or, introducing the numerical value $e' = 0.02870$ and changing the constants b and c into $\varkappa$ and t_0:

$$(7) \quad \begin{aligned} e &= 0.00098 + 0.00098\,\varkappa \cos 9^\circ.5\,(t - t_0) \\ g + h &= g' + h' + \qquad \varkappa \sin 9^\circ.5\,(t - t_0). \end{aligned}$$

2. H. STRUVE *) derived the following values of e and $g + h$:

Epoch	e	$g+h$	
1887.72	0.00097	288°	(from obs. Tethys-Rhea)
1889.72	0.00099	322	(„ „ Saturn-Rhea)
1891.25	0.00075	282	(„ „ Tethys-Rhea).

As $g' + h' = 276°$ for these epochs, we get the remarkable result that e and $g + h$ conform to formula (7) if we suppose $\varkappa$ small.

This supposition has been confirmed by the fact that it takes away the discrepancy in G. STRUVE's results, as has been shown in the introduction.

We may thus summarise our result as follows:

Rhea's observed eccentricity and longitude of pericentre are not arbitrary constants of integration, but perturbations produced by Titan.

*) *l. c.* p. 156.

Mean elements of Hyperion for various epochs deduced from observation,

by *J. Woltjer Jr.*

Introduction.

The theory with which the observations are to be compared may be stated as follows:

t_d = Greenwich mean solar time expressed in days
T = Greenwich mean solar time expressed in tropical years.

Arguments.

Libration argument $\tau = 0^\circ.56205\,(t_d - 1889\text{ Jan. }8.16)$
Secular argument $\varpi = 0^\circ.840 - 19^\circ.191\,(T - 1888.890)$.

Mean elements.

Tropical mean longitude $l + g + h =$

$$\begin{aligned} &304^\circ.530 + 16^\circ.919983\,(t_d - 1890\text{ Jan. }0.0) \\ &\quad + 9^\circ.160 \sin \tau \\ &\quad + 0^\circ.007 \sin 2\tau + 0^\circ.192 \sin(\varpi - \tau) \\ &\quad - 0^\circ.014 \sin 3\tau + 0^\circ.211 \sin(\varpi + \tau) \end{aligned}$$

Tropical longitude of pericentre $g + h =$

$$\begin{aligned} &276^\circ.500 - 18^\circ.663\,(T - 1888.890) \\ &\quad - 14^\circ.000 \sin \varpi \\ &\quad + 1^\circ.500 \sin 2\varpi \\ &\quad - 0^\circ.012 \sin 2\tau. \end{aligned}$$

Eccentricity $e =$

$$0.10430 + 0.02300 \cos \varpi - 0.00401 \cos \tau$$

Semi-axis major (for a distance whose log. is 0.97950)

$$a = 214''.18 - 0''.736 \cos \tau.$$

The longitudes are measured along the ecliptic and then along the orbital plane.

From these elements the true orbit-longitude and radius-vector are to be computed according to the formulas of elliptic motion. To these values the synodic perturbations according to *B. A. N.* **18**, Table II must then be added. The inclination i and longitude of ascending node h will be adopted according to circumstances; their values will be stated separately for each case *).

The observations usually give the values of the distance s and position-angle p with reference to Saturn or one of the satellites. These quantities are transformed into rectangular coordinates x and y by the formulas:

$$\begin{aligned} x &= s \sin(p - P) \\ y &= s \cos(p - P), \end{aligned}$$

P being the position-angle of the axis of y. Usually the projection on the celestial sphere of a line perpendicular to the assumed orbital plane of Hyperion will be taken for the axis of y. Any deviation from this convention will be stated expressly.

If generally ε_i denotes one of the elliptic elements, the equations of condition are:

$$\Sigma \frac{\partial x}{\partial \varepsilon_i} d\varepsilon_i = x \text{ (observed — computed)}.$$

Similar equations hold for the y-coordinates. Sometimes it appears desirable to introduce additional unknowns; these will be stated separately for each series of observations.

*) The arguments and the linear functions of the time contained in $l + g + h$ and $g + h$ have been taken from H. STRUVE, *Publications de l'Observatoire Central Nicolas.* Série II. Vol. XI. Beobachtungen der Saturnstrabanten, pp. 287 and 290, from which same source also the secular inequalities are taken. The libration and the associated terms were taken from my theoretical investigations, adopting the value of the coefficient of the principal term in mean longitude according to H. STRUVE, *l. c.* p. 287. The constant of the semi-axis major was taken from *B. A. N.* 7 p. 36. The value of the mass of Titan used to reduce the theoretical expressions to numbers is 1/4033.

I. *Berlin — Babelsberg* 1919.

Instrument: 26 inch refractor.
Observer: H. STRUVE.
Nr. of observations: 11 on 9 nights, 1 excluded.
The details of the observations and the reduction have already been published *), so I will only state again the resulting elements.

Mean elements of Hyperion for the epoch 1919 April 27.3507 Gr. M. T.

$$\left.\begin{array}{rl} l+g+h & 58^\circ.550 \pm 0^\circ.050 \\ g+h & 60^\circ.43 \;\; \pm 0^\circ.80 \\ h & 169^\circ.623 \pm 0^\circ.090 \\ i & 28^\circ.075 \pm 0^\circ.025 \end{array}\right\} \text{ecl. and mean eq. of date}$$

$$e \quad 0.08882 \pm 0.00048$$

II. *Washington* 1905, 1907, 1908 **).

Instrument: 26 inch refractor of the U. S. Naval Observatory.
Observer: J. C. HAMMOND.
Nr. of obs. in 1905: 19 on 19 nights, 2 excluded,
„ „ „ „ 1907: 18 „ 18 „ , 2 „ ,
„ „ „ „ 1908: 12 „ 12 „ .

The observations consist in micrometrical measures of distances and position-angles with reference to Titan. The position-angles have been reduced to the hour-circle through Saturn's centre, the distances to the times of the position-angles.

The elements of Titan have been taken according to H. STRUVE ***).

The constants of the orbital plane of Hyperion are also from H. STRUVE ****).

As during the observations of 1905 the value of the libration in mean longitude has decreased from $+3^\circ.8$ to $-4^\circ.6$, I introduced the correction to the adopted value of the coefficient of the principal term as an additional unknown. During the observations of 1908 this libration only oscillated between $+8^\circ.7$ and $+9^\circ.2$, the argument τ increased from 71° to 101°, so I introduced a correction to the computed value of τ as an additional unknown.

As the constants of the semi-axes major for Titan and Hyperion are connected by the linear equation *)

$$a_T = 0.8247544\, a_H,$$

and the assumed values 176″.65 and 214″.18 also satisfy this relation, it is evident that the coefficient of $\frac{da}{a}$ is $x_H - x_T$, and the correction $\frac{da}{a}$ applies equally to Titan and to Hyperion.

I have solved the equations of condition in x for corrections to a, e, $l+g+h$, $g+h$ and for the additional unknowns mentioned. With the resulting values I corrected the computed y-coordinates, and then solved the equations of condition in y for di and dh.

The table contains the necessary data of reduction. Its headings are self-explanatory. The coefficients of the equations of condition do not contain the synodic perturbations.

From the headings in the table it is evident that the unknowns are:

$$200\, d\,(l+g+h), \quad 40\, d\,(g+h), \quad 400\, de, \quad 200\,\frac{da}{a},$$

$100 \times$ correction to coeff. of $\sin\tau$ in mean longitude,

$$100 \times \frac{9.16}{57.3}\, d\tau, \quad 200\, di, \quad 200 \sin i\, dh.$$

Each observation of 1905 consists of 8 measures in position-angle and 8, sometimes 10, measures in distance; so, with the exception of two observations that have been excluded, all were given the same weight.

The number of measures in 1907 has been somewhat irregular: three observations consist of 8—10 measures in each coordinate, the rest usually have 4. I have neglected these fluctuations in accuracy and (except for the two that have been excluded) have assigned the same weight to all observations.

In 1908 the number of measures was irregular. I have introduced weights nearly proportional to the number of measures, weight unity corresponding to 4 measures in each coordinate.

From the equations of condition normal equations were formed in the usual manner. The resulting values of the unknowns with their mean errors, and the sums of the weighted squares of the right hand members of the equations of condition and of the residuals ([*pnn*] and [*pvv*] respectively) are given below.

*) *B. A. N*, 3. The mean error of $g+h$ has been corrected.

**) The observations have been published *Astronomical Journal* Nrs 582, 602 and 621, also partially in *Publications of the U. S. Naval Observatory*. Second series. Vol. VI. pp. A 48, 49. In 1906 there are only 6 observations, a number too small for discussion.

***) Vol XI p. 172 (after correction of two misprints: 0′.837 in ☊ and 0.000186 in e); the mean longitude was taken from: Beobachtungen des Saturnstrabanten Titan am Königsberger und Berliner Refractor (*Aus den Abhandlungen der Kön. Preuss. Akad. der Wissensch. vom Jahre* 1907) p. 35; the semi-axis major is from *l. c.* p. 42. The solar perturbations have been applied according to: Beobacht. der Saturnstrabanten, Erste Abt. *Supplément I aux Observations de Poulkova*. p. 90.

****) Vol. XI p. 290.

*) *B. A. N.* 7, p. 36.

	1905		1907		1908	
$d(l+g+h)$	$+0°.052$	$\pm 0°.028$	$+0°.170$	$\pm 0°.027$	$+0°.076$	$\pm 0°.049$
$d(g+h)$	$+0°.97$	$\pm 0°.14$	$+0°.66$	$\pm 0°.38$	$+0°.95$	$\pm 0°.60$
de	-0.00002	± 0.00078	-0.00028	± 0.00042	-0.00054	± 0.00030
$\frac{da}{a}$	$+0.00166$	± 0.00041	$+0.00130$	± 0.00043	$+0.00203$	± 0.00041
corr. to coeff. in mean long. of $\sin\tau$	$+0°.125$	$\pm 0°.114$				
$d\tau$					$-3°.54$	$\pm 1°.59$
di	$+0°.042$	$\pm 0°.021$	$+0°.127$	$\pm 0°.014$	$+0°.099$	$\pm 0°.022$
$\sin i\, dh$	$+0°.026$	$\pm 0°.025$	$-0°.031$	$\pm 0°.017$	$+0°.016$	$\pm 0°.025$
$[pnn]_x$	10.53		5.68		7.45	
$[pvv]_x$	0.79		0.97		0.62	
$[pnn]_y$	1.31		3.15		2.59	
$[pvv]_y$	1.05		0.53		0.77	
m.e. of one eq. in x	$\pm 0''.26$		$\pm 0''.28$		$\pm 0''.30$	
„ „ „ „ „ y	$\pm 0''.25$		$\pm 0''.18$		$\pm 0''.25$	

If we reduce the mean errors so as to correspond to an observation consisting of eight measures of distance and eight of position-angle, we find the values:

red. *m. e.* of one eq. in x	$\pm 0''.26$	$\pm 0''.20$	$\pm 0''.21$
„ „ „ „ „ „ y	$\pm 0''.25$	$\pm 0''.13$	$\pm 0''.18$

The mean value of the saturnocentric elevation of the earth above the plane of Hyperion's orbit has been

in 1905 $+12°$,
„ 1907 $0°$,
„ 1908 $-5°$.

The small value of the mean error of an equation in y for 1907 may possibly be ascribed to this small elevation.

The corrections $d(l+g+h)$ and $d(g+h)$ as given suppose the longitudes to be counted along the ecliptic till the ascending node of the originally assumed orbital plane of Hyperion, then along this plane till the node with the true plane, then along the true plane. To eliminate the originally assumed plane we must add the correction $\tan \frac{1}{2} i \sin i\, dh$, amounting for the three years to

$+0°.006 \pm 0°.006$, $-0°.008 \pm 0°.004$, $+0°.004 \pm 0°.006$.

In the case of 1905 and 1908 I add to the mean longitude corrections resulting from the corrections to the constants of the libration for each year for the central epoch of the observations. These corrections are:

1905: $-0°.014 \pm 0°.013$
1908: $-0°.013 \pm 0°.006$.

Adding all corrections to the assumed values of the mean elements for the mean epochs of observation, we get the mean elements and the constant of the semi-axis major with the mean errors which are collected below.

Mean elements of Hyperion for the epochs (*Gr. M. T.*)

	1905 Sept. 18.5979	1907 Sept. 14.6493	1908 Sept. 29.6822	
$l+g+h$	$217°.194 \pm 0°.031$	$255°.898 \pm 0°.027$	$239°.530 \pm 0°.050$	(ecl. and mean eq. of date)
$g+h$	$316°.32 \pm 0°.14$	$286°.08 \pm 0°.38$	$270°.75 \pm 0°.60$	
h	$169°.859 \pm 0°.054$	$169°.751 \pm 0°.037$	$169°.859 \pm 0°.054$	
i	$27°.634 \pm 0°.021$	$27°.764 \pm 0°.014$	$27°.760 \pm 0°.022$	
e	0.12640 ± 0.00078	0.12934 ± 0.00042	0.12525 ± 0.00030	
Constant of semi-axis major for the distance whose log. is 0.97950	$214''.54 \pm 0''.09$	$214''.46 \pm 0''.09$	$214''.61 \pm 0''.09$	

The expenses of the computations have been partly met by the grant from the „Leidsch Universiteitsfonds" already referred to *).

To be continued.

*) *B. A. N.* 3.

Reduced Gr. M. T.	x_H C	x_T C	x_H-x_T O	x_H-x_T O−C	$\frac{1}{200}\frac{\partial x}{\partial(l+g+h)}$	$\frac{1}{40}\frac{\partial x}{\partial(g+h)}$	$\frac{1}{400}\frac{\partial x}{\partial e}$	$\frac{1}{200}(x_H-x_T)$	$\sin\tau\frac{\partial x}{100\,\partial(l+g+h)}$	Res.	Weight
1905 July 25.7004	+ 171.″17	+ 181.″42	− 10.″50	− 0.″25	+ 0.856	− 0.935	+ 0.479	− 0.058	+ 0.707	− 0.″10	1
31.7136	+ 147.61	− 167.61	+ 310.19	− 5.03	− 0.819	− 1.223	− 0.004	+ 1.572	− 0.587	+ 4.44	0
Aug. 6.6896	− 179.09	+ 78.35	− 258.78	− 1.34	− 0.642	− 0.834	+ 0.534	− 1.289	− 0.388	+ 0.14	1
21.6421	+ 164.94	+ 7.95	+ 156.38	− 0.62	− 0.764	− 1.182	− 0.043	+ 0.786	− 0.244	− 0.11	1
27.6167	− 165.91	+ 139.35	− 306.24	− 0.98	− 0.728	− 0.914	+ 0.551	− 1.523	− 0.147	− 0.32	1
29.6118	− 221.41	+ 6.75	− 229.38	− 1.22	− 0.173	− 0.675	+ 0.315	− 1.137	− 0.028	+ 0.34	1
30.5879	− 221.30	− 64.53	− 157.43	− 0.67	+ 0.182	− 0.724	+ 0.140	− 0.780	+ 0.027	− 0.04	1
31.5932	− 199.05	− 128.12	− 71.31	− 0.38	+ 0.571	− 0.911	0.000	− 0.350	+ 0.072	− 0.24	1
Sept. 18.5979	− 189.37	− 185.46	− 4.49	− 0.58	− 0.564	− 0.796	+ 0.493	− 0.018	+ 0.128	− 0.04	1
21.5509	− 205.47	− 59.29	− 146.92	− 0.73	+ 0.428	− 0.822	+ 0.035	− 0.734	− 0.122	− 0.02	1
22.5532	− 168.47	+ 15.90	− 185.51	− 1.14	+ 0.797	− 1.065	− 0.040	− 0.927	− 0.241	+ 0.20	1
26.5282	+ 104.49	+ 191.54	− 87.84*)	− 0.79	+ 1.137	− 1.218	+ 0.472	− 0.442	− 0.434	− 0.08	1
27.5240	+ 163.79	+ 173.54	− 10.29*)	− 0.54	+ 0.882	− 0.974	+ 0.467	− 0.054	− 0.352	− 0.06	1
28.5334	+ 206.55	+ 130.36	+ 75.76	− 0.44	+ 0.562	− 0.780	+ 0.355	+ 0.377	− 0.236	+ 0.08	1
30.5012	+ 233.44	+ 0.44	+ 232.46	− 0.54	− 0.078	− 0.737	+ 0.046	+ 1.162	+ 0.036	+ 0.42	1
Oct. 1.5031	+ 220.04	− 70.35	+ 289.95	− 0.43	− 0.362	− 0.862	− 0.055	+ 1.448	+ 0.173	+ 0.30	1
3.5773	+ 146.71	− 171.80	+ 318.49	− 0.02	− 0.794	− 1.201	− 0.031	+ 1.589	+ 0.408	− 0.32	1
21.4619	+ 226.54	− 160.24	+ 389.75	+ 2.96	+ 0.039	− 0.689	+ 0.100	+ 1.934	− 0.033	− 2.79	0
30.4642	− 149.08	+ 120.48	− 270.78	− 1.22	− 0.707	− 0.881	+ 0.519	− 1.344	+ 0.707	+ 0.20	1

Reduced Gr. M. T.	x_H C	x_T C	x_H-x_T O	x_H-x_T O−C	$\frac{1}{200}\frac{\partial x}{\partial(l+g+h)}$	$\frac{1}{40}\frac{\partial x}{\partial(g+h)}$	$\frac{1}{400}\frac{\partial x}{\partial e}$	$\frac{1}{200}(x_H-x_T)$		Res.	Weight
1907 Aug. 6.7152	− 100.″37	− 183.″18	+ 82.″97	+ 0.″16	+ 1.080	− 0.837	+ 0.854	+ 0.424		+ 0.″11	1
11.7137	+ 213.66	+ 113.02	+ 100.90	+ 0.26	+ 0.655	− 0.074	+ 0.800	+ 0.507		+ 0.14	1
12.7744	+ 246.61	+ 167.98	+ 78.64	+ 0.02	+ 0.373	− 0.118	+ 0.652	+ 0.395		+ 0.18	1
13.7341	+ 260.81	+ 194.25	+ 66.48	− 0.08	+ 0.109	− 0.232	+ 0.562	+ 0.334		+ 0.06	1
31.6564	+ 151.55	+ 168.38	− 16.67	+ 0.16	+ 0.989	− 0.192	+ 1.015	− 0.085		+ 0.20	1
Sept. 7.6822	+ 184.88	− 186.00	+ 370.26	− 0.62	− 0.808	− 0.721	+ 0.767	+ 1.854		+ 0.21	1
8.6670	+ 132.56	− 153.96	+ 285.64	− 0.88	− 0.981	− 0.707	+ 0.918	+ 1.433		+ 0.24	1
13.6434	− 172.88	+ 174.06	− 346.84	+ 0.10	− 0.690	+ 0.049	+ 0.854	− 1.733		− 1.03	0
14.6493	− 202.94	+ 199.60	− 403.74	− 1.20	− 0.310	− 0.063	+ 0.660	− 2.012		+ 0.39	1
15.5971	− 208.41	+ 197.20	− 407.07	− 1.46	+ 0.112	− 0.312	+ 0.550	− 2.028		+ 0.79	0
26.6444	+ 259.17	− 15.82	+ 275.11	+ 0.12	− 0.267	− 0.468	+ 0.539	+ 1.373		− 0.20	1
29.5880	+ 150.69	+ 175.46	− 25.90	− 1.13	− 0.927	− 0.729	+ 0.861	− 0.125		+ 0.11	1
30.5689	+ 92.65	+ 199.27	− 107.32	− 0.71	− 1.063	− 0.655	+ 1.006	− 0.534		− 0.48	1
Oct. 5.6354	− 196.14	− 43.18	− 153.37	− 0.42	− 0.416	− 0.024	+ 0.702	− 0.765		− 0.12	1
6.5960	− 208.65	− 109.96	− 98.82	− 0.14	− 0.003	− 0.240	+ 0.563	− 0.491		− 0.16	1
8.5594	− 159.64	− 187.62	+ 28.14	+ 0.16	+ 0.828	− 0.781	+ 0.664	+ 0.149		− 0.06	1
9.6192	− 98.16	− 182.14	+ 84.34	+ 0.36	+ 1.117	− 0.860	+ 0.871	+ 0.431		− 0.08	1
14.5725	+ 217.06	+ 129.37	+ 88.60	+ 0.90	+ 0.647	− 0.097	+ 0.797	+ 0.443		− 0.53	1

Reduced Gr. M. T.	x_H C	x_T C	x_H-x_T O	x_H-x_T O−C	$\frac{1}{200}\frac{\partial x}{\partial(l+g+h)}$	$\frac{1}{40}\frac{\partial x}{\partial(g+h)}$	$\frac{1}{400}\frac{\partial x}{\partial e}$	$\frac{1}{200}(x_H-x_T)$	$\cos\tau\frac{\partial x}{100\,\partial(l+g+h)}$	Res.	Weight
1908 Aug. 29.7227	+ 250.″03	+ 160.″49	+ 89.″28	− 0.″26	+ 0.381	+ 0.315	+ 0.637	+ 0.448	+ 0.245	+ 0.″37	1
30.7075	+ 264.92	+ 194.05	+ 70.89	+ 0.02	+ 0.115	+ 0.168	+ 0.587	+ 0.355	+ 0.072	+ 0.07	1
31.7216	+ 263.56	+ 200.58	+ 63.14	+ 0.16	− 0.167	+ 0.008	+ 0.610	+ 0.316	− 0.101	− 0.10	1
Sept. 1.7277	+ 245.34	+ 178.13	+ 67.40	+ 0.18	− 0.444	− 0.118	+ 0.701	+ 0.339	− 0.259	− 0.13	1
3.6913	+ 164.14	+ 66.05	+ 98.12	+ 0.04	− 0.924	− 0.136	+ 0.992	+ 0.497	− 0.506	+ 0.11	1½
29.6822	− 152.28	+ 115.78	− 268.68	− 0.62	− 0.877	+ 0.561	+ 0.843	− 1.343	− 0.040	+ 0.07	1
30.6514	− 193.02	+ 169.10	− 362.67	− 0.55	− 0.516	+ 0.403	+ 0.668	− 1.812	− 0.012	− 0.19	1
Oct. 2.6049	− 202.03	+ 202.66	− 405.96	− 1.27	+ 0.371	− 0.156	+ 0.671	− 2.022	− 0.005	+ 0.30	2
3.6370	− 166.67	+ 176.22	− 343.83	− 0.93	+ 0.770	− 0.317	+ 0.860	− 1.712	− 0.028	+ 0.07	2
4.6120	− 113.99	+ 126.51	− 240.79	− 0.29	+ 1.032	− 0.292	+ 1.051	− 1.200	− 0.054	− 0.30	2
14.6018	+ 233.39	+ 45.50	+ 187.62	− 0.26	− 0.585	− 0.179	+ 0.774	+ 0.939	+ 0.145	+ 0.06	1½
20.5768	− 134.61	+ 121.41	− 256.86	− 0.84	− 0.961	+ 0.564	+ 0.905	− 1.281	+ 0.350	− 0.10	2

*) 180° has been added to the observed position angle.

Reduced Gr. M. T.	y_H C	y_T C	y_H-y_T O	y_H-y_T O—C	y_H-y_T O—C Corrected	$\frac{1}{200}\frac{\partial y}{\partial i}$	$\frac{1}{200}\frac{1}{\sin i}\frac{\partial y}{\partial h}$	Res.	Weight
1905 Juli 25.7004	+ 22″.69	− 12″.06	+ 35″.34	+ 0″.59	+ 0″.58	− 0.628	+ 0.860	− 0″.59	1
31.7136	− 36.89	− 13.14	− 14.05	+ 9.70	+ 9.83	− 0.983	− 0.809	− 10.05	0
Aug. 6.6896	− 28.69	+ 28.32	− 56.95	+ 0.06	+ 0.10	+ 0.624	− 1.012	− 0.11	1
21.6421	− 37.18	+ 32.95	− 70.63	− 0.50	− 0.27	− 1.068	− 0.697	+ 0.05	1
27.6167	− 34.43	− 25.75	− 8.91	− 0.23	− 0.25	+ 0.501	− 1.098	+ 0.23	1
29.6118	− 11.76	− 35.31	+ 23.74	+ 0.19	+ 0.15	+ 0.938	− 0.620	− 0.07	1
30.5879	+ 1.38	− 32.75	+ 34.12	− 0.01	− 0.04	+ 1.041	− 0.298	+ 0.16	1
31.5932	+ 14.78	− 25.22	+ 39.92	− 0.08	− 0.10	+ 1.042	+ 0.062	+ 0.26	1
Sept. 18.5979	− 28.86	+ 1.38	− 29.82	+ 0.42	+ 0.45	+ 0.643	− 0.973	− 0.44	1
21.5509	+ 10.92	+ 33.82	− 22.91	− 0.01	+ 0.09	+ 1.037	− 0.090	+ 0.06	1
22.5532	+ 23.90	+ 35.48	− 11.19	+ 0.39	+ 0.48	+ 0.972	+ 0.265	− 0.31	1
26.5282	+ 36.44	− 3.96	+ 40.42 *)	+ 0.02	− 0.08	− 0.183	+ 0.993	+ 0.14	1
27.5240	+ 28.09	− 17.40	+ 45.75 *)	+ 0.26	+ 0.18	− 0.524	+ 0.901	− 0.17	1
28.5334	+ 16.62	− 28.52	+ 45.03	− 0.11	− 0.18	− 0.814	+ 0.713	+ 0.12	1
30.5012	− 9.26	− 37.44	+ 28.18	0.00	+ 0.02	− 1.147	+ 0.176	− 0.18	1
Oct. 1.5031	− 21.96	− 34.08	+ 11.75	− 0.37	− 0.30	− 1.187	− 0.129	+ 0.12	1
3.5773	− 42.72	− 12.18	− 31.00	− 0.46	− 0.32	− 1.016	− 0.709	+ 0.10	1
21.4619	− 4.30	+ 15.86	− 20.79	− 0.63	− 0.56	− 1.072	+ 0.295	+ 0.43	0
30.4642	− 37.24	− 28.73	− 8.23	+ 0.28	+ 0.31	+ 0.378	− 1.062	− 0.35	1
1907 Aug. 6.7152	− 3.67	− 0.94	− 2.77	− 0.04	− 0.04	+ 0.373	+ 0.968	+ 0.10	1
11.7137	− 2.32	− 4.50	+ 1.78	− 0.40	− 0.41	− 1.142	+ 0.504	− 0.15	1
12.7744	− 1.23	− 2.81	+ 1.14	− 0.44	− 0.46	− 1.268	+ 0.196	− 0.13	1
13.7341	− 0.22	− 0.93	+ 0.16	− 0.55	− 0.57	− 1.302	− 0.097	0.00	1
31.6564	− 1.34	+ 1.96	− 3.89	− 0.59	− 0.59	− 0.852	+ 0.867	+ 0.12	1
Sept. 7.6822	+ 0.51	− 0.54	+ 0.84	− 0.21	− 0.21	− 0.828	− 1.037	− 0.04	1
8.6670	+ 0.46	− 1.43	+ 1.82	− 0.07	− 0.07	− 0.553	− 1.180	− 0.04	1
13.6434	− 0.15	− 0.98	+ 1.67	+ 0.84	+ 0.84	+ 0.920	− 0.600	− 0.37	0
14.6493	− 0.11	− 0.28	+ 0.99	+ 0.82	+ 0.82	+ 1.038	− 0.232	− 0.34	1
15.5971	+ 0.02	+ 0.33	+ 0.81	+ 1.12	+ 1.12	+ 1.034	+ 0.141	− 0.68	0
26.6444	− 0.68	− 0.28	− 1.20	− 0.80	− 0.80	− 1.264	− 0.455	+ 0.29	1
29.5880	− 2.38	− 0.04	− 2.49	− 0.15	− 0.14	− 0.675	− 1.123	− 0.04	1
30.5689	− 2.79	− 0.06	− 2.58	+ 0.15	+ 0.16	− 0.378	− 1.224	− 0.20	1
Oct 5.6354	− 1.26	− 0.70	− 0.16	+ 0.40	+ 0.40	+ 1.006	− 0.357	+ 0.09	1
6.5960	− 0.19	− 0.64	+ 1.06	+ 0.61	+ 0.62	+ 1.042	+ 0.014	− 0.16	1
8.5594	+ 2.14	− 0.08	+ 2.45	+ 0.23	+ 0.23	+ 0.746	+ 0.718	+ 0.02	1
9.6192	+ 3.14	+ 0.40	+ 3.00	+ 0.26	+ 0.26	+ 0.422	+ 0.971	− 0.18	1
14.5725	+ 2.43	+ 1.16	+ 1.09	− 0.18	− 0.17	− 1.122	+ 0.567	− 0.39	1
1908 Aug. 29.7227	− 9.87	− 14.05	+ 3.68	− 0.50	− 0.56	− 1.319	+ 0.030	+ 0.11	1
30.7075	− 3.24	− 5.90	+ 2.19	− 0.47	− 0.55	− 1.297	− 0.271	+ 0.09	1
31.7216	+ 3.75	+ 3.28	+ 0.20	− 0.27	− 0.34	− 1.194	− 0.565	− 0.10	1
Sept. 1.7277	+ 10.40	+ 11.87	− 1.80	− 0.33	− 0.39	− 1.017	− 0.822	0.00	1
3.6913	+ 20.83	+ 22.62	− 1.75	+ 0.04	− 0.02	− 0.490	− 1.154	− 0.21	1½
29.6822	+ 14.39	− 16.85	+ 31.63	+ 0.39	+ 0.28	+ 0.944	− 0.518	+ 0.01	1
30.6514	+ 8.18	− 11.24	+ 19.61	+ 0.19	+ 0.09	+ 1.045	− 0.148	+ 0.26	1
Oct. 2.6049	− 6.17	+ 3.52	− 9.31	+ 0.38	+ 0.33	+ 0.872	+ 0.603	0.00	2
3.6370	− 12.84	+ 10.94	− 23.02	+ 0.76	+ 0.76	+ 0.602	+ 0.905	− 0.51	2
4.6120	− 17.62	+ 16.37	− 34.04	− 0.05	− 0.02	+ 0.277	+ 1.088	+ 0.17	2
14.6018	+ 10.57	− 18.27	+ 28.77	− 0.07	− 0.24	− 0.959	− 0.903	− 0.14	1½
20.5768	+ 13.93	+ 15.09	− 0.89	+ 0.27	+ 0.26	+ 0.866	− 0.645	0.00	2

*) 180° has been added to the observed position angle.