 10 48	-1.1814	.5398	-.2356	+9.0621	.9971
3	94 Virginis	6	+82	+ 9	10 38.3	- 8 25 35	+0.8884	.5504	-.2346	-9.1534	.9956
3	95 Virginis	6	+81	+39	10 49.9	- 8 14 20	+1.2688	.5494	-.2345	-9.1751	.9951
4	ξ^1 Libræ	6	- 8	-90	7 59.2	-11 49 02	-0.8134	.5643	-.2205	-9.2919	.9915
4	σ^1 Libræ	6	+65	-11	19 22.9	+ 0 49 48	+0.5342	.5677	-.2017	-9.4134	.9849
4	σ^2 Libræ	6	+31	-43	20 14.8	+ 0 00 08	-0.0487	.5700	-.2003	-9.4016	.9857
4	ζ^1 Libræ	4	+74	+26	22 25.6	+ 2 06 11	+1.1151	.5681	-.1974	-9.4456	.9824
4	ξ^2 Libræ	6	+74	-18	23 26.9	+ 3 05 16	+0.8160	.5692	-.1959	-9.4430	.9826
5	ζ^4 Libræ	6	+74	-14	0 23.4	+ 3 59 42	+0.8806	.5699	-.1944	-9.4495	.9821
5	η Libræ	4½	-37	-90	5 05.2	+ 8 31 04	-1.1657	.5790	-.1863	-9.4186	.9845
5	θ Libræ	4½	-12	-90	9 05.8	-11 37 16	-0.8065	.5809	-.1795	-9.4480	.9822
5	ν Scorpio	4	+71	-24	16 29.0	- 4 30 52	+0.6979	.5804	-.1665	-9.5143	.9755
5	ψ Ophiuchi	5	+59	-11	21 22.0	+ 0 10 52	+0.5249	.5840	-.1564	-9.5275	.9739
5	ζ Ophiuchi	5	-49	-90	22 34.7	+ 1 20 43	-1.2348	.5906	-.1543	-9.4927	.9779
6	JUPITER		+68	+ 8	10 00.8	-11 40 00	+0.8351	.5817	-.1265	-9.5698	.9678
6	B.A.C. 5758	6	+20	-70	14 00.6	- 7 49 41	-0.1053	.5952	-.1179	-9.5613	.9691
6	VENUS		+20	-46	15 07.2	- 6 45 45	-0.0950	.5456	-.1087	-9.5640	.9687
6	ξ Ophiuchi	5	-46	-90	19 46.1	- 2 18 03	-1.1553	.6020	-.1055	-9.5533	.9703
6	B.A.C. 5866	6	-30	-90	21 12.4	- 0 55 15	-0.9521	.6021	-.1004	-9.5602	.9693
10	ϕ Capricor.	6	+69	+12	15 55.7	- 9 48 25	+0.8960	.5682	+1.337	-9.5595	.9664
11	ϵ Capricor.	5	+70	+23	1 12.8	- 0 51 17	+1.0457	.5599	+1.513	-9.5366	.9727
11	κ Capricor.	5	+70	+ 6	3 39.9	+ 1 30 36	+0.8100	.5595	+1.548	-9.5243	.9743
11	B.A.C. 7666	6	+48	-23	12 32.8	+10 04 58	+0.3095	.5535	+1.692	-9.4823	.9790
12	56 Aquarii	6	+43	-30	1 31.1	- 1 22 36	+0.1725	.5428	+1.866	-9.4225	.9843
12	ϵ^1 Aquarii	6	+75	+35	9 43.8	+ 6 33 55	+1.2148	.5346	+1.1958	-9.4083	.9853
12	ϵ^2 Aquarii	4	+76	+11	10 38.6	+ 7 27 03	+0.9036	.5343	+1.1968	-9.3948	.9862
12	74 Aquarii	6	- 9	-90	10 32.5	+ 9 17 14	-0.8121	.5362	+1.1987	-9.3319	.9897
12	ψ^1 Aquarii	5½	-40	-90	23 33.8	- 4 02 01	-1.2439	.5288	+1.2083	-9.2349	.9935
13	μ^2 Aquarii	5	-14	-90	0 36.1	- 3 01 41	-0.9241	.5264	+2.094	-9.2392	.9934
13	μ^3 Aquarii	5	+18	-61	1 07.4	- 2 31 20	-0.3567	.5255	+2.094	-9.2572	.9928
13	30 Piscium	4½	+74	-10	23 13.1	- 5 05 09	+0.5665	.5119	+2.214	-9.0756	.9969
14	33 Piscium	5	+80	- 6	0 59.8	- 3 21 28	+0.6357	.5110	+2.220	-9.0561	.9972
15	20 Ceti	5	+57	-24	2 32.4	- 2 32 23	+0.2939	.5028	+2.255	-8.5309	.9997
15	33 Ceti	6	+18	-65	12 05.2	+ 6 44 26	-0.4128	.5012	+2.244	+8.4619	.9998
15	f Piscium	6	- 4	-87	16 02.4	+10 35 05	-0.8194	.5006	+2.236	+8.6945	.9995
16	ν Pisidium	5	+37	-42	4 57.9	- 0 50 52	-0.0454	.5018	+2.203	+8.9172	.9985
16	ξ^1 Ceti	5	+35	-44	22 09.2	+ 8 08 10	-0.0982	.5025	+2.115	+9.1518	.9956
17	ξ Arietis	5½	0	-79	4 31.3	- 1 56 47	-0.7382	.5028	+2.078	+9.2371	.9934
17	B. A. C. 755	6	+15	-66	5 34.2	- 0 55 36	-0.4742	.5035	+2.071	+9.2352	.9935
17	B. A. C. 830	6	+90	+21	14 01.2	+ 7 17 03	+1.0146	.5084	+2.004	+9.2444	.9932
19	ω^1 Tauri	6	+10	-71	10 31.2	+ 2 28 19	-1.0882	.5252	+1.525	+9.5174	.9751
19	Runk. 1159	5	+90	+50	16 34.7	+ 8 20 34	+1.2451	.5342	+1.437	+9.4878	.9785
19	Runk. 1162	6	+90	+34	16 38.0	+ 8 23 41	+1.0842	.5335	+1.437	+9.4916	.9780
19	B.A.C. 1361	6	+84	+ 4	18 17.2	+ 9 59 51	+0.6190	.5335	+1.407	+9.5060	.9764
19	ϵ Tauri	3½	+90	+ 9	20 03.7	+11 42 57	+0.7018	.5343	+1.392	+9.5093	.9761
20	ν Tauri	4½	+38	-27	12 26.4	+ 3 34 08	-0.0264	.5425	+1.109	+9.5617	.9690
20	105 Tauri	6	+44	-21	14 42.0	+ 5 45 16	+0.0764	.5439	+1.073	+9.5642	.9687
20	n Tauri	5½	+48	-17	19 57.5	+10 50 19	+0.1361	0.5481	+0.961	+9.5724	.9674

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of σ .		At Washington Mean Time of σ .					
			North-ern.	South-ern.	h. m.		H	Y	p'	q'	Log sin D	Log cos D
					$^{\circ}$	$'$						
Jan. 20	α Tauri	5	+88	+11	23	48.6	- 9 26 20	+0.6397	0.5512	+0.0903	+9.5699	9.9678
21	β Geminor.	5	+55	- 6	16	14.7	+ 6 26 06	+0.2469	.5594	+0.0553	+9.5966	.9632
21	γ Geminor.	4	+90	+65	21	02.6	+11 03 59	+1.2685	.5656	+0.0444	+9.5837	.9655
23	α Geminor.	4	-28	-65	11	46.1	+ 0 26 14	-1.0797	.5665	-0.0442	+9.6218	.9582
24	γ Cancri	4 $\frac{1}{2}$	+37	-27	13	02.0	+ 0 45 04	-0.0509	.5701	-0.1045	+9.5735	.9672
26	η Leonis	3 $\frac{1}{2}$	+11	-63	1	48.0	-11 47 23	-0.5321	.5591	-0.1753	+9.4776	.9795
27	ϵ Leonis	4	-31	-79	12	35.7	- 2 10 56	-1.1806	.5468	-0.2218	+9.2935	.9914
27	ξ Virginis	5	-24	-81	22	31.2	+ 7 24 44	-1.1046	.5462	-0.2304	+9.1979	.9945
27	ν Virginis	4 $\frac{1}{2}$	+79	- 7	22	47.9	+ 7 40 52	+0.5994	.5473	-0.2304	+9.1071	.9964
28	π Virginis	5	-24	-83	5	48.0	- 9 32 52	-1.1161	.5438	-0.2352	+9.1118	.9963
28	η Virginis	6	-43	-83	10	06.4	- 5 23 01	-1.3059	.5428	-0.2379	+9.0620	.9971
28	ϵ Virginis	5	+45	-35	14	56.3	- 0 42 40	+0.0877	.5437	-0.2402	+8.8575	.9980
28	δ Virginis	6	+70	-13	2	02.2	+ 9 14 17	+0.5058	.5449	-0.2407	+8.9086	.9986
30	94 Virginis	6	+80	0	16	11.3	- 1 05 09	+0.7411	.5478	-0.2335	+9.1528	.9956
30	95 Virginis	6	+81	+12	16	23.1	- 0 53 43	+1.1233	.5475	-0.2336	+9.1752	.9951
Feb. 31	ξ^1 Librae	6	-18	-90	13	49.3	- 4 11 28	-0.0681	.5582	-0.2144	+9.2919	.9915
1	α^1 Librae	6	+57	-19	1	26.3	+ 7 01 01	+0.3964	.5614	-0.1992	+9.4134	.9849
1	β^1 Librae	6	+24	-51	2	19.2	+ 7 52 04	-0.1921	.5637	-0.1976	+9.4016	.9857
1	γ^1 Librae	4	+74	+16	4	32.9	+10 00 59	+0.9851	.5607	-0.1947	+9.4456	.9824
1	ξ^3 Librae	6	+73	- 3	5	35.6	+11 01 25	+0.6832	.5624	-0.1932	+9.4430	.9826
1	ζ^1 Librae	6	+72	+ 1	6	33.5	+11 57 13	+0.7494	.5628	-0.1916	+9.4495	.9821
1	η Librae	4 $\frac{1}{2}$	-57	-90	11	21.8	- 7 24 52	-1.3158	.5706	-0.1837	+9.4186	.9845
1	θ Librae	4 $\frac{1}{2}$	-21	-90	15	28.3	- 3 27 16	-0.9499	.5729	-0.1770	+9.4480	.9822
1	ν Scorpio	4	+64	- 8	23	03.1	+ 3 50 41	+0.5781	.5724	-0.1624	+9.5143	.9755
2	ϕ Ophiuchi	5	+52	-17	4	04.0	+ 8 40 25	+0.4071	.5757	-0.1526	+9.5275	.9739
2	B.A.C. 5758	6	+14	-53	21	11.4	+ 1 08 41	-0.2144	.5860	-0.1154	+9.5613	.9691
2	JUPITER		+39	-25	2	05.0	+ 5 50 55	+0.2654	.5793	-0.1030	+9.5803	.9660
3	ξ Ophiuchi	4 $\frac{1}{2}$	-61	-90	3	07.1	+ 6 50 36	-1.2720	.5928	-0.1011	+9.5533	.9703
3	B.A.C. 5866	6	-38	-90	4	35.9	+ 8 15 58	-1.0649	.5924	-0.0987	+9.5602	.9693
3	α^2 Ophiuchi	5	+66	+54	7	12.3	+10 46 16	+1.2703	.5837	-0.0913	+9.6067	.9613
3	B.A.C. 5954	6	-38	-90	10	10.3	-10 22 48	-1.0457	.5947	-0.0837	+9.5702	.9677
3	4 Sagittarii	5	+40	-20	18	25.7	- 2 26 55	+0.3558	.5906	-0.0631	+9.6059	.9614
3	B.A.C. 6088	6	-20	-90	19	17.2	- 1 37 27	-0.7387	.5957	-0.0605	+9.5878	.9648
3	7 Sagittarii	6	+66	+ 5	19	37.2	+ 1 18 16	+0.7709	.5889	-0.0605	+9.6140	.9598
3	B.A.C. 6161	6	+20	-39	23	07.2	+ 2 03 26	+0.0174	.5932	-0.0499	+9.6046	.9616
4	24 Sagittarii	6	+23	-34	7	48.5	+10 24 02	+0.1115	.5936	-0.0284	+9.6117	.9603
4	B.A.C. 6343	6	- 8	-72	9	38.0	-11 50 53	-0.4695	.5962	-0.0230	+9.6028	.9620
4	26 Sagittarii	6	+ 8	-49	10	56.1	-10 35 49	-0.1485	.5947	-0.0176	+9.6087	.9608
4	B.A.C. 6369	6	+65	+28	12	04.2	- 9 30 30	+1.0460	.5891	-0.0149	+9.6285	.9567
4	B.A.C. 6448	6	-31	-90	16	13.1	- 5 32 14	-0.8341	.5978	-0.0040	+9.5982	.9629
5	B.A.C. 6576	6	+34	-22	0	09.5	+ 2 06 03	+0.3123	.5914	+0.0176	+9.6165	.9593
5	α^1 Sagittarii	5 $\frac{1}{2}$	+65	+ 5	3	59.7	+ 5 47 00	+0.7702	.5883	+0.0283	+9.6225	.9580
5	α^2 Sagittarii	6	+29	-28	4	06.1	+ 5 53 16	+0.2153	.5909	+0.0283	+9.6135	.9599
5	β^1 Sagittarii	6	+65	+37	8	15.5	+ 9 52 51	+1.1604	.5835	+0.0388	+9.6266	.9572
5	B.A.C. 6864	6	+ 7	-56	18	27.5	- 4 19 04	-0.2541	.5845	+0.0643	+9.5943	.9636
9	α^1 Aquarii	5 $\frac{1}{2}$	-27	-90	8	57.6	+ 7 09 43	-1.1122	.5309	+0.2113	+9.2349	.9935
9	α^2 Aquarii	5	- 6	-90	9	59.3	+ 8 09 35	-0.7911	.5301	+0.2121	+9.2392	.9934
9	β^1 Aquarii	5	+25	-53	10	30.4	+ 8 39 41	-0.2244	.5290	+0.2121	+9.2572	.9928
10	α Piscium	4 $\frac{1}{2}$	+81	0	8	23.4	+ 5 53 08	+0.7471	.5159	+0.2244	+9.0756	.9969
10	33 Piscium	5	+83	+ 3	10	09.0	+ 7 35 38	+0.8011	0.5148	+0.2250	+9.0561	.9972

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of \odot .	At Washington Mean Time of \odot .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
Feb. 11	β^3 Ceti	6	+29	-51	20 50.2	- 6 42 42	-0.2016	0.5054	+ .2272	+8.4619	9.9998
12	γ Piscium	6	+ 8	-79	0 44.8	- 2 54 40	-0.6034	.5046	+ .2263	+8.6945	.9995
12	γ Piscium	5	+50	-30	13 32.4	+ 9 31 29	+0.1776	.5040	+ .2221	+8.9172	.9985
13	β^3 Ceti	5	+47	-31	6 35.6	+ 2 06 02	+0.1336	.5047	+ .2131	+9.1517	.9956
13	ξ Arietis	5½	+13	-68	12 55.4	+ 8 15 10	-0.5041	.5048	+ .2083	+9.2371	.9934
13	B. A. C. 755	6	+26	-51	13 57.6	+ 9 15 35	-0.2422	.5055	+ .2076	+9.2352	.9935
15	ω^1 Tauri	6	- 9	-71	18 55.6	-11 19 24	-0.8676	.5229	+ .1505	+9.5174	.9751
16	Rumk. 1162	6	+90	+61	1 04.7	- 5 21 45	+1.3053	.5319	+ .1417	+9.4914	.9780
16	B. A. C. 1361	6	+90	+17	2 44.5	- 3 45 04	+0.8373	.5308	+ .1402	+9.5060	.9764
16	ϵ Tauri	3½	+90	+22	4 31.7	- 2 01 10	+0.9191	.5325	+ .1371	+9.5093	.9761
16	ϵ Tauri	4½	+50	-16	21 02.0	-10 02 24	+0.1745	.5391	+ .1084	+9.5617	.9690
16	ω^5 Tauri	6	+57	-10	23 18.8	- 7 50 06	+0.2743	.5411	+ .1050	+9.5642	.9687
17	η Tauri	5½	+67	- 6	4 37.1	- 2 42 16	+0.3302	.5440	+ .0957	+9.5725	.9674
17	ω Tauri	5	+90	+22	8 30.2	+ 1 03 11	+0.8302	.5480	+ .0881	+9.5699	.9678
17	ν^1 Tauri	6	-41	-66	12 02.5	+ 4 28 19	-1.1978	.5429	+ .0802	+9.6082	.9609
18	γ Geminor.	5	+67	+ 2	1 05.4	- 6 55 21	+0.4161	.5555	+ .0534	+9.5966	.9632
18	β^3 Geminor.	6	+90	+18	3 36.6	- 4 29 20	+0.6899	.5574	+ .0491	+9.5942	.9636
18	δ Geminor.	6	0	-64	4 22.6	- 3 44 57	-0.6998	.5525	+ .0469	+9.6168	.9592
18	δ Geminor.	6	+90	+46	4 46.3	- 3 22 02	+0.9570	.5589	+ .0469	+9.5907	.9642
18	ϵ Geminor.	3	-35	-65	18 41.2	+10 03 37	-1.1410	.5564	+ .0157	+9.6303	.9563
18	B. A. C. 2238	6	+75	+12	22 15.7	-10 29 25	+0.5110	.5649	+ .0065	+9.6055	.9615
19	ω Geminor.	6	+29	-25	2 46.4	- 6 08 22	-0.1852	.5632	- .0029	+9.6165	.9593
19	δ^8 Geminor.	6	+30	-25	7 07.4	- 1 56 43	-0.1715	.5650	- .0146	+9.6157	.9594
19	ν^2 Geminor.	6	-22	-65	8 04.4	- 1 01 48	-1.0046	.5618	- .0169	+9.6283	.9568
19	α Geminor.	4	-19	-65	20 53.8	+11 19 51	-0.9770	.5648	- .0478	+9.6218	.9582
20	μ^1 Cancri	6	+57	- 6	6 17.9	- 3 36 32	+0.2787	.5711	- .0692	+9.5928	.9639
20	γ Cancri	4½	+40	-24	22 08.9	+11 39 53	+0.0038	.5702	- .1062	+9.5735	.9672
22	η Leonis	3½	+10	-64	10 33.8	- 1 13 44	-0.5512	.5499	- .1792	+9.4776	.9795
23	ϵ Leonis	4	-39	-79	20 40.4	+ 7 41 31	-1.2682	.5538	- .2268	+9.2936	.9914
24	ξ Virginis	5	-33	-81	6 21.3	- 6 57 24	-1.2117	.5522	- .2359	+9.1978	.9945
24	ν Virginis	4½	+69	-14	6 37.6	- 6 41 43	+0.4690	.5546	- .2359	+9.1071	.9964
24	π Virginis	5	-35	-83	13 27.0	- 0 06 13	-1.2405	.5514	- .2409	+9.1118	.9963
24	σ Virginis	5	+26	-43	22 20.8	+ 8 29 30	-0.0698	.5516	- .2455	+8.8575	.9989
26	δ^5 Virginis	6	+86	+27	3 00.0	-11 49 26	+1.1566	.5516	- .2475	-8.8600	.9989
26	B. A. C. 4478	6	+86	+39	3 28.4	-11 21 57	+1.2806	.5512	- .2475	-8.8846	.9987
26	δ^0 Virginis	6	+56	-25	8 31.7	- 6 28 58	+0.2875	.5525	- .2458	-8.9086	.9986
26	η^4 Virginis	6	+69	-14	22 20.8	+ 6 51 49	+0.5033	.5549	- .2377	-9.1537	.9956
26	η^5 Virginis	6	+81	+ 8	22 32.3	+ 7 02 54	+0.8814	.5542	- .2377	-9.1753	.9951
27	α Virginis	4	+80	+33	1 16.5	+ 9 41 26	+1.2173	.5543	- .2353	-9.2216	.9939
27	ξ^1 Libræ	6	-37	-90	19 34.0	+ 3 20 34	-1.2084	.5641	- .2167	-9.2920	.9915
28	σ^1 Libræ	6	+42	-33	7 01.3	- 9 36 36	+0.1449	.5661	- .2000	-9.4134	.9849
28	ζ^1 Libræ	4	+73	0	10 05.8	- 6 38 48	+0.7311	.5655	- .1954	-9.4456	.9824
28	ζ^2 Libræ	6	+58	-17	11 07.8	- 5 39 03	+0.4315	.5667	- .1937	-9.4431	.9826
28	ξ^2 Libræ	6	+62	-13	12 05.1	- 4 43 50	+0.4971	.5671	- .1922	-9.4495	.9821
28	θ Libræ	4½	-42	-90	20 55.7	+ 3 47 22	-1.1978	.5759	- .1766	-9.4480	.9822
Mar. 1	β^1 Scorpii	2	+71	+27	1 43.7	+ 8 24 45	+1.1120	.5697	- .1600	-9.5213	.9746
1	β^2 Scorpii	5½	+71	+27	1 43.9	+ 8 24 57	+1.1084	.5698	- .1691	-9.5212	.9746
1	ν Scorpii	4	+48	-22	4 28.1	+11 03 05	+0.3298	.5737	- .1633	-9.5143	.9755
1	\downarrow Ophiuchi	5	+37	-31	9 28.4	- 8 07 54	+0.1615	.5763	- .1531	-9.5275	.9739
1	ω Ophiuchi	5	+69	+32	12 44.7	- 4 58 58	+1.1505	0.5734	- .1469	-9.5572	9.9097

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of ζ .	At Washington Mean Time of ζ .							
			North- ern.	South- ern.		H			Y			Log sin D	Log cos D
						h	m	s	h	m	s		
Mar. 2	α^0 Ophiuchi	5	+66	+24	12 43.1	—	5 55	37	+1.0486	0.5807	—0.0911	—9.6067	9.9612
	JUPITER		+5	—60	14 18.3	—	4 24	06	—0.3181	.5827	—0.0859	—9.5854	.9652
3	4 Sagittarii	5	+28	—32	0 03.8	+	4 58	36	+0.1423	.5868	—0.0606	—9.6059	.9614
3	7 Sagittarii	6	+54	—8	1 16.2	+	6 08	10	+0.5616	.5852	—0.0580	—9.6140	.9598
3	24 Sagittarii	6	+11	—46	13 38.6	—	5 58	32	—0.1005	.5884	—0.0263	—9.6116	.9603
	B. A. C. 6343	6	—20	—94	15 29.9	—	4 11	36	—0.6699	.5909	—0.0210	—9.6029	.9620
	26 Sagittarii	6	—2	—62	16 49.3	—	2 55	13	—0.3447	.5894	—0.0184	—9.6087	.9608
	B. A. C. 6369	6	+65	+11	17 58.6	—	1 48	43	+0.8618	.5836	—0.0131	—9.6285	.9567
	B. A. C. 6448	6	—44	—90	22 29.6	+	2 31	45	—1.0283	.5917	—0.0025	—9.5982	.9629
	ψ Sagittarii	5	+65	+32	6 16.0	+	10 00	00	+1.2511	.5798	+0.0186	—9.6341	.9555
	B. A. C. 6576	6	+24	—32	6 17.6	+	9 01	34	+0.1392	.5819	+0.0186	—9.6165	.9593
	χ^1 Sagittarii	5½	+55	—5	10 12.5	—	10 12	36	+0.6077	.5818	+0.0291	—9.6225	.9580
	χ^2 Sagittarii	6	+20	—37	10 19.0	—	10 06	24	+0.0477	.5844	+0.0291	—9.6135	.9599
	h^1 Sagittarii	6	+65	+22	14 33.6	—	6 01	37	+1.0123	.5788	+0.0394	—9.6266	.9571
	h^2 Sagittarii	4½	+65	+42	14 49.6	—	5 46	12	+1.1959	.5782	+0.0394	—9.6293	.9566
	B. A. C. 6864	6	—1	—66	0 58.8	+	3 59	46	—0.4032	.5808	+0.0668	—9.5943	.9636
	4 Capricor.	6	—21	—90	7 53.3	+	10 38	43	—0.8030	.5789	+0.0836	—9.5784	.9664
	B. A. C. 7049	6	+37	—25	12 41.5	—	8 43	51	+0.2603	.5729	+0.0929	—9.5897	.9644
	17 Capricor.	6	+25	—40	19 45.7	—	1 55	14	+0.0048	.5698	+0.1085	—9.5744	.9670
	η Capricor.	5	—8	—88	3 38.9	+	5 40	52	—0.6454	.5678	+0.1253	—9.5431	.9718
	6 ζ Capricor.	6	+68	+19	5 25.5	+	7 23	39	+0.0943	.5604	+0.1293	—9.5695	.9678
	27 Capricor.	6	+48	—19	5 51.7	+	7 48	57	+0.3821	.5630	+0.1293	—9.5572	.9697
	ϕ Capricor.	6	+69	+15	8 31.8	+	10 23	21	+0.9480	.5592	+0.1351	—9.5594	.9694
	6 ϵ Capricor.	5	+70	+22	18 04.5	—	4 23	57	+1.0452	.5522	+0.1535	—9.5366	.9726
	α Capricor.	5	+70	+6	20 35.3	—	1 58	24	+0.8160	.5521	+0.1569	—9.5243	.9743
	7 29 Aquarii	6	+51	—21	5 39.8	+	6 47	44	+0.3459	.5479	+0.1714	—9.4823	.9790
	33 Ceti	6	+40	—41	5 05.7	+	3 20	42	—0.0088	.5064	+0.2296	+8.4619	.9908
	f Piscium	6	+19	—64	8 59.7	+	7 08	03	—0.4028	.5059	+0.2287	+8.6945	.9995
	v Piscium	5	+64	—18	21 44.6	—	4 28	32	+0.4031	.5057	+0.2247	+8.9171	.9985
	ξ^1 Ceti	5	+63	—18	14 43.3	—	11 58	28	+0.3866	.5069	+0.2155	+9.1517	.9956
	ξ Arietis	5½	+27	—51	21 01.4	—	5 50	59	—0.2425	.5071	+0.2106	+9.2371	.9934
	B. A. C. 755	6	+41	—36	22 03.8	—	4 50	26	+0.0228	.5077	+0.2098	+9.2352	.9935
	38 Arietis	5½	+34	—43	7 42.3	+	4 31	38	—0.1162	.5090	+0.2024	+9.3115	.9907
	SATURN		—49	—76	14 29.2	+	11 06	48	—1.3240	.5043	+0.1945	+9.3877	.9867
	ω^1 Tauri	6	+12	—60	3 17.9	—	1 09	19	—0.5168	.5229	+0.1508	+9.5174	.9751
	ω^2 Tauri	5½	—25	—70	6 57.8	+	2 23	09	—1.0755	.5229	+0.1448	+9.5384	.9724
	B. A. C. 1361	6	+90	+39	10 47.8	+	6 06	03	+1.1437	.5304	+0.1402	+9.5060	.9764
	ϵ Tauri	3½	+90	+48	12 35.6	+	7 50	29	+1.2257	.5319	+0.1371	+9.5093	.9761
	δ Tauri	4½	+72	0	5 12.5	—	0 04	09	+0.4760	.5379	+0.1083	+9.5617	.9691
	105 Tauri	6	+81	+6	7 30.5	+	2 09	24	+0.5757	.5390	+0.1047	+9.5642	.9687
	η Tauri	6	+88	+10	12 51.8	+	7 20	09	+0.6365	.5414	+0.0954	+9.5723	.9674
	θ Tauri	5	+90	+44	16 47.3	+	11 08	04	+1.1308	.5450	+0.0878	+9.5699	.9678
	121 Tauri	6	—14	—66	20 21.8	—	9 24	28	—0.9120	.5396	+0.0800	+9.6083	.9609
	132 Tauri	5	—28	—65	2 37.2	—	3 21	35	—1.0809	.5414	+0.0679	+9.6180	.9590
	1 Geminor.	5	+90	+18	9 34.7	+	3 21	50	+0.7040	.5513	+0.0534	+9.5966	.9632
	3 Geminor.	6	+90	+36	12 08.0	+	5 49	57	+0.9775	.5538	+0.0470	+9.5942	.9636
	5 Geminor.	6	+16	—43	12 54.7	+	6 35	04	—0.4221	.5487	+0.0449	+9.6169	.9592
	6 Geminor.	6	+90	+61	13 18.6	+	6 58	11	+1.2454	.5550	+0.0449	+9.5907	.9642
	8 Geminor.	3	—12	—65	3 26.3	—	3 23	18	—0.8802	.5516	+0.0141	+9.6303	.9563
	B. A. C. 2238	6	+90	+27	7 04.6	+	0 07	21	+0.7827	0.5598	+0.0050	+9.6054	9.9615

ELEMENTS

D

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of \odot .	At Washington Mean Time of \odot .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
Mar. 18	37 Geminor.	6	-35	-64	8 29.2	+ 1 29 02	-1.1431	0.5521	+ .0027	+9.6349	9.9553
18	ω Geminor.	6	+45	-10	11 39.6	+ 4 32 44	+0.0811	-5580	- .0041	+9.6164	-9593
18	48 Geminor.	6	+46	-11	16 05.0	+ 8 48 49	+0.0914	-5595	- .0156	+9.6156	-9595
18	52 Geminor.	6	- 3	-65	17 02.5	+ 9 44 17	-0.7480	-5563	- .0179	+9.6281	-9568
18	A Geminor.	6	-24	-65	21 14.3	-10 12 03	-1.0385	-5558	- .0272	+9.6313	-9561
19	\times Geminor.	4	- 3	-65	6 05.5	- 1 40 24	-0.7476	-5589	- .0482	+9.6218	-9582
19	μ^1 Caneri	6	+74	+ 6	15 39.3	+ 7 32 55	+0.5029	-5649	- .0690	+9.5928	-9639
20	γ Caneri	4½	+52	-14	7 45.3	- 0 55 37	+0.1979	-5645	- .1055	+9.5735	-9672
21	η Leonis	3½	+17	-57	20 33.7	+10 34 20	-0.4356	-5594	- .1805	+9.4776	-9795
23	ϵ Leonis	4	-35	-79	6 39.3	- 4 31 26	-1.2362	-5542	- .2298	+9.2936	-9914
23	ξ Virginis	5	-32	-81	16 15.1	+ 4 44 25	-1.2059	-5542	- .2398	+9.1978	-9945
23	ν Virginis	4½	+69	-14	16 31.1	+ 4 59 55	+0.4616	-5555	- .2397	+9.1071	-9964
23	π Virginis	5	-36	-83	23 15.5	+11 30 20	-1.2537	-5544	- .2452	+9.1118	-9963
24	c Virginis	5	+34	-46	8 01.0	- 4 02 13	-0.1179	-5559	- .2505	+8.8574	-9989
26	94 Virginis	6	+57	-23	6 49.8	- 6 51 25	+0.3222	-5635	- .2442	+9.1536	-9955
26	95 Virginis	6	+81	- 3	7 00.9	- 6 40 41	+0.6952	-5636	- .2434	+9.1753	-9951
26	\times Virginis	4	+80	+17	9 40.0	+ 4 07 13	+1.0212	-5636	- .2418	+9.2216	-9939
27	μ Libræ	5	+76	+44	1 11.7	+10 50 48	+1.3017	-5681	- .2247	+9.3693	-9878
27	α^1 Libræ	6	+29	-45	14 27.2	- 0 23 06	-0.0873	-5761	- .2058	+9.4134	-9849
27	α^2 Libræ	6	- 1	-88	15 17.7	+ 0 25 44	-0.6657	-5781	- .2042	+9.4017	-9857
27	γ^1 Libræ	4	+62	-14	17 25.6	+ 2 28 42	+0.4863	-5757	- .2008	+9.4456	-9824
27	γ^2 Libræ	6	+44	-30	18 25.6	+ 3 26 27	+0.1891	-5768	- .1991	+9.4431	-9826
27	γ^3 Libræ	6	+47	-27	19 21.1	+ 4 19 49	+0.2525	-5772	- .1973	+9.4495	-9821
28	β^1 Scorpii	2	+71	+ 7	8 33.9	- 6 57 29	+0.8455	-5800	- .1727	+9.5213	-9746
28	β^2 Scorpii	5½	+71	+ 7	8 34.1	- 6 57 20	+0.8420	-5800	- .1727	+9.5213	-9746
28	ν Scorpii	4	+34	-36	11 13.3	- 4 24 10	+0.0713	-5838	- .1664	+9.5143	-9755
28	\downarrow Ophiuchi	5	+24	-46	16 04.7	+ 0 15 56	-0.0987	-5861	- .1555	+9.5275	-9738
28	ω Ophiuchi	5	+69	+10	19 15.4	+ 3 19 13	+0.8758	-5834	- .1488	+9.5572	-9697
29	B.A.C. 5758	6	-13	-90	8 46.2	- 7 41 43	-0.7132	-5931	- .1178	+9.5613	-9691
29	b Ophiuchi	5	+66	+34	16 38.4	- 0 08 12	+1.1487	-5864	- .0973	+9.6099	-9666
29	e^2 Ophiuchi	5	+66	+ 4	18 37.6	+ 1 46 13	+0.7695	-5884	- .0921	+9.6066	-9613
29	JUPITER		-20	-90	23 37.1	+ 6 33 50	-0.7757	-5979	- .0793	+9.5872	-9649
30	4 Sagittarii	5	+13	-48	5 44.9	-11 32 57	-0.1289	-5929	- .0628	+9.6059	-9614
30	B.A.C. 6088	6	-51	-90	5 49.1	-11 28 55	-1.1746	-5976	- .0628	+9.5878	-9648
30	7 Sagittarii	6	+35	-24	6 56.0	-10 24 42	+0.2863	-5911	- .0574	+9.6140	-9598
30	λ Sagittarii	4	+64	+29	16 45.6	- 0 58 34	+1.0894	-5865	- .0329	+9.6340	-9555
30	24 Sagittarii	6	- 3	-64	19 07.4	+ 1 17 35	-0.3653	-5928	- .0247	+9.6117	-9603
30	B.A.C. 6343	6	-36	-90	20 57.3	+ 3 03 10	-0.9348	-5948	- .0192	+9.6029	-9620
30	26 Sagittarii	6	-17	-86	22 15.9	+ 4 18 40	-0.6102	-5932	- .0165	+9.6087	-9608
30	B.A.C. 6369	6	+52	- 7	23 24.4	+ 5 24 25	+0.5914	-5873	- .0138	+9.6285	-9567
31	\downarrow Sagittarii	5	+65	+20	11 35.7	- 6 53 01	+0.9879	-5822	+ .0186	+9.6341	-9555
31	B.A.C. 6576	6	+10	-48	11 37.3	- 6 51 27	-0.1220	-5873	+ .0186	+9.6165	-9593
31	α^1 Sagittarii	5½	+37	-20	15 31.0	+ 3 06 50	+0.3514	-5836	+ .0291	+9.6226	-9580
31	α^2 Sagittarii	6	+ 6	-53	15 37.4	- 3 00 40	-0.2075	-5861	+ .0291	+9.6135	-9599
31	β^1 Sagittarii	6	+65	+ 3	19 51.1	+ 1 03 12	+0.7558	-5800	+ .0395	+9.6265	-9571
31	β^2 Sagittarii	4½	+65	+16	20 07.1	+ 1 18 36	+0.9397	-5785	+ .0421	+9.6292	-9566
Apr. 1	B.A.C. 6864	6	- 5	-90	6 15.8	+11 04 06	-0.6500	-5806	+ .0672	+9.5943	-9636
1	4 Capricor.	6	-38	-90	13 11.2	- 6 16 09	-1.0438	-5780	+ .0839	+9.5784	-9664
1	B.A.C. 7049	6	+25	-39	18 00.7	- 1 37 20	+0.0260	-5704	+ .0953	+9.5896	-9644
2	17 Capricor.	6	+19	-47	1 07.5	+ 5 13 55	-0.1130	0.5664	+ .1107	+9.5746	9.9670

B

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of \odot .	At Washington Mean Time of \odot .						
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D	
												$h.$
Apr. 2	B.A.C. 7197	6	+67	+51	2 02.5	+ 6 06	54	+1.2726	0.5603	+1.1128	-9.5967	9.9631
2	η Capricor.	5	-21	-90	9 04.6	-11 06	05	-0.8630	.5636	+1.1272	-9.5430	.9718
2	27 Capricor.	6	+36	-31	11 18.7	- 8 56	44	+0.1714	.5589	+1.1311	-9.5572	.9697
2	ϕ Capricor.	6	+67	- 3	14 00.4	- 6 20	42	+0.6753	.5547	+1.1369	-9.5598	.9693
2	ϵ Capricor.	5	+70	+ 8	23 39.8	+ 2 58	40	+0.8565	.5487	+1.1531	-9.5366	.9726
3	α Capricor.	5	+67	- 6	2 12.4	+ 5 26	08	+0.6305	.5471	+1.1581	-9.5242	.9743
3	29 Aquarii	6	+41	-31	11 24.5	- 9 40	17	+0.1747	.5425	+1.1721	-9.4822	.9790
4	56 Aquarii	6	+39	-35	0 41.8	+ 3 11	15	+0.0986	.5347	+1.1897	-9.4224	.9843
4	τ^1 Aquarii	6	+75	+35	9 13.1	+11 26	26	+1.2218	.5265	+1.1999	-9.4082	.9853
4	τ^2 Aquarii	5½	+76	+10	10 09.3	-11 39	09	+0.1131	.5265	+1.2009	-9.3947	.9862
4	74 Aquarii	6	- 8	-90	12 05.8	- 9 46	15	-0.8085	.5289	+1.2030	-9.3318	.9898
4	ψ^1 Aquarii	5½	-32	-90	23 20.5	+ 1 07	52	-1.1698	.5235	+1.2129	-9.2349	.9935
5	ψ^2 Aquarii	5	- 8	-90	0 23.7	+ 2 09	12	-0.8407	.5225	+1.2136	-9.2391	.9934
5	ψ^3 Aquarii	5	+23	-56	0 55.6	+ 2 40	06	-0.2656	.5210	+1.2144	-9.2572	.9928
5	30 Piscium	4½	+83	+ 3	23 16.1	+ 0 21	08	+0.8067	.5110	+1.2273	-9.0755	.9969
6	33 Piscium	5	+83	+ 8	1 03.4	+ 2 05	25	+0.8876	.5104	+1.2280	-9.0560	.9972
10	SATURN		-14	-75	3 53.8	+ 2 08	06	-0.9734	.5104	+1.1900	-9.4152	.9848
11	ω^1 Tauri	6	+22	-49	10 04.5	+ 7 24	55	-0.3354	.5242	+1.1525	-9.5174	.9751
11	ω^2 Tauri	5½	- 7	-70	14 05.4	+10 18	24	-0.8389	.5242	+1.1465	-9.5384	.9724
12	ϵ Tauri	4	+90	+15	12 22.6	+ 8 53	33	+0.7382	.5380	+1.1095	-9.5617	.9690
12	105 Tauri	6	+90	+21	14 41.1	+11 07	35	+0.8401	.5392	+1.1058	-9.5642	.9687
12	ν Tauri	6	+90	+26	20 03.8	- 7 40	05	+0.8980	.5421	+1.0946	-9.5724	.9673
13	121 Tauri	6	+ 4	-62	3 36.7	- 0 22	01	-0.6476	.5389	+1.0809	-9.6082	.9609
13	132 Tauri	6	- 7	-65	9 54.7	+ 5 43	33	-0.8160	.5411	+1.0668	-9.6180	.9590
13	1 Geminor.	5	+90	+36	16 55.9	-11 29	18	+0.9826	.5501	+1.0522	-9.5966	.9632
13	3 Geminor.	6	+90	+62	19 30.8	- 8 59	36	+1.2589	.5517	+1.0480	-9.5942	.9636
13	5 Geminor.	6	+32	-27	20 17.9	- 8 14	03	-0.1509	.5467	+1.0459	-9.6169	.9592
14	ϵ Geminor.	3½	+ 6	-54	11 00.3	+ 5 58	23	-0.6116	.5487	+1.0131	-9.6303	.9563
14	37 Geminor.	6	-12	-64	16 07.7	+10 55	14	-0.8778	.5488	+1.0019	-9.6349	.9553
14	ω Geminor.	6	+63	+ 4	19 21.0	- 9 58	07	+0.3574	.5544	-0.0048	-9.6164	.9593
14	48 Geminor.	6	+64	+ 4	23 50.8	- 5 37	37	+0.3668	.5550	-0.0138	-9.6156	.9595
15	52 Geminor.	6	+13	-44	0 49.8	+ 4 40	40	-0.4808	.5516	-0.0161	-9.6281	.9568
15	A Geminor.	5½	- 5	-65	4 45.4	- 0 53	13	-0.7789	.5511	-0.0252	-9.6313	.9561
15	α Geminor.	4	+13	-47	14 07.3	+ 8 09	05	-0.4853	.5534	-0.0479	-9.6218	.9582
15	μ^1 Cancri	6	+90	+21	23 53.2	- 6 25	23	+0.7721	.5589	-0.0705	-9.5928	.9639
16	λ Cancri	6	-47	-66	6 10.6	- 0 21	09	-1.2437	.5508	-0.0838	-9.6174	.9591
16	γ Cancri	4½	+70	- 1	16 22.0	+ 9 28	53	+0.4536	.5571	-1.0566	-9.5735	.9672
17	B.A.C. 3138	6	-23	-68	5 53.7	- 1 27	35	-1.0520	.5504	-1.1350	-9.5715	.9675
18	η Leonis	3½	+28	-45	6 06.4	- 2 04	59	-0.2314	.5512	-1.1801	-9.4776	.9795
18	B.A.C. 3579	6	+66	-13	15 51.7	+ 7 20	18	+0.4088	.5520	-1.1948	-9.4156	.9848
18	ι Leonis	6	+59	-18	17 23.8	+ 8 49	13	+0.3158	.5516	-1.1981	-9.4098	.9852
18	h Leonis	6	-22	-75	23 51.8	- 8 56	04	-1.0765	.5476	-1.2069	-9.4121	.9850
19	ϵ Leonis	4	-23	-79	16 56.6	+ 7 33	55	-1.1000	.5476	-1.2301	-9.2936	.9914
20	ξ Virginis	5	-21	-81	2 41.4	- 7 01	04	-1.0894	.5486	-1.2391	-9.1979	.9945
20	ν Virginis	4½	+78	- 8	2 57.7	- 6 45	19	+0.5834	.5508	-1.2402	-9.1070	.9964
20	π Virginis	5	-26	-83	9 47.3	- 0 09	42	-1.1527	.5493	-1.2450	-9.1118	.9963
20	11 Virginis	6	-52	-87	13 57.9	+ 3 52	22	-1.3684	.5499	-1.2485	-9.0620	.9971
20	c Virginis	5	+39	-42	18 37.9	+ 8 22	53	-0.0361	.5520	-1.2509	-8.8573	.9989
22	α Virginis	4	+80	+13	20 06.0	+ 8 06	55	+0.9643	.5675	-1.2453	-9.2217	.9939
23	μ Libræ	5	+76	+32	11 20.2	- 1 12	37	+1.2023	0.5741	-1.2296	-9.3693	9.9878

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of \odot .	At Washington Mean Time of \odot .						
			North-ern.	South-ern.		H		Y	p'	q'	Log sin D	Log cos D
						h	m					
Apr. 24	ζ^1 Librae	4	+54	-21	3 09.8	-9	59 10	+0.3609	0.5845	-.2053	-9.4456	9.9824
24	β^1 Scorpii	2	+70	-3	17 50.7	+4	07 18	+0.6861	0.5896	-.1779	-9.5213	9.9746
24	β^2 Scorpii	5½	+70	-3	17 50.8	+4	07 20	+0.6825	0.5896	-.1779	-9.5212	9.9746
25	ν Scorpii	4	+26	-45	20 25.1	+6	35 29	+0.0803	0.5940	-.1714	-9.5143	9.9755
25	\downarrow Ophiuchi	5	+16	-56	1 06.8	+11	05 55	-0.2554	0.5970	-.1600	-9.5275	9.9739
25	ω Ophiuchi	5	+69	-2	4 11.0	-9	57 16	+0.6087	0.5943	-.1529	-9.5573	9.9697
25	B.A.C. 5658	6	-23	-90	17 13.7	+2	33 34	-0.8831	0.6049	-.1199	-9.5612	9.9691
25	B.A.C. 5831	6	+66	+32	21 41.2	+6	50 05	+1.1347	0.5969	-.1091	-9.6076	9.9611
26	b Ophiuchi	5	+66	+15	0 49.0	+9	50 12	+0.9391	0.5981	-.1009	-9.6099	9.9606
26	α^2 Ophiuchi	5	+56	-9	2 43.9	+11	40 22	+0.5638	0.6001	-.0953	-9.6067	9.9613
26	JUPITER		-30	-90	7 10.7	-8	03 54	-0.9328	0.6096	-.0814	-9.5871	9.9649
26	4 Sagittarii	5	+3	-61	13 27.6	-2	02 33	-0.3306	0.6046	-.0641	-9.6058	9.9614
26	7 Sagittarii	6	+24	-36	14 36.2	-0	56 48	+0.0777	0.6027	-.0612	-9.6139	9.9598
26	B.A.C. 6161	6	-17	-90	17 58.4	+2	17 01	-0.6616	0.6059	-.0496	-9.6046	9.9617
27	λ Sagittarii	3	+65	+10	0 05.5	+8	08 58	+0.8600	0.5973	-.0322	-9.6340	9.9555
27	24 Sagittarii	6	-14	-82	2 22.5	+10	20 20	-0.5769	0.6039	-.0264	-9.6117	9.9603
27	B.A.C. 6343	6	-51	-90	4 08.8	-11	57 44	-1.1358	0.6059	-.0206	-9.6028	9.9620
27	26 Sagittarii	6	-28	-90	5 24.8	-10	44 50	-0.8171	0.6041	-.0177	-9.6087	9.9608
27	B.A.C. 6369	6	+37	-20	6 31.0	-9	41 20	+0.3656	0.5983	-.0149	-9.6285	9.9567
27	\downarrow Sagittarii	5	+64	+3	18 19.4	+1	38 14	+0.7509	0.5917	+0.0193	-9.6341	9.9555
27	B.A.C. 6576	6	-2	-62	18 20.9	+1	39 44	-0.3434	0.5969	+0.0193	-9.6165	9.9593
27	χ^1 Sagittarii	5½	+23	-34	22 07.8	+5	17 26	+0.1188	0.5926	+0.0304	-9.6225	9.9580
27	χ^2 Sagittarii	6½	+18	-39	22 10.4	+5	19 58	+0.0247	0.5931	+0.0304	-9.6210	9.9583
27	χ^3 Sagittarii	6	-6	-69	22 14.0	+5	23 27	-0.4330	0.5952	+0.0304	-9.6134	9.9599
28	h^1 Sagittarii	6	+49	-11	2 20.5	+9	20 09	+0.5200	0.5887	+0.0413	-9.6265	9.9572
28	h^2 Sagittarii	4½	+63	0	2 36.1	+9	35 03	+0.7010	0.5879	+0.0403	-9.6293	9.9566
28	B.A.C. 6864	6	-27	-90	12 28.9	-4	55 24	-0.8714	0.5884	+0.0675	-9.5943	9.9636
28	4 Capricor.	6	-60	-90	19 14.7	+1	34 47	-1.2624	0.5848	+0.0849	-9.5784	9.9663
28	B.A.C. 7049	6	+13	-53	23 57.9	+6	07 14	-0.2038	0.5766	+0.0966	-9.5986	9.9645
29	17 Capricor.	6	+7	-62	6 56.4	-11	09 48	-0.3413	0.5713	+0.1124	-9.5745	9.9670
29	B.A.C. 7197	6	+68	+22	7 50.4	-10	17 47	+1.0328	0.5668	+0.1125	-9.5967	9.9632
29	η Capricor.	5½	-36	-90	14 45.7	-3	37 40	-1.0725	0.5691	+0.1272	-9.5430	9.9718
29	χ Capricor.	5½	+59	-10	16 31.7	-1	55 27	+0.5513	0.5612	+0.1311	-9.5695	9.9678
29	27 Capricor.	6	+24	-44	16 57.8	-1	30 18	-0.0576	0.5622	+0.1330	-9.5571	9.9698
29	ϕ Capricor.	6	+51	-17	19 37.3	+1	03 30	+0.4216	0.5594	+0.1371	-9.5594	9.9694
29	33 Capricor.	6	+69	+34	23 22.4	+4	40 42	+1.1776	0.5532	+0.1445	-9.5635	9.9688
30	β^1 Capricor.	6	+69	+28	4 09.4	+9	17 44	+1.1205	0.5494	+0.1534	-9.5491	9.9709
30	ϵ Capricor.	5	+66	-6	5 10.0	+10	16 10	+0.6288	0.5504	+0.1552	-9.5366	9.9727
30	α Capricor.	5	+53	-18	7 41.2	-11	17 47	+0.4059	0.5499	+0.1586	-9.5242	9.9743
30	B.A.C. 7550	6	+70	+41	7 56.0	-11	03 28	+1.2437	0.5458	+0.1602	-9.5400	9.9722
30	29 Aquarii	6	+29	-43	16 49.1	-2	28 18	-0.0417	0.5442	+0.1728	-9.4822	9.9790
May 1	56 Aquarii	6	+29	-47	6 03.7	+10	20 29	-0.1060	0.5335	+0.1913	-9.4223	9.9843
1	ϵ^1 Aquarii	6	+75	+18	14 34.9	-5	24 24	+1.0247	0.5258	+0.2003	-9.4083	9.9853
1	ϵ^2 Aquarii	5½	+76	-2	15 31.2	-4	29 55	+0.7175	0.5258	+0.2013	-9.3947	9.9862
1	74 Aquarii	6	-20	-90	17 27.9	-2	36 50	-1.0005	0.5280	+0.2033	-9.3319	9.9897
2	\downarrow^2 Aquarii	5	-19	-90	5 48.3	+9	21 07	-1.0186	0.5207	+0.2139	-9.2390	9.9934
2	\downarrow^1 Aquarii	5	+14	-68	6 20.3	+9	52 09	-0.4427	0.5190	+0.2146	-9.2572	9.9928
3	30 Piscium	4½	+82	-5	4 49.9	+7	42 19	+0.6647	0.5080	+0.2273	-9.0755	9.9969
3	33 Piscium	5	+81	-1	6 38.1	+9	27 29	+0.7483	0.5073	+0.2280	-9.0561	9.9972
4	33 Ceti	5	+39	-42	18 00.4	-4	09 41	-0.0287	0.5013	+0.2317	+8.4618	9.9998

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon, for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of σ .	At Washington Mean Time of σ .							
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D		
												$h.$	$m.$
May 4	f Piscium	6	+19	-65	21 57.4	-0	19	11	-0.4095	-0.5012	+2310	+8.6946	9.9995
5	ν Piscium	5	+68	-16	10 52.7	-11	45	22	+0.4565	-5.023	+2271	+8.9171	.9985
9	ϵ Tauri	4	+90	+22	18 38.6	-7	02	58	+0.8636	-5.398	+1114	+9.5616	.9691
9	105 Tauri	6	+90	+29	20 56.9	-4	49	06	+0.9685	-5.416	+1059	+9.5642	.9687
10	α Tauri	6	+90	+35	2 19.3	+0	22	55	+1.0316	-5.437	+0964	+9.5724	.9674
10	121 Tauri	6	+12	-52	9 52.0	+7	40	48	-0.5103	-5.412	+0806	+9.6082	.9610
10	132 Tauri	6	+2	-63	16 10.3	-10	13	26	-0.6737	-5.424	+0684	+9.6178	.9590
10	1 Geminor.	5	+90	+48	23 11.9	-3	25	50	+1.1379	-5.514	+0538	+9.5966	.9632
11	5 Geminor.	6	+41	-19	2 34.2	-0	10	16	+0.0022	-5.476	+0473	+9.6169	.9592
11	ϵ Geminor.	3 $\frac{1}{2}$	+15	-42	17 21.7	-9	52	46	-0.4510	-5.492	+0145	+9.6303	.9563
11	B.A.C. 2238	6	+90	+14	21 02.3	-6	19	45	+1.2382	-5.564	+0065	+9.6053	.9615
11	27 Geminor.	6	-1	-63	22 28.6	-4	56	21	-0.7158	-5.487	+0034	+9.6348	.9553
12	ω Geminor.	6	+78	+13	1 43.3	-1	48	19	+0.5286	-5.540	-0034	+9.6163	.9593
12	48 Geminor.	6	+79	+13	6 15.1	+2	34	09	+0.5407	-5.546	-0146	+9.6155	.9595
12	52 Geminor.	6	+23	-33	7 14.5	+3	31	31	-0.3122	-5.512	-0169	+9.6281	.9568
12	A Geminor.	5 $\frac{1}{2}$	+6	-55	11 12.1	+7	21	01	-0.6079	-5.502	-0259	+9.6311	.9561
12	π Geminor.	4	+23	-36	20 39.7	-7	30	54	-0.3117	-5.516	-0461	+9.6219	.9582
13	μ^3 Cancri	6	+90	+33	6 33.2	+2	02	13	+0.9607	-5.560	-0682	+9.5928	.9639
13	λ Cancri	6	-26	-66	12 56.5	+8	12	18	-1.0737	-5.474	-0836	+9.6174	.9591
13	γ Cancri	4 $\frac{1}{2}$	+89	+10	23 18.6	-5	46	49	+0.6422	-5.527	-1047	+9.5734	.9672
14	B.A.C. 3138	6	-10	-68	13 07.6	+7	33	58	-0.8821	-5.447	-1330	+9.5714	.9675
15	η Leonis	3 $\frac{1}{2}$	+38	-36	13 58.2	+7	34	32	-0.0577	-5.431	-1780	+9.4775	.9795
15	42 Leonis	6	+77	-4	20 44.9	-9	52	18	+0.5565	-5.440	-1875	+9.4327	.9835
16	B.A.C. 3579	6	+80	-3	0 00.8	-6	42	52	+0.5865	-5.431	-1936	+9.4155	.9848
16	δ Leonis	6	+72	-9	1 35.7	-5	11	04	+0.4914	-5.429	-1951	+9.4098	.9852
16	ζ Leonis	6	-11	-75	8 15.7	+1	15	41	-0.0260	-5.386	-2050	+9.4121	.9850
17	ϵ Leonis	4	-13	-79	1 53.2	-5	41	33	-0.9638	-5.381	-2271	+9.2935	.9914
17	ξ Virginis	5	-12	-81	11 56.7	+4	02	11	-0.9625	-5.389	-2367	+9.1979	.9945
17	ν Virginis	4 $\frac{1}{2}$	+90	0	12 13.5	+4	18	27	+0.7325	-5.411	-2367	+9.1070	.9964
17	A 1 Virginis	5 $\frac{1}{2}$	-35	-81	13 11.5	+5	14	29	-1.2428	-5.386	-2375	+9.1971	.9945
17	π Virginis	5	-17	-83	19 15.8	+11	06	53	-1.0349	-5.399	-2424	+9.1118	.9963
17	11 Virginis	6	-36	-83	23 34.2	-8	43	13	-1.2589	-5.404	-2450	+9.0609	.9971
18	c Virginis	5	+45	-36	4 22.5	-4	04	32	+0.0846	-5.427	-2480	+8.8573	.9989
19	65 Virginis	6	+86	+22	9 09.3	-0	15	48	+1.1043	-5.519	-2545	-8.8599	.9989
19	80 Virginis	6	+52	-30	14 36.3	+4	59	55	+0.2080	-5.547	-2534	-8.9085	.9986
20	95 Virginis	6	+81	-4	4 16.1	-5	49	05	+0.6984	-5.619	-2471	-9.1751	.9951
20	π Virginis	4	+80	+16	6 54.9	-3	16	01	+1.0106	-5.632	-2450	-9.2216	.9939
20	μ Libræ	5	+76	+34	22 16.3	+11	31	46	+1.2204	-5.719	-2303	-9.3692	.9878
21	ζ^1 Libræ	4	+53	-22	14 05.9	+2	45	15	+0.3524	-5.851	-2069	-9.4456	.9824
22	β^1 Scorpii	2	+69	-5	4 40.1	-7	15	06	+0.6528	-5.929	-1799	-9.5213	.9746
22	β^2 Scorpii	5 $\frac{1}{2}$	+68	-5	4 40.2	-7	15	04	+0.6495	-5.929	-1799	-9.5213	.9746
22	ν Scorpio	4	+24	-47	7 12.6	-4	48	47	-0.1126	-5.979	-1734	-9.5143	.9755
22	ω Ophiuchi	5	+14	-58	11 50.4	-0	22	13	-0.2929	-6.008	-1643	-9.5275	.9739
22	α Ophiuchi	5	+66	-5	14 51.8	+2	31	44	+0.6497	-5.995	-1546	-9.5573	.9697
23	b Ophiuchi	5	+66	+9	11 04.4	-2	06	20	+0.8604	-6.063	-1012	-9.6099	.9606
23	c 2 Ophiuchi	5	+51	-13	12 56.4	-0	19	01	+0.4873	-6.086	-0954	-9.6066	.9613
23	JUPITER		-18	-90	13 33.4	+0	16	23	-0.7610	-6.193	-0957	-9.5853	.9652
23	4 Sagittarii	5	-1	-67	23 22.9	+9	40	44	-0.4072	-6.140	-0658	-9.6059	.9614
24	7 Sagittarii	6	+19	-41	0 29.5	+10	44	34	-0.0051	-6.121	-0628	-9.6139	.9598
24	9 Sagittarii	6	+21	-39	0 52.0	+11	06	03	+0.9359	-0.6121	-0598	-9.6150	.9596

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon, for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of σ .	At Washington Mean Time of σ .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
May 24	B. A. C. 6161	6	-21	-90	3 45.7	-10 07 35	-0.7374	0.6157	-0.0537	-9.6046	9.9617
24	λ Sagittarii	4	+65	+3	9 41.7	-4 26 50	+0.7568	.6079	-0.0354	-9.6340	.9555
24	24 Sagittarii	6	-19	-90	11 54.4	-2 19 46	-0.6613	.6142	-0.0263	-9.6116	.9603
24	B. A. C. 6343	6	-58	-90	13 37.3	-0 41 12	-1.2131	.6167	-0.0232	-9.6028	.9620
24	26 Sagittarii	6	-33	-90	14 50.9	+0 29 15	-0.9007	.6150	-0.0202	-9.6087	.9608
24	B. A. C. 6369	6	+30	-26	15 55.0	+1 30 38	+0.2636	.6086	-0.0141	-9.6284	.9567
25	\downarrow Sagittarii	5	+55	-4	3 20.0	-11 33 13	+0.6339	.6027	+0.0190	-9.6340	.9555
25	B. A. C. 6576	6	-7	-70	3 21.5	-11 31 45	-0.4430	.6080	+0.0190	-9.6164	.9593
25	α^1 Sagittarii	5 $\frac{1}{2}$	+17	-40	7 00.7	-8 01 45	+0.0091	.6034	+0.0307	-9.6224	.9580
25	α^2 Sagittarii	6 $\frac{1}{2}$	+13	-46	7 03.2	-7 59 18	-0.0834	.6039	+0.0307	-9.6209	.9584
25	α^3 Sagittarii	6	-11	-78	7 06.7	-7 55 57	-0.5336	.6060	+0.0307	-9.6133	.9599
25	β^1 Sagittarii	6	+41	-18	11 04.9	-4 07 39	+0.4012	.5994	+0.0422	-9.6265	.9572
25	β^2 Sagittarii	4 $\frac{1}{2}$	+53	-8	11 19.9	-3 53 15	+0.5792	.5987	+0.0422	-9.6292	.9566
25	B. A. C. 6864	6	-34	-90	20 52.5	+5 16 02	-0.9741	.5985	+0.0698	-9.5943	.9636
26	B. A. C. 7049	6	+6	-61	7 58.3	-8 04 33	-0.3228	.5869	+0.0980	-9.5895	.9645
26	17 Capricor.	6	0	-71	14 43.3	-1 35 16	-0.4610	.5828	+0.1124	-9.5743	.9671
26	B. A. C. 7197	6	+67	+12	15 35.5	-0 45 00	+0.8917	.5761	+0.1147	-9.5966	.9632
26	η Capricor.	5 $\frac{1}{2}$	-47	-90	22 17.6	+5 41 56	-1.1965	.5777	+0.1300	-9.5430	.9718
27	α Capricor.	6	+50	-18	0 00.4	+7 20 53	+0.4146	.5694	+0.1341	-9.5695	.9678
27	27 Capricor.	6	+17	-52	0 25.7	+7 45 16	-0.1851	.5723	+0.1342	-9.5571	.9698
27	ϕ Capricor.	6	+43	-25	3 00.3	+10 14 12	+0.2861	.5671	+0.1402	-9.5592	.9694
27	37 Capricor.	6	+69	+16	11 17.6	-5 46 31	+0.9736	.5577	+0.1553	-9.5490	.9709
27	ϵ Capricor.	5	+57	-14	12 16.4	-4 49 48	+0.4888	.5585	+0.1571	-9.5365	.9727
27	α Capricor.	5	+45	-26	14 43.5	-2 27 54	+0.2685	.5578	+0.1607	-9.5242	.9743
27	B. A. C. 7550	6	+70	+26	14 57.8	-2 14 05	+1.0945	.5664	+0.1623	-9.5399	.9722
28	29 Aquarii	6	+23	-51	23 37.2	+6 07 20	-0.1739	.5508	+0.1752	-9.4821	.9790
28	56 Aquarii	6	+22	-54	12 34.1	-5 21 43	-0.2358	.5396	+0.1929	-9.4223	.9843
28	α^1 Aquarii	6	+75	+8	20 55.2	+2 43 20	+0.8845	.5294	+0.2029	-9.4081	.9853
28	74 Aquarii	6	-29	-90	23 44.5	+5 27 18	-1.1218	.5327	+0.2050	-9.3316	.9898
29	α^2 Aquarii	5	-28	-90	11 53.5	-6 46 14	-1.1379	.5225	+0.2161	-9.2390	.9934
29	α^3 Aquarii	5	+8	-77	12 25.1	-6 15 37	-0.5662	.5219	+0.2162	-9.2569	.9928
30	30 Piscium	4 $\frac{1}{2}$	+73	-12	10 41.2	-8 38 59	+0.5440	.5087	+0.2282	-9.0755	.9969
30	33 Piscium	5	+80	-8	12 28.7	-6 54 32	+0.6286	.5078	+0.2290	-9.0557	.9972
31	33 Ceti	6	+34	-47	23 45.7	+3 23 04	-0.1218	.4999	+0.2320	+8.4623	.9998
June 1	γ Piscium	6	+15	-71	3 43.7	+7 14 29	-0.4967	.4996	+0.2313	+8.6948	.9995
1	ν Piscium	5	+63	-20	16 41.0	-4 09 40	+0.3794	.5003	+0.2274	+8.9172	.9985
2	ξ^1 Ceti	2	+68	-15	9 53.3	-11 25 56	+0.4496	.5033	+0.2180	+9.1518	.9956
2	ξ^2 Arietis	5 $\frac{1}{2}$	+33	-46	16 15.6	-5 14 24	-0.1505	.5040	+0.2143	+9.2371	.9934
2	B. A. C. 755	6	+47	-31	17 18.5	-4 13 12	+0.1208	.5047	+0.2136	+9.2353	.9935
7	ϵ Geminor.	3	+17	-40	23 07.7	-2 19 22	-0.4185	.5516	+0.0146	+9.6303	.9563
8	37 Geminor.	6	+1	-60	4 15.5	+2 37 57	-0.6819	.5512	+0.0033	+9.6348	.9553
8	ω Geminor.	6	+81	+15	7 29.5	+5 45 13	+0.5648	.5564	-0.0035	+9.6163	.9593
8	48 Geminor.	6	+83	+15	12 00.4	+10 06 50	+0.5790	.5569	-0.0149	+9.6155	.9595
8	52 Geminor.	6	+25	-31	12 59.6	+11 04 01	-0.2748	.5536	-0.0171	+9.6281	.9568
8	A Geminor.	5 $\frac{1}{2}$	+8	-52	16 56.6	-9 07 06	-0.5695	.5523	-0.0262	+9.6312	.9561
9	α Geminor.	4	+25	-34	2 23.2	-0 00 02	-0.2703	.5535	-0.0465	+9.6217	.9582
9	μ^1 Caneri	6	+90	+36	12 16.7	+9 33 01	+1.0076	.5574	-0.0688	+9.5928	.9639
10	γ Caneri	4 $\frac{1}{2}$	+90	+12	5 04.5	+1 46 28	+0.6929	.5528	-0.1052	+9.5735	.9672
10	B. A. C. 3138	6	-7	-68	18 58.8	-8 47 25	-0.8377	.5438	-0.1329	+9.5714	.9675
11	η Leonis	3 $\frac{1}{2}$	+40	-33	20 07.5	-8 28 41	-0.0083	0.5398	-0.1766	+9.4776	9.9795

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of ζ .	At Washington Mean Time of ζ .					
			North- ern.	South- ern.		<i>H</i>	<i>Y</i>	<i>p'</i>	<i>q'</i>	Log sin <i>D</i>	Log cos <i>D</i>
June 12	42 Leonis	6	+83	-1	3 01.3	-1 48 21	+0.6121	0.5395	-.1874	+9.4328	9.9835
12	B.A.C. 3579	6	+86	0	6 21.0	+1 24 47	+0.6424	.5390	-.1916	+9.4155	.9848
12	<i>i</i> Leonis	6	+76	-6	7 57.8	+2 58 27	+0.5463	.5381	-.1945	+9.4098	.9852
12	<i>k</i> Leonis	6	-9	-75	14 46.1	+9 33 35	-0.8882	.5336	-.2024	+9.4121	.9850
13	<i>l</i> Leonis	4	-11	-79	8 49.7	+3 02 32	-0.9311	.5312	-.2231	+9.2926	.9914
13	ξ Virginis	5	-10	-81	19 10.4	-10 56 29	-0.9328	.5311	-.2332	+9.1979	.9945
13	ν Virginis	4½	+90	+3	19 27.7	-10 39 43	+0.7878	.5335	-.2332	+9.1070	.9964
13	A ¹ Virginis	5½	-31	-81	20 27.4	-9 41 56	-1.2061	.5309	-.2340	+9.1967	.9946
14	π Virginis	5	-15	-83	2 43.0	-3 38 20	-1.0081	.5315	-.2384	+9.1118	.9963
14	11 Virginis	6	-33	-83	7 09.4	+0 39 40	-1.2368	.5320	-.2417	+9.0620	.9971
14	<i>c</i> Virginis	5	+48	-34	12 07.2	+5 27 54	+0.1259	.5338	-.2444	+8.8578	.9989
15	65 Virginis	6	+86	+26	17 52.7	+10 15 29	+1.1527	.5424	-.2503	+8.8599	.9989
15	66 Virginis	6	+86	+35	18 26.3	+10 47 58	+1.2546	.5419	-.2502	+8.8843	.9987
15	80 Virginis	6	+54	-28	23 30.8	-8 17 37	+0.2396	.5449	-.2493	+8.9089	.9986
16	94 Virginis	6	+60	-22	13 26.3	+5 09 26	+0.3374	.5526	-.2434	+9.1536	.9956
16	95 Virginis	6	+80	-1	13 37.7	+5 20 31	+0.7321	.5518	-.2433	+9.1752	.9951
16	ν Virginis	4	+80	+18	16 21.6	+7 58 42	+1.0469	.5533	-.2415	+9.2216	.9939
17	μ Libræ	5	+76	+37	8 10.2	-0 46 18	+1.2511	.5636	-.2272	+9.3692	.9878
18	ζ^1 Libræ	4	+54	-21	0 23.1	-9 09 24	+0.3666	.5777	-.2052	+9.4456	.9824
18	β^1 Scorpii	2	+69	-4	15 13.6	+5 06 32	+0.6637	.5884	-.1777	+9.5213	.9746
18	β^2 Scorpii	5½	+69	-4	15 14.1	+5 07 02	+0.6592	.5884	-.1777	+9.5214	.9746
18	ν Scorpio	4	+25	-47	17 48.3	+7 35 05	-0.1076	.5924	-.1736	+9.5143	.9755
18	\downarrow Scorpii	5	+14	-58	22 29.8	-11 54 41	-0.2895	.5970	-.1625	+9.5275	.9739
19	ω Ophiuchi	5	+67	-4	1 33.2	-8 58 41	+0.6567	.5952	-.1556	+9.5573	.9697
19	JUPITER		+3	-66	18 56.9	+7 41 47	-0.3995	.6155	-.1109	+9.5816	.9658
19	<i>b</i> Ophiuchi	5	+66	+9	21 52.7	+10 30 10	+0.8604	.6063	-.1007	+9.6099	.9606
19	<i>c</i> ² Ophiuchi	5	+51	-13	23 44.7	-11 42 31	+0.4867	.6083	-.0979	+9.6066	.9613
20	4 Sagittarii	5	-1	-67	10 09.4	-1 44 28	-0.4083	.6160	-.0654	+9.6059	.9614
20	λ Sagittarii	4	+65	+3	20 23.6	+8 03 20	+0.7508	.6111	-.0348	+9.6340	.9555
21	\downarrow Sagittarii	5	+55	-5	13 47.7	+0 42 38	+0.6253	.6088	+0.0177	+9.6340	.9555
21	λ^2 Sagittarii	4½	+52	-8	21 38.8	+8 13 49	+0.5703	.6058	+0.0418	+9.6202	.9566
22	B.A.C. 7049	6	+6	-61	17 49.2	+3 34 25	-0.3226	.5966	+0.0974	+9.5896	.9645
23	17 Capricor.	6	+1	-71	0 23.7	+9 53 14	-0.4581	.5907	+0.1148	+9.5743	.9671
23	B.A.C. 7197	6	+67	+10	1 14.6	+10 42 07	+0.8782	.5842	+0.1172	+9.5966	.9632
23	η Capricor.	5	-45	-90	7 45.8	-7 01 52	-1.1836	.5873	+0.1311	+9.5430	.9718
23	α Capricor.	6	+50	-18	9 25.7	-5 25 46	+0.4075	.5790	+0.1355	+9.5695	.9678
23	27 Capricor.	6	+17	-52	9 50.3	-5 02 06	-0.1851	.5818	+0.1355	+9.5571	.9698
23	ϕ Capricor.	6	+46	-22	12 41.2	-2 17 41	+0.3296	.5768	+0.1419	+9.5593	.9694
23	33 Capricor.	6	+69	+19	15 53.0	+0 45 50	+1.0158	.5698	+0.1500	+9.5635	.9688
23	37 Capricor.	6	+69	+15	20 23.8	+5 07 41	+0.9598	.5665	+0.1577	+9.5490	.9709
23	ϵ Capricor.	5	+57	-14	21 21.0	+6 02 44	+0.4816	.5674	+0.1596	+9.5365	.9727
23	α Capricor.	5	+44	-26	23 43.9	+8 20 24	+0.2645	.5666	+0.1633	+9.5242	.9743
23	B.A.C. 7550	6	+70	+24	23 57.9	+8 33 57	+1.0802	.5621	+0.1650	+9.5399	.9722
24	29 Aquarii	6	+23	-51	8 22.2	-7 19 45	-0.1703	.5590	+0.1784	+9.4821	.9790
24	56 Aquarii	6	+22	-54	20 56.6	+4 48 37	-0.2313	.5465	+0.1966	+9.4223	.9843
25	α^1 Aquarii	6	+75	+8	5 03.9	-11 20 09	+0.8758	.5370	+0.2058	+9.4082	.9853
25	α^2 Aquarii	5½	+69	+10	5 57.8	-10 28 12	+0.5758	.5367	+0.2068	+9.3947	.9862
25	74 Aquarii	6	-36	-90	7 20.8	-9 07 45	-1.2003	.5400	+0.2079	+9.3316	.9898
25	\downarrow^2 Aquarii	5	-27	-90	19 39.5	+2 47 24	-1.1169	.5301	+0.2186	+9.2390	.9934
25	\downarrow^3 Aquarii	5	+9	-76	20 10.3	+3 17 14	-0.5522	0.5282	+0.2192	+9.2569	9.9928

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of ζ .	At Washington Mean Time of ζ .						
			North-ern.	South-ern.		H		Y	p'	q'	Log sin D	Log cos D
						h	m					
June 26	30 Piscium	4½	+73	-12	17 56.6	+ 0 24 00	+0.5495	0.5129	+2.2308	-9.0750	9.9969	
26	33 Piscium	5	+80	-7	19 42.0	+ 2 06 21	+0.6334	.5125	+2.2312	-9.0556	.9972	
28	33 Ceti	6	+35	-46	6 27.3	+11 52 12	-0.1046	.5018	+2.2329	+8.4618	.9998	
28	f Piscium	6	+16	-69	10 22.9	- 8 18 50	-0.4767	.5011	+2.2319	+8.6950	.9995	
28	v Piscium	5	+64	-19	23 13.6	+ 4 10 26	+0.3950	.5010	+2.2275	+8.9174	.9985	
29	ξ Ceti	5	+69	-14	16 20.6	- 3 11 13	+0.4662	.5029	+2.2185	+9.1518	.9956	
29	ξ Arietis	5½	+34	-45	22 41.6	+ 2 59 07	-0.1317	.5033	+2.2144	+9.2371	.9934	
29	B. A. C. 755	6	+48	-31	23 44.4	+ 4 00 08	+0.1387	.5038	+2.2137	+9.2353	.9935	
30	31 Arietis	5½	+6	-78	4 59.0	+ 9 05 55	-0.8624	.5041	+2.2090	+9.3110	.9907	
30	38 Arietis	5½	+43	-35	9 27.1	-10 33 39	+0.0459	.5066	+2.2057	+9.3116	.9907	
July 1	SATURN		+41	-32	19 47.7	- 1 13 06	+0.0083	.5140	+1.6777	+9.4825	.9790	
2	ω^1 Tauri	6	+27	-44	4 47.9	+ 7 30 38	-0.2437	.5237	+1.5556	+9.5174	.9751	
2	ω^2 Tauri	5½	0	-69	8 48.3	+11 23 42	-0.7396	.5241	+1.4966	+9.5385	.9724	
2	MARS		-38	-69	14 19.3	- 7 15 36	-1.2156	.4950	+1.3444	+9.5613	.9691	
3	ν Tauri	4	+90	+22	7 00.6	+ 8 53 58	+0.8734	.5292	+1.1109	+9.5616	.9691	
3	105 Tauri	6	+90	+30	9 18.2	+11 07 11	+0.9786	.5426	+1.1071	+9.5642	.9687	
3	n Tauri	5½	+90	+36	14 39.0	- 7 42 28	+1.0442	.5453	+0.9976	+9.5723	.9674	
3	121 Tauri	6	+13	-51	22 09.3	- 0 27 00	-0.4915	.5435	+0.8817	+9.6082	.9610	
4	1 Geminor	5	+90	+49	11 22.6	-11 40 15	+1.1516	.5547	+0.9545	+9.5966	.9632	
4	γ Cancri	4½	+89	+10	10 50.5	+ 9 19 46	+0.6459	.5563	-1.047	+9.5736	.9672	
7	B. A. C. 3138	6	+11	-68	0 38.0	- 1 20 51	-0.8902	.5469	-1.329	+9.5714	.9675	
9	η Leonis	3½	+37	-36	1 39.4	- 1 09 28	-0.0755	.5417	-1.1709	+9.4775	.9795	
9	43 Leonis	6	+76	-5	8 32.4	+ 5 30 03	+0.5420	.5410	-1.1875	+9.4328	.9835	
9	B. A. C. 3579	6	+79	-4	11 51.9	+ 8 43 07	+0.5711	.5396	-1.1932	+9.4155	.9848	
9	i Leonis	6	+70	-10	13 28.8	+10 16 49	+0.4737	.5393	-1.1945	+9.4098	.9852	
9	k Leonis	6	-14	-75	20 17.6	- 7 07 28	-0.9692	.5337	-2.2037	+9.4121	.9850	
10	c Leonis	4	-17	-79	14 26.7	+10 26 55	-1.0219	.5299	-2.236	+9.2934	.9914	
11	ξ Virginis	5	-17	-81	0 53.3	- 3 26 09	-1.0292	.5288	-2.328	+9.1979	.9945	
11	v Virginis	4½	+90	-2	1 10.8	- 3 09 12	+0.7031	.5310	-2.328	+9.1073	.9964	
11	π Virginis	5	-22	-83	8 31.5	+ 3 57 40	-1.1089	.5286	-2.375	+9.1118	.9963	
11	c Virginis	5	+42	-39	18 04.4	-10 47 26	+0.0326	.5299	-2.429	+8.8578	.9989	
13	65 Virginis	6	+86	+19	0 28.6	- 5 21 04	+1.0718	.5351	-2.471	+8.8599	.9989	
13	66 Virginis	6	+86	+28	1 03.1	- 4 47 42	+1.1754	.5354	-2.470	+8.8840	.9987	
13	80 Virginis	6	+48	-33	6 15.8	+ 0 14 54	+0.1477	.5380	-2.459	+8.9089	.9986	
13	94 Virginis	6	+54	-26	20 35.4	- 9 53 45	+0.2709	.5442	-2.396	+9.1536	.9956	
13	95 Virginis	6	+80	-6	20 47.3	- 9 42 19	+0.6512	.5435	-2.395	+9.1751	.9951	
13	x Virginis	4	+80	+13	23 36.2	- 6 59 05	+0.9721	.5447	-2.377	+9.2216	.9939	
14	2 Libræ	6	+79	+44	4 22.7	- 2 22 16	+1.3155	.5469	-2.341	+9.2822	.9919	
14	μ Libræ	5	+76	+31	15 54.9	+ 8 46 10	+1.1874	.5547	-2.227	+9.3692	.9878	
15	ζ^1 Libræ	4	+50	-25	8 39.6	+ 0 54 55	+0.2986	.5679	-2.2017	+9.4456	.9824	
15	ζ^2 Libræ	6	+33	-41	9 40.9	+ 1 53 56	-0.0129	.5697	-2.2001	+9.4428	.9827	
15	ζ^3 Libræ	6	+36	-38	10 32.0	+ 2 42 58	+0.0577	.5703	-1.1986	+9.4495	.9821	
15	β^1 Scorpii	2	+66	-7	23 58.4	- 8 20 45	+0.6112	.5795	-1.738	+9.5213	.9746	
15	β^2 Scorpii	5½	+66	-7	23 58.6	- 8 20 35	+0.6080	.5795	-1.738	+9.5213	.9746	
16	v Scorpii	4	+21	-51	2 37.9	- 5 47 25	-0.1695	.5835	-1.697	+9.5143	.9755	
16	ω Ophiuchi	5	+11	-62	7 27.8	- 1 08 42	-0.3501	.5882	-1.592	+9.5276	.9739	
16	ω Ophiuchi	5	+64	-7	10 36.6	+ 1 52 43	+0.6120	.5865	-1.526	+9.5573	.9697	
16	B. A. C. 5758	6	+30	-90	23 51.3	- 9 24 26	-0.9877	.6019	-1.214	+9.5613	.9691	
16	JUPITER		+19	-47	23 51.8	- 9 23 56	-0.1096	.6019	-1.204	+9.5780	.9664	
17	39 Ophiuchi	5½	+66	+47	4 18.1	- 5 08 34	+1.2517	0.5952	-1.103	+9.6113	9.9603	

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
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1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of σ .	At Washington Mean Time of σ .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
July 17	B. A. C. 5831	6	+66	+22	4 20.3	- 5 06 30	+1.0330	0.5963	-1.083	-9.6076	9.9611
17	δ Ophiuchi	5	+66	+ 8	7 28.2	- 2 06 16	+0.8352	.5987	-1.002	-9.6099	.9606
17	ϵ^2 Ophiuchi	5	+49	-15	9 22.9	- 0 16 20	+0.4590	.6016	-0.048	-9.6066	.9613
17	λ Sagittarii	5	- 3	-69	20 00.7	+ 9 54 49	-0.4348	.6104	-0.0634	-9.6059	.9614
18	λ Sagittarii	4	+65	+ 2	6 25.3	- 4 05 54	+0.7447	.6069	-0.0336	-9.6340	.9555
19	\downarrow Sagittarii	5	+56	- 4	0 01.4	-11 15 34	+0.6354	.6066	+0.0211	-9.6340	.9555
19	λ^2 Sagittarii	4½	+54	- 7	7 55.4	- 3 41 30	+0.5878	.6042	+0.0449	-9.6292	.9566
20	η Capricor.	5	-39	-90	17 57.7	+ 4 58 06	-1.1254	.5894	+1.348	-9.5430	.9718
21	ϵ Capricor.	5	+61	-10	7 24.0	- 6 06 12	+0.5500	.5721	+1.620	-9.5365	.9727
21	α Capricor.	5	+49	-22	9 44.9	- 3 50 27	+0.3368	.5713	+1.658	-9.5242	.9743
21	B. A. C. 7550	6	+70	+30	9 58.9	- 3 37 02	+1.1482	.5670	+1.676	-9.5399	.9722
21	29 Aquarii	6	+27	-46	18 15.7	+ 4 21 48	-0.0861	.5642	-1.184	-9.4821	.9790
22	56 Aquarii	6	+27	-48	6 37.1	- 7 42 50	-0.1319	.5537	+1.990	-9.4223	.9843
22	ϵ^2 Aquarii	6	+75	+14	14 35.2	- 0 00 55	+0.9745	.5440	+2.086	-9.4080	.9853
22	ϵ^2 Aquarii	5½	+75	- 4	15 27.9	+ 0 49 00	+0.6784	.5437	+2.097	-9.3946	.9862
22	74 Aquarii	6	-18	-90	17 17.1	+ 2 35 36	-0.9837	.5456	+2.118	-9.3317	.9898
23	\downarrow^1 Aquarii	5½	-46	-90	3 52.8	-11 09 21	-1.3080	.5365	+2.218	-9.2346	.9935
23	\downarrow^2 Aquarii	5	-17	-90	4 52.7	-10 11 26	-0.9860	.5354	+2.225	-9.2390	.9934
23	\downarrow^3 Aquarii	5	+15	-66	5 22.8	- 9 42 16	-0.4261	.5348	+2.226	-9.2568	.9928
24	30 Piscium	4½	+83	- 5	2 41.2	+10 56 30	+0.6832	.5198	+2.240	-9.0750	.9969
24	33 Piscium	5	+78	- 0	4 24.4	+ 4 24.4	+0.7674	.5183	+2.346	-9.0555	.9972
25	33 Ceti	6	+44	-38	14 28.9	- 2 18 26	+0.0548	.5062	+2.352	+8.4637	.9998
25	γ Piscium	6	+24	-59	18 19.8	+ 1 25 52	-0.3154	.5055	+2.341	+8.6952	.9995
26	ν Piscium	5	+76	-11	6 59.2	-10 16 12	+0.5537	.5045	+2.291	+8.9173	.9985
26	ϵ^1 Ceti	5	+82	- 5	23 53.2	+ 6 09 07	+0.6240	.5055	+2.190	+9.1520	.9956
27	ξ Arietis	5½	+47	-36	6 10.3	-11 44 27	+0.0470	.5057	+2.146	+9.2364	.9935
27	B. A. C. 755	6	+58	-22	7 12.5	-10 44 01	+0.2973	.5061	+2.138	+9.2353	.9935
27	38 Arietis	5½	+52	-22	16 50.3	+ 1 22 47	+0.2021	.5077	+2.062	+9.3116	.9907
29	SATURN	5	+70	- 7	8 16.0	-11 06 44	+0.4556	.5202	+1.586	+9.4940	.9778
29	α^1 Tauri	6	+35	-36	12 00.4	- 7 29 12	-0.1027	.5238	+1.534	+9.5172	.9751
29	ω^2 Tauri	5½	+ 7	-65	16 00.5	- 3 36 28	-0.6103	.5243	+1.473	+9.5384	.9724
29	ϵ Tauri	4½	+90	+29	14 12.0	- 6 06 58	+0.9774	.5403	+1.099	+9.5616	.9691
30	105 Tauri	6	+90	+37	16 29.7	- 3 53 45	+1.0799	.5415	+1.062	+9.5642	.9687
30	η Tauri	6	+90	+44	21 50.2	+ 1 16 22	+1.1389	.5441	+0.967	+9.5724	.9674
31	121 Tauri	6	+18	-45	5 19.9	+ 8 31 14	-0.4034	.5425	+0.808	+9.6082	.9610
31	132 Tauri	5	+ 8	-55	11 35.1	- 9 26 04	-0.5720	.5442	+0.685	+9.6180	.9590
31	MARS	3	+76	+ 6	14 03.5	- 7 02 39	+0.5124	.5198	+0.609	+9.6037	.9618
31	1 Geminor	5	+90	+57	18 32.7	- 2 42 32	+1.2229	.5540	+0.536	+9.5966	.9632
31	5 Geminor	6	+46	-14	21 52.9	+ 0 30 54	+0.0893	.5514	+0.449	+9.6169	.9592
Aug. 1	ϵ Geminor	3	+19	-37	12 27.4	- 9 24 36	-0.3808	.5536	+0.0136	+9.6303	.9563
1	37 Geminor	6	+ 3	-56	17 32.1	- 4 30 28	-0.6515	.5536	+0.021	+9.6368	.9553
1	ω Geminor	6	+83	+16	20 43.8	- 1 25 24	+0.5817	.5594	-0.048	+9.6163	.9593
2	48 Geminor	6	+84	+15	1 11.5	+ 2 52 59	+0.5869	.5604	-0.164	+9.6155	.9595
2	52 Geminor	6	+26	-31	2 10.0	+ 3 49 27	-0.2630	.5571	-0.188	+9.6281	.9568
2	A Geminor	5½	+ 9	-51	6 03.9	+ 7 35 12	-0.5633	.5562	-0.281	+9.6313	.9561
2	α Geminor	4	+25	-35	15 22.4	- 7 25 51	-0.2843	.5578	-0.090	+9.6219	.9582
5	B. A. C. 3579	6	+70	-10	18 01.4	- 7 19 54	+0.4044	.5437	-1.1961	+9.4155	.9848
5	δ Leonis	6	+63	-15	19 37.0	- 5 47 31	+0.3637	.5432	-1.1974	+9.4097	.9852
6	δ Leonis	6	-22	-75	2 20.4	+ 0 42 43	-1.0789	.5376	-2.068	+9.4120	.9850
6	ϵ Leonis	4	-27	-79	20 15.8	- 5 56 34	-1.1598	0.5335	-2.267	+9.2934	9.9914

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of ζ .	At Washington Mean Time of ζ .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
Aug. 7	ξ Virginis	5	-29	-81	6 35.7	+ 4 03 37	-1.1820	0.5320	-2.350	+9.1979	9.9945
7	ν Virginis	4½	+75	-11	6 53.0	+ 4 20 24	+0.5428	.5341	-2.358	+9.1071	.9964
7	π Virginis	5	-33	-83	14 09.7	+11 23 14	-1.2425	.5311	-2.403	+9.1118	.9963
7	c Virginis	5	+33	-48	23 38.4	- 3 26 06	-0.1450	.5320	-2.446	+8.8578	.9989
9	65 Virginis	6	+86	+ 6	5 58.4	+ 1 56 06	+0.8748	.5351	-2.475	-8.8595	.9989
9	66 Virginis	6	+86	+13	6 33.4	+ 2 29 58	+0.9768	.5347	-2.474	-8.8842	.9987
9	β Virginis	6	+85	+33	10 06.0	+ 5 55 45	+1.2303	.5355	-2.493	-8.9811	.9980
9	80 Virginis	6	+37	-44	11 47.3	+ 7 33 47	-0.0558	.5368	-2.460	-8.9083	.9986
10	94 Virginis	6	+43	-37	2 12.8	- 2 28 59	+0.0658	.5424	-2.385	-9.1535	.9956
10	95 Virginis	6	+65	-17	2 24.8	- 2 17 24	+0.4483	.5417	-2.385	-9.1752	.9951
10	α Virginis	4	+75	0	5 15.4	+ 0 27 33	+0.7707	.5425	-2.364	-9.2216	.9939
10	μ Libræ	5	+76	+15	21 47.1	- 7 34 15	+0.9931	.5495	-2.217	-9.3692	.9878
11	σ Libræ	6	+10	-70	11 43.9	+ 5 53 19	-0.4704	.5616	-2.037	-9.4135	.9849
11	σ Libræ	6	-26	-90	12 36.8	+ 6 44 19	-1.0624	.5639	-2.022	-9.4015	.9857
11	ζ Libræ	4	+39	-35	14 50.4	+ 8 53 06	+0.1066	.5621	-1.993	-9.4456	.9824
11	ζ Libræ	6	+23	-52	15 52.9	+ 9 53 25	-0.1987	.5648	-1.962	-9.4430	.9826
11	ζ Libræ	6	+26	-49	16 50.7	+10 49 05	-0.1366	.5640	-1.961	-9.4495	.9821
12	β Scorpii	2	+55	-17	6 30.1	- 0 01 28	+0.4362	.5717	-1.716	-9.5213	.9746
12	β Scorpii	5½	+55	-17	6 30.3	- 0 01 19	+0.4356	.5719	-1.717	-9.5213	.9746
12	B.A.C. 5330	5½	+55	-17	6 30.3	- 0 01 19	+0.4328	.5720	-1.717	-9.5211	.9747
12	ω Scorpii	4½	+70	+37	7 03.2	+ 0 30 19	+1.2179	.5699	-1.697	-9.5396	.9722
12	ν Scorpio	4	+12	-62	9 13.6	+ 2 35 51	-0.3512	.5768	-1.658	-9.5143	.9755
12	\downarrow Ophiuchi	5	+ 1	-76	14 11.0	+ 7 22 02	-0.5293	.5810	-1.555	-9.5276	.9739
12	ω Ophiuchi	5	+53	-16	17 24.8	+10 28 25	+0.4491	.5792	-1.491	-9.5573	.9697
13	JUPITER		+20	-47	5 26.7	- 1 57 42	-0.0958	.5889	-1.121	-9.5776	.9665
13	B.A.C. 5758	6	-44	-90	7 01.2	- 0 26 54	-1.1550	.5946	-1.163	-9.5613	.9691
13	39 Ophiuchi	5½	+66	+30	11 35.6	+ 3 56 39	+1.1218	.5867	-1.063	-9.6113	.9603
13	B.A.C. 5831	6	+66	+12	11 37.8	+ 3 58 41	+0.9001	.5878	-1.063	-9.6076	.9611
13	b Ophiuchi	5	+65	- 1	14 51.2	+ 7 04 21	+0.7028	.5899	-0.985	-9.6099	.9606
13	c Ophiuchi	5	+41	-23	16 49.1	+ 8 57 34	+0.3250	.5942	-0.934	-9.6066	.9613
14	4 Sagittarii	5	-10	-81	3 45.1	- 4 32 59	-0.5663	.6013	-0.631	-9.6059	.9614
14	7 Sagittarii	6	+11	-50	5 54.6	- 3 26 20	-0.1553	.6003	-0.574	-9.6139	.9598
14	9 Sagittarii	4½	+14	-46	5 18.0	- 3 03 56	-0.0931	.5999	-0.574	-9.6154	.9595
14	B.A.C. 6161	6	-30	-90	8 18.7	- 0 10 36	-0.8917	.6045	-0.489	-9.6046	.9617
14	λ Sagittarii	3	+58	- 4	14 27.4	+ 5 42 56	+0.6460	.5984	-0.316	-9.6340	.9555
14	24 Sagittarii	6	-26	-90	16 44.3	+ 7 54 12	-0.7898	.6056	-0.258	-9.6116	.9603
14	26 Sagittarii	6	-42	-90	19 46.0	+10 48 26	-1.0240	.6070	-0.170	-9.6087	.9608
14	B.A.C. 6369	6	+24	-32	20 51.9	+11 51 36	+0.1603	.6016	-0.111	-9.6284	.9567
15	\downarrow Sagittarii	5	+51	- 8	8 31.3	- 0 57 46	+0.5643	.5991	+0.211	-9.6340	.9555
15	B.A.C. 6576	6	-11	-77	8 32.8	- 0 56 20	-0.5224	.6044	+0.211	-9.6164	.9593
15	α Sagittarii	5½	+14	-44	12 15.0	+ 2 36 40	-0.0555	.6014	+0.328	-9.6224	.9580
15	α Sagittarii	6	-14	-85	12 21.1	+ 2 42 34	-0.6023	.6041	+0.328	-9.6134	.9599
15	β Sagittarii	6	+38	-21	16 21.5	+ 6 33 09	+0.3509	.5987	+0.444	-9.6265	.9572
15	β Sagittarii	4½	+50	-11	16 36.8	+ 6 47 45	+0.5307	.5979	+0.444	-9.6292	.9566
15	η Capricor.	5	-40	-90	3 16.6	- 7 54 59	-1.1301	.5867	+1.354	-9.55430	.9718
17	ϵ Capricor.	5	+64	- 9	16 51.6	+ 5 09 27	+0.5852	.5709	+1.628	-9.5365	.9727
17	α Capricor.	5	+51	-20	19 13.8	+ 7 26 23	+0.3758	.5688	+1.684	-9.5242	.9743
19	\downarrow Aquarii	5	- 8	-90	14 23.2	+ 1 07 07	-0.8551	.5386	+2.253	-9.2390	.9934
19	\downarrow Aquarii	5	+23	-58	14 53.2	+ 1 36 07	-0.2947	.5367	+2.260	-9.2568	.9928
20	30 Piscium	5	+83	+ 5	12 00.9	- 1 55 47	+0.8531	.5228	+2.375	-9.0750	9.9969

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of ϕ .	At Washington Mean Time of ϕ .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
Aug. 20	33 Piscium	5	+83	+10	13 43.0	-10 16 47	+0.9404	0.5226	+0.2381	-0.9555	9.9972
21	33 Ceti	6	+57	+26	23 21.2	+ 8 21 43	+0.2821	.5107	+0.2384	+8.4634	.9998
22	γ Piscium	6	+46	-35	3 09.5	-11 56 32	+0.1001	.5098	+0.2370	+8.6691	.9995
22	ν Piscium	5	+90	+2	15 37.9	+ 0 10 18	+0.7964	.5089	+0.2322	+8.9175	.9985
23	ξ Ceti	5	+90	+9	8 18.5	- 7 37 45	+0.8790	.5092	+0.2215	+9.1520	.9956
23	ξ Arietis	5½	+58	-23	14 31.0	- 1 35 57	+0.2895	.5091	+0.2168	+9.2372	.9934
23	B. A. C. 755	6	+77	-9	15 32.5	- 0 36 17	+0.5571	.5094	+0.2159	+9.2354	.9935
23	31 Arietis	5½	+18	-62	20 40.8	+ 4 23 08	-0.4340	.5087	+0.2115	+9.3110	.9907
24	38 Arietis	5½	+69	-13	1 01.3	+ 8 36 02	+0.4560	.5112	+0.2068	+9.3116	.9907
25	SATURN		+90	+22	19 19.8	+ 1 39 05	+0.9462	.5260	+0.1543	+9.4994	.9772
25	ω^1 Tauri	6	+49	-23	19 56.1	+ 2 14 13	+0.1443	.5247	+0.1529	+9.5174	.9751
25	ω^2 Tauri	5½	+21	-49	23 55.5	+ 6 06 27	-0.3552	.5248	+0.1467	+9.5385	.9724
26	ϵ Tauri	4½	+90	+50	22 06.2	+ 3 34 55	+1.2151	.5398	+0.1086	+9.5616	.9691
27	121 Tauri	6	+31	-32	13 15.7	- 5 45 15	-0.1816	.5412	+0.0794	+9.6082	.9610
27	132 Tauri	6	+21	-41	19 31.7	+ 0 18 21	-0.3575	.5429	+0.0670	+9.6180	.9590
28	5 Geminor	6	+59	-3	5 51.5	+10 17 16	+0.2909	.5490	+0.0456	+9.6169	.9592
28	ϵ Geminor	3½	+30	-26	20 29.1	+ 0 24 57	-0.1999	.5518	+0.0121	+9.6303	.9503
29	37 Geminor	6	+14	-42	1 34.9	+ 5 20 09	+0.5120	.5518	+0.0007	+9.6348	.9553
29	ω Geminor	6	+90	+25	4 47.3	+ 8 25 53	+0.7471	.5576	-0.0062	+9.6163	.9593
29	48 Geminor	6	+90	+24	9 15.8	-11 14 55	+0.7484	.5586	+0.0178	+9.6155	.9595
29	52 Geminor	6	+35	-22	10 14.4	-10 18 20	-0.1037	.5553	-0.0201	+9.6281	.9568
29	α Geminor	5½	+18	-41	14 09.0	- 6 31 55	-0.4109	.5555	-0.0295	+9.6312	.9561
29	\times Geminor	3½	+33	-27	23 28.7	+ 2 28 16	-0.1468	.5565	-0.0503	+9.6217	.9582
30	μ^1 Cancri	6	+90	+41	9 13.2	+11 52 22	+1.0832	.5617	-0.0733	+9.5928	.9639
30	λ Cancri	6	-17	-66	15 30.4	- 6 03 40	-0.9627	.5531	-0.0869	+9.6174	.9591
31	γ Cancri	4½	+90	+13	1 42.4	+ 3 47 05	+0.7034	.5589	-0.1090	+9.5736	.9670
31	B. A. C. 3138	6	-9	-68	15 18.1	- 7 05 24	-0.8706	.5508	-0.1385	+9.5714	.9675
Sept. 4	c Virginis	5	+26	-57	6 28.7	+ 5 11 51	-0.2909	.5374	-0.2490	+8.8576	.9989
5	65 Virginis	6	+84	-6	12 13.0	+ 9 58 13	+0.6606	.5404	-0.2517	-8.8598	.9989
5	66 Virginis	6	+80	-1	12 46.9	+10 30 59	+0.7628	.5400	-0.2517	-8.8842	.9987
5	β^2 Virginis	6	+85	+15	16 15.5	-10 07 16	+1.0090	.5407	-0.2504	-8.9816	.9980
5	80 Virginis	6	+26	-56	17 55.0	- 8 31 04	-0.2683	.5424	-0.2497	-8.9083	.9986
6	94 Virginis	6	+30	-50	8 05.8	+ 5 11 24	-0.1672	.6470	-0.2416	-9.1536	.9956
6	95 Virginis	6	+51	-30	8 17.5	+ 5 22 44	+0.2124	.5464	-0.2416	-9.1752	.9951
6	\times Virginis	4½	+70	-13	11 05.4	+ 8 04 59	+0.5299	.5470	-0.2393	-9.2215	.9939
6	2 Libræ	6	+79	+6	15 50.5	-11 19 38	+0.8714	.5477	-0.2359	-9.2821	.9919
7	μ Libræ	6	+76	-1	3 24.1	- 0 09 49	+0.7382	.5532	-0.2232	-9.3692	.9878
7	ν^1 Libræ	5	+74	+38	10 58.4	+ 7 08 29	+1.2569	.5559	-0.2129	-9.4319	.9835
7	σ^1 Libræ	6	-4	-90	17 13.6	-10 49 36	-0.7257	.5643	-0.2040	-9.4135	.9849
7	ζ^1 Libræ	4	+26	-50	20 18.9	- 7 50 58	-0.1516	.5644	-0.1994	-9.4456	.9824
7	ζ^2 Libræ	6	+10	-70	21 21.1	- 6 51 00	-0.4561	.5658	-0.1977	-9.4430	.9826
7	ζ^3 Libræ	6	+13	-65	22 18.6	- 5 55 37	-0.3943	.5662	-0.1961	-9.4495	.9821
8	β^1 Scorpii	2	+40	-31	11 56.0	+ 7 11 46	+0.1776	.5728	-0.1705	-9.5213	.9746
8	β^2 Scorpii	5½	+40	-31	11 56.2	+ 7 11 55	+0.1741	.5728	-0.1705	-9.5213	.9746
8	ω^1 Scorpii	4½	+70	+14	12 29.0	+ 7 43 33	+0.9598	.5696	-0.1705	-9.5396	.9722
8	ω^2 Scorpii	4½	+70	+27	12 43.3	+ 7 57 19	+1.1218	.5690	-0.1705	-9.5436	.9717
8	ν Scorpii	4	-2	-84	14 39.5	+ 9 49 09	-0.6095	.5762	-0.1664	-9.5143	.9755
8	B. A. C. 5395	6	+69	+42	15 18.8	+10 26 57	+1.2505	.5702	-0.1644	-9.5548	.9701
8	\downarrow Ophiuchi	5	-13	-90	19 37.4	- 9 24 09	-0.7872	.5798	-0.1560	-9.5274	.9739
8	ω Ophiuchi	5	+38	-30	22 51.9	- 6 17 08	+0.1943	0.5788	-0.1472	-9.5573	9.9697

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
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1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of \odot .		At Washington Mean Time of \odot .												
			North-ern.	South-ern.	H			Y	p'	q'	Log sin D	Log cos D							
					$h.$	$m.$	$s.$												
Sept. 9	JUPITER		°	°	$h.$	$m.$	$s.$												
9	39 Ophiuchi	5½	+5	-66	13	14.2	+7	31	50	-0.3854	0.5876	-1139	-9.5817	9.9658					
9	B.A.C. 5831	6	+66	+10	17	10.5	+11	18	52	+0.8812	.5840	-1039	-9.6113	.9603					
9	b Ophiuchi	5	+63	-4	17	12.6	+11	20	56	+0.6586	.5851	-1039	-9.6076	.9611					
9	c ² Ophiuchi	5	+49	-15	20	28.1	-9	31	18	+0.4635	.5868	-0961	-9.6099	.9606					
9	λ Sagittarii	5	+27	-36	22	27.4	-7	36	43	+0.0844	.5894	-0908	-9.6066	.9613					
10	4 Sagittarii	5	-24	-90	9	32.5	+3	01	47	-0.8017	.5966	-0610	-9.6059	.9614					
10	7 Sagittarii	6	-1	-66	10	43.1	+4	09	32	-0.3845	.5948	-0581	-9.6139	.9598					
10	9 Sagittarii	4½	+2	-61	11	06.7	+4	32	16	-0.3236	.5950	-0554	-9.6153	.9595					
10	B.A.C. 6161	6	-39	-90	14	10.4	+7	28	35	-1.1251	.5991	-0470	-9.6046	.9617					
10	λ Sagittarii	3	+27	-17	20	25.6	-10	31	24	+0.4320	.5928	-0299	-9.6340	.9555					
10	24 Sagittarii	6	-41	-90	22	45.0	-8	17	34	-1.0134	.5996	-0243	-9.6116	.9603					
10	26 Sagittarii	6	-62	-90	1	50.2	-5	19	51	-1.2462	.6006	-0157	-9.6087	.9608					
11	B.A.C. 6369	6	+13	-44	2	57.4	-4	15	25	-0.0502	.5951	-0099	-9.6284	.9567					
11	σ Sagittarii	2½	+64	+59	6	57.8	-0	24	43	+1.2697	.5886	+0015	-9.6491	.9519					
11	↓ Sagittarii	5	+37	-20	14	51.6	+7	09	59	+0.3751	.5924	+0215	-9.6340	.9555					
11	B.A.C. 6576	6	-22	-90	14	53.1	+7	11	28	-0.7231	.5972	+0243	-9.6164	.9593					
11	χ ² Sagittarii	5½	+4	-56	18	40.2	+10	49	29	-0.2455	.5943	+0327	-9.6224	.9580					
11	χ ³ Sagittarii	6	-26	-90	18	46.5	+10	55	30	-0.7949	.5969	+0327	-9.6135	.9599					
11	h ¹ Sagittarii	6	+28	-31	22	52.4	-9	08	24	+0.1713	.5910	+0467	-9.6265	.9572					
11	h ² Sagittarii	4½	+38	-21	23	08.0	-8	53	29	+0.3533	.5902	+0467	-9.6292	.9566					
12	B.A.C. 6864	6	-50	-90	8	55.8	+0	31	05	-1.1760	.5932	+0738	-9.5943	.9636					
12	B.A.C. 7049	6	0	-71	20	13.3	+11	22	07	-0.4604	.5849	+1021	-9.5895	.9645					
13	B.A.C. 7179	6	-4	-80	3	01.9	-6	04	50	-0.5640	.5812	+1190	-9.5743	.9671					
13	B.A.C. 7197	6	+67	+5	3	54.3	-5	14	29	+0.7989	.5749	+1213	-9.5966	.9632					
13	η Capricor.	5½	-54	-90	10	37.7	+1	13	47	-1.2601	.5797	+1350	-9.5430	.9718					
13	χ Capricor.	6	+47	-21	12	20.4	+2	52	38	+0.3637	.5721	+1393	-9.5694	.9679					
13	z Capricor.	6	+15	-55	12	45.6	+3	16	57	-0.2350	.5746	+1393	-9.5571	.9698					
13	φ Capricor.	6	+42	-27	15	19.8	+5	45	25	+0.2509	.5704	+1457	-9.5592	.9694					
14	33 Capricor.	6	+69	+19	18	57.0	+9	14	38	+1.0139	.5648	+1539	-9.5634	.9688					
14	37 Capricor.	6	+69	+16	23	33.2	-10	19	08	+0.9809	.5626	+1617	-9.5490	.9709					
14	ε Capricor.	4½	+59	-13	0	31.4	-9	23	05	+0.5030	.5625	+1638	-9.5365	.9727					
14	z Capricor.	5	+47	-25	2	56.6	-7	03	04	+0.2967	.5619	+1692	-9.5242	.9743					
14	B.A.C. 7550	6	+70	+27	3	10.9	-6	49	15	+1.1207	.5592	+1692	-9.5399	.9722					
15	56 Aquarii	6	+30	-46	0	18.2	-10	25	54	-0.0826	.5489	+2025	-9.4223	.9843					
15	π ¹ Aquarii	6	+75	+21	8	24.3	-2	35	57	+1.0720	.5409	+2124	-9.4080	.9853					
15	π ² Aquarii	4	+69	+1	9	17.6	-1	44	27	+0.7771	.5407	+2135	-9.3947	.9862					
16	4 ² Aquarii	4½	-7	-90	22	50.2	+11	21	59	-0.8339	.5363	+2263	-9.2390	.9934					
16	4 ³ Aquarii	5	+24	-56	23	20.5	+11	51	19	-0.2685	.5346	+2271	-9.2568	.9928					
17	30 Piscium	5	+83	+10	20	39.2	+8	30	21	+0.9406	.5225	+2396	-9.0750	.9969					
17	33 Piscium	5	+83	+16	22	21.8	+10	09	54	+1.0323	.5214	+2403	-9.0555	.9972					
18	33 Ceti	6	+68	-17	8	02.2	-5	09	24	+0.4526	.5124	+2413	+8.4637	.9998					
18	γ Piscium	6	+46	-36	11	49.7	-1	28	27	+0.0986	.5120	+2405	+8.6952	.9995					
18	μ Piscium	4½	-21	-85	18	17.2	+4	47	51	-1.1041	.5104	+2379	+8.9730	.9981					
19	ν Piscium	5	+90	+15	0	14.7	+10	35	01	+1.0000	.5113	+2350	+8.9176	.9985					
19	ξ ¹ Ceti	5	+90	+24	16	49.1	+2	40	40	+1.1115	.5123	+2247	+9.1520	.9956					
19	ξ Arietis	5½	+75	+10	22	58.9	+8	39	47	+0.5325	.5124	+2101	+9.2372	.9934					
19	B.A.C. 755	6	+90	+5	23	59.9	+9	39	00	+0.8015	.5129	+2181	+9.2353	.9935					
20	31 Arietis	5½	+31	+47	5	05.9	-9	23	54	-0.1810	.5120	+2136	+9.3110	.9907					
20	38 Arietis	5½	+90	+1	9	27.0	-5	10	28	+0.7230	.5143	+2097	+9.3116	.9907					
22	ω ¹ Tauri	6	+69	-7	4	03.4	-11	50	43	+0.4376	0.5265	+1540	+9.5174	9.9751					

For facilitating the Calculation of Occultations of Planets and Stars by the Moon, for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of \odot .	At Washington Mean Time of \odot .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
Sept. 22	ω^2 Tauri	5½	+38	-33	8 02.0	-7 59 31	-0.0611	0.5265	+1.476	+9.5384	9.9724
22	τ Tauri	4½	-28	-67	20 08.2	+3 43 55	-1.1110	.5273	+1.1272	+9.5860	.9651
23	103 Tauri	6	-43	-66	8 24.2	-8 23 35	-1.2289	.5309	+1.1050	+9.6104	.9605
23	121 Tauri	6	+48	-16	21 21.6	+4 08 29	+0.1096	.5406	+0.7091	+9.6082	.9610
24	132 Tauri	5½	+37	-24	3 39.3	+10 13 37	-0.0697	.5419	+0.6667	+9.6180	.9590
24	ϵ Geminor	6	+83	+12	14 02.4	+3 44 04	+0.5751	.5479	+0.431	+9.6169	.9592
25	ϵ Geminor	3½	+46	-12	4 46.5	+10 30 08	+0.0724	.5490	+0.120	+9.6303	.9563
25	37 Geminor	6	+29	-26	9 55.0	-8 31 55	-0.2114	.5493	-.0016	+9.6348	.9553
25	ω Geminor	6	+90	+42	13 09.2	-5 24 24	+1.0186	.5546	-.0085	+9.6163	.9593
25	48 Geminor	6	+90	+41	17 40.4	-1 02 32	+1.0125	.5553	-0.177	+9.6155	.9595
25	52 Geminor	6	+51	-8	18 39.6	-0 05 20	+0.1565	.5518	-.0199	+9.6281	.9568
25	A Geminor	5½	+32	-25	22 36.6	+3 43 32	-0.1553	.5511	-.0292	+9.6312	.9561
26	α Geminor	3½	+47	-14	8 02.5	-11 10 09	+0.0983	.5528	-.0521	+9.6219	.9582
27	λ Caneri	6	-1	-66	0 15.1	+4 28 53	-0.7404	.5493	-.0883	+9.6174	.9591
27	γ Caneri	5½	+90	+25	10 33.8	-9 33 37	+0.9152	.5550	-.1101	+9.5736	.9672
28	B.A.C. 3138	6	+3	-67	0 17.8	+3 42 07	-0.6868	.5473	-.1393	+9.5714	.9675
29	η Leonis	3½	+40	-34	0 59.0	+3 33 19	-0.0213	.5455	-.1856	+9.4775	.9795
29	43 Leonis	6	+77	-5	7 43.4	+10 04 13	+0.5462	.5461	-.1952	+9.4328	.9835
29	B.A.C. 3579	6	+77	-6	10 58.4	-10 47 18	+0.5539	.5454	-.2014	+9.4155	.9848
29	i Leonis	6	+69	-12	12 32.9	-9 15 53	+0.4476	.5449	-.2029	+9.4098	.9852
29	h Leonis	6	-16	-75	19 11.1	-2 50 55	-1.0146	.5404	-.2129	+9.4121	.9850
30	e Leonis	4	-28	-79	12 46.4	-9 50 21	-1.1776	.5389	-.2334	+9.2934	.9914
Oct. 3	94 Virginis	6	+23	-59	15 55.9	-9 10 48	-0.3113	.5547	-.2471	+9.1535	.9956
3	95 Virginis	6	+43	-38	16 07.3	-8 59 46	+0.0650	.5541	-.2471	+9.1751	.9951
3	α Virginis	4½	+60	-21	18 50.7	-6 21 59	+0.3727	.5541	-.2454	+9.2214	.9939
3	B.A.C. 4765	6	+79	-4	23 28.5	-1 53 55	+0.6984	.5559	-.2410	+9.2822	.9919
4	μ Libræ	6	+69	-12	10 42.5	+8 56 09	+0.5462	.5613	-.2288	+9.3692	.9878
4	ν Libræ	5	+74	+18	18 04.0	-7 58 18	+1.0454	.5643	-.2178	+9.4319	.9835
5	δ Libræ	6	-15	-90	0 08.8	-2 06 52	-0.9106	.5728	-.2084	+9.4135	.9849
5	ζ^1 Libræ	4	+15	-63	3 09.0	+0 46 39	-0.3578	.5729	-.2033	+9.4456	.9824
5	ζ^2 Libræ	6	-1	-88	4 09.5	+1 44 53	-0.6592	.5744	-.2017	+9.4430	.9826
5	ζ^3 Libræ	6	+2	-82	5 05.3	+2 38 40	-0.5994	.5749	-.1999	+9.4495	.9821
5	λ Libræ	6	+70	+30	13 25.5	+10 40 01	+1.1585	.5733	-.1849	+9.5281	.9738
5	β^1 Scorpii	2	+28	-44	18 21.1	-8 35 38	-0.0507	.5800	-.1747	+9.5213	.9746
5	β^2 Scorpii	5½	+28	-44	18 21.3	-8 35 29	-0.0541	.5800	-.1747	+9.5213	.9746
5	ω^1 Scorpii	4½	+70	-1	18 53.3	-8 04 43	+0.7214	.5780	-.1726	+9.5396	.9722
5	ω^2 Scorpii	4½	+70	+9	19 07.2	-7 51 18	+0.8812	.5773	-.1726	+9.5436	.9717
5	ν Scorpii	4	-15	-90	21 00.5	-6 02 23	-0.8312	.5847	-.1682	+9.5143	.9755
5	B.A.C. 5395	6	+70	+17	21 38.8	-5 25 30	+1.0051	.5774	-.1682	+9.5548	.9701
6	ϕ Ophiuchi	5	-27	-90	1 51.1	-1 23 01	-1.0113	.5871	-.1593	+9.5276	.9739
6	ω Ophiuchi	5	+25	-44	5 00.9	+1 39 24	-0.0436	.5856	-.1501	+9.5573	.9697
6	39 Ophiuchi	5½	+61	-6	22 56.6	-5 07 35	+0.6261	.5895	-.1045	+9.6113	.9603
6	B.A.C. 5831	6	+46	-19	22 58.8	-5 05 32	+0.4054	.5906	-.1045	+9.6076	.9611
7	θ Ophiuchi	3½	+66	+38	0 28.2	-3 39 40	+1.1984	.5871	-.1018	+9.6235	.9578
7	JUPITER		-23	-90	0 40.9	-3 27 28	-0.8580	.5903	-.1013	+9.5887	.9646
7	b Ophiuchi	5	+34	-29	2 10.8	-2 01 16	+0.2124	.5921	-.0964	+9.6099	.9606
7	c^2 Ophiuchi	5	+14	-51	4 08.1	-0 08 41	-0.1638	.5946	-.0909	+9.6066	.9613
7	4 Sagittarii	5	-40	-90	15 03.4	+10 20 06	-1.0462	.6005	-.0600	+9.6059	.9614
7	7 Sagittarii	6	-14	-89	16 13.1	+11 26 59	-0.6316	.5987	-.0571	+9.6139	.9598
7	9 Sagittarii	4½	-10	-82	16 36.6	+11 49 28	-0.5714	0.5984	-.0571	+9.6153	9.9595

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon, for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of σ .	At Washington Mean Time of σ .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
Oct. 8	α Sagittarii	3	0	0	^{h.} 1 49.6	^{m.} - 3 20 01	^{s.} + 0.1805	0.5950	-0.0311	-9.6340	9.9555
8	B.A.C. 6369	6	0	-60	8 18.6	+ 2 53 08	-0.2974	.5965	-0.0107	-9.6284	.9567
8	σ Sagittarii	2½	+64	+21	12 17.7	+ 6 42 34	+1.0184	.5894	+0.0007	-9.6491	.9519
8	\downarrow Sagittarii	5	+23	-34	20 10.2	- 9 44 06	+0.1294	.5918	+0.0238	-9.6340	.9555
8	B.A.C. 6576	6	-37	-90	20 11.7	- 9 42 35	-0.9670	.5970	+0.0238	-9.6163	.9593
8	α^2 Sagittarii	5½	- 8	-75	23 58.7	- 6 04 43	-0.4888	.5932	+0.0352	-9.6224	.9580
9	α^2 Sagittarii	6½	-13	-83	0 01.4	- 6 02 11	-0.5829	.5939	+0.0352	-9.6209	.9584
9	α^3 Sagittarii	6	-41	-90	0 05.0	- 5 58 41	-1.0404	.5959	+0.0352	-9.6134	.9599
9	h^1 Sagittarii	6	+15	-45	4 11.2	- 2 02 20	-0.0691	.5899	+0.0464	-9.6265	.9572
9	h^2 Sagittarii	4½	+24	-35	4 26.7	- 1 47 27	+0.1119	.5892	+0.0464	-9.6292	.9566
10	B.A.C. 7049	6	-13	-90	1 39.1	- 5 24 43	-0.6885	.5817	+0.1014	-9.5895	.9645
10	17 Capricor.	6	-17	-90	8 31.9	+ 1 12 32	-0.7861	.5774	+0.1181	-9.5743	.9671
10	B.A.C. 7197	6	+59	-9	9 25.2	+ 2 03 45	+0.5835	.5711	+0.1203	-9.5966	.9632
10	α Capricor.	6	+36	-33	17 57.4	+10 17 02	+0.1555	.5662	+0.1402	-9.5692	.9679
10	27 Capricor.	6	+ 4	-39	18 23.0	+10 41 43	-0.4449	.5688	+0.1402	-9.5570	.9698
10	ϕ Capricor.	6	+31	-70	20 59.3	-10 47 40	+0.0461	.5645	+0.1463	-9.5592	.9694
11	33 Capricor.	6	+69	+ 5	0 39.8	- 7 15 11	+0.8183	.5601	+0.1524	-9.5634	.9688
11	37 Capricor.	6	+69	+ 3	5 20.4	- 2 44 33	+0.7918	.5565	+0.1620	-9.5490	.9709
11	ϵ Capricor.	4½	+47	-24	6 19.5	- 1 47 30	+0.3125	.5574	+0.1639	-9.5365	.9727
11	κ Capricor.	5	+36	+35	8 47.2	+ 0 34 57	+0.1087	.5571	+0.1675	-9.5242	.9743
11	B.A.C. 7550	6	+70	-12	9 01.7	+ 0 48 58	+0.9983	.5530	+0.1692	-9.5399	.9722
11	29 Aquarii	6	+18	-57	17 41.0	+ 9 10 18	-0.2706	.5517	+0.1828	-9.4821	.9790
12	56 Aquarii	6	+23	-55	6 32.7	- 2 23 56	-0.2373	.5425	+0.2016	-9.4223	.9843
12	α^1 Aquarii	6	+75	+11	14 47.9	+ 5 35 06	+0.9396	.5347	+0.2113	-9.4080	.9853
12	α^2 Aquarii	4	+74	- 7	15 42.3	+ 6 27 45	+0.6452	.5348	+0.2125	-9.3944	.9862
12	74 Aquarii	6	-20	-90	17 35.6	+ 8 17 29	-1.0271	.5370	+0.2147	-9.3316	.9898
13	β^1 Aquarii	4½	-41	-90	4 29.2	- 5 09 37	-1.2812	.5306	+0.2253	-9.2346	.9935
13	β^2 Aquarii	4½	-13	-90	5 30.5	- 4 10 10	-0.9482	.5297	+0.2261	-9.2390	.9934
13	β^3 Aquarii	5	+19	-64	6 01.4	- 3 40 15	-0.3779	.5280	+0.2270	-9.2568	.9928
13	B.A.C. 8214	6	0	-90	14 17.6	+ 4 20 41	-0.7456	.5247	+0.2328	-9.1577	.9955
13	B.A.C. 8274	6	+21	-62	20 51.8	+10 42 54	-0.3549	.5207	+0.2368	-9.0976	.9966
14	30 Piscium	5	+83	+ 6	3 43.0	- 6 38 14	+0.8886	.5175	+0.2396	-9.0755	.9969
14	33 Piscium	5	+83	+13	5 27.3	- 4 56 59	+0.9854	.5166	+0.2404	-9.0555	.9972
16	μ Piscium	4½	-17	-85	1 54.2	- 9 47 29	-1.0568	.5089	+0.2393	+8.9726	.9981
16	ν Piscium	5	+90	+19	7 54.0	- 3 57 58	+1.0693	.5104	+0.2365	+8.9174	.9985
17	ξ^1 Ceti	5	+90	+33	0 32.6	-11 48 09	+1.2167	.5125	+0.2267	+9.1520	.9956
17	ξ^2 Arietis	5½	+86	- 5	6 43.1	- 5 48 19	+0.6479	.5127	+0.2219	+9.2373	.9934
17	B. A. C. 755	6	+90	+11	7 44.2	- 4 49 00	+0.9196	.5133	+0.2211	+9.2355	.9935
17	31 Arietis	5½	+40	-39	12 50.3	+ 0 08 15	-0.0188	.5129	+0.2166	+9.3099	.9908
17	38 Arietis	5½	+90	- 9	17 11.5	+ 4 21 45	+0.8582	.5157	+0.2117	+9.3116	.9907
18	B.A.C. 1096	6	+28	-47	18 16.4	+ 4 42 01	-0.2549	.5202	+0.1821	+9.4745	.9798
19	ω^1 Tauri	6	+87	+ 3	11 42.5	- 2 23 57	+0.6369	.5283	+0.1568	+9.5174	.9751
19	ω^2 Tauri	5½	+50	-22	15 40.4	+ 1 26 35	+0.1422	.5282	+0.1503	+9.5385	.9724
19	α^1 Tauri	5½	-37	-68	19 34.4	+ 5 13 16	-1.2148	.5253	+0.1435	+9.5726	.9673
20	τ Tauri	4½	-10	-67	3 44.8	-10 51 47	-0.8971	.5289	+0.1296	+9.5859	.9651
20	103 Tauri	6	-18	-66	16 04.6	+ 1 04 19	-0.9977	.5328	+0.1052	+9.6104	.9605
21	121 Tauri	6	+63	- 4	4 57.5	-10 27 57	+0.3442	.5419	+0.0790	+9.6082	.9610
21	132 Tauri	5½	+52	-12	11 15.9	- 4 22 06	+0.1676	.5426	+0.0665	+9.6180	.9590
21	139 Tauri	5½	-33	-64	15 23.1	- 0 23 06	-1.1468	.5381	+0.0579	+9.6408	.9539
21	5 Geminor	6	+90	+25	21 41.1	+ 5 42 22	+0.8189	0.5474	+0.0449	+9.6169	9.9592

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of \odot .	At Washington Mean Time of \odot .							
			North-ern.	South-ern.		<i>H</i>	<i>Y</i>	<i>p'</i>	<i>q'</i>	Log sin <i>D</i>	Log cos <i>D</i>		
												<i>h.</i>	<i>m.</i>
Oct. 22	ϵ Geminor.	3½	+62	+1	12 30.8	— 3	57	52	+0.3178	0.5478	+0.0115	+9.6303	9.9563
22	37 Geminor.	6	+43	—13	17 41.9	+ 1	02	42	+0.0328	—5473	+0.0002	+9.6348	—9553
23	52 Geminor.	6	+68	+ 5	2 31.9	+ 9	34	39	+0.4033	—5493	—0.0201	+9.6281	—9568
23	A Geminor.	5½	+47	—12	6 31.7	—10	33	40	+0.0891	—5481	—0.0292	+9.6312	—9561
23	c Geminor.	6	—36	—64	15 53.4	— 1	31	03	—1.1660	—5427	—0.0518	+9.6438	—9532
23	α Geminor.	3½	+63	— 1	16 04.9	— 1	19	59	+0.3433	—5490	—0.0518	+9.6217	—9582
24	λ Caneri	6	+13	—52	8 33.0	+ 9	25	23	+0.5101	—5445	—0.0871	+9.6173	—9591
24	ν ³ Caneri	6	—25	—66	13 34.8	— 4	33	46	—1.0752	—5416	—0.0979	+9.6188	—9588
24	γ Caneri	4½	+90	+43	19 03.2	+ 0	43	35	+1.1572	—5492	—0.1106	+9.5734	—9672
25	ξ Caneri	5	—18	—67	7 04.1	—11	39	38	—1.0102	—5393	—0.1349	+9.5853	—9652
25	79 Caneri	6	—19	—67	7 31.7	—11	13	00	—1.0186	—5395	—0.1349	+9.5844	—9654
25	B.A.C. 3138	6	+16	—55	9 03.8	— 9	43	59	—0.4691	—5287	—0.1388	+9.5714	—9675
26	γ Leonis	3½	+52	—24	10 16.8	— 9	20	52	+0.1779	—5389	—0.1838	+9.4775	—9795
26	42 Leonis	6	+90	+ 5	17 09.9	— 2	41	19	+0.7418	—5394	—0.1950	+9.4325	—9835
26	B.A.C. 3579	6	+90	+ 5	20 28.9	+ 0	31	12	+0.7450	—5389	—0.1995	+9.4153	—9848
26	ι Leonis	6	+85	— 2	22 05.3	+ 2	04	30	+0.6360	—5383	—0.2024	+9.4097	—9852
27	κ Leonis	6	— 5	—75	4 52.0	+ 8	37	59	—0.8494	—5339	—0.2123	+9.4121	—9850
27	ι Leonis	4	—17	—79	22 45.8	+ 1	57	10	—1.0402	—5336	—0.2328	+9.2935	—9914
28	ξ Virginis	5	+23	—81	8 58.8	+11	50	25	—1.1282	—5343	—0.2435	+9.1978	—9945
28	ν Virginis	4½	+78	—10	9 15.9	—11	53	03	+0.5765	—5305	—0.2434	+9.1070	—9964
28	π Virginis	4½	—35	—83	16 24.8	— 4	58	01	—1.2653	—5351	—0.2489	+9.1118	—9963
29	c Virginis	5	+30	—53	1 39.9	+ 3	59	01	—0.2176	—5380	—0.2545	+8.8578	—9989
Nov.	β ¹ Scorpii	2	+23	—51	3 17.5	+ 2	08	39	—0.1580	—5905	—0.1792	+9.5213	—9746
2	β ² Scorpii	5½	+22	—51	3 17.5	+ 2	08	42	—0.1615	—5905	—0.1792	+9.5213	—9746
2	ω ¹ Scorpii	4½	+65	— 9	3 48.5	+ 2	38	28	+0.6020	—5872	—0.1792	+9.5396	—9722
2	ω ² Scorpii	4½	+65	+ 1	4 02.0	+ 2	51	27	+0.7593	—5878	—0.1769	+9.5436	—9717
2	ν ¹ Scorpio	4	—21	—90	5 51.7	+ 4	36	47	—0.9324	—5942	—0.1747	+9.5142	—9755
2	B.A.C. 5395	6	+69	+ 8	6 28.8	+ 5	12	21	+0.8772	—5880	—0.1724	+9.5547	—9701
2	φ Ophiuchi	5	—35	—90	10 32.9	+ 9	06	38	—1.1143	—5981	—0.1630	+9.5274	—9739
2	ω Ophiuchi	5	+20	—51	13 36.4	—11	57	18	—0.1660	—5960	—0.1557	+9.5573	—9697
3	39 Ophiuchi	5½	+51	—15	6 55.2	+ 4	38	43	+0.4721	—6010	—0.1075	+9.6113	—9603
3	B.A.C. 5831	6	+38	—27	6 57.2	+ 4	40	41	+0.2551	—6022	—0.1075	+9.6076	—9611
3	θ Ophiuchi	3½	+65	+21	8 23.6	+ 6	03	26	+1.0335	—5985	—0.1047	+9.6235	—9578
3	b Ophiuchi	5	+26	—38	10 02.5	+ 7	38	15	+0.0617	—6039	—0.0989	+9.6099	—9606
3	c ² Ophiuchi	5	+ 6	—61	11 55.7	+ 9	26	44	—0.3106	—6063	—0.0931	+9.6066	—9613
3	VENUS		+64	+30	17 21.6	— 9	21	07	+1.1254	—5500	—0.0744	+9.6382	—9545
3	4 Sagittarii	5	—51	—90	22 28.5	— 4	27	11	—1.1890	—6117	—0.0632	+9.6059	—9614
3	7 Sagittarii	6	—22	—90	23 35.8	— 3	22	42	—0.7820	—6099	—0.0601	+9.6139	—9598
3	9 Sagittarii	4½	—19	—90	23 58.5	— 3	01	00	—0.7230	—6099	—0.0571	+9.6153	—9595
4	λ Sagittarii	4	+17	—41	8 53.1	+ 5	31	02	+0.0102	—6056	—0.0295	+9.6340	—9555
4	B.A.C. 6369	6	— 9	—73	15 09.5	+11	31	39	—0.4650	—6068	—0.1110	+9.6284	—9568
4	σ Sagittarii	2½	+64	+ 7	19 01.3	— 8	46	20	+0.8299	—5991	+0.0122	+9.6490	—9519
5	φ Sagittarii	5	+14	—44	2 39.7	— 1	27	00	—0.0505	—6013	+0.0224	+9.6340	—9555
5	B.A.C. 6576	6	—50	—92	2 41.3	— 1	25	32	—1.1319	—6066	+0.0224	+9.6164	—9593
5	χ ¹ Sagittarii	5½	—17	—90	6 21.9	+ 2	05	57	—0.6619	—6022	+0.0342	+9.6224	—9580
5	χ ² Sagittarii	6	—55	—90	6 28.0	+ 2	11	47	—1.2061	—6047	+0.0342	+9.6134	—9599
5	h ¹ Sagittarii	6	+ 5	—57	10 27.6	+ 6	01	32	—0.2506	—5983	+0.0459	+9.6265	—9572
5	h ² Sagittarii	4½	+15	—46	10 42.7	+ 6	16	03	—0.0711	—5976	+0.0459	+9.6292	—9566
6	17 Capricor.	6	—28	—90	14 12.1	+ 8	40	05	—0.9661	—5810	+0.1198	+9.5743	—9671
6	B.A.C. 7197	6	+47	—20	15 04.5	+ 9	30	26	+0.3916	0.5760	+0.1221	+9.5966	9.9632

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of ζ .	At Washington Mean Time of ζ .					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
Nov. 6	α Capricor.	6	+25	-43	23 29.5	-6 23 30	-0.0328	0.5700	+1.1399	-9.5694	9.9678
6	β Capricor.	6	-5	-87	23 54.8	-5 59 08	-0.6292	.5709	+1.1420	-9.5571	.9668
7	γ Capricor.	6	+21	-50	2 29.3	-3 30 18	-0.1409	.5677	+1.1462	-9.5593	.9664
7	δ Capricor.	6	+65	-7	6 07.5	-0 00 08	+0.6266	.5612	+1.1543	-9.5634	.9688
7	ϵ Capricor.	6	+68	+35	7 26.9	+1 16 25	+1.1995	.5585	+1.1563	-9.5703	.9677
7	ζ Capricor.	6	+64	-8	10 45.6	+4 28 00	+0.6017	.5585	+1.1620	-9.5490	.9709
7	η Capricor.	4½	+37	-35	11 44.3	+5 24 34	+0.1261	.5592	+1.1638	-9.5365	.9727
7	θ Capricor.	5	+27	-46	14 10.9	+7 45 57	-0.0757	.5569	+1.1691	-9.5242	.9743
7	B.A.C. 7550	6	+68	0	14 25.3	+7 59 54	+0.7494	.5542	+1.1691	-9.5399	.9722
7	ι Aquarii	6	+10	-69	23 02.2	-7 41 14	-0.4350	.5502	+1.1841	-9.4825	.9790
8	ν Aquarii	6	+14	-67	11 53.1	+4 43 48	-0.4093	.5398	+1.2024	-9.4223	.9843
8	ξ Aquarii	6	+70	0	20 09.6	-11 15 50	+0.7729	.5314	+1.2119	-9.4080	.9853
8	ζ^1 Aquarii	4	+64	-16	21 04.3	-10 22 56	+0.4786	.5312	+1.2129	-9.3947	.9862
8	ζ^2 Aquarii	6	-34	-90	22 57.6	-8 33 10	-1.1934	.5333	+1.2151	-9.3316	.9898
9	χ Aquarii	4½	-24	-90	10 57.9	+3 04 32	-1.1028	.5252	+1.2259	-9.2390	.9934
9	ψ Aquarii	5	+10	-75	11 29.0	+3 34 42	-0.5315	.5246	+1.2259	-9.2568	.9928
10	ω Piscium	5	+8	-1	9 24.2	+0 50 18	+0.7625	.5124	+1.2388	-9.0750	.9969
10	α Piscium	5	+84	+4	11 09.8	+2 32 49	+0.8614	.5114	+1.2394	-9.0556	.9972
11	β Ceti	6	+66	-20	21 43.7	-11 52 46	+0.4069	.5054	+1.2419	+8.4637	.9998
12	γ Piscium	6	+45	-38	1 36.4	-8 06 39	+0.0655	.5052	+1.2411	+8.6955	.9995
12	δ Piscium	4½	-22	-85	8 12.0	-1 42 16	-1.1223	.5044	+1.2389	+8.9723	.9981
12	ϵ Piscium	5	+90	+15	14 16.2	+4 11 39	+1.0214	.5063	+1.2363	+8.9174	.9985
13	ζ^1 Ceti	5	+90	+30	7 05.5	+3 27 41	+1.1948	.5096	+1.2265	+9.1521	.9956
13	ζ^2 Arietis	5½	+84	-5	13 19.5	+2 35 34	+0.6334	.5103	+1.2219	+9.2372	.9934
13	ζ^3 Arietis	5½	+38	-41	19 29.8	+8 35 16	-0.6299	.5106	+1.2168	+9.3110	.9907
13	ζ^4 Arietis	5½	+90	+9	23 52.8	-11 09 22	+0.8602	.5139	+1.2122	+9.3116	.9907
15	ω^1 Tauri	5½	+53	-19	22 30.4	+10 04 08	+0.2003	.5294	+1.1514	+9.5385	.9724
16	α^1 Tauri	5½	-31	-68	2 24.3	-10 09 13	-1.1553	.5267	+1.1447	+9.5726	.9673
16	β Tauri	4½	-6	-67	10 34.4	-2 14 38	-0.8287	.5306	+1.1306	+9.5859	.9651
16	γ Tauri	6	-12	-66	22 53.3	+9 40 32	-0.9179	.5348	+1.1060	+9.6104	.9605
17	δ Tauri	6	+70	0	11 45.1	-1 52 52	+0.4365	.5432	+1.0817	+9.6082	.9610
17	ϵ Tauri	5½	+58	-7	18 02.9	+4 12 26	+0.2640	.5446	+1.0668	+9.6180	.9590
17	ζ Tauri	5½	-24	-64	22 09.9	+8 11 14	-1.0505	.5400	+1.0583	+9.6408	.9539
18	η Geminor	6	+90	+32	4 27.8	-9 43 28	+0.9241	.5490	+1.0452	+9.6169	.9592
18	θ Geminor	3½	+71	+7	19 18.2	+4 37 02	+0.4302	.5489	+1.0116	+9.6303	.9563
19	ι Geminor	6	+50	-7	0 30.0	+9 38 20	+0.1467	.5479	+1.0002	+9.6348	.9553
19	κ Geminor	6	+78	+11	9 21.9	-5 47 44	+0.5228	.5494	-0.0201	+9.6281	.9568
19	λ Geminor	5½	+54	-6	13 22.9	-1 54 52	+0.2085	.5478	-0.0292	+9.6312	.9561
19	μ Geminor	6	-24	-64	22 48.4	+7 11 32	-1.0510	.5419	-0.0493	+9.6437	.9532
19	ν Geminor	3½	+73	+5	23 00.0	+7 22 44	+0.4666	.5469	-0.0515	+9.6217	.9582
20	ω^1 Cancri	6	-31	-64	6 32.6	-9 19 55	-1.1303	.5406	-0.0670	+9.6385	.9545
20	ω^2 Cancri	6	+20	-44	15 38.1	-0 32 40	-0.3882	.5419	-0.0863	+9.6172	.9591
20	ν^1 Cancri	6	-15	-66	20 43.9	+4 22 56	-0.0570	.5386	-0.0968	+9.6188	.9588
21	ξ Cancri	5	-10	-68	14 30.6	-2 25 32	-0.8888	.5347	-1.1327	+9.5853	.9652
21	ζ Cancri	6	-10	-68	14 58.7	-1 58 23	-0.9001	.5343	-1.1347	+9.5844	.9654
21	B.A.C. 3138	6	+20	-47	16 32.5	-0 27 36	-0.3457	.5360	-1.1366	+9.5714	.9675
22	η Leonis	3½	+66	-17	18 20.5	+0 30 35	+0.3045	.5315	-1.1812	+9.4773	.9795
23	δ Leonis	6	+90	+13	1 24.9	+7 21 28	+0.8728	.5314	-1.1919	+9.4328	.9835
23	B.A.C. 3506	6	+90	+12	4 49.5	+10 39 37	+0.8752	.5309	-1.1962	+9.4153	.9848
23	ϵ Leonis	6	+90	+5	6 28.7	-11 44 19	+0.7642	0.5301	-1.1991	+9.4097	.9852

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
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1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of ϕ .		At Washington Mean Time of ϕ .							
			North-ern.	South-ern.	of ϕ .		H	Y	p'	q'	Log sin D	Log cos D		
					$h.$	$m.$							$h.$	$m.$
Nov. 23	β Leonis	6	+ 1	-74	13	26.4	- 4	59	45	-0.7409	0.5256	-.2084	+9.4121	9.9850
24	ϵ Leonis	4	-11	-79	7	54.0	-11	06	41	-0.9462	.5243	-.2303	+9.2934	.9914
24	ξ Virginis	5	-16	-81	18	26.3	- 0	54	06	-1.0423	.5250	-.2395	+9.1975	.9945
24	ν Virginis	4 $\frac{1}{2}$	+89	- 4	18	43.9	- 0	37	03	+0.6848	.5272	-.2394	+9.1070	.9964
24	A^1 Virginis	5 $\frac{1}{2}$	-45	-81	19	44.7	+ 0	21	47	-1.3406	.5248	-.2403	+9.1971	.9946
25	π Virginis	4 $\frac{1}{2}$	-27	-83	2	06.2	+ 6	31	25	-1.1866	.5260	-.2456	+9.1118	.9963
25	c Virginis	5	+34	-48	11	38.1	- 8	14	41	-0.1326	.5290	-.2510	+8.8570	.9989
26	65 Virginis	6	+83	- 8	17	36.8	- 3	13	52	+0.6452	.5404	-.2575	+8.8602	.9989
26	66 Virginis	6	+82	- 2	21	10.5	- 2	41	18	+0.7432	.5410	-.2575	+8.8849	.9987
26	β Virginis	6	+85	+11	21	37.1	+ 0	38	27	+0.9665	.5421	-.2569	+8.9816	.9980
26	80 Virginis	6	+25	-59	23	15.4	+ 2	13	28	-0.3098	.5445	-.2565	+8.9089	.9985
27	94 Virginis	6	+25	-58	13	09.1	- 8	21	13	-0.2849	.5540	-.2501	+9.1536	.9956
27	95 Virginis	6	+44	-37	13	20.5	- 8	10	11	+0.0879	.5533	-.2501	+9.1752	.9951
27	α Virginis	4 $\frac{1}{2}$	+61	-21	16	03.4	- 5	32	54	+0.3859	.5553	-.2481	+9.2216	.9939
27	γ Libræ	6	+79	- 5	20	39.7	- 1	06	21	+0.6944	.5572	-.2449	+9.2822	.9919
28	ν^1 Libræ	5	+74	+14	14	57.4	- 7	28	33	+0.9849	.5719	-.2235	+9.4320	.9835
Dec. 1	γ Sagittarii	4 $\frac{1}{2}$	-20	-90	10	05.8	+ 8	54	26	-0.7491	.6209	-.0590	+9.6153	.9595
2	B. A. C. 6369	6	-11	-76	0	46.6	- 1	03	14	-0.5023	.6193	-.0133	+9.6284	.9567
2	δ Sagittarii	2 $\frac{1}{2}$	+64	+ 3	4	30.2	+ 2	30	35	+0.7709	.6116	-.0007	+9.6491	.9519
2	\downarrow Sagittarii	5	+11	-47	11	52.1	+ 9	33	20	-0.0984	.6133	+0.2449	+9.6340	.9555
2	B. A. C. 6576	6	-52	-90	11	53.6	+ 9	34	45	-1.1623	.6187	+0.2049	+9.6164	.9593
2	γ^1 Sagittarii	5 $\frac{1}{2}$	-20	-90	15	26.1	-11	01	55	-0.7011	.6152	+0.0344	+9.6224	.9580
2	γ^2 Sagittarii	6	-59	-90	15	32.0	-10	56	17	-1.2365	.6179	+0.3444	+9.6134	.9599
2	h^1 Sagittarii	6	+ 3	-60	19	52.7	- 7	15	27	-0.2976	.6250	+0.4688	+9.6265	.9572
2	h^2 Sagittarii	4 $\frac{1}{2}$	+12	-49	19	37.3	- 7	01	29	-0.1213	.6101	+0.4688	+9.6292	.9566
3	B. A. C. 7049	6	-26	-90	15	34.8	- 7	53	48	-0.9107	.5990	+0.1043	+9.5895	.9645
3	17 Capricor.	6	-31	-90	22	05.8	- 5	38	28	-1.0086	.5924	+0.1223	+9.5742	.9671
3	B. A. C. 7197	6	+43	-23	22	56.3	- 4	50	01	+0.3261	.5856	+0.1247	+9.5966	.9632
4	α Capricor.	6	+23	-47	7	03.7	+ 2	58	23	-0.0915	.5797	+0.1433	+9.5694	.9679
4	27 Capricor.	6	- 8	-90	7	28.5	+ 3	22	12	-0.6772	.5824	+0.1436	+9.5571	.9698
4	ϕ Capricor.	6	+18	-53	9	57.4	+ 5	45	27	-0.1986	.5770	+0.1498	+9.5592	.9694
4	33 Capricor.	6	+61	-11	13	28.3	+ 9	08	23	+0.5568	.5717	+0.1563	+9.5634	.9688
4	35 Capricor.	6	+69	+27	14	45.1	+10	22	18	+1.1205	.5688	+0.1583	+9.5701	.9677
4	37 Capricor.	6	+60	-12	17	57.5	-10	32	28	+0.5323	.5664	+0.1662	+9.5490	.9709
4	ϵ Capricor.	4 $\frac{1}{2}$	+34	-38	18	54.3	+ 9	37	44	+0.0634	.5670	+0.1680	+9.5365	.9727
4	α Capricor.	5	+24	-49	21	16.4	- 7	20	35	-0.1354	.5661	+0.1718	+9.5242	.9743
4	B. A. C. 7550	6	+69	- 4	21	30.4	- 7	07	24	+0.6776	.5635	+0.1718	+9.5399	.9722
5	29 Aquarii	6	+ 6	-74	5	52.0	+ 0	56	13	-0.5044	.5578	+0.1871	+9.4821	.9790
5	56 Aquarii	6	+11	-70	18	23.0	-10	58	49	-0.4639	.5468	+0.2044	+9.4223	.9843
6	τ^1 Aquarii	6	+75	- 4	2	30.2	- 3	07	43	+0.7046	.5370	+0.2138	+9.4080	.9853
6	τ^2 Aquarii	4	+60	-19	3	21.6	- 2	18	05	+0.4142	.5368	+0.2149	+9.3947	.9862
6	74 Aquarii	6	-38	-90	5	12.8	- 0	30	31	-1.2382	.5385	+0.2170	+9.3314	.9898
6	\downarrow^2 Aquarii	4 $\frac{1}{2}$	-28	-90	17	00.0	+10	54	06	-1.1497	.5284	+0.2275	+9.2390	.9934
6	\downarrow^3 Aquarii	5	+ 8	-78	17	30.7	+11	23	47	-0.5834	.5278	+0.2276	+9.2568	.9928
7	30 Piscium	5	+83	- 4	15	10.5	+ 8	24	02	+0.7058	.5129	+0.2395	+9.0750	.9969
7	33 Piscium	5	+83	+ 1	16	55.3	+10	05	46	+0.8054	.5118	+0.2401	+9.0555	.9972
9	33 Ceti	6	+63	-22	3	24.9	- 4	24	08	+0.3667	.5031	+0.2412	+8.4637	.9998
9	f Piscium	6	+45	-38	7	18.3	- 0	37	20	+0.0714	.5029	+0.2403	+8.6893	.9995
9	μ Piscium	4 $\frac{1}{2}$	-24	-85	13	55.3	+ 5	48	26	-1.1566	.5016	+0.2378	+8.9730	.9981
9	ν Piscium	5	+90	+13	20	01.2	+11	44	05	+0.9873	.5035	+0.2354	+8.9175	.9985

ELEMENTS

For facilitating the Calculation of Occultations of Planets and Stars by the Moon, for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of ϕ .	At Washington Mean Time of ϕ .					
			North-ern.	South-ern.		<i>H</i>	<i>Y</i>	<i>p'</i>	<i>q'</i>	Log sin <i>D</i>	Log cos <i>D</i>
Dec. 10	ξ^1 Ceti	5	+90	+28	12 56.7	+ 4 10 55	+1.1679	0.5063	+2.252	+9.1520	9.9956
10	ξ Arietis	5 1/2	+85	- 5	19 13.2	+10 16 43	+0.6476	.5071	+2.207	+9.2357	.9935
10	B. A. C. 755	6	+90	+11	20 15.3	+11 15 01	+0.9217	.5077	+2.200	+9.2339	.9935
11	ζ^1 Arietis	5 1/2	+39	-41	1 26.2	- 7 40 56	-0.0485	.5077	+2.157	+9.3099	.9908
11	ζ^8 Arietis	5 1/2	+90	+ 7	5 51.0	- 3 23 44	+0.8390	.5103	+2.2121	+9.3117	.9907
12	SATURN		+90	+29	13 59.2	+ 3 47 36	+1.0887	.5275	+1.744	+9.4719	.9801
13	ω^1 Tauri	6	+90	+ 5	0 45.5	- 9 45 50	+0.6803	.5278	+1.581	+9.5174	.9751
13	ω^2 Tauri	5 1/2	+53	-20	4 44.3	- 5 54 27	+0.1885	.5282	+1.517	+9.5385	.9724
13	τ Tauri	5	- 6	- 67	16 50.1	+ 5 48 30	-0.8397	.5300	+1.311	+9.5859	.9651
15	λ^2 Tauri	5 1/2	+57	- 8	0 17.9	-11 45 03	+0.2548	.5458	+0.0676	+9.6180	.9590
15	λ^3 Tauri	5 1/2	-25	-64	4 24.4	- 7 46 46	-1.0610	.5415	+0.0589	+9.6408	.9539
16	ϵ Geminor	3 1/2	+69	+ 6	1 29.0	-11 24 45	+0.4191	.5511	+0.0117	+9.6303	.9563
16	A Geminor	5 1/2	+53	- 7	19 30.3	+ 5 59 56	+0.1946	.5500	-0.0292	+9.6313	.9561
17	α Geminor	3 1/2	+72	+ 4	5 06.0	- 8 43 50	+0.4525	.5499	-0.0517	+9.6217	.9582
17	ω^1 Cancri	6	-33	-64	12 37.9	- 1 27 10	-1.1497	.5422	-0.0672	+9.6385	.9545
17	λ Cancri	6	+19	-46	21 43.2	+ 7 19 54	-0.4082	.5431	-0.0866	+9.6173	.9591
18	ω^2 Cancri	6	-12	-66	1 28.1	+10 57 15	-0.9110	.5401	-0.0950	+9.6198	.9586
18	ω^3 Cancri	6	-17	-66	2 49.3	-11 44 13	-0.9804	.5396	-0.0971	+9.6188	.9588
18	γ Cancri	4 1/2	+90	+58	8 23.2	- 6 21 23	+1.2770	.5461	-1.093	+9.5734	.9672
18	ξ Cancri	5	-12	-68	20 39.5	+ 5 30 48	-0.9185	.5344	-1.326	+9.5853	.9652
18	γ^9 Cancri	6	-12	-68	21 07.3	+ 5 57 44	-0.9290	.5339	-1.346	+9.5844	.9654
18	B.A.C. 3138	6	+21	-48	22 42.1	+ 7 29 29	-0.3731	.5357	-1.364	+9.5714	.9675
20	η Leonis	3 1/2	+58	-19	0 45.5	- 8 43 01	+0.2738	.5287	-1.800	+9.4774	.9795
20	δ^2 Leonis	6	+90	+11	7 56.2	- 8 19 42	-0.8455	.5273	-1.1915	+9.4326	.9835
20	B.A.C. 3579	6	+90	+10	11 24.3	- 4 58 05	+0.8470	.5264	-1.1955	+9.4153	.9848
20	δ Leonis	6	+90	+ 3	13 05.2	- 3 20 14	+0.7348	.5255	-1.1983	+9.4097	.9852
20	δ Leonis	6	- 1	-75	20 11.4	+ 3 32 49	-0.7889	.5204	-2.207	+9.4120	.9850
21	ϵ Leonis	4	-14	-79	15 04.7	- 2 08 23	-1.0014	.5172	-2.273	+9.2934	.9914
22	ξ Virginis	5	-20	- 81	1 54.9	+ 8 22 05	-1.1018	.5170	-2.364	+9.1975	.9945
22	ν Virginis	4 1/2	+85	- 6	2 13.0	+ 8 39 40	+0.6497	.5192	-2.364	+9.1070	.9964
22	π Virginis	4 1/2	-33	-83	9 48.9	- 7 58 14	-1.2500	.5174	-2.411	+9.1114	.9964
22	σ Virginis	5	+32	-51	19 39.6	+ 1 34 34	-0.1816	.5198	-2.467	+8.8570	.9989
24	δ^5 Virginis	6	+80	-10	2 42.9	+ 7 40 07	+0.6089	.5295	-2.523	-8.8602	.9989
24	δ^6 Virginis	6	+86	- 4	3 17.7	+ 8 13 53	+0.7089	.5301	-2.523	-8.8843	.9987
24	δ^7 Virginis	6	+85	+ 9	6 52.1	+11 41 23	+0.9365	.5322	-2.517	-8.9816	.9980
24	δ^8 Virginis	6	+22	-63	8 34.0	-10 39 58	-0.3606	.5335	-2.513	-8.9089	.9986
24	δ^9 Virginis	6	+23	-61	22 58.2	+ 3 16 00	-0.3317	.5436	-2.450	-9.1536	.9956
24	δ^4 Virginis	6	+42	-49	23 10.0	+ 3 27 25	+0.0472	.5430	-2.450	-9.1752	.9951
25	α Virginis	4 1/2	+59	-23	1 58.9	+ 6 10 39	+0.3502	.5449	-2.432	-9.2217	.9939
25	ζ^2 Librae	6	+78	- 6	6 44.7	+10 46 47	+0.6651	.5466	-2.401	-9.2822	.9919
25	μ Librae	6	+65	-16	18 12.1	- 2 09 42	+0.4794	.5573	-2.289	-9.3692	.9878
26	ω^1 Librae	5	+74	+12	1 37.5	+ 4 59 42	+0.9594	.5617	-2.203	-9.4319	.9835
26	ω^2 Librae	6	-22	-90	7 42.4	+10 51 18	-1.0198	.5725	-2.117	-9.4135	.9849
26	ζ^1 Librae	4	+10	-71	10 41.7	-10 16 07	-0.6339	.5740	-2.071	-9.4456	.9824
26	ζ^3 Librae	6	- 7	-90	11 41.7	- 9 18 20	-0.7668	.5758	-2.055	-9.4431	.9826
26	ζ^4 Librae	6	- 4	- 9	12 37.1	- 8 25 03	-0.7089	.5769	-2.038	-9.4495	.9821
26	δ^1 Librae	6	+71	+39	15 00.9	- 6 06 41	+1.2520	.5738	-1.987	-9.5086	.9761
26	λ Librae	6	+70	+17	20 50.1	- 0 30 52	+1.0205	.5785	-1.894	-9.5283	.9738
27	β^1 Scorpii	2	+21	-52	1 39.2	+ 4 06 55	-0.1866	.5876	-1.795	-9.5213	.9746
27	β^2 Scorpii	5 1/2	+21	-53	1 39.3	+ 4 07 04	-0.1901	0.5876	-1.795	-9.5213	9.9746

For facilitating the Calculation of Occultations of Planets and Stars by the Moon,
for the Year 1853.

1853.	Star's Name.	Mag.	Limiting Parallels.		Washington Mean Time of σ .	At Washington Mean Time of σ .					
			North- ern.	South- ern.		<i>H</i>	<i>Y</i>	<i>p'</i>	<i>q'</i>	Log sin <i>D</i>	Log cos <i>D</i>
Dec. 27	ω^1 Scorpii	4½	+63	-10	2 10.5	+ 4 37 02	+0.5754	0.5861	-.1774	-9.5396	9.9722
27	ω^2 Scorpii	4½	+69	- 1	2 24.1	+ 4 50 05	+0.7331	.5855	-.1774	-9.5436	.9717
27	ν Scorpii	4	-23	-90	4 14.3	+ 6 35 55	-0.9616	.5939	-.1732	-9.5143	.9755
27	B.A.C. 5395	6	+69	+ 6	4 51.6	+ 7 11 40	+0.8513	.5863	-.1731	-9.5548	.9701
27	\downarrow Ophiuchi	5	-38	-90	8 56.0	+11 06 20	-1.1445	.5995	-.1618	-9.5274	.9739
27	ω Ophiuchi	5	+18	-53	11 59.2	- 9 57 57	-0.1958	.5984	-.1547	-9.5573	.9697
31	B.A.C. 7049	6	-22	-90	2 13.9	+ 0 33 27	-0.8515	.6081	+ .1077	-9.5896	.9645
31	17 Capricor.	6	-26	-90	8 33.5	+ 6 37 24	-0.9421	.6034	+ .1240	-9.5743	.9671
31	B.A.C. 7197	6	+46	-20	9 22.5	+ 7 24 23	+0.3707	.5966	+ .1266	-9.5965	.9632
31	α Capricor.	6	+26	-43	17 14.8	- 9 02 20	-0.0296	.5907	+ .1463	-9.5694	.9679
31	27 Capricor.	6	- 4	-85	17 38.5	- 8 39 37	-0.6077	.5935	+ .1464	-9.5571	.9698
31	ϕ Ophiuchi	6	+21	-49	20 03.0	- 6 20 49	-0.1326	.5880	+ .1533	-9.5594	.9694
31	33 Capricor.	6	+64	- 8	23 27.1	- 3 04 47	+0.6145	.5824	+ .1600	-9.5634	.9688
32	35 Capricor.	6	+68	+32	0 32.3	- 2 02 24	+1.1708	0.5794	+ .1621	-9.5703	9.9677

NOTES.

B. A. C.—British Association Catalogue.

Rumk.—Rumker's Catalogue.

PREDICTION OF OCCULTATIONS.

IN the prediction of an occultation for a particular place, the principal objects of determination are, the instant of *immersion*, or of the star's disappearance behind the moon's limb; of *emersion*, or of the star's re-appearance; and the points on the moon's border where these appearances take place.

The calculations, according to the method of the late Professor Bessel, are greatly facilitated by means of the elements given in the preceding list. Those who may wish to consult Prof. Bessel's original paper on this subject, will find it in Schumacher's *Astronomische Nachrichten*, Vol. VII., page 1; also in the *Berliner Astronomisches Jahrbuch* for 1831, page 257. The process of computation is shown by the following equations:

d = Longitude from Washington, of the place, + West, - East.

ϕ = Geographical North Latitude of the place.

ϕ' = Geocentric North Latitude of the place.

r = Earth's radius at the place, or the distance of the observer's position from the earth's centre.

It is unnecessary to calculate ϕ' and r separately, as we have

$$r \sin \phi' = \frac{(1-e^2) \sin \phi}{\sqrt{(1-e^2 \sin^2 \phi)}} \qquad r \cos \phi' = \frac{\cos \phi}{\sqrt{(1-e^2 \sin^2 \phi)}}$$

in which e denotes the eccentricity of the earth's meridians.

The logarithms of $\frac{1-e^2}{\sqrt{(1-e^2 \sin^2 \phi)}} = \log A$, and of $\frac{1}{\sqrt{(1-e^2 \sin^2 \phi)}} = \log B$, derived from $e = .081697$, according to the latest determination of Prof. Bessel, may be taken from the following table, where the geographical latitude of the place is the argument.

ϕ	Log A	Log B
0	9.9971	0.0000
10	9.9971	0.0000
20	9.9973	0.0002
30	9.9975	0.0004
40	9.9977	0.0006
50	9.9979	0.0009
60	9.9982	0.0011
70	9.9984	0.0013

$$r \sin \phi' = A \sin \phi$$

$$r \cos \phi' = B \cos \phi$$

$$a = r \cos \phi' \sin(h-d)$$

$$b = r \cos \phi' \cos(h-d)$$

$$\log \lambda = 9.4192$$

$$u = a$$

$$v = r \sin \phi' \cos D - b \sin D$$

$$u' = b \lambda$$

$$v' = a \lambda \sin D$$

$$m \sin M = p - u$$

$$m \cos M = q - v$$

$$n \sin N = p' - u'$$

$$n \cos N = q' - v'$$

$$\log k = 9.4350$$

$$\cos \psi = \frac{m \sin(M-N)}{k}$$

$$Q = 270^\circ - N \mp \psi$$

$$t = -\frac{m}{n} \cos(M-N) \mp \frac{k \sin \psi}{n}$$

Upper signs for Immersion; under signs for Emersion.

$$c \sin C = u + t u'$$

$$c \cos C = v + t v'$$

$$V = Q + C$$

Mean Solar Time of the Star's apparent contact with the moon's limb:

$$= T - d + t$$

$$\text{Angle from North Point} = Q$$

$$\text{Angle from Vertex} = V$$

The angle ψ is to be taken out positive and less than 180° . If $\log m \sin(M-N)$ be greater than $\log k$, $\cos \psi$ will evidently be greater than 1, or impossible, and there will be no occultation, except in some rare instances where the moon's limb passes

very close to the star, when $\log \cos \psi$ will result very near 0. In these cases, a re-calculation should be made according to the method which follows, using

$$t = -\frac{m}{n} \cos(M-N),$$

which may give $\log m \sin(M-N)$ less than $\log k$, when the star will be occulted. On the other hand, it may happen that in these cases of very near approach, a first determination may give a $\cos \psi$ less than 1, which a re-calculation will show to impossible. The angle ψ is then to be considered = 0° when $m \sin(M-N)$ is positive, and we shall have $Q = 270^\circ - N$. When $m \sin(M-N)$ is negative, $\psi = 180^\circ$, or $Q = 270^\circ - N + 180^\circ$. We shall also have, at the time of nearest approach,

$$\text{star's distance from moon's limb} = 57' \times (m \sin(M-N) - .2725), \text{ nearly,}$$

the error in this computed distance increasing *with* the distance.

By *Angle from North Point*, is to be understood the arc included between the star when in contact, and the point where the limb is intersected by an arc of a great circle passing from the moon's centre to the North Pole; and by *Angle from Vertex*, the arc between the star at contact, and the point where the limb is intersected by an arc of a great circle passing from the moon's centre to the zenith. These angles are reckoned from the North point and from the vertex, towards the right hand round the circumference of the moon's disc, as seen with an inverting telescope. For *direct* vision, add 180° to the angles given by the equations.

The results obtained by the above equations are only approximate, yet the computed times of immersion and emersion will usually be within one or two minutes of the truth. The error generally increases with the star's distance from the apparent path of the moon's centre, and may, in some cases, amount to several minutes. For an immersion this error is not of much consequence; but for an emersion, especially of a small star, the time should be determined with greater precision. For this purpose, u' and v' must be computed with

$$h' - d = h - d + \frac{1}{2} \mu$$

μ being the symbol by which we express the sidereal equivalent of t in these equations.

$$u' = r \cos \phi' \lambda \cos (h' - d)$$

$$v' = r \cos \phi' \lambda \sin (h' - d) \sin D.$$

Then with these values of u' and v' , recompute N , n , ψ , and t , by means of

$$n \sin N = p' - u'$$

$$n \cos N = q' - v'$$

$$\cos \psi = \frac{m \sin (M - N)}{k}$$

$$t = -\frac{m}{n} \cos (M - N) \mp \frac{k \sin \psi}{n}$$

using the M and m obtained by the first computation, and we shall have the time of contact $T - d + t$, generally within a few seconds of the truth.

As a check on the accuracy of the work, we might compute

$$\begin{aligned} u &= r \cos \varphi' \sin (h - d + \mu) \\ v &= r \cos \varphi' \cos D - r \cos \varphi' \cos (h - d + \mu) \end{aligned}$$

and we should have

$$(p + tp' - u)^2 + (q + tq' - v)^2 = k^2 = 0.0741.$$

But if $m \sin M$, $m \cos M$, $\log n \sin N$, and $\log n \cos N$, have been correctly computed, we shall have the following shorter and more convenient check on the subsequent calculations for the time of contact:

$$(m \sin M + tn \sin N)^2 + (m \cos M + tn \cos N)^2 = k^2 = 0.0741.$$

The elements of computation, published in our general list, are given for the instant of the moon's true conjunction with the star in right ascension. It is desirable, however, in computing an occultation for a particular place, to assume a time for the calculation near to the time of the nearest approach of the moon's centre to the star, as seen at that place, and to reduce the elements to this assumed time. This time, for which the nearest tenth of an hour will be sufficiently accurate, will not differ greatly from the time of *apparent* conjunction, as affected by parallax, which may be determined approximately by the following equations. Let $T - d$ be the time of apparent conjunction; then

$$(t) = \frac{\sin (H - d)}{p' \sec \varphi - [9.4027] \cos (H - d)}$$

$$T - d = \text{time of true } \sigma - d + (t).$$

The elements corresponding to the time $T - d$ may then be obtained as follows:

$$\begin{aligned} h - d &= H - d + (\mu) \\ p &= (t) p' \\ q &= Y + (t) q' \end{aligned}$$

Where occultations are to be generally observed, as at astronomical stations, either temporary or permanent, the observer will find an advantage in looking over the list and selecting, beforehand, all those which may be visible at his station, by observing if his latitude be included between the *limiting parallels* for any given occultation, if the time ($T - d$) be favourable as regards the absence of daylight, and if the star's hour-angle ($h - d$) be not greater than its semidiurnal arc for the given latitude.

For obtaining the time

$$T - d = \sigma - d + (t),$$

it will be well to tabulate the values of

$$(t) = \frac{\sin(H - d)}{p' \sec \phi - [9.4027] \cos(H - d)}$$

for every half hour of $(H - d)$ as far as the greatest semidiurnal arc computed for the latitude of the station with a declination of 30° ; and for all values of p' , using two decimal figures, from 0.50 to 0.60.

It will also be found advantageous to have tabulated values of

$$u = r \cos \phi' \sin(h - d)$$

$$u' = r \cos \phi' \lambda \cos(h - d)$$

which should be given for every minute (in time) of $(h - d)$, from 0^h to 6^h . If $(h - d)$ exceeds 6^h , the argument will be $12^h - (h - d)$ instead of $(h - d)$. It will be seen by the equations that u will have the same sign as $\sin(h - d)$, and that u' will have the same sign as $\cos(h - d)$.

In the equation

$$v = r \sin \phi' \cos D - b \sin D$$

the term $r \sin \phi' \cos D$ may be tabulated for every tenth minute of declination, from 0° to 30° .

The practical application of the preceding formulæ will be seen by the following calculations for an occultation of the star h^1 Sagittarii, March 31st, 1853, as it will appear at San Diego, California; in north latitude $32^\circ 45' = \phi$, and west longitude from Washington $2^h 40^m 29^s = d$. The data for the computation are given on page 9, and, with the latitude and longitude of the place, are as follows:—

March 31st, 1853. h^1 Sagittarii.

$\phi + 32^\circ 45'$	$H + 1^h 03^m 12^s$	$p' + 0.5800$
$d + 2^h 40^m 29^s$	$d + 2^h 40^m 29^s$	$q' - 0.0395$
$\sigma - d \quad 19 \quad 51.1$	$H - d - 1^h 37^m 17^s$	$\log \sin D - 9.6265$
$\sigma - d \quad 17 \quad 10.6$	$Y + 0.7558$	$\log \cos D + 9.9571$

Calculation of the time $T - d$, and reduction of the elements of computation.

	$\log p' + 9.763$	$(t) - 0.9$
$\log p' \sec \phi =$	$\log \sec \phi + 0.075$ (Reduced to hours and minutes)	$(t) - 0.54^h 0^m 0^s$
	$\log(1) + 9.838$ Sid. equiv. for (t)	$(\mu) - 0.54^h 9^m$
	$\log \text{const} \quad 9.403$	$H - d - 1^h 37^m 17^s$
$\log [9.403] \cos(H - d) =$	$\log \cos(H - d) + 9.960$ $H - d + (\mu) =$	$h - d - 2^h 31^m 26^s$
	$\log(2) + 9.363$	$\sigma - d \quad 17 \quad 10.6$
	$(2) + .231$ $\sigma - d + (t) =$	$T - d \quad 16 \quad 16.6$
$(1) - (2) =$	$(1) + .689$ $(t)p' = -0.9 \times 0.5800 =$	$p - 0.5220$
	$(3) + .458$ $-0.9 \times 0.0395 =$	$(t)q' - 0.0355$
	$\log(3) + 9.661$	$Y + 0.7558$
$\log \frac{\sin(H - d)}{(3)} =$	$\log \sin(H - d) - 9.615$ $Y + (t)q'$	$q + 0.7203$
	$\log(t) - 9.954$	

Calculation of the Times of Immersion and Emersion, etc.

(Table, page 28, Arg. Φ)	$\log A$	9.9976		$r \sin \Phi' \cos D$	+	.4874
	$\log \sin \Phi$	+9.7332		$b \sin D$	-	.2813
$\log A \sin \Phi =$	$\log r \sin \Phi'$	+9.7308	$r \sin \Phi' \cos D - b \sin D =$	v	+	.7687
	$\log \cos D$	+9.9571		q	+	.7203
	$\log r \sin \Phi' \cos D$	+9.6879	$q - v =$	$m \cos M$	-	.0484
(Table, page 28, Arg. Φ)	$\log B$	0.0005	$a =$	p	-	.5220
	$\log \cos \Phi$	+9.9248	$p - u =$	u	-	.5166
$\log B \cos \Phi =$	$\log r \cos \Phi'$	+9.9253		$m \sin M$	-	.0054
	$\log \sin (h - d)$	-9.7879		q'	+	.0395
$\log r \cos \Phi' \sin (h - d) =$	$\log u = \log a$	-9.7132		v'	+	.0574
	$\log \cos (h - d)$	+9.8974	$q' - v' =$	$n \cos N$	-	.0179
$\log r \cos \Phi' \cos (h - d) =$	$\log b$	+9.8227		p'	+	.5800
	$\log \lambda$	9.4192	$p' - u' =$	u'	+	.1746
	$\log a \lambda$	-9.1324		$n \sin N$	+	.4054
	$\log \sin D$	-9.6265		M	186° 22'	
$\log a \lambda \sin D =$	$\log b \sin D$	-9.4492		N	92 32	
	$\log v'$	+8.7589		$M - N$	93 50	
$\log b \lambda =$	$\log u$	+9.2419		270° - N	177 28	
	$\log m \sin M$	-7.7324		\downarrow	79 43	
	$\log m \cos M$	-8.6848	For Immersion, 270° - $N - \psi =$	Q	97 45	
	$\log \tan M$	+9.0476		(2)	+	.0080
	$\log \cos M$	-9.9973	For Immersion, (2) - (1) =	(1)	+	.6603
	$\log m$	+8.6875	For Emersion, (2) + (1) =	t_1	-	.6523
	$\log n \sin N$	+9.6079		t_2	+	.6683
	$\log n \cos N$	-8.2529		$\log t_1$	-	9.8144
	$\log \tan N$	-1.3550		$\log u'$	+	9.2419
	$\log \sin N$	+9.9996		$\log t_1 u'$	-	9.0563
	$\log n$	+9.6083		$\log v'$	+	8.7589
	$-\log \frac{m}{n}$	-9.0792		$\log t_1 v'$	-	8.5733
	$\log \cos (M - N)$	-8.8251		$t_1 v'$	-	.0374
	$\log \sin (M - N)$	+9.9990	$v + t_1 v' =$	$c \cos C$	+	.7313
	$\log k$	9.4350		$t_1 u'$	-	.1139
	$\log \frac{m}{k}$	+9.2525	$u + t_1 u' =$	$c \sin C$	-	.6305
$\log \frac{m}{k} \sin (M - N) =$	$\log \cos \psi$	+9.2515		$\log c \sin C$	-	9.7996
	$\log \sin \psi$	+9.9930		$\log c \cos C$	+	9.8641
$\log \frac{k \sin \psi}{n} =$	$\log k \sin \psi$	+9.4280		$\log \tan C$	-	9.9355
	$\log (1)$	+9.8197				
$-\log \frac{m}{n} \cos (M - N) =$	$\log (2)$	+7.9043				
				$T - d$	$\frac{h}{16}$	$\frac{m}{16.6}$
IMMERSION: San Diego Mean Time			(Reduced to hours and minutes)	t_1	-	0 39.1
				$T - d + t_1$		15 37.5
				C	-	40° 46'
Immersion Angle from North Point =				Q		97 45
Immersion Angle from Vertex = $Q + C =$				V		56 59
				t_2	+	0 40.1
EMERSION: San Diego Mean Time				$-T - d + t_2$		16 56.7

OCCULTATIONS OF PLANETS AND STARS BY THE MOON,

Visible at Washington, D. C., during the Year 1853.

1853.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.			
			Washington		Angle from		Washington		Angle from	
			Sidereal Time.	Mean Time.	N. Point.	Vertex.	Sidereal Time.	Mean Time.	N. Point.	Vertex.
January 4	♄ Libræ	6	h. m.	h. m.	90°	63°	h. m.	h. m.	208°	194°
5	♃ Scorpii*	4	13 11	18 11			14 16	19 16		
30	♃ Virginis	6	10 24	15 20	338	287	Star 1'.6 north of ☽'s limb.			
Febr'y 3	4 Sagittarii	5	11 54	15 12	26	357	13 02	16 20	266	251
3	7 Sagittarii	6	14 10	17 12	165	124	Star 3'.3 south of ☽'s limb.			
13	♄ Ceti	5	15 17	18 19	85	55	16 34	19 36	247	230
20	♃ Cancri	6	4 59	7 23	150	194	6 05	8 29	265	315
28	♄ Libræ*	6	2 34	4 31	113	57	3 32	5 29	249	192
March 3	B. A. C. 6369	6	9 03	10 28	32	341	9 47	11 11	280	230
6	♄ Capricor.*	5	15 20	16 31	69	32	16 35	17 46	273	248
16	♄ Tauri	4½	4 01	4 23	72	42	5 17	5 39	326	340
16	105 Tauri	6	8 09	8 31	7	62	Star 1'.2 north of ☽'s limb.			
16	♃ Tauri*	6	13 14	13 36	97	139	14 04	14 25	271	311
17	1 Geminor.	5	10 39	10 56	257	314	Star 1'.7 north of ☽'s limb.			
17	3 Geminor.	6	13 12	13 29	357	44	Star 4'.8 north of ☽'s limb.			
29	♃ Cancri	4½	6 26	6 32	91	40	7 49	7 55	247	119
29	♃ Ophiuchi	5	17 03	16 32	3	0	17 27	16 57	328	330
30	♃ Sagittarii	4	16 34	15 59	24	2	17 18	16 43	318	305
April 24	♃ Scorpii*	2	20 56	18 43	117	166	21 41	19 28	220	270
24	♃ Scorpii*	5½	20 56	18 43	118	167	21 41	19 28	219	269
May 1	♄ Aquarii*	5½	16 26	13 46	147	97	17 12	14 31	245	230
12	48 Geminor.	6	10 20	6 57	47	105	11 22	7 59	292	350
17	♃ Virginis	4½	16 53	13 10	109	161	17 32	13 49	197	249
22	♃ Ophiuchi	5	19 26	15 23	104	139	20 27	16 23	235	278
23	♃ Ophiuchi	5	13 55	9 48	37	359	14 51	10 44	285	255
24	♃ Sagittarii	4	12 22	8 12	28	338	12 57	8 47	309	259
25	h ¹ Sagittarii*	6	13 55	9 41	166	116	14 05	9 50	185	136
25	h ² Sagittarii*	4½	13 50	9 36	110	60	14 44	10 30	241	194
26	B. A. C. 7197	6	18 48	14 28	96	73	20 11	15 51	292	286
27	B. A. C. 7550	6	17 43	13 20	68	27	18 43	14 20	320	286
June 8	♃ Geminor.	6	13 55	8 46	172	221	Star 1'.7 south of ☽'s limb.			
12	B. A. C. 3579	6	11 59	6 35	48	86	13 15	7 40	250	299
12	♄ Leonis	6	14 05	8 40	107	160	14 51	9 26	195	249
21	♃ Sagittarii	5	19 31	13 29	88	94	20 48	14 47	284	305
23	33 Capricor.	6	21 47	15 38	66	73	22 39	16 30	344	2
July 19	♃ Ophiuchi	5	18 59	11 19	166	201	Star 2'.5 south of ☽'s limb.			
19	h ² Sagittarii†	4½	14 04	6 14	113	63	14 58	7 07	239	193
21	B. A. C. 7550*	6	16 24	8 25	27	337	16 41	8 42	356	307
22	♄ Aquarii	6	21 50	13 46	90	78	23 00	14 56	334	338
22	♄ Aquarii	5½	23 14	15 11	125	133	0 39	16 36	301	327
30	♄ Tauri†	4½	21 01	12 26	76	33	21 45	13 10	317	269
August 9	65 Virginis	6	15 34	6 20	65	98	16 46	7 32	231	274
9	66 Virginis	6	16 37	7 24	67	108	17 45	8 32	235	283
12	♃ Scorpii	4½	17 04	7 38	338	0	Star 1'.4 north of ☽'s limb.			
13	39 Ophiuchi*	5½	22 25	12 55	357	46	Star 3'.9 north of ☽'s limb.			
13	B. A. C. 5831*	6	22 00	12 30	58	106	22 53	13 22	296	346
15	♃ Sagittarii	5	17 39	8 01	178	160	Star 2'.9 south of ☽'s limb.			
17	♄ Capricor.*	5	3 38	17 51	51	101	4 03	18 17	352	42
20	30 Piscium }	5	20 25	10 27	134	92	21 39	11 41	286	255
22	♃ Piscium	5	0 59	14 52	77	64	1 53	15 47	358	4

OCCULTATIONS OF PLANETS AND STARS BY THE MOON,

Visible at Washington, D. C., during the Year 1853.

1853.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.			
			Washington		Angle from		Washington		Angle from	
			Sidereal Time.	Mean Time.	N. Point.	Vertex.	Sidereal Time.	Mean Time.	N. Point.	Vertex.
Aug. 23	B. A. C. 755	6	<i>h. m.</i> 0 37	<i>h. m.</i> 14 27	128°	94°	<i>h. m.</i> 2 03	<i>h. m.</i> 15 53	303°	297°
Sept. 13	♄ Capricor.	6	0 49	13 16	153	195	1 38	14 05	254	300
15	♈ Aquarii	6	18 14	6 35	88	43	19 20	7 40	312	273
15	♈ Aquarii	4	19 41	8 01	150	114	20 45	9 05	261	235
20	♄ Arietis†	5½	19 49	7 50	164	115	20 24	8 25	245	194
24	♊ Geminor.	6	0 23	12 08	100	45	1 27	13 11	288	230
25	♊ Geminor.	6	6 11	17 51	103	67	7 42	19 21	249	276
Oct. 10	B. A. C. 7197	6	23 12	9 54	130	160	0 20	11 02	275	316
11	B. A. C. 755°	6	22 06	8 44	83	89	23 13	9 50	333	354
16	♊ Piscium	5	19 32	5 50	99	48	20 29	6 47	317	266
17	B. A. C. 755†	6	19 34	5 48	123	74	20 29	6 43	288	237
19	♉ Tauri	6	23 49	9 55	115	60	1 01	11 07	300	247
19	♉ Tauri	5½	5 49	15 54	127	170	7 09	17 14	266	320
22	♊ Geminor	3½	0 57	10 51	150	94	1 38	11 32	232	175
22	♊ Geminor	6	7 55	17 48	139	83	8 46	18 39	209	163
Nov. 23	♊ Geminor	3½	4 51	14 40	69	11	6 15	16 04	288	242
2	♏ Scorpil	4½	19 27	4 39	112	151	20 21	5 33	221	265
3	♏ Ophiuchi*	5½	22 52	7 59	150	200	23 17	8 24	205	255
7	♄ Capricor.	6	21 06	5 57	167	165	21 55	6 47	241	249
7	♄ Capricor.*	6	2 52	11 43	61	111	3 26	12 17	345	35
10	♊ Piscium	5	0 25	9 05	96	104	1 34	10 14	340	6
13	♋ Ceti	5	20 40	5 08	57	5	21 09	5 37	0	309
17	♉ Tauri	6	1 55	10 07	106	48	3 15	11 26	293	239
17	♉ Tauri	5½	10 56	19 07	135	191	11 38	19 49	221	275
19	♊ Geminor†	6	23 34	7 38	120	75	0 23	8 27	252	201
19	A Geminor	5½	3 43	11 46	113	53	5 02	13 05	255	200
22	♌ Leonis	3½	10 01	17 51	104	105	11 02	18 52	195	224
24	♍ Virginis	4½	10 33	18 16	5	343	11 27	19 10	283	279
Dec. 2	♐ Sagittari	2½	21 44	4 57	98	132	22 51	6 04	279	322
11	♄ Arietis	5½	21 19	3 55	125	73	22 21	4 56	292	240
25	♌ Libræ	6	10 53	16 34	60	17	12 02	17 42	235	202

* Whole occultation below the horizon of Washington.
 † Immersion below the horizon of Washington.
 ‡ Emersion below the horizon of Washington.

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