APPENDIX IV

WASHINGTON OBSERVATIONS
OF THE MOON

1894-1922

DISCUSSED BY
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WASHINGTON OBSERVATIONS OF THE MOON 1894-1922

The observations of the Moon taken at the old observatory from 1866 to 1891 were reduced on a uniform basis and compared with HANSEN's tables by Prof. J. R. EASTMAN, the results being collected and published in Publications of the U. S. Naval Observatory, Second Series, Volume IV, Part II. Prof. E. W. BROWN's new tables of the Moon have been used in the Ephemeris since 1923, and the comparisons with these tables of the observations from 1923 to 1929 are given in *Astronomical Journal*, No. 939. The 2,900 observations of the Moon made here from 1894 to 1922 have now been reduced to a uniform basis, compared with tabular places approximating those from Professor BROWN's tables, and collected here. A summary of these results has been given in *Astronomical Journal*, No. 926.

The observations were taken on the 9-inch transit circle except in parts of the years 1899, 1902, and 1903, when the 6-inch transit circle was used. Since 1903 the Moon and clock stars have been screened, and an average of $+0''.03$ has been applied to the right ascensions for personal equation. Since 1913 a reversing prism has been used over the eyepiece. The transits were taken over fixed threads. Corrections were applied for motion of the Moon in the time interval between the computed and observed time of transit, except before 1903 when they were negligible. The declinations were corrected for corrections in tabular parallax. All observations have been referred to NEWCOMB's system for equator and equinox. The observed corrections to the tabular semidiameter are:

1894-1903,	R. A.	$-0''.84$,	Decl.	$-0''.80$
1903-1913,	R. A.	$-0''.69$,	Decl.	$-0''.90$
1913-1922,	R. A.	$-0''.75$,	Decl.	$-1''.14$

and the observations were correspondingly corrected.

The following corrections to the NEWCOMB-HANSEN tabular places as given in the American Ephemeris have been computed and applied for each observation. The first line in (a) is the secular variation deduced by Doctor FOTHERINGHAM in the form " δT " given by Professor BROWN. This is not in the tables. The other terms in (a) are the differences BROWN minus NEWCOMB-HANSEN, secular, empirical, and long period, that have been applied to the mean longitude. The corrections to the true longitude, (b), and to the latitude, (c), were collected by Dr. F. E. ROSS, largely from the works of BROWN, NEWCOMB, and HILL, and put into tabular form by him in 1913 for use in the Nautical Almanac office. These formulæ, (b) and (c), as used by Doctor ROSS, exist only in manuscript form and are therefore given here in full. The reductions of the observations 1903-1922 using such tables are given in Publications of the U. S. Naval Observatory, Second Series, Volume IX, and Volume XIII, but as used here they have been slightly modified to conform with the present reductions.

(a) Corrections to the mean longitude:

$$\begin{aligned}
 & -2''.71 + 2''.02t + 4''.79t^2 \dots\dots + 13''.60 \sin (139^\circ t + 104^\circ) - 10''.71 \sin (140^\circ t + 101^\circ) \\
 & + 1''.98 + 1''.36t - 2''.42t^2 - 0''.0067t^3 - 15''.49 \sin (132^\circ t + 94^\circ) + 10''.71 \sin (140^\circ t + 101^\circ) \\
 & + 1''.07 \sin (131^\circ.9t + 33^\circ.7) + 0''.31 \sin (16^\circ.2t + 68^\circ) + 0''.11 \sin (g - 26V + 29g' + 52^\circ) \\
 & + 0''.84 \sin (20^\circ.2t + 31^\circ) + 0''.25 \sin (150^\circ t + 87^\circ) + 0''.07 \sin (g + 2\Pi - 2\Pi' - 3Q - g' + 265^\circ) \\
 & + 0''.04 \sin (236^\circ.9 - 6^\circ.07t - 0^\circ.03t^2).
 \end{aligned}$$

(b) Corrections to the true longitude:

"	"	"
-1.06 sin Ω .	+0.24 sin $(2\Pi - 2\Pi' - 2J)$.	+0.13 sin $(g + 2\Pi + 19g' - 20V + 173^\circ)$.
+0.43 cos Ω .	+0.28 sin $(2\Pi - 2\Pi' - 3J + 268^\circ)$.	+0.05 sin $(2\Omega + 5V - 8g' + 330^\circ)$.
+0.45 sin $(\Pi - \Pi')$.	+0.07 sin $(2\Pi - 2\Pi' + 3V - 5g')$.	+0.06 sin $(2\Pi + 6V - 10g' + 122^\circ)$.
+0.09 sin $(J + 30^\circ)$.	+0.09 sin $(4M - 2g' + 85^\circ)$.	
+0.20 sin $(g + \Omega)$.	+0.06 sin $(g + 2\Pi_1 - \Omega)$.	+ (0.01 sin $\Omega - 0''.09$ cos Ω) cos g .
-0.20 sin $(g - \Omega)$.	+0.12 sin $(g + \Pi - \Pi')$.	-1.14 sin $(g + 2\Pi - 2\Pi' - 2J)$.
+0.06 sin $(g + J + 22^\circ)$.	+0.06 sin $(g - J + 157^\circ)$.	+0.44 sin $(g + 2\Pi - 3J + 68^\circ)$.
-0.07 sin $(g + V - g')$.	+0.03 sin $(g + 2V - 2g')$.	-0.66 sin $(g + 2\Pi - 2\Pi' + 3V - 5g')$.
+0.09 sin $(g - V + g')$.	-0.02 sin $(g - 2V + 2g')$.	+0.08 sin $(g + 2\Pi + 6V - 10g' + 122^\circ)$.
-0.13 sin $(g - 3V + 3g')$.	-0.12 sin $(g + J - g')$.	+0.07 sin $(g + 2M - g' + 323^\circ)$.
+0.10 sin $(g - J + g')$.	-0.19 sin $(g + 2J - 2g')$.	+0.07 sin $(g - 2M + g' + 206^\circ)$.
+0.23 sin g' .	-0.04 sin $(g - 2J + 2g')$.	+0.37 sin $(2g + 2\Pi_1 - \Omega)$.
+0.28 sin $(V - g')$.	-0.35 sin $(2V - 3g' + 347^\circ)$.	+0.10 sin $(g + 3J - 2g' + 92^\circ)$.
-0.12 sin $(2V - 2g')$.	+0.18 sin $(3V - 4g' + 168^\circ)$.	+0.09 sin $(3V - 5g' + 141^\circ)$.
-0.10 sin $(g' - J)$.	+0.05 sin $(2g' - 2J)$.	-0.16 sin $(g' - 2J + 18^\circ)$.
+0.10 sin $(2D + \Omega)$.	+0.07 sin $(2D - g + \Omega)$.	-0.05 sin $(2g' - 3J + 268^\circ)$.
-0.06 sin $(2D - \Omega)$.	-0.06 sin $(2D - g - \Omega)$.	-0.16 sin $(2D - g - 2V + 2g')$.
+0.56 sin $(D - g)$.	+0.13 sin $(2D - g - V + g')$.	+0.14 sin $(2D - g + 2V - 2g')$.
+0.08 sin $(D + g)$.	-0.08 sin $(2D - g + 4V - 4g')$.	-0.04 sin $(2D - g + 5V - 5g')$.
-0.22 sin $(2D - g)$.	+0.05 sin $(2D - g - J + g')$.	-0.02 sin $(2D - g + 6V - 6g')$.
-0.27 sin $(2D - g - g')$.	+0.09 sin $(2D - g + 2J - 2g')$.	+0.21 sin $(2D - g + J - g' + 178^\circ)$.
+1.37 sin D .	+0.06 sin $(2D - g + J + 105^\circ)$.	+0.05 sin $(2D - g + 2J - g' + 337^\circ)$.
-0.21 sin $2D$.	+0.06 sin $(2D - g - J + 75^\circ)$.	+0.02 sin $(2D - g + J - 2g' + 173^\circ)$.
+0.10 sin $(2D - V + g')$.	-0.02 sin $(2D - g - 3J + 3g')$.	+0.02 sin $(2D - g + 2J + g' + 196^\circ)$.
-0.02 sin $(2D + V - g')$.	-0.14 sin $(2D - 2V + 2g')$.	+0.02 sin $(2D - g + 3J - 2g' + 92^\circ)$.
-0.12 sin $(D + g')$.	-0.03 sin $(2D + 3V - 3g')$.	-0.17 sin $(2D + J - g')$.
-0.07 sin $(2D - 2J + 2g')$.	+0.08 sin $(2D + 2J - 2g')$.	+0.03 sin $(2D - J + g')$.

(c) Corrections to the latitude:

$$+1''.00 - 0''.50 + (\Delta\lambda - \Delta\Omega) \sin i \cos (g + \Pi_1 - \Omega) - 0''.18 \cos (g + \Pi_1 - \Omega) \\ - 0''.43 \sin (2g + \Pi_1) - 0''.33 \sin (g + \Pi_1 - 2\Omega) - 0''.31 \sin (g + \Pi_1 - 2g' - 2\Pi'_1)$$

(d) Element correction:

$$\Delta\Pi = -4''.27 + 7''.82t - 0''.97t^2, \quad \Delta\Omega = -4''.47 + 11''.84t - 0''.63t^2, \\ \text{correction to parallax} = +0''.45 + 0''.05 \cos g, \quad \text{solar parallax} = 8''.80, \\ \text{Earth's ellipticity} = 1/298.2$$

(e) Nomenclature:

t = Centuries from 1800. g and D , Moon's mean anomaly and elongation.
 g' , V , M , J , Q , mean longitudes of *Earth*, *Venus*, *Mars*, *Jupiter*, *Mercury* from *Earth's* perihelion 1800.
 Π , Π_1 , longitude of *Moon's* perigee from mean equinox of 1800, and of date.
 Π' , Π'_1 , longitude of *Earth's* perihelion from mean equinox of 1800 and of date.
 Ω , longitude *Moon's* node from mean equinox of date.

The resulting, observed minus computed, longitude and latitude for each observation are given on pages 217 to 228. On these pages the blank dates are those of new Moon near the lunation observed. The series is short for element correction but possibly adapted to further analysis for short terms.

The residuals in longitude were arranged according to the age of the Moon, the mean for each lunation being taken out, as follows:

LONGITUDE RESIDUALS

	Days Before Full Moon												
	12	11	10	9	8	7	6	5	4	3	2	1	0
	"	"	"	"	"	"	"	"	"	"	"	"	"
1895-1903	+0.15	-0.08	+0.32	+0.73	+0.30	+0.06	-0.06	+0.05	-0.09	-0.36	-0.08	+0.15	+0.30
1903-1913		-0.20	-0.55	-0.15	+0.14	+0.04	-0.36	+0.08	+0.18	+0.26	-0.12	-0.04	+0.10
1913-1922		+0.50	-0.28	+0.11	+0.03	-0.10	-0.16	-0.22	+0.08	-0.11	+0.22	+0.06	+0.08

	Days After Full Moon												
	0	1	2	3	4	5	6	7	8	9	10	11	12
	"	"	"	"	"	"	"	"	"	"	"	"	"
1895-1903		+0.20	-0.07	+0.16	+0.20	-0.01	+0.14	-0.33	+0.01	-0.14	-0.05	-0.24	-0.37
1903-1913		+0.14	+0.04	-0.37	+0.06	+0.25	-0.06	+0.16	+0.04	+0.04	+0.11	-0.13	
1913-1922		+0.19	+0.20	+0.52	-0.30	-0.10	-0.27	-0.20	-0.41	+0.26	+0.27		
And in groups of four days each:													
Days	-12-9		-8-5		-4-1		Full		+1+4		+5+8		+9+12
No. Obsns.	268		510		537		Moon		453		404		244
Mean	+0''.05		-0''.02		+0''.01				+0''.08		-0''.06		-0''.03

The observations seem satisfied as reduced, using BROWN's parallactic coefficient slightly modified to the solar parallax 8''.80.

The means by lunations have been tabulated by the calendar months in which they fall. These were divided into three periods, and for comparison with them similar results are given as derived from the observations taken on the 9 and 6 inch transit circles from 1923 to 1929 compared directly with the new tables.

LONGITUDINAL RESIDUALS

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	"	"	"	"	"	"	"	"	"	"	"	"
1897-1903	+0.18	+0.36	+0.14	-0.10	-0.19	-0.56	-0.41	-0.13	+0.10	+0.23	+0.12	+0.22
1903-1913	+0.59	+0.35	+0.26	-0.02	-0.30	-0.46	-0.36	-0.61	-0.13	+0.07	+0.32	+0.22
1913-1922	+0.46	+0.58	+0.35	+0.05	-0.05	-0.28	+0.09	-1.30	-0.30	-0.15	+0.13	+0.24
1923-1929	+0.17	+0.18	+0.19	+0.22	-0.13	-0.33	-0.29	-0.30	+0.05	0.00	+0.11	+0.11

These give the annual terms:

$$+0''.32 \sin (g'+99^\circ), +0''.47 \sin (g'+78^\circ), +0''.50 \sin (g'+57^\circ), \text{ and } +0''.24 \sin (g'+70^\circ).$$

The coefficient is less for the last or direct comparison but the phase is the same. Some of this may be in the observations. There are no errors of this size in the clock stars.

Since writing the above it has been shown in a paper in the *Astronomical Journal*, which includes a discussion of some 4,000 transit-circle observations, that the residuals in longitude varying with the longitude and correspondingly the annual terms, shown above, are largely due to irregularities of the surface of the Moon's limbs. Due to the varying angle of inclination of the Moon's axis to the meridian at transit, which depends upon the Moon's longitude, the point at which a transit thread is placed tangent to a limb varies over an arc of 50° , or some 900 miles along the Moon's surface, and the elevations and depressions of the surface produce residuals as large as $2''$, and the surface varies in such a way as to give errors in observed longitudes of a systematic character.

The tabulation of the mean longitude residuals for each lunation in periods of 14 lunations gave the following, where lunation No. 1 is the mean of multiples of 14 lunations from December 3, 1922. The second set of residuals was derived after an annual term of $+0''.48 \sin (g'+65^\circ)$ had been taken out. The third set was given by the 1923-1929 observations.

Lunation	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	"	"	"	"	"	"	"	"	"	"	"	"	"	"
$\Delta\lambda$	-0.21	+0.02	+0.09	-0.05	-0.14	+0.08	+0.18	+0.18	+0.30	-0.07	-0.36	-0.23	+0.10	+0.16
$\Delta\lambda$	-0.15	+0.15	+0.04	-0.03	0.00	+0.25	+0.19	+0.30	+0.20	-0.08	-0.48	-0.19	-0.05	+0.15
$\Delta\lambda$	-0.21	+0.14	+0.04	+0.02	-0.13	+0.07	+0.20	+0.25	0.00	+0.19	+0.19	-0.16	-0.25	-0.33

The mean residuals for each lunation are tabulated in Table I, both for longitude and latitude. Where two full Moons occur in a calendar month both are given in order.

TABLE I

Yr.	Longitude, Means by Lunations (O-C)											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1894	"	"	"	"	"	"	"	"	"	"	"	"
95	-3.40 1	—	-3.80 1	-3.60 3	-4.14 1	-3.65 2	-5.00 1	-6.50 1	-4.10 10	-5.95 4	-1.50 2	-4.17 3
96	-1.73 3	—	—	—	—	—	-4.24 6	-4.89 15	-4.57 3	-4.53 10	-4.45 8	-3.75 7
97	-3.78 13	-3.79 10	-5.04 8	-5.00 11	-4.52 15	-5.42 13	-4.85 15	-4.87 15	-5.42 19	-5.89 13	-4.92 17	-3.87 13
98	-3.70 10	-4.08 18	-3.23 18	-4.70 10	-4.85 10	-4.23 16	-4.19 12	-4.32 10	-4.85 13	-4.32 15	-4.24 12	-3.77 11
99	-3.20 10	-2.84 5	-3.69 7	-4.42 14	-4.29 13	-4.43 16	-4.32 8	-4.23 10	-2.82 15	-2.48 13	-2.93 15	-2.90 16
1900	-3.53 12	-2.87 11	-2.58 11	-3.33 12	-3.05 12	-3.64 13	-4.65 16	-3.50 15	-3.24 11	-2.26 12	-2.86 7	-3.88 15
01	-3.31 16	-2.78 10	-3.25 10	-2.03 9	-2.63 11	-3.14 12	-3.81 14	-2.63 13	-2.70 12	-2.46 18	-2.58 11	-2.58 13
02	-1.68 9	-1.65 10	-1.96 11	-1.51 15	-2.30 11	-2.97 10	-2.72 12	-2.13 12	-0.97 14	-2.00 16	-2.33 10	-2.19 11
03	-1.56 9	-1.50 9	-1.33 6	-2.26 9	-1.77 19	-2.09 10	-0.69 13	-1.88 6	-1.38 12	-0.62 11	-1.32 12	-1.34 13
04	-1.04 7	-0.54 8	-1.37 10	-1.11 9	-1.36 10	-1.53 7	-1.26 10	—	-1.49 13	-0.98 17	-0.42 11	-0.10 12
05	+0.85 8	-0.85 13	-1.08 12	-1.37 10	-1.12 9	-1.61 7	—	-1.82 5	-1.39 10	-1.10 13	-0.33 13	-0.42 12
06	+0.04 8	+0.13 9	-0.26 10	-1.25 8	+0.10 6	—	-0.18 5	—	-1.00 5	-1.96 8	-0.10 1	—
07	—	—	—	-0.63 7	+0.05 10	-0.10 14	-0.29 13	-0.08 13	+0.31 15	-0.22 16	-0.22 12	+0.23 11
08	+1.12 13	-0.09 9	+0.28 12	+0.77 14	+1.00 7	+0.90 16	+0.57 11	+0.22 10	+0.98 16	+1.59 8	+1.60 17	+0.97 10
09	+0.03 9	-0.19 10	+0.48 11	+1.67 15	-0.47 7	+0.50 5	+0.54 14	+0.92 11	+1.39 16	+1.67 14	+1.84 16	+1.58 10
1910	+1.71 13	+2.41 13	+1.36 14	+1.96 12	+1.74 14	+1.03 11	+1.52 15	+1.17 12	+1.13 15	+1.72 16	+2.36 10	+1.84 14
11	+2.27 12	+3.10 9	+2.92 12	+1.45 2	—	—	—	—	—	—	—	—
12	—	+2.20 6	+2.30 6	+1.85 12	+0.69 17	+1.31 13	+0.52 13	+0.95 10	+2.23 10	+1.89 13	+2.00 15	+2.02 14
13	+2.52 9	+3.16 11	+3.31 11	+2.85 2	—	—	—	+1.16 9	+2.48 8	+2.47 10	+3.14 10	+3.03 9
14	+3.82 7	+4.07 3	+2.62 7	+2.93 8	+3.67 3	+2.87 7	+3.95 6	—	+2.46 9	+2.86 7	+2.23 3	+3.55 4
15	+4.76 5	+3.31 8	+3.08 9	+2.75 2	—	+3.38 8	+3.08 5	—	+2.42 10	+2.13 6	+3.44 5	+4.21 9
16	+3.88 5	+3.95 4	+3.92 9	+3.24 8	+3.97 3	+3.96 5	+3.70 4	+2.40 1	+4.69 8	+4.36 8	+4.23 10	+4.05 8
17	+4.46 5	+4.48 6	+4.72 4	+4.06 8	+4.33 6	+4.30 4	—	—	—	—	—	—
18	+3.42 5	+3.50 9	+4.26 12	+4.26 5	+2.99 9	+2.62 7	—	—	—	+4.53 7	+3.59 7	+3.25 2
19	+3.20 5	+3.27 3	+3.48 5	+4.97 3	+3.30 1	+2.68 6	+2.40 1	+2.74 5	+2.55 2	+3.07 3	+3.90 3	—
1920	+3.80 5	+4.62 5	+4.95 4	+3.79 8	+3.42 6	+3.61 11	+3.69 7	+1.60 4	+4.05 11	+3.33 10	+3.38 4	+2.80 1
21	+3.82 6	+4.88 5	+4.11 6	+3.35 6	+2.75 9	+2.86 8	+2.67 8	+2.09 10	+3.28 5	+3.81 9	+4.22 4	+3.77 6
1922	+4.32 6	+3.84 5	+3.60 9	—	+3.44 8	+2.73 6	+3.38 4	+2.00 3	+3.14 8	+3.39 9	+3.78 9	+3.78 6

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TABLE I—Continued

Yr.	Latitude, Means by Lunations (O-C)											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1894	"	"	"	"	"	"	"	"	"	"	"	"
95	-2.50 1	—	+0.50 1	-1.50 2	-0.20 1	+0.50 2	-0.80 1	-0.10 1	-0.63 6	-0.50 4 -1.33 3	0.00 1 -0.48 6	-1.95 2 +0.70 3 -0.30 1
96	+1.00 2	—	—	—	—	—	-1.83 3	-0.33 11	—	+0.85 8	-0.36 5	+0.56 8
97	+0.93 12	-0.42 8	+0.80 5	-0.85 10	-1.22 13	-0.28 12	-0.24 10	-0.28 13	+0.24 18	+0.88 12	+1.15 15	+0.57 11
98	+1.18 9	+0.44 14	-0.08 17	-0.34 10	-1.41 8	-0.64 14	-1.18 12	-0.32 11	-0.13 11	+0.15 15	+0.77 11	+0.19 8
99	+0.39 10	-0.52 4	-0.87 6	-0.31 14	-0.82 10	-0.32 16	-0.68 5	-0.39 8	-0.18 12	-0.14 8	+0.15 13	+0.62 14
1900	-0.04 10	-1.02 9	-0.99 9	-0.80 11	+0.18 10	-0.45 10	-0.24 14	-0.25 13	-1.40 8	-0.39 10	-1.32 6	+0.53 14
01	-0.16 14	-0.43 9	+0.02 9	-0.10 6	+0.28 9	+0.52 12	+0.37 13	+0.85 11	-0.06 12	-0.46 13	-0.05 8	-0.03 11
02	+0.03 7	-0.13 7	+0.04 8	+0.32 12	+0.31 10	-0.87 9	-0.02 11	-0.27 11	+0.39 11	-0.22 13	-0.51 10	-1.30 9
03	-0.39 10	-0.26 9	-0.52 5	+0.80 8	-0.11 15	-0.65 10	-0.03 11	+0.53 6	+0.32 10	-0.55 10	-0.05 11	-0.75 13
04	-0.82 6	-0.84 7	-0.65 8	+0.44 7	+0.36 7	+0.49 7	+0.78 9	—	-0.53 10	+0.31 17	-0.44 11	-0.36 11
05	-0.26 8	-0.79 12	0.00 9	-0.05 8	+0.58 5	-0.40 7	—	+0.42 4	+0.05 9	+0.42 13	+0.01 11	+0.39 12
06	+0.34 9	-0.37 9	-0.80 9	+0.30 7	-1.58 5	—	+0.30 4	—	+0.24 5	+0.43 6	-0.20 1	—
07	—	—	—	+0.50 5	+0.34 7	+0.19 11	-0.09 10	+0.12 11	+0.01 11	+0.39 13	+0.28 10	+0.35 10
08	+0.32 13	+0.49 9	+0.40 9	0.00 9	+0.30 5	+0.18 13	0.00 11	+0.40 9	-0.06 12	-0.11 7	+0.01 16	+0.31 8
09	+0.24 8	+0.06 9	+1.10 7	+0.78 14	-0.86 7	+0.47 6	-0.13 14	+0.01 13	-0.43 13	-0.51 14	-0.63 15	-0.67 9
1910	+0.15 13	-0.27 10	+0.78 13	+0.89 7	+0.30 13	-0.23 9	-0.21 12	-0.77 10	-0.75 12	-0.39 13	-0.17 9	-0.71 14
11	-0.71 9	+0.36 9	+0.11 11	-0.25 2	+0.36 9	-0.77 11	-0.34 12	—	—	—	—	—
12	—	-0.88 6	+0.72 5	-0.31 10	-0.50 13	—	—	+0.02 6	-0.18 10	-0.17 11	-0.22 14	-0.44 12
13	-0.32 10	-0.35 11	-0.31 8	-0.15 2	—	—	—	+0.40 8	+0.17 6	+0.50 9	-0.25 11	-0.26 9
14	-0.71 7	+0.70 3	-0.35 6	+0.63 7	-0.63 3	-0.10 7	+0.38 4	—	+0.11 7	+0.74 7	+2.03 3	+0.73 4
15	+0.05 4	+0.09 7	+0.29 7	-0.70 2	—	-0.64 7	-0.68 4	—	-0.08 9	-0.55 6	+1.40 5	+0.22 8
16	-0.35 4	-0.17 3	-0.18 8	-0.06 7	+0.20 3	-0.32 4	-1.30 3	—	-0.27 6	-0.29 8	-0.43 9	+0.28 9
17	0.00 4	-0.02 4	-0.10 2	+0.37 7	+1.04 5	-0.45 2	—	—	—	—	—	—
18	-0.56 5	-0.58 8	+0.11 10	-0.83 4	-0.04 9	+0.43 7	—	—	—	-0.12 6	-0.07 6	-0.33 3
19	-0.32 5	-0.22 4	-0.63 7	+0.80 3	-1.35 2	-0.37 6	-1.80 1	-0.21 7	-0.75 2	-0.57 3	+0.52 4	—
1920	-0.68 5	+0.08 6	-0.33 6	+0.73 10	+0.21 10	+0.21 10	-0.14 7	+0.45 6	+0.28 10	+0.41 9	—	-0.37 3
21	-0.62 5	-0.68 5	+0.13 7	+0.58 5	+0.20 8	+0.29 7	-0.07 7	0.00 11	-0.30 8	+0.29 7	+0.28 5	-0.32 5
1922	-0.84 5	-1.00 5	-0.50 7	-0.25 2	+0.20 6	+0.22 4	-0.26 5	+0.04 5	-0.43 6	+0.51 7	+0.42 8	0.00 6

The total mean correction to the latitude is $0''.0$, upholding the empirical correction $-0''.50$ that was included. From a longer series of Greenwich observations Professor BROWN found $-0''.51$, and from the revision of NEWCOMB's work on occultations Dr. H. SPENCER JONES found $-0''.50$. These corrections are based on NEWCOMB's star system to which modern observations hardly allow a correction of more than $0''.1$. This correction seems important in its bearing on fundamental declinations using Moon observations for determination of Equator point, as is now being done here. One object in this comparison of Moon observations with recent theory has been to obtain residuals suitable for solutions for equinox and equator for reductions of concurrent catalogs.

The residuals $\Delta\lambda, \Delta\beta$, pages 217 to 228, were divided into three groups of nine years each and meaned for each hour of right ascension. These means were changed into $\Delta\alpha, \Delta\delta$, and, neglecting the latitude of the Moon, were solved in the form;

$$\begin{aligned}\Delta\delta &= \sin \alpha \Delta\epsilon + \cos \alpha \sin \epsilon \Delta\lambda_0 - \Delta\delta_0 \\ E &= \Delta\lambda_0 - \Delta\alpha_0\end{aligned}$$

giving the following corrections to NEWCOMB's equatorial declinations, obliquity, and equinox:

	$\Delta\delta_0$	$\Delta\epsilon$	$\Delta\lambda_0$	$\Delta\alpha_0$	E
1894-1903	+0".23	+0".52	-4".02	-3".30	-0".048
1903-1913	+0.10	-0.35	+0.53	+0.72	-0.013
1913-1922	+0.05	-0.15	+3.04	+3.53	-0.033
Mean, 1909,	+0".13	0".00			-0".031

The personal equations were unknown for the first group, and but roughly known for the second. The large variations in the corrections to the tabular longitudes were also detrimental, but the results are quite concordant with more general results for this epoch, as will be shown elsewhere. With the more accurate tables now in use such observations assume importance in catalog work.

The results have been summarized for each year as shown in Table II, and where also for comparison, similar, but approximate, results are given for the years 1866 to 1893, and the results for 1923 to 1929. In Table II for the years 1894 to 1922, column 2 gives the means for each year of the corrections computed for each observation by the formulæ given above. For the years 1866 to 1893 this column gives the average value for the year of the secular and long period terms only, terms of a year being included. In forming the means for this column 2, however, the secular correction " δT " has been omitted. Column 3 gives the corrections to the quantities in column 2 to reduce them to the similar corrections used by Professor BROWN in reducing the Greenwich observations to the new tables. Columns 4 and 5 give the numbers of observations and the mean of the observed minus computed longitudes for each year, respectively. For the years 1894 to 1922 these are the means after each observation was reduced as already explained, and as given on pages 217 to 228, but with " δT " taken out. For the years 1866 to 1891 the average correction to the Ephemeris from the observed right ascensions for the year was taken as the correction in longitude. For the years 1866 to 1882 corrections for motion and NEWCOMB's corrections to HANSEN were also included. And to these means for each year, from 1866 to 1891, were applied the corrections

in column 2 to get the residuals in column 5. The years 1923 to 1929 are the direct comparison with the Ephemeris as given in *Astronomical Journal* No. 939. In column 6 are given the corresponding observed minus computed longitudes from the Greenwich meridian observations, taken from *Greenwich Astronomical Results, 1920 and 1927*; and in column 7 are the corresponding results from occultations, taken from Doctor JONES's revision of NEWCOMB's occultation work in *Monthly Notices*, November, 1929, except that the quantities in this column for 1909 to 1922 are the Cape occultations reduced by $0''.6$, which is the mean difference between the Cape occultations and the revision occultations from 1880 to 1908, using the Cape results as found in *Annales of the Cape Observatory*, Volume 8, Part 8. In columns 8, 9, and 10 are the differences in the results from the different series, and in column 11 are the straight means for the three series. The quantities in column 11 represent observation minus BROWN's tables. In column 12 " δT " has been applied, and in column 13 the great empirical term has been taken out, so that this last column represents the total observation minus theory.

WASHINGTON OBSERVATIONS OF THE MOON, 1894-1922

TABLE II.—Longitude, by Years (O-C)

1	2	3	4	5	6	7	8	9	10	11	12	13
Yr.	Comp. -N. H.	Br. -Comp.	No. Obs.	W.	Gr.	Occ.	W.-Gr.	W.-Occ.	Gr.-Occ.	Mean (W, Gr, Occ.)	Mean - δ T.	M- δ T. +G. E. T.
1866.5	+0.21	+0.12	99	+2.14	+2.32	+2.98	-0.18	-0.84	-0.66	+2.48	+3.06	-0.75
67	-0.03	+0.03	89	+1.39	+1.80	+1.94	-0.41	-0.55	-0.14	+1.71	+2.27	-1.85
68	+0.34	-0.12	96	+1.16	+1.65	+1.41	-0.49	-0.25	+0.24	+1.41	+1.95	-2.57
69	+0.73	+0.19	46	+1.60	+1.25	+2.07	+0.35	-0.47	-0.82	+1.64	+2.15	-2.68
1870.5	+0.77	+0.28	54	+0.07	+1.01	+1.11	-0.94	-1.04	-0.10	+0.73	+1.21	-3.92
71	+0.02	+0.45	44	+0.12	+0.10	-0.39	+0.02	+0.51	+0.49	-0.06	+0.40	-5.03
72	+0.32	+0.33	77	-0.14	+0.01	-0.82	-0.15	+0.68	+0.83	-0.32	+0.11	-5.63
73	+0.87	+0.41	60	-1.19	-1.03	-1.20	-0.16	+0.01	+0.17	-1.14	-0.74	-6.79
74	+1.39	+0.10	83	-1.38	-1.86	-1.72	+0.48	+0.34	-0.14	-1.65	-1.29	-7.63
75	+1.86	-0.07	85	-1.43	-2.08	-2.04	+0.65	+0.61	-0.04	-1.85	-1.54	-8.17
76	+2.88	-0.66	78	-1.88	-2.23	-2.07	+0.35	+0.19	-0.16	-2.06	-1.79	-8.71
77	+3.82	-0.77	66	-1.21	-1.89	-3.09	+0.68	+1.88	+1.20	-2.06	-1.83	-9.04
78	+4.23	+0.08	61	-1.70	-2.13	-1.96	+0.43	+0.26	-0.17	-1.93	-1.74	-9.22
79	+3.59	+0.15	55	-1.17	-2.19	-1.89	+1.02	+0.72	-0.30	-1.75	-1.61	-9.36
1880.5	+4.12	-0.45	60	-1.20	-1.92	-2.70	+0.72	+1.50	+0.78	-1.94	-1.85	-9.86
81	+3.50	+0.18	60	-1.12	-1.73	-2.20	+0.61	+1.08	+0.47	-1.68	-1.64	-9.91
82	+3.03	-0.11	47	-0.79	-1.93	-2.51	+1.14	+1.72	+0.58	-1.74	-1.76	-10.29
83	+2.48	-0.19	60	-2.15	-2.21	-3.17	+0.06	+1.02	+0.96	-2.51	-2.58	-11.36
84	+2.46	+0.03	81	-2.74	-2.43	-2.46	-0.31	-0.28	+0.03	-2.54	-2.66	-11.68
85	+2.68	+0.10	78	-2.02	-2.57	-2.38	+0.55	+0.36	-0.19	-2.32	-2.50	-11.76
86	+2.64	+0.10	65	-1.74	-2.84	-2.52	+1.10	+0.78	-0.32	-2.37	-2.62	-12.12
87	+1.86	+0.45	60	-1.65	-2.42	-2.24	+0.77	+0.59	-0.18	-2.10	-2.39	-12.13
88	+2.18	+0.18	32	-1.97	-2.83	-2.85	+0.86	+0.88	+0.02	-2.55	-2.92	-12.90
89	+2.19	+0.46	54	-1.37	-2.36	-2.67	+0.99	+1.30	+0.31	-2.13	-2.57	-12.77
1890.5	+2.05	+0.19	49	-1.59	-2.08	-2.64	+0.49	+1.05	+0.56	-2.10	-2.61	-13.02
91	+1.90	+0.19	27	-1.88	-3.04	-2.76	+1.16	+0.88	-0.28	-2.56	-3.15	-13.77
92	+2.54	+0.23			-3.48	-2.84			-0.64	-3.16	-3.82	-14.65
93	+3.42	+0.28			-3.70	-2.53			-1.17	-3.11	-3.84	-14.87
94	+4.57	-0.42	9	-3.56	-3.23	-3.11	-0.33	-0.45	-0.12	-3.30	-4.11	-15.33
95	+4.73	-0.43	38	-3.29	-2.97	-2.72	-0.32	-0.57	-0.25	-2.99	-3.89	-15.29
96	+4.75	+0.18	54	-3.27	-3.26	-2.20	-0.01	-1.07	-1.06	-2.91	-3.90	-15.48
97	+5.40	0.00	165	-3.75	-2.94	-3.20	-0.81	-0.55	+0.26	-3.30	-4.38	-16.13
98	+4.71	+0.01	166	-2.92	-2.14	-2.78	-0.78	-0.14	+0.64	-2.61	-3.77	-15.68
99	+3.88	+0.15	144	-2.30	-1.96	-2.53	-0.34	+0.23	+0.57	-2.26	-3.51	-15.57
1900.5	+3.70	+0.21	151	-2.07	-1.37	-1.46	-0.70	-0.61	+0.09	-1.63	-2.98	-15.18
01	+3.58	+0.17	152	-1.42	-1.26	-1.30	-0.16	-0.12	+0.04	-1.33	-2.78	-15.12
02	+3.32	+0.22	143	-0.45	-0.18	+0.05	-0.27	-0.50	-0.23	-0.19	-1.74	-14.24
03	+2.93	-0.22	136	+0.20	+0.40	+0.37	-0.20	-0.17	+0.03	+0.32	-1.33	-13.95
04	+3.21	+0.08	118	+0.72	+0.78	+0.81	-0.06	-0.09	-0.03	+0.77	-0.99	-13.72
05	+3.61	-0.07	113	+0.98	+1.88	+1.31	-0.90	-0.33	+0.57	+1.39	-0.48	-13.32
06	+3.32	-0.19	59	+1.44	+2.42	+2.28	-0.98	-0.84	+0.14	+2.05	+0.07	-12.88
07	+3.36	-0.61	111	+2.08	+2.81	+2.32	-0.73	-0.24	+0.49	+2.40	+0.31	-12.74
08	+3.15	-0.15	146	+3.04	+2.98	+2.96	+0.06	+0.08	+0.02	+2.99	+0.79	-12.35
09	+3.59	-0.13	147	+3.28	+3.07	+3.98	+0.21	-0.70	-0.91	+3.44	+1.12	-12.09
1910.5	+3.87	-0.20	160	+4.10	+4.30	+4.24	-0.20	-0.14	+0.06	+4.21	+1.77	-11.51
11	+4.54	-0.57	35	+5.21	+4.43	+5.06	+0.78	+0.15	-0.63	+4.90	+2.34	-11.01
12	+4.70	+0.22	137	+4.25	+4.97	+5.20	-0.72	-0.95	-0.23	+4.81	+2.12	-11.29
13	+5.70	+0.10	80	+5.49	+5.91	+6.12	-0.42	-0.63	-0.21	+5.84	+3.01	-10.45
14	+5.98	-0.10	67	+6.11	+6.67	+6.19	-0.56	-0.08	+0.48	+6.32	+3.36	-10.14
15	+5.49	+0.22	70	+6.35	+6.95	+6.13	-0.60	+0.22	+0.82	+6.48	+3.39	-10.15
16	+5.75	+0.20	73	+7.25	+7.69	+6.74	-0.44	+0.51	+0.95	+7.23	+4.01	-9.56
17	+5.39	+0.53	33	+7.74	+8.10	+7.45	-0.36	+0.29	+0.65	+7.76	+4.40	-9.19
18	+5.45	+0.02	63	+7.18	+7.74	+6.34	-0.56	+0.84	+1.40	+7.09	+3.58	-10.02
19	+4.47	+0.63	39	+6.79	+7.42	+7.72	-0.63	-0.93	-0.30	+7.31	+3.65	-9.94
1920.5	+4.68	+0.37	79	+7.55	+7.96	+7.08	-0.41	+0.47	+0.88	+7.53	+3.72	-9.86
21	+5.50	-0.69	82	+7.32	+8.27	+7.17	-0.95	+0.15	+1.10	+7.59	+3.64	-9.93
22	+5.01	-0.38	73	+7.60	+8.50	+7.24	-0.90	+0.36	+1.26	+7.78	+3.69	-9.87
23			81	+6.83	+7.17		-0.34			+7.00	+2.75	-10.78
24			76	+6.86	+7.18		-0.32			+7.02	+2.61	-10.88
25			111	+7.14	+6.65		+0.49			+6.90	+2.33	-11.11
26			101	+6.86	+6.46		+0.06			+6.66	+1.93	-11.45
27			107	+6.27	+6.21		+0.18			+5.79	+0.73	-12.50
28			121	+5.88	+5.70		+0.11			+5.60	+0.37	-12.77
1929.5			99	+5.65	+5.54							

¹ See text.

WASHINGTON OBSERVATIONS OF THE MOON, 1894-1922

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Washington Observations of the Moon, 1894-1922 (O-C)

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1894	"	"	1896	"	"	1897	"	"	1897	"	"
Sept. 28.5			Jan. 26.4	-1.7	-0.4	Jan. 19.6	-3.8	+2.0	July 2.1	-6.9	
Oct. 10.4	-5.2	-2.4	27.4	+0.2	+2.4	21.6	-3.2	+1.7	4.2	-5.6	+0.4
11.4	-4.6	-0.5	Feb. 13.0			22.7	-3.7	+0.7	5.2	-6.8	+2.1
15.5	-8.0	+0.1	July 10.1			24.7	-2.9	+3.3	6.2	-6.6	-1.6
16.6	-6.0	+0.8	13.1	-5.1		25.8	-3.1	+0.8	8.3	-5.2	-0.9
28.0			17.2	-6.1	-1.1	28.9	-6.6		11.4	-7.4	-1.6
Nov. 2.2	-1.8		18.3	-2.5	-0.8	Feb. 1.1			13.5	-4.1	
3.2	-1.2	0.0	Aug. 3.8	-4.1	-3.6	4.1	-4.4	-2.7	14.5	-2.2	+0.2
26.7			4.9	-2.5		9.2	-2.8	-1.6	15.6	-2.1	-0.6
Dec. 4.2	-4.8	-1.0	5.9	-5.1		13.4	-1.2	+1.4	18.7	-4.3	+1.9
5.3	-4.9	-2.9	8.5			14.4	-3.9	+1.6	21.8	-6.1	-1.4
7.3	-2.8		11.1	-5.7		16.5	-5.4	+1.0	22.8	-5.5	-0.9
26.4			14.2	-6.4	-0.2	17.5	-3.5	-0.3	23.8	-4.9	
1895			15.2	-4.0	-2.0	19.6	-4.1	-0.4	24.9	-2.9	
Jan. 4.3	-3.4	-2.5	16.3	-7.6		23.8	-4.2	-2.4	25.9	-2.1	
25.2			17.3	-7.1	-1.3	25.8	-3.4		29.0		
Feb. 24.0			19.4	-4.9	+0.3	26.9	-5.0		31.1	-7.3	
Mar. 6.4	-3.8	+0.5	24.6	-4.1	-1.2	Mar. 2.8			Aug. 2.1	-6.7	-0.4
25.7			25.6	-5.3	+0.4	10.2	-3.6	+2.0	3.2	-5.4	-1.2
Apr. 10.6	-2.3	-0.4	26.6	-4.7	-0.6	12.3	-5.2	+2.7	6.3	-5.4	-0.8
18.8	-3.7	-2.6	27.6	-6.9	-0.3	14.4	-6.4	+2.4	7.3	-4.7	-1.7
19.9	-4.8		28.7	-6.5	+2.0	16.4	-5.2		8.4	-6.6	-3.4
24.3			29.7	-2.4	-0.4	21.6	-7.1	-1.2	12.5	-2.3	+1.0
May 4.4	-4.1	-0.2	30.7		-0.3	22.7	-5.4	-1.9	13.6	-5.1	+0.5
23.8			31.8	-1.9		26.8	-4.4		14.6	-5.2	-0.7
28.2	-3.8	-0.7	Sept. 1.8	-3.4		27.9	-3.0		16.6	-6.1	+1.6
June 1.3	-3.5	+1.7	2.9	-2.3		Apr. 1.5			17.7	-5.4	+0.8
22.2			6.9			5.1	-2.9		19.7	-3.7	+0.4
July 3.4	-5.0	-0.8	9.1	-2.9		11.3	-6.3	+0.6	20.8	-3.1	-0.3
21.5			10.1	-5.2		12.4	-7.6	+2.7	21.8	-3.9	+0.6
30.3	-6.5	-0.1	11.2	-5.6		15.5	-10.5	-1.8	23.9	-2.2	
Aug. 19.8			Oct. 6.2			17.5	-4.0	+1.1	27.4		
23.1	-5.5		9.1	-4.1		18.6	-4.1	-1.1	31.1	-4.5	
24.2	-4.9		15.3	-5.2	+0.3	19.6	-3.5	-2.4	Sept. 1.2	-7.8	-0.8
26.2	-6.1		19.4	-6.9	+1.7	20.7	-3.7	-3.3	2.2	-5.0	+1.0
28.3	-5.7	-0.9	21.5	-5.4	+0.3	21.7		-1.6	3.2	-7.1	-1.6
31.4	-2.3	-2.5	22.5	-6.1	-1.1	22.7	-3.2	-1.1	4.3	-7.0	+1.2
Sept. 2.5	-4.0	-0.7	24.6	-2.7	-1.1	26.9	-4.7	-1.6	5.3	-6.5	-3.6
3.5	-4.2	+1.0	26.7	-4.6	+3.3	27.9	-4.6		6.4	-9.2	-0.6
4.5	-2.8	-0.7	27.7	-2.8	+3.8	May 1.2			7.4	-6.7	-1.6
11.8	-1.8	0.0	30.8	-4.0	-0.4	6.2	-1.3		8.4	-7.7	+1.6
13.8	-3.7		Nov. 1.9	-3.5		7.2	-4.0		9.5	-7.5	+1.4
18.2			4.6			8.2	-4.6	+1.8	10.5	-6.4	+0.2
21.1	-7.2		7.1	-4.7		9.3	-4.6	+1.2	13.6	-4.2	+0.6
23.2	-6.1		10.2	-3.3	-1.4	13.4	-9.4	-3.8	14.6	-5.1	-0.4
28.4	-5.4	-1.3	13.3	-4.0	-0.3	15.5	-7.1	-1.7	15.7	-7.0	+1.2
Oct. 1.4	-3.0		14.3	-3.2		16.5	-4.4	-2.5	17.7	-0.6	+0.6
3.5	-5.3	-1.8	15.4	-5.7		17.6	-3.4	-1.6	18.8	-2.3	-0.5
5.6	-6.6	-0.9	16.4	-5.8	-0.4	18.6	-2.3	-4.8	19.8		+1.4
17.5			17.4	-6.3	+1.2	19.7	-4.8	-2.5	20.8	-2.0	+2.3
21.1	-7.8		18.4	-2.6	-0.9	20.7	-3.6	+0.1	21.9	-2.8	+2.5
22.2	-5.0		Dec. 4.0			21.7	-2.1	-0.1	23.9	-3.5	
23.2	-4.3	0.0	9.2	-3.7	+1.6	22.8	-5.1	-1.2	25.9		
24.2	-1.6	-0.7	10.2	-2.0	+0.2	24.8	-5.3	-0.7	29.1	-4.5	
25.3	-3.7	-1.3	11.2	-4.2	-0.2	25.8	-5.8	0.0	Oct. 3.3	-7.4	-1.5
26.3	-3.6	-1.0	12.3	-5.5	+1.5	30.8			4.3		-1.4
29.4	-4.7	-0.8	14.3	-4.5	-0.4	June 6.2	-5.3	+1.4	5.3	-7.7	+1.8
Nov. 2.5	-2.2	+0.9	16.4	-4.1	-0.2	9.3	-4.0	-1.5	6.4	-6.8	+0.6
16.0			17.4	-2.2	+0.2	10.3	-4.7	-0.2	7.4	-7.9	+1.6
19.1	-3.4		28.8		+1.8	11.4	-9.7	-1.6	9.5	-7.4	+1.9
21.2	-2.4	+0.8	1897			12.4	-6.6	-1.2	11.5	-8.3	
22.2	-2.1	+0.9	Jan. 2.5			13.5	-6.3	-1.5	12.6	-8.8	+3.7
29.4	-2.5	+0.4	6.1	-2.8	+1.1	14.5	-1.9	-2.7	13.6	-6.4	+0.2
Dec. 15.6			7.2	-4.1	0.0	18.7	-2.0	+0.9	14.6	-4.4	0.0
1896			8.2	-3.7	+2.1	20.7	-5.3	-1.7	15.7	-1.4	+1.3
Jan. 3.6	-1.0		9.2	-5.5		21.8	-7.0		16.7	-2.5	+0.3
4.7	-3.9	-0.3	10.2	-1.1	-0.3	22.8	-4.4	+0.5	17.7	-3.1	+2.1
14.2			11.3	-4.9	+0.3	23.8	-6.9	-1.0	25.3		
18.1	-3.7		12.3	-3.8	-0.3	24.8	-6.4	+5.2	30.2	-4.3	-0.2
			18.5		-0.3	29.4			31.2	-4.1	-0.8

WASHINGTON OBSERVATIONS OF THE MOON, 1894-1922

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1897	"	"	1898	"	"	1898	"	"	1898	"	"
Nov. 2.3	-7.5	+1.2	Mar. 4.4	-3.1	+1.9	Aug. 1.5	-5.2	+0.3	Dec. 15.1	-2.3	"
3.3	-6.2	+1.5	5.4	-1.8	+0.7	3.6	-5.2	-0.6	16.1	-4.5	-2.6
4.4	-7.4	+2.8	6.5	-3.9	+0.8	5.6	-3.0	0.0	17.2	-3.4	+0.3
5.4	-9.2	+3.8	7.5	-3.5	+0.2	6.7	-----	+0.3	18.2	-4.6	+0.6
6.4	-4.9	+1.7	8.5	-2.9	+0.6	7.7	-4.2	-0.5	23.4	-4.0	+0.5
9.5	-4.9	+0.6	9.6	-5.6	-0.3	8.7	-4.3	+1.4	24.4	-4.0	+0.1
10.5	-6.2	-1.0	10.6	-1.2	-2.6	16.7	-----	-----	25.4	-6.3	+1.0
11.6	-5.3	+0.3	12.7	-4.0	-1.8	21.1	-5.0	-----	26.5	-4.3	+2.4
12.6	-0.8	+0.9	13.7	-5.0	0.0	22.2	-4.0	-1.3	29.6	-1.9	-----
13.6	-3.9	+1.5	14.8	-3.4	-4.3	24.2	-5.4	-1.1			
16.7	-4.1	+3.4	21.6	-----	-----	26.3	-3.8	-2.5			
17.8	-4.4	+1.1	31.3	-5.2	+2.4	27.4	-5.0	-2.5	1899		
18.8	-2.4	+0.4	Apr. 1.3	-4.5	+1.8	28.4	-----	-2.8	Jan. 6.8	-0.7	-0.8
19.8	-3.6	-----	2.4	-3.6	+0.4	30.5	-6.1	+2.1	7.9	-5.5	-----
20.9	-4.5	-----	3.4	-5.0	+1.8	31.5	-3.7	-1.2	11.2	-----	-----
23.7	-----	-----	5.5	-5.8	-0.3	Sept. 1.6	-4.1	-0.1	18.2	-6.3	+1.7
27.1	-2.4	-----	6.5	-5.1	-0.7	2.6	-3.4	+0.4	19.3	-4.4	+1.2
29.2	-4.9	-0.7	7.5	-2.2	-0.9	3.6	-1.1	+0.2	20.3	-2.0	+0.3
30.2	-4.6	+2.3	8.6	-1.2	-2.4	4.7	-----	+1.0	21.4	-3.4	+1.3
Dec. 1.3	-4.0	+2.1	12.8	-6.9	-3.0	5.7	-1.2	-0.1	22.4	-2.9	+1.8
6.4	-5.7	+0.9	15.9	-7.5	-2.5	6.7	-1.1	-0.8	23.4	-3.5	+0.2
7.5	-6.0	-0.1	20.2	-----	-----	7.8	-0.6	-0.2	25.5	-4.5	-0.3
8.5	-3.5	-0.9	29.3	-5.1	-----	8.8	-1.8	+0.6	26.5	-2.2	+0.8
9.5	-0.4	+0.8	30.3	-2.9	0.0	10.9	-2.6	-----	Feb. 1.7	-3.2	-1.6
12.6	-5.2	-----	May 1.3	-5.5	-0.4	11.9	-1.2	-----	3.8	+0.4	-1.5
15.7	-3.8	-0.4	2.4	-5.3	+0.9	15.3	-----	-----	9.7	-----	-----
16.8	-4.9	+1.5	8.6	-7.0	-4.2	19.1	-5.0	-0.4	21.4	-4.4	+0.2
17.8	-1.5	-1.0	9.7	-3.7	-1.4	23.3	-3.8	-1.9	24.5	-2.8	-0.4
18.8	-3.4	+1.8	10.7	-2.5	-2.4	24.3	-5.7	-1.7	25.5	-2.6	-1.0
23.1	-----	-----	11.7	-4.9	-2.5	25.4	-6.8	+0.3	27.6	-1.8	-0.9
27.2	-3.7	0.0	13.8	-5.3	-1.3	26.4	-7.7	+1.2	Mar. 5.8	-2.6	-----
28.2	-4.8	-0.7	17.9	-6.3	-----	27.4	-4.9	+0.9	11.1	-----	-----
30.2	-6.3	-----	19.8	-----	-----	28.5	-7.7	+0.1	17.2	-1.9	+2.0
			24.1	-4.5	-----	29.5	-7.0	+0.5	20.3	-3.8	-----
1898			25.2	-2.5	-1.1	30.5	-3.9	-1.1	23.4	-4.1	+1.0
Jan. 3.4	-3.4	-0.6	27.2	-4.2	+1.6	Oct. 5.6	-2.6	-0.4	24.4	-4.0	+0.7
4.4	-4.2	+3.5	28.3	-3.7	+0.8	6.7	-0.1	+1.1	29.6	-1.8	-1.1
5.4	-1.0	+0.7	30.3	-2.5	+1.0	10.9	-4.6	-----	Apr. 1.7	-3.5	-4.5
7.5	-0.8	+1.2	31.4	-3.8	-0.4	11.9	-3.2	-----	4.8	-6.7	-3.3
8.5	-4.5	+1.6	June 1.4	-5.6	-0.6	14.8	-----	-----	9.6	-----	-----
16.8	-5.7	+0.9	3.5	-5.2	-0.4	19.2	-2.6	-----	13.1	-2.8	-----
17.9	-2.6	+4.0	5.6	-3.0	-2.2	20.2	-2.3	-1.7	16.2	-1.7	-0.9
21.6	-----	-----	6.6	-3.4	-1.1	22.3	-8.6	-3.6	17.3	-4.3	-0.6
24.1	-4.6	-----	7.7	-2.7	+0.6	23.3	-6.9	+0.9	18.3	-2.4	-0.6
26.2	-4.1	+0.3	8.7	-4.5	-1.4	24.3	-7.5	+1.1	19.3	-3.0	+0.2
27.2	-4.7	+1.1	9.7	-4.3	-1.3	26.4	-9.3	+2.7	20.4	-3.6	0.0
28.2	-7.0	-1.7	11.8	-6.5	-2.6	27.4	-8.6	+2.1	21.4	-6.3	+1.0
29.3	-3.9	0.0	12.8	-6.9	-2.0	28.5	-5.6	0.0	22.4	-7.1	-1.0
30.3	-5.4	+0.9	13.8	-4.4	-----	30.5	-2.7	-1.0	23.4	-4.6	-0.2
Feb. 2.4	-2.3	+0.1	18.5	-----	-----	31.6	+0.9	+0.4	24.5	-4.7	+0.6
3.4	-1.9	+1.4	23.1	-4.6	-1.4	Nov. 1.6	-7.0	+1.1	26.5	-5.5	-0.6
4.5	-6.0	+1.6	24.2	-4.3	+0.5	2.6	-----	-0.4	27.6	-----	+1.1
5.5	-3.6	+0.5	25.2	-3.9	-0.1	3.7	-0.5	-2.6	28.6	-4.8	+0.4
6.5	-3.3	+1.5	27.3	-4.2	-----	4.7	-1.4	+1.3	29.7	-3.4	-1.7
7.6	-1.5	+1.0	29.3	-----	-0.3	6.8	-1.0	+0.5	30.7	-7.6	-2.0
8.6	-3.6	+2.1	30.4	-3.9	-1.8	8.8	-1.6	+1.4	May 9.0	-----	-----
9.6	-3.3	-----	July 1.4	-4.6	-0.2	13.3	-----	-----	12.1	-3.4	-----
10.6	-3.1	-1.5	2.5	-2.5	-3.0	19.2	-6.6	-1.8	14.2	-3.9	-0.2
13.8	-3.9	-1.2	3.5	-4.4	-2.2	20.3	-5.7	+0.8	15.2	-2.8	-----
15.8	-6.4	-----	7.7	-4.6	-1.4	21.3	-6.6	+1.7	20.4	-4.4	+1.5
16.9	-4.8	-----	8.7	-2.4	-1.2	24.4	-5.6	+1.7	21.4	-4.9	-0.5
20.1	-----	-----	9.7	-4.8	-1.1	25.4	-6.0	+1.2	23.5	-6.6	-0.8
23.1	-2.5	-----	10.8	-6.1	-1.9	27.5	-5.2	-0.1	24.5	-4.8	-0.5
24.1	-5.8	-1.0		-----	-----	30.6	-2.0	+1.2	25.5	-0.8	-0.8
26.2	-3.8	+0.9	23.2	-5.6	0.0	Dec. 1.6	-2.4	+1.2	26.6	-3.6	-2.3
27.2	-1.7	+0.2	25.2	-4.9	-0.5	6.8	-2.1	+0.9	27.6	-3.9	-0.6
28.3	-3.6	-0.2	28.3	-5.4	-0.9	7.8	-4.0	+0.8	28.7	-5.1	-----
Mar. 1.3	-1.4	+1.1	29.4	-1.3	-0.6	8.8	-1.8	+0.9	29.7	-6.3	-2.2
2.3	-1.6	+1.0	30.4	-4.1	-2.4	9.9	-2.9	-----	June 2.8	-5.3	-1.8
3.4	-3.4	+1.5				12.8	-----	-----	7.6	-----	-----
									14.2	-0.7	+0.3

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1899	"	"	1899	"	"	1900	"	"	1900	"	"
June 16.3	-2.6	-1.3	Nov. 13.4	-6.0	-0.2	Apr. 7.3	-4.1	-0.2	Aug. 30.2	-3.8	-----
18.3	-2.7	-0.8	14.4	-5.3	+2.0	8.3	-4.4	-0.6	31.2	-3.4	-1.9
19.4	-6.6	+2.2	18.6	-1.8	-0.3	9.4	-2.4	+1.3	Sept. 1.2	-2.0	-0.9
20.4	-7.5	+2.0	19.6	-0.6	-2.1	10.4	-1.9	+0.7	2.3	-3.1	-2.2
21.4	-3.7	-0.4	20.6	-1.2	-0.4	14.5	-1.4	-0.2	3.3	-2.8	-0.6
22.5	-0.7	-0.1	21.7	-1.6	-0.1	15.5	-2.1	-0.7	4.3	-3.7	+0.2
23.5	-2.6	+0.4	23.7	-0.9	+1.4	19.7	-1.5	-1.9	5.4	-3.2	-1.6
24.6	-4.8	-1.1	24.8	-1.0	+3.7	23.8	-5.7	-3.0	6.4	-3.1	-3.3
25.6	-6.7	-2.0	25.8	-2.2	+1.7	24.9	-5.5	-3.2	7.5	-3.1	-0.9
26.6	-4.6	0.0	26.8	-3.1	-----	25.9	-6.8	-----	17.8	-3.3	-----
27.7	-5.5	-0.4	Dec. 2.3	-----	-----	28.5	-----	-----	18.9	-4.2	-----
28.7	-5.2	+0.8	5.1	-5.0	-----	May 5.2	-1.2	-1.1	23.1	-----	-----
29.8	-6.8	-0.8	6.1	-4.1	-----	6.3	-3.9	-1.1	27.1	-5.1	-----
30.8	-5.4	-2.7	8.2	-3.9	+1.8	7.3	-2.3	+0.5	Oct. 5.4	-4.6	-1.2
July 2.9	-4.8	-1.3	9.2	-4.2	+1.2	8.3	-1.2	0.0	6.4	-2.8	-0.2
7.1	-----	-----	12.4	-6.9	+0.6	9.4	-2.8	+0.7	7.5	-4.8	-1.5
11.1	-4.8	-----	13.4	-3.7	+1.7	10.4	-0.1	+0.4	9.6	+2.5	-2.6
12.1	-2.4	-----	15.5	-1.5	-2.2	14.5	-1.6	-0.8	10.6	-----	+0.5
18.3	-4.0	+0.4	16.5	-1.3	-1.2	15.6	-2.1	+3.1	11.6	+1.7	+1.5
20.4	-4.4	-1.8	17.5	-3.2	+1.1	17.6	-1.8	+1.3	14.7	-1.3	-0.5
21.5	-5.8	+0.2	18.6	-1.3	+2.7	21.8	-6.2	-1.2	15.8	-2.9	-0.2
22.5	-3.9	-----	19.6	-2.5	+0.2	22.8	-6.2	-----	16.8	-3.8	-1.4
27.7	-5.3	-1.7	20.6	-----	+0.8	25.9	-7.2	-----	17.8	-3.3	+1.7
28.7	-4.0	-0.5	21.7	-2.1	+1.6	27.9	-----	-----	18.9	-0.6	-----
Aug. 5.8	-----	-----	22.7	-1.2	+0.3	June 1.2	-2.8	-----	19.9	-2.1	-----
16.3	-2.6	-0.3	25.8	-0.3	-1.8	3.2	-1.2	-1.4	22.8	-----	-----
17.4	-3.8	-1.0	26.8	-3.0	+2.0	4.2	-2.2	+0.8	27.1	-2.8	-----
19.5	-4.4	-0.8	28.9	-2.3	-----	5.3	-2.3	-0.6	29.2	-2.1	-0.7
20.5	-6.5	0.0	31.7	-----	-----	6.3	-2.5	+1.0	30.2	-4.2	-3.7
21.5	-5.3	+1.0	-----	-----	-----	7.3	-1.7	-0.2	Nov. 2.3	-4.7	-1.6
22.6	-3.6	+0.3	1900	-----	-----	9.4	-2.7	+0.5	4.4	-4.6	0.0
23.6	-3.8	-1.2	Jan. 4.1	-4.7	+0.2	10.4	-3.4	-2.4	9.6	-0.2	-0.8
24.6	-5.2	-----	5.2	-4.1	+0.8	11.5	-4.6	+0.3	12.7	-1.4	-1.1
25.7	-3.6	-1.1	6.2	-4.2	+1.3	14.6	-4.8	-----	21.6	-----	-----
31.9	-3.5	-----	7.2	-6.6	+1.8	19.8	-6.0	-1.9	27.2	-3.8	-2.1
Sept. 4.4	-----	-----	8.3	-4.8	-0.6	20.8	-7.1	-0.6	29.3	-5.2	+1.1
11.2	-3.7	-----	9.3	-4.9	+0.2	21.8	-6.0	-----	30.3	-6.2	+0.4
12.2	-4.6	-2.1	12.4	-4.2	-1.4	26.3	-----	-----	Dec. 2.4	-6.7	+1.7
13.3	-3.0	-0.8	13.5	-2.5	-0.1	29.1	-4.3	-----	4.4	-5.5	+0.1
14.3	-5.1	-1.4	15.5	-1.8	-0.9	30.1	-3.6	0.0	5.5	-5.0	-0.7
15.4	-3.7	-0.4	23.8	-1.0	-1.7	July 1.2	-2.8	-0.3	8.6	-2.4	+0.4
16.4	-3.8	-1.3	25.8	-2.2	-----	2.2	-4.3	+0.6	9.6	-2.0	+1.1
17.4	-3.7	+0.8	26.9	-1.4	-----	6.3	-3.6	+0.6	10.7	-4.4	0.0
18.5	-3.8	-0.1	30.3	-----	-----	7.3	-5.6	+2.0	11.7	-2.9	+2.0
21.6	-4.2	+0.1	Feb. 3.1	-5.9	+1.7	8.4	-4.2	+0.1	13.8	-2.4	+0.2
22.6	-0.7	-1.0	5.2	-3.7	+1.4	9.4	-3.8	-----	14.8	-4.6	-0.6
23.7	+0.9	+0.4	6.3	-3.0	-1.5	10.4	-1.5	-1.1	15.8	-1.3	+1.7
24.7	-0.8	+1.9	8.3	-2.5	-1.2	11.5	-4.9	-0.2	16.8	-2.9	+2.1
26.8	-2.2	+1.7	9.4	+0.1	-1.7	13.6	-6.8	+0.9	17.9	-2.8	-----
27.8	-2.2	-----	13.5	-2.7	-2.0	14.6	-7.5	-1.4	21.3	-----	-----
29.9	-1.7	-----	19.7	-1.6	-2.4	15.6	-6.1	-1.8	26.2	-5.2	-----
Oct. 4.1	-----	-----	20.7	-1.2	-1.3	16.7	-6.3	-0.6	27.2	-4.1	-1.6
7.1	-5.6	-----	22.8	-1.6	-2.2	17.7	-5.9	-1.8	28.2	-4.8	-1.3
10.2	-2.5	-----	25.9	-3.4	-----	20.8	-3.2	-0.4	29.3	-5.9	-2.2
12.3	-4.4	-2.0	26.9	-6.1	-----	25.9	-----	-----	-----	-----	-----
13.3	-5.3	-2.3	28.8	-----	-----	28.1	-3.3	-----	1901	-----	-----
14.3	-3.8	-0.7	Mar. 3.1	-6.8	-----	31.2	-3.3	-----	Jan. 1.4	-2.5	-1.6
18.5	-4.4	-----	7.2	-1.6	-0.4	Aug. 1.2	-1.4	+0.6	2.4	-2.7	+1.5
19.5	-0.6	-0.2	10.3	-----	-0.3	2.2	-2.7	+0.4	3.5	-4.5	-0.6
20.6	+0.3	+2.1	12.4	-2.8	+0.8	3.2	-2.4	-0.2	4.5	-2.7	+1.1
21.6	+0.9	+1.0	16.5	-2.3	-0.9	4.3	-2.7	-0.8	5.5	-2.2	-0.4
22.6	-1.4	-1.7	17.6	-0.4	-1.8	5.3	-4.3	+1.1	6.6	-2.0	+0.4
25.8	-3.7	+2.7	19.6	-1.3	-1.1	6.4	-2.4	-0.6	7.6	-3.6	+1.8
26.8	-0.2	-----	20.7	-0.8	-1.6	7.4	-4.6	-2.1	8.6	-2.6	+2.3
27.8	-1.6	-----	21.7	0.0	-1.2	8.4	-2.9	+0.7	9.7	-5.3	-0.3
Nov. 2.7	-----	-----	22.7	-1.8	-2.3	9.5	-2.5	-2.5	12.8	-1.5	-1.2
7.2	-2.9	-----	26.9	-5.8	-----	10.5	-4.4	-0.7	13.8	-0.6	-0.1
8.2	-3.3	-2.6	27.9	-4.8	-----	11.5	-5.4	-0.2	15.9	-2.7	-----
9.2	-4.5	-1.2	Apr. 3.2	-2.3	-1.5	14.7	-7.4	+0.9	19.9	-----	-----
10.3	-4.1	-0.7	5.2	-1.9	+0.5	16.7	-2.8	+0.2	28.3	-2.6	-1.2
12.3	-5.5	+0.8	-----	-----	-----	24.4	-----	-----	29.3	-4.3	-1.2

WASHINGTON OBSERVATIONS OF THE MOON, 1894-1922

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1901	"	"	1901	"	"	1901	"	"	1902	"	"
Jan. 31.4	-4.9	-1.7	July 20.2	-4.6	+0.5	Dec. 15.1	-3.8	-0.4	May 21.5	-3.8	+1.8
Feb. 1.5	-7.2	-1.2	21.2	-3.4	-0.5	17.2	-5.4	-0.4	22.5	+0.5	+0.6
4.6	-3.0	+1.2	23.3	-3.3	-0.9	18.2	-5.1	-0.3	25.6	-0.3	+2.1
5.6	-2.2	+1.4	28.4	-1.9	-0.9	19.3	-5.1	+0.4	27.7	-0.3	+1.5
6.6	-2.0	-0.7	29.5	-2.2	+1.4	20.3	-4.7	-0.9	28.7	-4.5	-2.0
9.7	-0.4	-0.7	31.5	-3.2	+2.5	22.4	-2.3	+1.1	29.8	-1.4	-1.5
10.7	-2.2	-0.1	Aug. 1.6	-5.7	0.0	24.5	-1.7	+0.7	June 1.9	-2.8	-0.6
12.8	+1.0	-0.9	8.8	-2.3	-0.6	25.5	-1.7	+1.8	5.5	-5.7	-2.0
18.4	-1.5	+0.4	9.9	-2.6	-0.6	27.6	-2.6	-1.1	9.1	-3.7	-0.6
24.2	-3.0	-0.2	13.6	-0.3	+1.1	30.7	-1.0	-0.2	10.2	-3.9	-0.6
25.3	-5.7	+1.4	20.2	-0.3	+2.4	31.7	-0.1	-1.5	12.2	-1.5	-0.6
27.3	-4.8	+1.1	21.2	-0.5	+1.4	1902			14.3	-4.6	0.0
Mar. 1.4	-5.3	+0.8	22.3	-2.3	-0.7	Jan. 3.8	+1.4	+0.1	17.4	-3.2	-1.3
5.5	-4.4	+2.1	26.4	-2.6	-0.7	4.9	-1.3	-0.4	18.4	-2.3	-1.4
6.6	-3.0	-1.6	27.4	-4.2	+1.4	9.2	-4.6	-1.2	19.5	-0.2	+0.5
7.6	-2.3	-1.9	28.5	-3.1	+0.8	13.1	-3.8	+1.3	21.5	-1.7	-1.8
11.7	-0.6	-1.9	29.5	-3.3	+0.8	14.2	-3.1	+0.4	23.6	-2.9	-1.8
17.9	-1.9	-0.2	31.6	-2.9	-0.2	15.2	-3.0	-0.3	24.6	-4.0	-2.0
19.8	-4.5	+0.2	Sept. 1.6	-3.8	+0.8	17.3	-3.0	-0.5	July 4.8	-3.2	-1.9
22.1	-2.6	+1.4	3.7	-2.8	+2.6	19.3	-0.4	-1.5	9.2	-1.9	+1.5
24.2	-5.6	+0.4	4.7	-3.7	-0.4	20.4	+0.6	-1.2	11.2	-4.4	+1.0
28.3	-1.4	-0.3	5.8	-3.4	-0.4	23.5	+0.2	+2.0	12.3	-2.9	+0.3
Apr. 1.4	-3.9	-1.1	7.9	-1.5	0.0	27.6	+0.5	-0.2	13.3	-2.4	-1.8
4.5	+0.2	-1.2	12.2	-1.6	-1.3	Feb. 2.8	-2.6	-0.2	14.3	-2.0	+2.0
9.7	+1.1	-0.6	21.3	-3.4	-2.4	7.8	-4.0	-0.6	15.4	-2.8	+1.2
10.7	-0.6	-2.8	22.3	-4.6	+0.4	10.1	-3.1	+2.1	16.4	-2.3	-0.8
11.8	-2.4	+1.0	23.3	-2.4	+0.4	13.2	-1.5	-1.1	17.4	-1.5	-0.7
15.9	-5.7	-0.3	24.4	-3.9	+1.3	14.2	-4.2	+1.7	Aug. 3.1	-2.1	+0.8
18.2	-4.9	+1.0	25.4	-2.8	+0.8	17.3	-2.0	-0.6	9.2	-1.4	-1.3
26.3	-5.3	+0.7	26.5	-2.6	-0.4	18.4	-3.4	+1.1	11.3	-2.7	-0.2
27.3	-3.0	-0.2	27.5	-2.5	-2.0	19.4	-2.7	-0.7	16.4	-3.1	-1.0
28.4	-3.5	-0.3	30.6	-3.6	+1.1	22.5	-0.2	0.0	17.5	-2.2	-0.3
29.4	-4.2	-0.2	Oct. 2.7	-0.9	-0.7	23.5	+0.4	+2.3	18.5	-0.5	+0.6
30.4	-1.2	+0.8	3.7	-0.6	+0.8	24.6	+0.1	-0.5	19.5	-1.8	-1.2
May 3.5	-0.5	+1.2	4.8	-0.7	-0.1	26.6	+0.2	-0.3	22.6	-0.2	-0.2
4.5	-0.9	+0.7	5.8	-3.0	-0.1	29.7	-1.2	-0.4	23.7	-2.5	+0.6
5.6	+0.2	+1.2	6.8	-2.6	-0.4	31.8	-0.4	-0.3	24.7	-1.4	-0.5
6.6	-0.8	+0.7	7.9	-1.7	-0.1	Apr. 7.9	-2.6	+1.2	25.7	-1.8	-1.2
11.8	-3.0	+2.3	11.8	-2.5	+0.5	12.2	-3.4	+1.1	26.8	-0.2	-0.2
13.9	0.0	-0.3	15.1	-0.6	-1.5	15.3	-4.2	+1.1	Sept. 1.5	0.0	-0.4
17.5	-3.6	+0.1	16.1	-2.2	-2.0	17.4	-3.2	+1.1	5.1	-0.4	-0.3
23.2	-5.0	+2.2	18.2	-4.2	-0.9	18.4	-2.7	-0.7	6.1	-1.4	+2.1
28.4	-6.8	+2.4	19.2	-3.6	+1.1	19.4	-2.2	0.0	7.2	-1.1	-0.6
29.4	-4.1	+1.7	20.3	-1.3	-0.4	22.5	+0.4	+2.3	8.2	-0.1	+1.8
30.4	-1.4	+0.8	21.3	-0.7	-0.1	23.5	+0.1	-0.5	11.3	-0.2	+1.7
31.5	+0.3	-0.6	22.3	-0.9	-0.1	24.6	+0.2	-0.4	12.3	-1.5	-1.0
June 3.6	-0.6	-0.6	24.4	-4.5	+0.8	26.6	+1.5	+2.0	13.4	-2.1	+0.8
4.6	-1.7	+1.0	25.4	-2.6	-0.1	27.7	+2.3	+0.2	14.4	-2.2	-1.3
5.6	-5.2	+0.1	26.5	-3.0	-0.1	29.7	-1.5	-1.0	15.4	-3.3	+1.0
8.7	-2.4	-2.4	27.5	-0.2	-2.0	30.8	-3.1	-3.2	16.5	0.0	-0.9
9.8	-3.0	+0.6	29.6	-0.9	-0.7	May 1.8	-2.7	-2.7	18.5	-1.3	0.0
10.8	-4.2	+2.3	30.6	-3.6	+1.1	4.9	-3.2	-3.2	22.7	-1.9	+0.7
11.8	-3.5	-0.2	Nov. 1.7	-0.6	+0.8	7.2	-4.2	+1.4	Oct. 1.0	-2.6	-0.2
15.9	-2.8	+0.9	2.8	-0.7	-0.1	10.1	-2.0	-2.0	6.2	-1.4	+0.8
18.1	-5.1	+1.0	3.8	-1.3	-0.4	15.3	-1.7	-0.3	7.2	-1.6	-1.8
21.2	-4.0	+0.4	5.8	-1.4	-0.1	17.4	-2.4	+1.5	10.3	-0.6	-1.0
23.2	-3.6	+2.2	6.9	-0.9	-0.1	18.4	-2.4	-2.4	12.4	-2.7	0.0
24.3	-4.6	+0.9	10.6	-4.7	-0.4	19.4	-2.4	-2.4	13.4	-2.4	+0.2
25.3	-6.2	+1.0	19.3	-4.2	+1.2	Dec. 1.7	-2.5	-2.2	14.4	-2.2	+0.6
26.3	-4.2	+1.6	20.3	-3.8	+0.2	3.8	-0.9	+0.1	15.5	-4.1	-0.7
27.4	-5.3	-1.8	21.3	-3.0	-3.2	4.8	-0.7	-3.2	16.5	-2.2	0.0
28.4	-1.5	-0.7	22.4	-1.0	-3.2	5.9	-0.8	-3.2	18.6	-2.2	0.0
29.4	-1.8	-0.4	26.5	-3.6	+3.3	6.9	-3.2	-3.2			
30.5	-1.9	-0.4	28.6	-2.5	-2.2	10.4	-2.4	+1.5			
July 1.5	-4.2	+1.4	Dec. 1.7	-2.5	-2.2						
2.5	-4.2	+1.4	3.8	-0.9	+0.1						
3.6	-4.2	+1.4	4.8	-0.7	+0.1						
5.6	-4.6	+1.4	5.9	-0.8	-3.2						
10.8	-4.6	+1.4	6.9	-3.2	-3.2						
15.2	-4.6	+1.4	10.4	-3.2	-3.2						

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1902	"	"	1903	"	"	1903	"	"	1904	"	"
Oct. 19.6	-1.2	+0.4	Apr. 26.8	-0.8	-----	Sept. 30.3	+0.6	-2.1	Mar. 29.5	-2.0	-1.0
20.6	-1.7	-0.1	30.1	-2.1	-----	Oct. 4.4	-0.2	-0.4	Apr. 1.6	-2.2	-----
21.7	-1.6	-1.0	May 1.2	-2.9	-1.3	5.5	-0.1	-0.4	2.6	-2.3	+0.6
22.7	-1.1	-0.4	4.3	-3.5	-0.9	6.5	-1.3	0.0	3.6	-----	-0.9
24.8	-4.3	+0.1	5.3	-3.5	+0.1	12.7	-0.3	-1.0	4.7	-0.9	+1.4
27.9	-2.5	-----	6.4	-3.9	-----	13.8	-2.0	+0.4	5.7	-2.9	-0.5
Nov. 7.2	-1.6	-3.2	7.4	-3.6	0.0	14.8	-0.9	+0.5	8.8	-1.3	-1.2
9.3	-4.1	-0.8	8.4	-3.6	-0.8	19.9	-----	-----	10.9	+0.4	-----
12.4	-1.8	+0.6	9.5	-1.8	+0.6	26.2	+0.3	+2.9	15.2	-----	-----
13.4	-2.5	-0.3	10.5	+1.0	+2.2	27.2	-0.4	-0.7	20.2	+0.4	-----
14.5	-2.1	-0.4	11.5	-1.0	+0.4	28.3	-1.4	-1.8	21.2	+0.4	-0.7
15.5	-1.0	-0.9	12.6	-1.3	+0.4	29.3	-1.8	-1.1	22.2	-1.5	+0.2
16.6	-1.7	-2.9	13.6	+0.8	-0.4	Nov. 3.5	-1.5	+0.2	May 1.6	-2.4	+0.4
19.7	-2.7	+0.1	14.6	0.0	+0.9	6.6	-3.0	-0.9	2.6	-1.3	+1.2
21.8	-2.3	+1.7	15.7	-0.4	-0.2	7.6	-0.2	-0.1	3.7	-1.7	-0.1
22.8	-3.5	+1.0	16.7	-3.5	-0.6	8.6	-0.6	-----	4.7	-0.9	+0.2
Dec. 29.4	-3.4	-----	17.7	-3.8	-1.1	9.7	-2.0	-0.5	5.7	-1.2	+1.9
3.1	-2.4	-3.0	18.8	-2.7	-----	10.7	-1.8	+0.2	7.8	-1.8	-----
5.2	-4.6	-0.2	19.8	-2.7	-----	11.8	-1.6	+2.3	14.7	-----	-----
8.3	-3.5	+0.3	20.8	-3.7	-2.6	12.8	-1.8	-1.1	23.3	-2.5	-----
9.3	-3.3	-1.1	26.2	-3.3	-1.1	18.8	-----	-----	24.3	-1.9	-0.2
10.3	-1.7	-0.3	June 1.2	-2.8	-0.4	24.2	-3.1	-0.3	25.4	-2.1	+0.4
14.5	-0.1	-2.8	2.3	-2.6	-0.4	25.2	+1.2	-----	26.4	-1.5	+0.4
17.6	-1.4	0.0	3.3	-2.0	-1.1	26.2	-0.9	+0.2	27.5	-1.5	-0.1
21.8	-0.5	-3.3	4.3	-1.5	-0.5	27.3	-1.3	-0.4	28.5	-1.6	+0.3
22.8	-1.8	-1.3	8.5	-0.8	+0.6	28.3	-1.0	-0.6	30.6	-1.4	+1.0
23.8	-1.4	-----	9.5	-2.4	-0.7	30.4	-1.4	+1.0	June 3.7	-1.6	+0.7
29.2	-----	-----	10.5	-2.5	-1.3	Dec. 1.4	-1.8	+0.3	6.8	+0.8	-----
1903	"	"	14.7	-1.7	+1.0	3.5	-0.7	-0.9	8.9	-0.3	-----
Jan. 6.2	-3.9	+1.5	15.7	-2.8	-1.6	5.6	-1.5	-1.3	13.2	-----	-----
9.4	-1.9	-1.1	17.8	-2.8	-1.7	6.6	-1.9	-1.1	20.3	-1.6	-----
10.4	-2.2	-1.0	24.5	-1.8	+0.2	7.6	-2.8	-1.6	22.3	-3.3	+0.8
11.4	-1.5	+0.6	July 1.3	-2.4	+0.2	9.7	-1.2	-1.7	23.4	-1.7	+0.7
12.5	-2.8	+0.4	6.4	-3.4	-0.2	10.7	-----	-0.9	24.4	-2.6	+0.3
13.5	-1.1	+0.6	7.5	-0.4	-0.3	11.8	-1.0	-2.5	26.5	-0.8	+0.5
14.6	-----	-3.4	8.5	-0.1	0.0	18.2	-----	-----	July 2.7	+0.3	+1.4
15.6	-0.3	+1.9	9.5	-2.6	-0.1	22.1	-1.7	-----	3.7	-----	0.0
17.7	-0.9	-1.6	10.6	-2.6	-0.1	23.2	-1.8	-0.7	5.8	-----	-0.3
18.7	+0.6	-1.8	11.6	-2.6	-0.1	26.2	+0.1	-1.4	7.8	-1.0	-----
28.0	-1.8	-----	13.6	+0.2	-0.5	28.3	-2.5	+0.9	12.5	-----	-----
Feb. 31.1	-1.8	-1.0	14.7	+1.0	+0.4	29.3	-0.6	+0.1	20.3	-0.5	+1.9
4.2	-2.4	-0.6	15.7	+0.8	-0.1	30.4	+0.1	-1.7	22.4	-2.9	+0.1
5.3	-1.4	+1.1	16.7	-0.9	-1.0	31.4	-0.9	-2.1	24.4	-0.1	-----
6.3	-0.2	-0.6	19.8	-0.3	-----	1904	"	"	25.5	-0.3	+1.4
8.4	-5.7	+0.4	20.9	0.0	-----	Jan. 16.9	-----	-----	26.5	-0.7	+1.1
9.4	-2.3	+0.2	23.8	-2.3	-1.2	24.2	-1.0	+0.3	27.5	-1.1	+0.6
10.5	-1.6	-1.3	28.2	-2.9	+1.0	25.3	-0.5	+0.3	29.6	-1.2	+0.5
12.6	+1.4	-0.2	Aug. 5.4	-2.5	+0.2	27.3	+0.8	-0.5	31.6	-0.8	+0.8
13.6	+0.5	-0.3	7.5	-3.2	+0.3	30.4	-1.6	-0.3	Aug. 2.7	-2.6	-0.2
26.7	-4.5	-----	9.6	-0.5	-0.6	Feb. 2.6	+0.5	-1.7	3.7	-2.4	+0.8
Mar. 3.1	-2.5	+0.3	11.6	+0.1	+3.5	3.6	-0.6	-1.9	Sept. 10.8	-----	-----
11.5	-1.7	-0.7	16.8	-2.4	-----	8.8	-1.8	-2.1	9.1	-1.2	-3.2
12.5	-0.1	-1.1	22.1	-0.4	+0.4	10.9	-0.1	-----	15.2	-1.4	-0.1
13.5	0.0	-3.1	25.1	-0.8	+2.0	15.7	-----	-----	16.3	-1.8	-----
14.6	+0.8	+2.0	2.4	-1.4	-1.3	20.1	-1.0	-----	17.3	-1.2	+0.9
28.3	-1.7	+2.6	3.4	-1.6	-0.9	22.2	+1.0	-1.2	21.4	-0.4	+2.7
Apr. 4.3	-3.3	+2.4	4.4	-2.8	-0.6	23.2	-1.6	-1.4	22.5	-1.7	+1.3
5.3	-2.6	-0.3	5.5	-1.4	-0.4	24.3	-2.2	0.0	23.5	-2.1	-0.6
6.3	-4.7	+0.2	6.5	-3.4	+0.9	25.3	-0.7	-0.4	25.5	-2.9	-----
8.4	-2.8	-0.6	10.6	-1.7	+0.2	27.3	-2.2	0.0	26.6	-1.1	-3.0
9.4	+0.5	+1.6	11.7	-1.0	-0.2	Mar. 1.5	-1.9	-0.9	Oct. 1.7	+0.7	-2.1
10.5	-1.2	-0.2	12.7	+0.7	+0.4	3.6	-2.8	-----	2.8	-2.1	-1.0
17.7	-1.2	-----	13.7	-0.4	+2.3	4.6	-1.7	-2.0	3.8	-1.4	-0.2
18.7	-1.2	-----	15.8	-1.2	-----	8.8	-0.6	+0.7	4.9	-2.8	-----
19.8	-1.2	-----	20.5	-0.9	-1.6	16.5	+1.0	-0.1	8.5	-0.2	0.0
			24.1	-0.1	-1.1	24.3	-2.4	-0.5	14.2	+0.2	+2.4
			25.2	-0.4	+0.2	25.3	-1.5	+0.2	15.2	-1.0	-0.6
			26.2	-----	-----	27.4	-1.2	+0.8	16.3	-0.9	+0.6
			28.3	-----	-----	28.4	-----	-----	17.3	-----	-----

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Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1904	"	"	1905	"	"	1905	"	"	1906	"	"
Oct. 18.3	-0.3	+0.2	Mar. 19.5	-1.4	0.0	Nov. 1.2	-0.4	+4.0	Apr. 28.2	+2.1	-3.5
19.4	+0.5	+1.4	25.7	-1.7	+1.7	2.2	-1.4	-1.1	30.2	+0.2	-1.6
21.4	-0.7	+0.9	27.8	-1.5	-1.1	6.3	+0.3	+0.2	May 1.3	-1.0	-1.9
22.5	-0.8	+1.9	28.8	-1.8	-----	7.4	+1.6	+2.5	2.3	-0.9	0.0
23.5	-0.5	-0.3	30.9	-0.4	-----	8.4	+0.3	+0.5	4.4	-0.5	-0.9
24.5	-3.4	+0.6	Apr. 4.3	-----	-----	10.5	+0.7	+0.1	22.6	-----	-----
26.6	-1.4	-0.6	8.1	+0.6	-----	11.5	-1.5	-----	June 21.2	-----	-----
27.6	-0.6	-1.0	13.3	-0.3	+0.2	12.5	-2.4	-1.2	29.3	-0.5	-0.9
28.7	+0.1	+2.4	16.4	-1.8	0.0	14.6	+0.5	-2.0	July 1.3	-1.4	+0.9
29.7	-0.2	-0.2	17.5	-1.6	-0.4	16.7	+0.4	+0.7	5.5	+0.5	+0.2
30.7	-3.5	-0.4	18.5	-2.8	+0.4	20.8	-0.8	-1.4	6.5	+1.1	+1.0
31.8	-1.4	-1.0	19.5	-2.8	-0.3	21.8	-0.1	-2.2	7.6	-0.6	-----
Nov. 1.8	-2.5	-1.1	20.6	-1.4	-0.4	22.9	-1.5	-----	20.8	-----	-----
6.9	-----	-----	23.7	-1.0	0.0	26.0	-----	-----	Aug. 19.3	-----	-----
14.3	-0.4	-0.4	24.7	-0.8	+0.1	Dec. 1.2	-0.4	-0.1	31.4	-1.8	+1.8
15.3	-2.4	+0.2	27.8	-1.8	-----	4.3	-0.7	+4.0	Sept. 2.5	-1.7	+0.6
16.3	-0.9	+1.7	May 3.9	-----	-----	5.3	+0.7	+2.3	3.5	+1.0	+0.2
17.3	+0.7	+1.4	8.1	+1.6	-----	6.3	+1.8	+1.7	4.6	-1.1	-----
18.4	-0.3	-0.1	12.3	-1.6	-0.4	7.4	+2.2	+0.3	5.6	-----	-0.3
19.4	+0.6	0.0	16.4	-1.6	-----	10.5	-0.2	-0.8	9.7	-1.4	-----
20.4	-1.3	-0.3	18.5	-1.1	-----	11.5	+1.2	-1.7	10.8	-----	-1.1
21.5	-0.4	-1.1	19.6	-1.8	+0.5	12.5	+0.7	-0.8	17.8	-----	-----
24.6	+0.1	-1.3	20.6	-1.2	-0.2	13.6	-2.4	+2.3	21.1	-4.7	-----
28.7	-0.2	-3.1	21.6	-0.1	+0.6	16.7	-3.5	-2.6	22.2	-2.8	-----
30.8	-0.1	-1.8	23.7	-1.8	+2.4	18.8	-2.8	-2.1	24.2	-2.8	-0.4
Dec. 6.4	-----	-----	24.7	-2.5	-----	21.9	-1.6	+2.1	25.3	-0.2	+2.2
12.2	-0.1	+0.7	June 2.5	-----	-----	25.5	-----	-----	Oct. 6.6	-1.7	-0.4
13.2	-0.7	+1.6	9.2	-2.4	-1.3	30.2	-1.0	+1.7	7.7	-0.7	-0.6
14.3	-1.5	+2.5	13.4	-2.1	-0.5	1906	-----	-----	11.8	-1.8	+1.2
16.3	-0.1	-----	14.4	-1.2	-0.1	Jan. 1.2	+0.4	+1.9	12.8	-1.0	+0.6
18.4	+1.3	+0.1	15.5	-2.3	-1.9	2.3	-----	+1.7	17.2	-----	-----
19.4	+1.6	+0.7	16.5	-0.1	-0.8	5.4	+2.1	-0.7	25.3	-0.1	-0.2
20.4	-1.1	-1.6	18.6	-1.0	+0.5	9.5	+1.2	+1.0	Nov. 15.6	-----	-----
21.5	+0.2	-0.6	19.6	-2.2	+1.3	10.5	0.0	-0.2	1907	-----	-----
22.5	0.0	-0.5	July 2.0	-----	-----	12.6	-1.8	-2.8	Apr. 12.1	-----	-----
28.7	-1.2	-1.6	31.5	-----	-----	16.7	+0.9	-0.4	18.2	+1.2	-----
29.8	-0.4	-2.9	Aug. 15.5	-3.2	-1.2	18.8	-1.5	+0.9	20.3	+1.6	-0.5
30.8	+0.8	-2.4	17.6	+0.3	+1.3	24.0	-----	-----	21.3	-1.5	-0.2
1905	-----	-----	18.6	-1.9	+0.4	30.2	+0.6	+1.5	24.4	-0.2	+2.6
Jan. 5.0	-----	-----	21.7	-1.7	+1.2	31.2	+0.9	-0.6	25.4	-0.5	-1.0
14.3	+2.2	+0.8	22.7	-2.6	-----	Feb. 2.3	+1.2	-1.5	30.6	-3.6	+1.6
15.3	+1.2	-0.4	Sept. 5.2	-----	-0.9	3.3	+0.6	-1.1	May 4.8	-1.4	-----
16.3	+2.0	-0.6	6.3	-4.3	0.0	4.4	+0.8	-3.1	11.7	-----	-----
18.4	+1.8	+1.0	7.3	-2.4	-----	5.4	+1.1	-0.2	17.2	-0.3	-----
19.5	+0.1	+0.4	8.3	-2.4	+1.9	7.5	-0.2	+0.7	20.3	+1.4	-0.1
20.5	-0.4	-0.8	9.4	-1.2	-1.4	9.5	-2.0	-0.4	21.3	+0.3	-0.3
21.5	-0.2	-1.2	12.5	-0.8	-----	16.8	-1.8	+1.4	23.4	+1.4	+0.2
22.6	+0.1	-1.3	13.5	-----	+0.8	22.6	-----	-----	27.5	-0.8	+1.1
Feb. 3.7	-----	-----	15.6	+0.6	-1.5	Mar. 1.2	+0.2	0.0	28.6	-0.8	+0.9
7.1	-1.6	-----	18.7	-0.1	-0.4	2.2	+0.1	-1.9	29.6	-1.4	+0.6
10.2	-0.3	-0.7	21.8	-1.6	-----	4.3	+0.6	-1.1	June 3.8	+0.1	0.0
11.2	+0.8	-1.2	22.8	-----	+1.5	6.4	-1.3	-1.0	5.9	-0.6	-----
13.3	0.0	-0.6	23.8	-----	+0.5	8.5	-0.5	-1.1	6.9	+1.2	-----
14.3	-0.8	-1.0	24.9	-0.6	-----	9.5	-0.8	-0.3	10.3	-----	-----
15.4	-1.2	-1.2	25.9	-1.1	-----	10.5	-2.0	-1.7	17.2	+0.3	-----
16.4	-1.0	+1.5	28.2	-----	-----	15.7	-----	+1.3	20.3	+1.1	+0.5
17.4	-0.7	-1.0	Oct. 4.2	-1.8	+1.2	17.8	+0.8	-1.4	21.4	+0.4	-0.3
18.5	-0.8	-0.9	5.3	-1.6	+2.4	19.9	+0.6	-----	22.4	+0.6	+1.1
20.5	-1.2	-0.8	6.3	-2.2	-0.3	20.9	-0.3	-----	23.4	-0.4	-0.3
23.6	-1.6	-2.9	7.3	-1.6	+0.3	24.3	-----	-----	24.5	+0.8	-0.4
24.6	-2.8	+0.2	8.4	-1.4	+0.3	Apr. 2.3	-1.6	-0.9	25.5	+1.0	+1.1
Mar. 1.9	+0.1	-----	9.4	-0.3	+1.5	6.4	-1.4	+0.1	26.6	-2.6	0.0
5.5	-----	-----	12.5	+0.7	+0.8	7.5	-0.1	-1.1	27.6	-1.5	+0.8
11.2	-0.6	-----	13.5	+0.7	+0.8	9.5	-0.4	-0.3	30.7	+0.8	+0.5
13.2	-0.5	-0.6	14.5	-0.2	+0.3	10.6	-1.8	+1.4	July 2.8	+0.6	+0.1
14.3	-1.2	+0.5	15.6	-2.6	-0.1	12.7	-2.0	+3.0	3.8	+0.1	-1.0
15.3	-1.3	+0.4	16.6	-0.6	-0.6	15.8	-0.6	-0.1	4.8	-1.4	-----
16.4	-1.8	-0.4	21.8	-1.8	0.0	16.8	-2.1	-----	5.9	-1.2	-----
17.4	-0.5	+0.3	22.8	-1.6	-1.2	23.0	-----	-----	9.9	-----	-----
18.4	-0.3	-0.8	27.6	-----	-----	27.1	+0.7	-----	15.2	+0.1	-----

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1907	"	"	1907	"	"	1908	"	"	1908	"	"
July 16.2	+0.8	---	Dec. 1.9	+0.1	---	May 10.3	+0.7	+0.4	Oct. 14.7	+3.0	-1.1
19.3	-0.9	-0.2	4.7	---	---	11.4	+1.7	-0.3	15.7	-0.8	-0.9
20.3	-0.2	-0.2	7.1	+1.6	---	12.4	+0.5	+1.4	16.8	+3.0	+0.4
21.4	+2.9	-0.2	10.2	-0.6	+1.1	17.6	+1.5	+0.5	24.6	---	---
23.5	+0.2	+0.1	12.3	+0.8	+1.9	23.8	+1.9	---	30.2	+1.3	+2.5
25.5	-2.0	+0.6	18.5	-0.1	-0.1	24.8	-1.0	---	31.2	+0.6	-0.1
26.6	-0.9	+2.0	19.5	-0.6	+0.3	29.4	---	---	Nov. 1.3	+1.4	0.0
27.6	0.0	-1.8	20.5	+1.4	+0.1	June 2.1	+1.0	---	2.3	0.0	-0.2
29.7	-1.6	-0.6	21.6	-2.4	-1.2	5.2	+2.1	-0.8	5.4	+0.1	+1.3
30.7	+0.9	+0.3	23.6	-1.9	-1.4	7.3	+1.8	+0.1	6.5	+0.8	-0.5
Aug. 1.8	-3.4	-0.9	24.7	+2.3	+1.6	8.3	+2.4	+0.3	8.5	+0.1	-0.1
2.8	+0.3	---	25.7	+0.6	-1.0	9.3	+2.3	+2.0	9.6	+3.4	-1.3
8.6	---	---	27.8	+1.4	+2.2	11.4	+0.6	+0.4	10.6	+2.1	-0.3
14.2	-1.6	---				12.4	-0.3	+1.6	11.6	0.0	+0.6
15.2	-0.9	-0.3	1908			13.5	+1.9	+1.6	12.7	+3.3	-0.1
18.3	+2.3	+0.7	Jan. 3.2	---	---	14.5	+1.1	-0.3	13.7	+2.3	+0.6
19.4	-0.2	+1.0	6.1	0.0	---	15.6	+1.8	+0.8	14.7	+4.5	-0.5
20.4	+1.0	-0.5	9.2	+2.0	+1.1	16.6	-2.8	+0.9	15.8	+0.2	-1.9
22.5	+0.1	+1.4	10.3	+1.8	+1.2	18.7	+0.3	-0.2	16.8	+3.2	+1.3
24.6	+1.2	-0.6	12.3	+1.5	-1.4	20.8	+2.2	-2.6	18.9	+1.3	-1.2
25.6	-1.7	+2.2	14.4	---	-0.2	21.8	0.0	---	19.9	+2.6	---
26.6	+1.7	-0.4	15.4	0.0	-1.6	22.8	0.0	-1.4	23.2	---	---
28.7	-0.2	-1.2	16.5	+0.1	0.0	23.9	0.0	---	27.1	+2.2	---
29.7	-2.2	+0.1	17.5	-0.1	-0.6	28.0	---	---	29.2	+1.2	+0.3
30.8	-0.5	-1.1	18.5	+2.8	+0.2	July 2.1	+1.1	---	30.3	-0.3	+0.1
31.8	-0.1	---	19.6	+0.6	-0.2	7.3	+0.9	+0.8	Dec. 1.3	+0.7	+0.9
Sept. 7.2	---	---	21.6	+2.5	+0.3	8.3	---	-0.6	2.3	0.0	+1.4
12.2	-0.8	---	22.7	-0.1	+0.4	9.4	+1.2	+0.4	3.4	+0.2	+0.8
13.2	-1.8	-0.8	25.7	+0.7	+2.6	10.4	0.0	+1.8	5.4	+0.7	0.0
14.2	+2.9	0.0	26.8	+2.8	+2.3	11.4	+1.2	+1.2	7.5	+1.5	-0.8
15.3	+2.0	+1.2	Feb. 1.6	---	---	13.5	+1.6	-1.5	8.5	+1.4	-0.2
16.3	-0.2	-0.5	6.2	+0.1	0.0	15.6	-2.1	+0.2	18.9	+2.1	---
20.5	0.0	+0.1	7.2	-0.7	+0.9	16.6	+0.3	-0.7	22.8	---	---
21.5	+0.7	+0.8	8.2	+0.9	+0.1	18.7	+0.9	-0.3	28.2	+0.8	+0.7
23.6	-0.8	---	9.3	-0.3	-0.1	19.7	-0.6	-0.1	29.2	+0.6	+1.4
24.6	+2.3	+0.8	12.4	-0.4	-1.1	20.8	+1.8	-1.2	31.3	-1.0	+1.7
25.6	-0.3	-1.0	16.5	+0.8	-1.1	27.6	---	---			
26.7	-0.8	-0.3	17.5	+1.6	-0.1	Aug. 3.2	+0.9	-0.1	1909		
27.7	+0.6	-0.2	20.6	-1.6	+2.9	4.2	-0.1	+0.1	Jan. 1.3	-0.4	+0.6
29.8	-0.7	0.0	24.8	-1.2	+2.9	7.3	+1.2	+2.4	2.4	+0.4	-0.6
30.8	-1.1	---	Mar. 2.1	---	---	9.4	+0.1	+0.6	3.4	+0.4	-0.8
Oct. 1.8	+2.6	---	7.2	-1.3	-1.4	10.5	0.0	-0.2	6.5	-1.2	-2.4
6.7	---	---	10.3	-1.5	-0.8	11.5	-1.1	+1.2	12.7	+0.8	+1.3
10.1	-0.6	---	11.3	-0.9	-0.9	12.5	-0.7	+0.6	17.9	-0.1	---
12.2	+1.5	---	12.4	+0.2	-1.2	13.6	+1.2	-0.8	21.3	---	---
13.2	-0.9	+2.2	13.4	0.0	-0.8	15.7	+1.7	-0.2	25.2	-0.7	---
14.3	-0.1	-0.9	14.4	+0.8	+0.1	20.8	-1.0	---	26.2	-0.2	+0.2
15.3	-1.6	+0.4	17.5	+2.6	+3.3	26.2	---	---	27.2	+0.2	+0.2
16.4	+0.1	-0.1	20.6	+2.9	+4.0	31.1	+0.3	---	28.3	+0.2	-1.4
17.4	-1.1	+1.3	21.6	+0.3	---	Sept. 2.2	+0.8	+0.7	31.4	+0.3	-0.4
18.4	+0.1	+1.8	24.8	+3.1	+1.3	3.2	+0.6	+0.9	Feb. 1.4	-1.2	-0.5
19.5	0.0	0.0	25.8	-0.4	---	4.3	+2.5	+0.5	2.4	-0.6	-0.6
20.5	-0.9	+2.6	26.8	-2.5	---	6.4	+1.3	-0.7	3.5	-2.0	-1.0
21.5	-1.9	+0.4	31.5	---	---	7.4	-0.2	+0.8	4.5	-0.2	-0.7
23.6	-0.4	-1.0	Apr. 4.1	-0.1	---	8.5	+0.6	+0.1	11.7	+2.3	+4.7
24.6	+0.2	-1.7	6.2	+0.1	---	9.5	+1.1	+1.3	19.7	---	---
25.7	-0.7	-1.0	7.2	+0.8	-2.2	10.5	+3.2	-2.1	26.2	-0.7	+0.2
29.8	+2.7	+1.1	8.3	0.0	---	11.6	+0.3	-0.5	28.3	-0.7	+0.5
31.9	+0.1	---	9.3	+0.8	-1.9	12.6	+2.5	-0.5	Mar. 1.4	-0.3	---
Nov. 5.2	---	---	10.3	+1.0	---	14.7	+3.8	-1.2	2.4	-1.0	---
13.3	-1.1	+0.6	11.4	+1.0	+0.1	15.7	+0.3	0.0	5.5	+1.4	+0.9
14.3	-0.4	+1.0	12.4	+1.3	-1.4	16.7	-1.0	---	7.5	+1.7	+0.3
15.4	-2.0	+1.5	13.4	+1.8	+0.8	17.8	+1.5	---	11.7	+2.3	+2.5
16.4	+1.9	+0.4	16.5	+0.1	+1.7	18.8	-1.9	---	13.7	+3.0	+2.3
17.4	-0.4	+1.8	17.6	+3.5	+1.2	24.9	---	---	14.8	+1.2	+1.0
19.5	-2.0	-0.9	19.6	+0.5	+0.4	Oct. 6.4	+1.7	+1.4	15.8	+2.3	---
24.7	+0.3	-2.2	20.7	+1.4	+1.3	7.4	+0.6	+0.1	17.9	-3.9	---
26.7	-1.4	-0.2	21.7	-1.4	---	11.6	+1.2	---	21.1	---	---
27.8	+0.4	-1.3	29.9	---	---	12.6	+3.2	+0.2	26.2	-0.1	-0.5
28.8	+0.3	---	May 9.3	+1.7	-0.5	13.7	+0.8	-0.9	28.3	0.0	-0.5
29.8	+1.7	+2.1									

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1909	"	"	1909	"	"	1910	"	"	1910	"	"
Mar. 29.3	0.0	-2.2	Sept. 5.7	-0.1	-0.2	Jan. 25.5	+3.6	+0.8	June 26.7	-1.8	
30.3	+0.6	-0.4	6.8	+1.3	-1.0	26.6	+1.8	-2.5	27.7	+1.4	-0.8
31.4	+1.0	-0.1	13.9			27.6	+2.4	+0.4	28.7	+0.3	-0.7
Apr. 2.4	+1.7	+0.3	18.1	-0.1		29.7	+2.9	0.0	29.8	-0.8	-1.6
3.5	+2.0	+0.3	21.2	+1.5	+0.9	30.7	+2.4	-0.1	July 6.2		
4.5	+2.2	+1.8	22.3	+0.6		Feb. 1.7	+3.2	+2.7	9.1	+1.1	
5.5	+3.6	+2.2	23.3	+1.0	-0.5	3.8	+3.9	+3.4	14.3	+1.0	+1.1
6.5	+2.0	+2.2	24.3	+1.8	+0.1	9.3			15.3	+1.6	+1.0
7.6	+0.8	+1.5	25.4	+2.6	-1.3	14.2	+2.2	-1.6	19.4	+3.4	
8.6	+3.4	+1.7	26.4	+0.5	-0.5	15.2	+1.6	-2.2	20.5	+1.6	+0.7
10.7	+4.5	+3.8	28.5	+2.0	+1.1	16.2	+2.7	-2.6	21.5	+2.3	-0.2
11.7	+2.0	+0.8	29.5	+1.6	-0.6	18.3	+0.8	-0.1	22.5	-0.4	+0.5
15.9	+1.4		30.6	+3.3	-0.6	19.4	+0.4	-1.0	23.6	+0.1	+0.2
19.5			Oct. 1.6	+0.2	-1.0	22.5	+1.4	+0.4	24.6	+1.8	-0.6
24.2	-1.0		2.6	+3.5	-1.5	24.5	+3.5	+1.0	25.6	+3.4	-1.6
25.2	+0.5	-1.4	4.7	+2.6	+1.1	25.6	+3.3	+0.8	26.7	+3.0	-1.3
26.3	-0.2	-2.2	6.8	-0.5	-2.3	26.6	+2.1	+0.7	27.7	-0.2	-0.4
28.3		-0.7	7.8	+1.9	-0.5	Mar. 3.7	+4.9	+1.9	28.7	+0.6	-1.0
29.3	+1.3	-2.0	8.9	-0.3		4.8	+3.7		30.8	+2.3	-0.9
May 9.7		+0.3	13.6			5.8	+2.9		31.9	+1.2	
11.8	+0.2	+0.3	19.2	+1.7	-2.7	6.9	+1.8		Aug. 4.6		
12.8	-2.5	-0.3	20.2	+0.9	-0.7	10.8			9.2	+0.3	
16.9	-1.6		22.3	-0.1	+0.3	15.2	+1.1		10.2	+0.8	+1.2
18.9			24.4	+1.8	-1.1	16.2	+1.4	+0.9	11.2	+0.7	-0.3
28.3	+1.4	+1.0	25.4	+1.7	0.0	17.2	0.0	+0.3	13.3	+0.7	
29.3	+1.8	+0.4	26.4	+2.1	+0.2	18.3	+0.7	0.0	16.4	+2.1	-0.8
30.4	+0.4	+1.0	27.5	+1.4	-0.5	19.3	0.0	-1.1	19.5	+2.1	-1.4
31.4	+0.8	+1.4	28.5	+1.4	+0.9	21.4	-0.4	-0.7	20.5	+0.4	-0.8
June 6.6		-0.4	29.6	+1.7	+0.1	22.4	+1.5	+1.3	21.6	+0.8	-0.8
11.8	-1.9	-0.6	30.6	+4.9	0.0	23.5	+0.4	+1.0	22.6	+2.5	-2.1
17.3			31.6	-0.2	-0.9	24.5	+1.2	-0.4	23.6	+1.3	-2.3
21.1	0.0		Nov. 1.7	+3.2	+0.4	25.5	+3.1	+1.6	26.7	+2.4	-0.3
24.2	+1.5	-1.7	3.7	+0.5	-1.1	26.5	+1.8	+2.8	27.8	-0.1	-0.1
26.3	+1.4	+0.4	4.8	+2.4	-2.0	27.6	+2.3	+2.9	Sept. 3.0		
28.3	+0.2	+3.1	12.4			28.6	+2.7	+1.4	7.1	+0.4	
29.4	+0.6	+0.8	19.2	+2.0	-1.4	31.7	+3.2	+2.0	8.1	+1.2	-3.0
30.4	-0.2	+1.6	20.3	+1.0	-1.4	Apr. 9.2			10.2	+2.6	
July 1.5	+1.5	+0.7	22.3	+1.4	-0.3	13.2	0.0		12.3	+3.7	-1.6
2.5	-0.8	+0.1	25.5	+0.8	-1.1	14.2	-0.3		15.4	+2.2	-0.2
3.5	+1.1	-0.1	26.5	+0.7	-0.7	19.4	+1.7	+1.3	16.4	+2.6	-0.6
4.6		-0.3	27.5	+4.1	-0.5	23.5	-0.2	+1.3	17.5	+2.1	-1.5
6.6	0.0	-0.3	28.6	+0.2	-0.9	25.6	+3.0	+0.9	20.6	+1.1	-0.7
7.6	-1.7	-1.9	29.6	+2.5	+0.3	26.6	+2.4	+3.0	21.6	-0.8	-0.1
8.7	+1.8	-1.3	30.7	+1.2	+1.3	27.6	+0.9	+0.1	22.7	+1.1	+0.2
9.7	+1.0	-1.3	Dec. 1.7	+1.4	-2.3	28.7	+4.6	-0.2	24.7	-1.1	-0.1
10.8	+1.1	-1.6	2.7	+3.6	-0.5	29.7	+3.0		25.8	-1.2	0.0
16.7			3.8	+1.4	-0.3	30.7	+3.8	-0.2	26.8	+1.4	0.0
24.2	+2.6	+1.4	4.8	+3.4	+0.3	May 4.9	+1.4		27.8	+0.6	
25.3		+0.6	5.8	+1.2	-2.0	5.9	+3.2		28.9	+1.1	-1.4
27.3	+0.4	+1.9	7.9	+2.0	+0.1	8.5			Oct. 2.6		
28.4	+3.0	+1.2	8.9	+2.6		13.2	+0.5	-2.2	10.2	+1.8	-1.9
29.4	0.0	-1.8	12.1			14.2	+1.0	+0.1	11.3	+2.4	-1.0
30.4	-0.2	+0.6	16.1	+1.4		15.3	+1.4	+0.7	12.3	+4.4	-0.6
Aug. 1.5		-0.4	17.2	+1.1		16.3	+1.3	-0.5	14.4	+1.4	-1.6
2.6	+0.3	-0.8	18.2	-0.5	+0.3	17.3	+2.0	+0.8	15.4	+2.4	-0.2
4.6	-0.6	-0.5	20.3		+0.7	18.4	+1.6	+0.8	16.4	+3.1	-1.0
5.7	+1.4	-0.3	21.3	+2.4	-0.5	19.4	+1.6	+0.5	17.5	+0.5	-0.1
6.7	+0.8	-0.6	22.4	+0.5	-1.1	21.4	0.0	+1.9	18.5	+1.4	-0.6
7.7	+2.0	-0.8	24.4	+1.9	-0.3	23.5	+0.7	+1.4	20.6	+0.4	+0.2
8.8	+0.4	-0.4	26.5	+1.1	-1.7	26.6	+4.8	0.0	22.7	+1.5	+1.2
15.3			27.6	+2.3	-2.6	27.6	+3.1	+1.1	23.7	+0.2	-0.6
21.2	-0.8	+0.6	31.7	+0.7	-1.3	28.7	+3.8	-0.7	24.8	+2.6	+0.2
22.2	+1.4	+0.7				31.8	+1.0	0.0	25.8	+0.6	+0.9
23.2	+1.7	+1.2	1910			June 3.9	+1.5		26.8	+1.6	
24.3	+1.2	+0.9	Jan. 3.8	+4.9	+0.5	6.8			27.9	+2.2	
25.3	+2.0	+1.1	10.8			19.4	+1.4		28.9	+1.0	
26.3	+0.3	-1.0	15.2	-0.1	-0.4	20.4	+0.8	+1.4	Nov. 1.4		
27.4	+0.7	-0.8	16.2	+1.0	-0.1	21.5	+3.3	+0.8	7.2	+2.2	
30.5	+0.7	+0.3	19.3	+1.4	+0.7	22.5	+3.0	-0.4	8.2	+4.3	+0.4
31.5	+2.3	-1.8	20.3	-0.1	-2.5	23.6	+2.5	-0.6	9.2	+3.0	-1.9
Sept. 1.6	+2.2	+0.1	22.4	-0.5	-0.5	24.6	+1.5	-1.0	11.3	+2.7	-0.4
2.6	-1.1	+0.2	23.5	+0.3	0.0	25.6	-0.3	+0.8	16.5	+2.2	-0.2

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1910	"	"	1912	"	"	1912	"	"	1913	"	"
Nov. 17.5	+2.9	+0.5	Feb. 8.7	+3.5	-0.3	July 30.6	+1.1	-0.4	Jan. 1.8	-0.6	
19.6	+0.9	+2.4	17.5			Aug. 1.6	+1.4		6.7		
20.7	+0.5	-1.0	27.3	+5.5	+1.4	2.7	-3.1	+0.6	13.2	+2.1	+0.4
22.7	+2.7	-0.1	28.4	+2.0	+1.1	3.7	+1.1	0.0	14.2	+2.4	-1.6
25.8	+2.2	-1.2	Mar. 1.5	+0.9	+0.2	4.7	-1.0	-0.4	15.3	+2.6	-0.8
Dec. 1.2			2.5	+1.3	+0.9	12.1			18.4	+3.7	+1.8
7.2	+2.2	-1.0	9.7	+2.2	0.0	16.1	+2.5		19.4		+0.6
8.2	+3.0	-0.2	10.8	+1.9		18.2	-0.3		21.5	+1.8	+1.5
9.3	+2.8	-0.6	18.2			19.2	-0.1		22.5	+2.4	-0.6
11.3	+2.2	-0.9	25.3	+4.1	+1.3	22.4	+1.3	-0.7	25.6	+2.8	-1.9
12.4	+2.7	-1.5	26.3	+3.4	+0.1	23.4	+2.0	+0.7	27.7	+3.7	-0.4
13.4	+0.8	+0.6	29.4	+2.2	+0.8	24.4	+2.6	-0.7	29.8	+1.2	-2.2
14.4	+0.1	-1.3	31.5	-0.1	-1.0	25.5	+2.8	-0.6	Feb. 5.5		
15.5	+1.7	-0.6	Apr. 2.5	+0.4	+0.2	29.6	-1.6	+0.9	12.2	+3.3	-1.4
16.5	+2.4	0.0	3.6	+0.4	-0.8	31.6	-1.1	+0.5	13.2	+2.2	-1.5
17.6	-0.6	+0.7	4.6	+2.6	-0.4	Sept. 5.8	+1.4		14.3	+2.9	-1.5
19.7	+1.6	-1.4	5.6	+1.2	-0.7	10.8			15.3	+3.5	+1.9
20.7	+1.2	-1.3	6.7	+3.3	-1.3	17.2	+2.0	-3.1	16.3	+4.6	+0.2
22.8		-2.1	8.8	+3.4	-1.3	19.3	+3.5	-0.7	17.4	+4.2	+0.7
24.8	+3.4	-0.4	10.8	+2.5		20.3	+4.1	-1.8	18.4	+3.4	+1.6
26.9	+2.3		11.9	-1.2		22.4	+3.2	-0.5	19.5	+3.2	+1.8
31.0			16.7			27.5	-1.1	+0.2	22.6	+3.4	-2.1
			23.2	+2.0	0.0	28.6	+0.8	+0.2	25.7	+0.9	-1.3
1911			25.3	+3.2	+2.1	29.6	+0.3	+0.6	27.8	+3.2	-2.3
Jan. 4.1	+0.8		27.4	+1.4	-0.8	30.7	+3.8	+0.2	Mar. 7.4		
5.2	+2.3		May 1.5	+1.6	-2.1	Oct. 3.8	+5.7	+2.1	12.1	+1.9	
6.2	+0.7	+0.3	2.6	+2.6	-0.3	4.8	0.0	+1.0	16.3	+4.9	+0.2
7.2	+0.6	-1.2	3.6	+0.4	+1.0	9.8			17.3	+2.8	+0.1
8.3	+2.0	-0.9	4.6	+3.3	+0.1	15.2	+2.6		18.4	+3.3	+0.9
9.3	+0.7	-0.9	9.8	+1.1	-0.8	16.2	+3.9	+0.2	20.5	+2.3	+0.3
10.3	+3.5	-1.3	10.8	-2.2		18.3	+4.0	-2.1	21.5	+4.1	-1.0
15.6	+1.4	-0.6	16.2			20.4	+3.1	0.0	22.5	+4.0	-0.7
16.6	+3.0	-1.8	20.2	-1.4		25.5	+1.0	-0.5	24.6	+4.4	-0.6
19.7	+3.5	-0.8	21.2	+2.1	+0.1	26.5	+1.6	+0.8	27.7	+2.7	-1.7
23.8	+4.6	+0.8	22.2	+0.7	-0.5	27.6	+1.3	+0.5	28.8	+2.1	
24.8	+4.1		24.3	+0.7	-0.3	28.6	+1.8	0.0	31.9	+3.9	
29.7			25.3	+0.3	-0.8	29.6	+0.3	-0.2	Apr. 6.0		
Feb. 3.2		-0.4	26.4	+0.4	+0.1	30.7	+0.8	+2.3	17.4	+1.9	+1.2
4.2	+1.1	-1.0	27.4	+1.3	-1.6	Nov. 2.8	+4.2	-0.7	18.4	+3.8	-1.5
5.2	+2.6	-2.0	28.4	+0.1	-2.1	3.8	+1.8	-2.2	May 5.6		
7.3	+2.0	-0.4	30.5	+0.9	-0.6	4.9	-1.8		Aug. 1.8		
10.4	+1.0	+1.2	31.5	+0.6		8.3			7.2	+1.7	
12.5	+3.1	+1.8	June 1.6	+3.2	-0.9	15.2	+2.0	-0.3	8.2	+0.8	
13.5	+3.5	+0.6	3.6	+2.2	+0.5	16.3	+2.9	+0.4	11.3		-0.7
18.7	+4.8	+1.0	5.7	+0.3	+0.2	17.3	+1.9		14.4	+2.0	-0.4
20.8	+5.4	+2.4	7.8	-2.3	+0.5	18.3	+2.7	+0.6	15.4	+3.1	-1.0
22.8	+4.3		8.8	+0.4	-1.1	19.3	+2.6	-0.8	17.5	+2.1	+0.9
28.3			9.8	+0.7		20.4	-0.4	-0.4	19.6	-0.2	+1.8
Mar. 6.2	+1.1	-2.7	10.9	+1.6		21.4	+1.9	-0.3	20.6	-0.8	+1.5
8.3	+2.2	-0.3	14.5			22.4	+2.2	-0.3	21.7	-0.7	+1.0
9.3	+0.5	-0.8	20.2	+1.1	-1.7	24.5	+1.2	+0.7	23.7	+2.4	+0.1
10.4	+2.4	+1.0	21.3	+0.9	-0.5	25.6	+3.3	-0.2	31.2		
11.4	+1.0	+0.5	22.3	+0.8		26.6	+0.5	+1.2	Sept. 4.2	+1.7	
15.5	+1.4	+0.4	24.4	-0.7	-2.2	28.7	+1.6	+2.1	5.2	-0.9	
16.6	+4.1	+0.2	28.5	+2.6	-1.1	29.7	+0.1	-2.1	8.3	+2.7	-1.3
18.6	+3.9	+1.0	29.5	+2.2	-1.0	30.8	+3.9	-1.6	9.3	+2.1	-0.6
20.7	+5.2	+1.8	July 2.6	+2.0	-0.3	Dec. 2.8	+3.7	-2.1	10.3	+2.7	+0.6
21.7	+4.8	+0.7	4.7	+1.1	+0.4	8.0			11.4	+3.6	+0.3
23.8	+4.2	-0.6	5.7	+0.8	+0.1	12.1	+0.7		22.7	+4.4	0.0
24.8	+4.3		6.7	+1.6	-1.5	13.2	+2.8	-0.4	23.7		+2.0
29.8			7.8	+0.1	-0.4	14.2	+3.1	-0.5	24.7	+3.5	
Apr. 9.4	+1.0	+0.4	8.8	+1.5	-0.4	15.2	+1.7	-0.5	29.5		
10.4	+1.9	-0.9	9.8	+3.0		16.3	+1.3	-0.3	Oct. 4.2	+2.4	
28.2			13.8			19.3	+2.4	-0.8	6.2	+3.9	-0.3
1912			19.2	+0.9	-2.0	20.4	+1.3	-1.9	9.3	+4.5	-0.4
Jan. 18.7			22.3	-0.3	-1.9	21.4	+2.1	-0.7	12.4	+2.8	-0.5
31.4	+1.2	+2.0	23.3	+0.5	-1.5	22.5	+2.3	-0.1	13.4	+2.7	0.0
Feb. 2.5	+2.2	+1.0	25.3	+1.1	+0.6	24.5	+4.0	+1.1	14.5	+0.9	-0.5
4.6	+3.0	-1.8	26.4	+1.7	+0.5	25.6	+1.0	+1.6	15.5	+0.4	+1.0
5.6	+1.5	-3.2	27.5	+2.5	0.0	28.7	+2.8	-1.3	16.5	+0.5	+0.9
7.7	+1.8	-3.0	28.5	+2.2	-0.6	30.8	+3.4	-1.5	21.7	+3.8	+3.0
			29.5	-1.4	+1.0						

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1913	"	"	1914	"	"	1915	"	"	1916	"	"
Oct. 22.7	+2.8	+1.3	July 9.6	+5.0	+0.3	June 12.1			Mar. 22.6	+4.3	
28.9			16.8	+2.4		17.2	+1.1		23.7	+2.8	-0.7
Nov. 5.3	+3.2	-0.5	22.4			19.2	+2.6	-1.2	24.7	+4.4	-1.2
6.3	+3.5	+0.6	Aug. 20.8			22.3	+2.7	+0.9	25.7	+3.3	-0.9
7.3	+4.4	+0.3	30.3	+2.3	0.0	23.3	+2.7	0.0	Apr. 2.0		
10.3	+1.8	+0.8	31.3	+2.5		24.4	+3.3	-1.9	10.3	+3.6	-1.2
12.5	+3.6	-1.7	Sept. 1.4	+2.0	+0.1	25.4		-1.6	12.3	+3.2	+0.1
13.5	+2.6	-0.3	2.4	+2.3	+0.2	26.5	+4.8	-2.3	13.3	+3.1	+0.4
14.5	+2.8	+0.1	4.5	+3.0	-0.2	28.5	+5.9	+1.5	15.4	+2.6	+1.4
17.6	+4.5	+1.7	5.5	+2.5	+0.7	July 2.7	+3.5		17.5	+2.2	+0.3
18.7	+2.4	-0.7	7.6	+1.1	+0.6	11.7			18.5	+4.1	-0.5
20.8		-1.2	9.6	+1.6	-0.6	22.4	+2.1	+0.4	19.6	+4.7	-0.9
21.8	+2.6	-1.8	14.7	+4.8		23.4	+5.1	-0.7	25.8	+2.4	
27.4			19.2			24.4	+4.3	-1.9	May 1.5		
Dec. 4.2	+3.9	-0.4	28.3	+2.5	+1.4	31.7	+2.7	-0.5	9.2	+3.7	-0.4
5.2	+2.7	+0.5	29.3	+3.3	+1.4	Aug. 2.7	+1.2		10.3	+4.3	+1.5
8.3	+2.7	-0.6	30.4	+4.6	+1.4	10.2			15.3	+3.9	-0.5
9.4	+2.2	+0.2	Oct. 1.4	+3.0	+1.6	Sept. 8.8			31.1		
11.4	+0.7	+0.1	2.4	+2.6	+1.3	14.2	+1.6		June 12.4	+4.5	+0.4
13.5	+3.3	+0.4	5.5	+0.4	-0.9	15.2	+1.9	-2.0	13.4	+5.0	-1.0
15.6	+4.0	+1.1	12.7	+3.6	-1.0	16.3	+3.1	-0.7	18.6	+5.8	-0.1
18.7	+4.4	-2.5	18.6			20.4	+2.7	+1.3	22.8	+2.2	-0.6
19.7	+3.4	-1.1	27.3		+4.0	21.4	+2.5	+0.9	23.8	+2.3	
26.9			28.3	+1.2	+0.3	22.4	+2.1	+0.5	29.8		
			30.4	+3.6	+1.8	23.5	+2.4	+0.3	July 6.2	+3.3	
1914			31.4	+1.9		24.5	+2.2	+0.8	7.2	+3.7	
Jan. 5.3	+3.4	-1.0	Nov. 17.0			27.6	+2.7	-0.8	8.3	+3.0	
6.3	+4.0	-0.6	23.2	+5.9	+0.6	28.7	+3.0	-1.0	11.3	+4.8	-0.3
7.3	+3.2	-1.4	24.3	+4.2	+0.5	Oct. 8.2			12.4		+0.1
8.4	+3.3	-0.8	25.3	+1.4	+0.5	12.2	+1.7		14.5		-3.7
10.5	+4.3	+1.2	28.4	+2.7	+1.3	15.3	+2.9	-0.7	29.4		
13.5	+4.5	-0.8	Dec. 16.4			21.4	+2.6	+0.1	Aug. 4.2	+2.4	
15.7	+4.0	-1.6	21.2		+0.8	22.5	+1.2	-0.2	28.0		
25.6			22.2	+4.4	+2.0	24.6	+0.9	-1.4	Sept. 5.3	+4.6	
Feb. 7.4	+4.6	+0.8	23.2	+3.6	+0.7	25.6	+3.5	-1.0	9.4	+4.4	+0.5
8.4	+4.2	+0.4	30.4	+4.5	-1.4	27.6		-0.1	11.5	+4.2	+0.4
9.4	+3.4	+0.9				Nov. 6.6			12.5	+3.2	-0.9
24.3			1915			10.2	+3.7		13.6	+4.0	-0.6
Mar. 3.2	+0.9	-1.4	Jan. 1.5		-1.2	13.3	+4.4	+1.3	16.7	+5.3	-0.8
4.2	+1.8	+1.3	4.6	+2.8	+2.1	15.3	+2.7	+1.8	19.8	+5.1	
7.4	+3.7	+0.6	7.7	+4.3		16.3	+2.3	+2.6	20.8	+6.7	-0.2
9.4	+3.2	-0.3	9.8	+2.4	-0.1	24.6		-0.3	26.6		
12.5	+3.4	-1.8	14.9			27.7	+4.1	+1.6	Oct. 6.3	+4.3	0.0
13.6	+2.7	-0.5	21.2	+4.2	+0.6	Dec. 6.0			7.4	+4.2	-0.7
20.8	+2.6		26.4	+4.6	+0.8	10.2	+4.3		10.5	+2.6	+0.6
26.0			28.4	+7.1	-0.8	13.3	+3.8	+2.1	11.5	+3.1	-0.2
Apr. 3.2	+3.4	+0.1	29.4	+4.8	-0.4	14.3	+3.8	+1.0	12.6	+3.6	-0.4
5.3	+3.4	+1.2	Feb. 8.8	+3.1		15.3	+4.1	+1.4	13.6	+6.0	-0.1
6.4	+3.0	+1.3	13.5			18.4	+4.3	-1.5	14.6	+5.9	-0.5
7.4	+3.4	+0.3	18.2	+3.2	+0.1	21.5	+4.9	+0.3	17.7	+5.2	-1.0
9.5	+2.5	-0.4	19.2	+3.4	+1.6	22.6	+4.9	-0.5	26.2		
10.5	+3.0	+0.1	20.2	+2.8	-0.1	23.6	+3.8	-1.0	31.2	+5.7	
13.6	+1.6	+1.8	26.4		+0.3	24.6	+4.0	0.0	Nov. 1.2	+4.1	-0.5
17.8	+3.1		27.5	+3.2	+0.6				2.2	+2.9	-1.2
24.8			Mar. 1.5	+4.3	-0.6	1916			3.3	+3.9	-0.3
May 6.3	+4.1	-0.6	3.6	+3.0	-1.3	Jan. 4.5			4.3	+2.5	-0.1
9.5		-1.4	8.8	+2.8		8.2	+4.0		5.4	+2.3	+1.1
16.7	+3.7	+0.1	9.8	+3.8		14.2	+3.9	+0.5	8.5	+3.0	-0.5
18.8	+3.2		15.1			20.5	+5.1	-0.3	10.5	+5.2	-0.8
24.4			24.3	+4.4	-0.1	23.6	+3.0	-0.8	11.6	+6.4	-1.1
June 2.3	+3.3	+1.7	26.4	+2.2	+0.4	25.7	+3.4	-0.8	18.7	+6.3	-0.5
3.3	+3.0	-0.5	27.4	+1.8	+1.4	Feb. 3.0			24.7		
5.4	+2.3	+1.0	29.4	+3.4	+0.5	7.2	+2.1		Dec. 1.2	+3.3	+0.7
6.5	+2.6	-1.7	30.5	+3.5	-1.4	10.2	+3.5	-0.2	2.3	+3.4	+0.9
10.6	+4.9	-0.4	31.5	+2.5	+1.4	14.3	+6.1	+0.7	5.3	+3.8	+0.5
15.6	+1.8	+0.2	Apr. 4.7	+1.7	-0.2	15.3	+4.1	-1.0	6.3	+2.6	+0.2
16.7	+2.2	-1.0	7.8	+3.7		Mar. 3.5			7.4	+4.2	-0.5
23.0			8.8	+4.5		9.2	+3.5	-1.2	9.5		-0.5
30.2	+2.2	-0.5	13.8			11.3	+5.0	+0.8	12.6	+4.0	+1.2
July 3.4	+3.1		21.2	+3.0	-2.2	13.3	+5.0	-0.7	13.6	+6.0	-0.1
7.5	+5.8	+0.1	24.3	+2.5	+0.8	16.4	+3.2	+1.7	17.7	+5.1	+0.1
8.5	+5.2	+1.6	May 13.5			17.4	+3.8	+0.8	24.2		

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1917	"	"	1918	"	"	1919	"	"	1920	"	"
Jan. 6.3	+4.2	-1.3	Apr. 4.8	+6.0	-----	Mar. 24.7	+5.9	-1.2	Apr. 2.4	-----	+0.6
7.5	+4.8	-1.6	5.8	+4.8	-----	31.2	-----	-----	5.6	+4.8	+1.6
8.5	+3.2	+1.6	10.5	-----	-----	Apr. 17.6	+5.2	+1.0	7.6	+6.0	+2.0
9.6	+4.1	+1.3	15.2	+4.0	-----	18.6	+4.2	+1.7	10.7	+5.5	+0.2
18.8	+6.0	-----	18.3	+3.8	-1.0	21.7	+5.5	-0.3	18.2	-----	-----
22.6	-----	-----	21.3	+4.7	-0.7	29.5	-----	-----	22.2	+3.6	-----
26.2	+3.6	-----	27.6	+3.8	-0.8	May 13.4	-----	-0.1	23.2	+3.1	+0.2
30.3	+4.1	-0.8	May 1.7	+5.0	-0.8	22.7	+3.3	-2.6	24.2	+1.9	-0.4
Feb. 1.3	+4.2	+1.1	9.8	-----	-----	28.8	-----	-----	28.3	+3.6	+1.4
6.5	+4.6	-0.2	16.2	-----	-1.5	June 2.2	+1.8	-----	29.4	+2.2	+0.4
7.5	+4.6	-0.2	17.2	+3.0	-1.5	3.2	+3.5	-1.4	May 1.5	-----	-0.8
16.7	+5.8	-----	18.3	+4.1	+0.3	10.4	+3.2	+1.3	3.5	-----	+0.4
21.0	-----	-----	20.3	+3.1	+0.9	13.5	-----	0.0	4.6	-----	+0.3
Mar. 6.4	+4.7	-0.4	22.4	+3.6	+0.6	16.6	+3.2	0.0	5.6	-----	+1.0
9.5	+4.9	+0.2	23.4	+3.0	-0.7	17.6	+1.8	-0.5	6.6	-----	-0.2
15.8	+4.2	-----	25.5	+3.9	+1.3	19.7	+2.6	-1.6	8.7	+6.1	-0.2
17.8	+5.1	-----	26.5	+4.9	+0.8	27.2	-----	-----	17.5	-----	-----
22.5	-----	-----	31.6	+0.1	-0.6	July 3.2	+2.4	-1.8	22.2	+3.8	-0.4
28.2	+4.1	-----	June 3.7	+1.2	-----	26.5	-----	-----	25.3	+3.2	+0.7
29.2	+5.2	0.0	8.2	-----	-----	Aug. 7.4	-----	+0.2	26.3	+2.7	+0.6
30.3	+4.8	-1.0	15.2	+2.1	+2.0	8.4	-----	+0.9	27.3	+2.4	+0.7
Apr. 3.3	+3.7	+1.2	17.3	+4.5	+0.6	9.4	-----	+0.4	28.4	+2.9	+0.8
7.5	+3.7	+0.3	19.3	+3.0	+0.9	11.5	+1.3	-0.7	29.4	+3.6	+0.8
9.6	-----	-0.5	23.5	+6.2	+0.4	14.6	+3.1	-0.8	June 1.5	-----	+1.2
10.6	+4.0	+1.1	26.6	+1.9	+0.1	15.6	+2.0	-0.7	5.6	+5.7	-0.4
13.7	+3.8	+1.5	27.6	-0.4	+0.6	18.7	+3.3	-0.8	7.7	+2.5	-0.6
14.7	+3.2	-----	July 1.8	+1.0	-1.6	19.8	+4.0	-----	9.7	+3.4	-1.3
20.9	-----	-----	7.6	-----	-----	25.0	-----	-----	10.7	+4.8	-----
30.3	+4.6	+0.8	Oct. 4.4	-----	-----	Sept. 8.4	-----	-1.3	11.8	+4.7	-----
May 1.3	+6.1	+2.2	10.2	+3.2	-----	12.6	+2.4	-0.2	15.9	-----	-----
2.4	+4.8	+1.6	14.3	+2.7	-0.4	16.7	+2.7	-----	21.2	-----	-0.2
3.4	+4.9	+1.2	15.3	+4.1	-0.9	23.5	-----	-----	25.3	+2.3	+1.6
11.7	+3.2	-0.6	17.4	+4.7	-0.2	Oct. 6.4	+2.8	-1.3	26.4	+3.9	+1.0
14.8	+2.4	-----	18.5	-----	+0.4	7.4	+3.2	+0.2	28.4	+3.0	+0.8
20.3	-----	-----	21.6	+6.5	+0.6	10.6	+3.2	-0.6	29.4	-----	-0.7
25.2	+5.4	-----	22.6	+5.4	-0.2	23.2	-----	-----	July 1.5	+5.2	-0.8
June 4.4	+3.4	+0.6	28.8	+5.1	-----	Nov. 3.3	+4.1	+0.7	3.6	+3.2	+0.3
7.6	+4.0	-1.5	Nov. 3.2	-----	-----	6.4	-----	-0.5	8.7	+2.5	-0.6
13.7	+4.4	-----	8.2	+2.9	-----	13.7	+4.1	+0.4	15.1	-----	-----
18.8	-----	-----	11.2	+3.4	-1.2	14.8	+3.5	+1.5	20.2	+3.1	-----
1918	-----	-----	12.3	+3.2	-1.0	21.9	-----	-----	21.2	+4.7	-0.2
Jan. 12.2	-----	-----	14.3	+4.3	+0.4	Dec. 21.5	-----	-----	22.2	+3.7	+0.2
19.2	+3.5	+0.4	15.4	+4.5	-1.0	29.2	+1.8	+0.2	26.3	+3.4	-----
21.3	+2.9	-1.4	25.7	+3.3	+1.1	30.2	+1.9	+0.2	27.4	-----	+0.2
22.3	+4.8	-0.3	26.8	+3.5	+1.3	1920	-----	-----	28.4	-----	+1.5
23.3	+3.5	-0.9	Dec. 2.9	-----	-----	Jan. 2.3	+4.8	-2.1	29.5	-----	-0.2
25.5	+2.4	-0.6	12.3	+3.1	+0.2	12.7	+5.4	-1.4	30.5	+3.6	-----
Feb. 10.7	-----	-----	17.5	-----	-0.4	13.8	+5.1	-0.3	Aug. 2.6	+3.8	-1.6
15.2	+1.9	-----	19.6	+3.4	-0.8	20.5	-----	-----	3.6	+3.5	-0.9
18.3	+3.4	+0.1	1919	-----	-----	28.2	+3.6	+1.1	13.5	-----	-----
20.3	+3.9	-0.7	Jan. 1.6	-----	-----	29.3	+4.2	-0.8	25.3	-----	+0.8
21.4	+4.3	-1.4	6.2	+3.0	-----	30.3	+3.8	+0.6	26.4	-----	+0.5
23.4	+3.7	-1.8	9.2	+2.1	-0.4	Feb. 2.5	-----	-1.2	Sept. 1.6	+0.7	+0.2
26.5	+3.9	+0.1	10.3	+2.3	-0.4	10.7	+4.8	+0.5	2.6	+0.8	+1.3
Mar. 1.6	+3.3	-1.1	13.4	-----	-1.3	11.8	+6.7	+0.3	3.7	+1.7	+0.2
2.6	+3.4	+0.3	20.6	+3.4	+0.3	19.2	-----	-----	4.7	+3.2	-0.3
3.7	+3.7	-0.1	24.7	+5.2	+0.2	26.2	+4.1	+0.2	11.8	-----	-----
12.1	-----	-----	31.2	-----	-----	27.3	+5.4	-2.5	16.2	+6.6	-----
15.2	+4.3	-----	Feb. 6.2	+3.0	-0.2	Mar. 1.4	+3.4	-0.3	17.2	+4.4	-----
16.2	+3.6	-1.4	7.2	+3.1	+0.4	2.4	-----	-0.3	18.2	+3.0	-0.5
18.2	+4.4	0.0	10.4	-----	-1.3	3.5	-----	0.0	20.3	+7.5	+1.8
22.4	-----	-0.5	18.6	+3.7	+0.2	9.7	+6.9	+0.9	21.3	+5.3	+1.2
23.4	+3.3	+0.4	Mar. 1.8	-----	-----	19.8	-----	-----	22.3	+5.3	-1.0
25.4	+3.3	+0.8	6.2	+3.9	-0.2	24.2	+3.5	+0.6	25.4	+3.8	-1.0
26.5	+4.8	+0.8	7.2	+3.1	-3.0	25.2	+2.7	-1.0	Oct. 1.6	+3.3	0.0
27.5	+4.5	+0.2	10.3	+1.8	+0.7	26.2	-----	+0.6	2.7	-----	+0.1
28.5	+3.7	-0.2	11.3	+2.7	+0.4	27.3	+1.8	+0.9	4.7	+2.8	-0.1
29.6	+2.7	+1.0	18.6	-----	-0.9	30.4	+2.3	+0.2	5.7	+0.8	+0.3
30.6	+5.7	0.0	20.6	-----	-0.2	31.4	+3.7	+1.6	6.8	+1.8	+2.0
									11.3	-----	-----

WASHINGTON OBSERVATIONS OF THE MOON, 1894-1922

Washington Observations of the Moon, 1894-1922 (O-C)—Continued

Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.	Date	Long.	Lat.
1920	"	"	1921	"	"	1921	"	"	1922	"	"
Oct. 16.2	+4.8	-----	May 18.3	+3.0	+0.3	Oct. 30.3	-----	-----	June 10.5	+4.2	-0.3
19.2	+4.7	+1.2	19.4	+2.4	0.0	Nov. 5.2	+5.6	+2.0	12.6	+3.4	+1.0
20.3	+4.2	-1.2	20.4	+2.1	-0.2	7.2	+4.3	-0.8	15.6	+2.1	-0.2
21.3	+5.3	-0.8	21.5	-----	-0.2	10.3	+4.0	+0.6	24.5	-----	-0.8
22.3	+3.6	-0.2	26.6	+2.2	+0.6	12.4	+3.0	+0.3	30.2	-----	-0.3
23.3	+3.6	+1.0	31.6	+3.4	-----	15.4	-----	-0.7	July 5.4	+2.5	-0.2
25.4	+3.7	+0.1	June 5.5	-----	-----	28.8	-----	-----	6.4	+3.1	-0.2
26.4	-----	-1.0	10.2	+0.4	-----	Dec. 3.2	+5.2	-----	7.5	+4.2	0.0
Nov. 3.7	+1.0	+2.4	14.3	+1.8	+0.1	7.2	+3.5	+0.7	12.6	+3.7	0.0
4.8	+2.6	+2.2	15.3	+1.0	+0.7	9.3	+3.2	+0.4	23.8	-----	-----
5.7	-0.2	-----	20.5	+4.8	+1.0	15.5	+4.0	-1.2	31.3	+0.7	-0.3
10.0	-----	-----	21.6	+4.2	+1.4	19.7	+3.6	-0.7	Aug. 2.3	+1.5	-0.9
18.3	+3.7	-1.1	24.7	+1.3	+0.2	21.7	+3.1	-0.8	4.4	-----	+0.9
19.3	+2.9	-0.8	26.7	+4.5	-0.6	28.5	-----	-----	5.4	-----	-0.1
20.3	+2.8	+0.8	27.6	+4.9	-0.8	1922	-----	-----	9.6	+3.8	+0.6
25.5	+4.1	-----	July 4.9	-----	-----	Jan. 6.3	+4.0	-0.4	22.2	-----	-----
Dec. 9.7	-----	-----	14.3	+1.1	-0.6	7.3	+3.2	-----	28.2	+1.9	-0.6
1921	-----	-----	16.4	+2.6	+0.1	9.4	+4.1	-2.3	29.3	+2.0	-0.8
Jan. 3.8	+2.8	-----	17.4	+4.4	+0.2	10.4	+4.9	-1.0	30.3	+3.0	+0.1
8.5	-----	-----	18.4	+3.4	-0.4	12.5	+4.6	-0.4	Sept. 5.4	+2.8	-----
17.3	+3.2	-0.6	19.4	+3.4	-----	14.6	+5.1	-0.1	6.5	+3.3	-1.3
18.3	+4.2	-0.8	20.5	+2.5	+0.1	27.3	-----	-----	12.7	+2.4	-0.1
19.3	+4.0	-1.6	21.6	+1.1	+0.7	31.2	+3.4	-----	13.7	+4.6	+0.1
23.5	+4.1	-----	23.6	+2.8	-0.6	Feb. 2.2	+2.9	-0.5	15.7	+5.1	-----
24.6	+3.2	+0.9	Aug. 3.1	-----	-----	3.2	+3.6	-0.9	20.5	-----	-----
27.6	+4.2	-1.0	8.2	+4.0	-0.9	6.3	+3.9	-1.3	25.2	+1.6	-----
Feb. 7.3	-----	-----	9.2	+4.2	-0.2	8.3	-----	-1.4	26.2	+3.7	+0.2
14.2	+4.2	-0.3	10.3	+1.8	-0.8	13.6	+5.4	-0.9	27.2	+3.9	+1.2
15.2	+4.4	-1.3	15.4	-----	+1.0	26.1	-----	-----	28.3	+4.9	+2.1
16.3	+3.8	-1.0	18.5	+0.1	-0.2	Mar. 3.2	+2.0	-----	29.3	+3.7	-0.7
17.3	+6.5	-----	19.5	+2.3	-0.6	5.2	+3.4	-0.1	30.3	+3.4	-0.4
18.4	-----	0.0	21.6	+1.6	+0.4	6.2	+3.1	+0.1	Oct. 2.4	+2.7	+0.5
25.6	-----	-0.8	22.6	+1.0	+0.9	8.3	+4.1	0.0	5.5	+3.8	-----
Mar. 3.7	+5.5	-----	23.7	+0.2	+0.2	12.4	-----	-0.6	12.7	+2.9	+0.7
9.0	-----	-----	24.6	+0.6	+0.2	13.4	+4.2	-0.3	19.9	-----	-----
15.2	+3.8	-0.6	26.7	+5.1	0.0	15.6	+5.1	-1.3	24.2	+4.6	-----
16.2	+4.5	-1.2	Sept. 1.5	-----	-----	16.6	+2.5	-0.4	26.2	+4.7	+2.1
18.3	+3.7	+0.8	7.2	+3.0	-0.1	17.7	+4.1	-0.7	27.2	+4.6	-0.8
21.4	+4.1	+1.1	8.2	+3.2	+0.3	22.7	+3.9	-----	28.3	+3.6	0.0
22.5	-----	-0.5	12.3	+4.3	+0.1	27.8	-----	-----	30.3	+3.8	0.0
25.6	+4.2	0.0	13.4	+3.3	-0.5	Apr. 12.5	-----	-1.0	Nov. 3.4	+2.7	-0.3
26.6	+4.4	+1.3	14.4	-----	-0.9	15.6	-----	+0.5	8.6	+3.2	+1.0
Apr. 7.7	-----	-----	15.5	-----	-0.7	26.5	-----	-----	9.7	+3.6	+2.1
12.2	+4.6	-----	22.7	+2.7	-0.2	May 1.2	+5.8	-----	11.7	+3.2	-0.7
15.3	+3.2	+1.1	23.7	-----	-0.4	2.2	+2.2	-0.8	18.3	-----	-----
18.4	+2.7	+0.4	30.8	-----	-----	6.3	+3.4	+1.2	23.2	+4.2	-1.0
19.4	+4.0	+0.6	Oct. 5.2	+2.6	-----	8.3	+2.5	-0.4	24.2	-----	0.0
20.4	+2.2	0.0	6.2	+4.7	-----	9.4	+3.0	+0.8	27.3	+3.7	+0.7
21.5	+3.4	-----	7.2	+4.7	+0.3	10.4	+3.5	-----	28.3	+3.8	+0.6
25.6	-----	+0.8	8.3	+5.4	+1.6	15.6	+4.7	+0.8	29.3	+3.3	+0.1
May 7.2	-----	-----	14.4	+3.7	+0.3	19.7	+2.4	0.0	30.4	+4.2	-0.4
10.2	+5.4	-----	17.5	-----	-1.3	26.0	-----	-----	Dec. 3.4	+3.5	-----
14.2	+1.4	+0.3	21.6	+3.6	+1.0	29.2	+1.6	-----	17.8	-----	-----
16.3	+1.6	+0.2	22.7	+3.8	-0.4	June 6.3	+3.7	-----			
17.3	+3.2	+0.6	24.7	+3.6	+1.4	7.4	+1.4	+0.4			
			25.7	+2.2	+0.7						