ELEMENTS OF (622) [1906 WP].

By J. C. HAMMOND.

This asteroid was discovered by METCALF at Taunton, Mass., on November 13, 1906. Provisional elements were computed from three observations made at Washington by the method given in TISSERAND'S *Leçons sur la Détermination des Orbites*.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α .	Apparent δ .	Log $p\Delta$.		Red. to 1906.0	
				α	δ	α	δ
1906	h m s	h m s	° ' "			s	"
Nov. 21	10 45 31	3 51 16.23	+1 31 4.8	9.106 _n	0.726	-1.82	-1.7
Dec. 18	12 18 2	3 33 23.59	+3 4 44.0	9.450	0.716	-2.12	-3.7
1907							
Jan. 10	7 20 3	3 35 34.59	+6 30 7.9	9.062 _n	0.673	-2.43	-4.6

Elements.

Epoch: 1906, December 18.5, Berlin Mean Time.

$$\begin{aligned}
 M &= 19\ 40\ 58.6 \\
 \omega &= 253\ 50\ 12.6 \\
 \Omega &= 142\ 21\ 39.1 \\
 i &= 8\ 38\ 46.1 \\
 \varphi &= 14\ 8\ 38.8 \\
 \mu &= 944''.890 \\
 \log a &= 0.383084
 \end{aligned}
 \left. \vphantom{\begin{aligned} M \\ \omega \\ \Omega \\ i \\ \varphi \\ \mu \\ \log a \end{aligned}} \right\} 1906.0$$

ω is the longitude of perihelion counted from the node.

The residuals (O-C) for the middle place are $-1''.3$ in α and $-1''.7$ in δ .

Heliocentric Coordinates 1906.0

$$\begin{aligned}
 x &= r [9.998163] \sin (126\ 30\ 50.3 + v) \\
 y &= r [9.981707] \sin (38\ 4\ 48.8 + v) \\
 z &= r [9.475233] \sin (19\ 22\ 57.5 + v)
 \end{aligned}$$

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Ephemeris for 1906.

Berlin Mean Midnight.	Apparent α .	Apparent δ .	Log A .	Aberr. Time.
1906	h m s	° ' "		m s
♂ Nov. 21	3 51 26.31	+1 31 19.8	9.94776	7 22
25	3 47 57.84	1 30 50.5	9.95174	7 26
29	3 44 38.01	1 35 30.1	9.95733	7 32
Dec. 3	3 41 32.69	1 45 15.2	9.96441	7 40
7	3 38 47.29	1 59 54.2	9.97289	7 49
11	3 36 26.16	2 19 11.3	9.98264	7 59
15	3 34 33.15	2 42 45.8	9.99351	8 11
19	3 33 11.31	3 10 13.2	0.00534	8 25
23	3 32 22.33	3 41 7.0	0.01798	8 40
27	3 32 6.96	4 14 55.3	0.03126	8 56
31	3 32 25.15	4 51 11.2	0.04506	9 13
1907				
Jan. 4	3 33 16.39	5 29 26.7	0.05924	9 31
8	3 34 39.69	6 9 18.0	0.07371	9 51
12	3 36 34.12	+6 50 21.5	0.08836	10 11

The asteroid was observed visually at this opposition at Washington only and the observations give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O-C		Date.	O-C		Date.	O-C	
	α	δ		α	δ		α	δ
1906	s	"	1906	s	"	1906	s	"
Nov. 21	+0.02	-0.4	Dec. 3	-0.16	-3.4	Dec. 22	-0.19	-3.5
22	+0.06	+1.3	4	-0.08	-4.5	24	-0.20	-4.6
23	-0.07	-2.5	11	-0.21	-4.2	1907		
24	-0.03	-0.3	12	-0.19	-5.1	Jan. 1	-0.09	-0.6
25	-0.06	-3.8	18	-0.18	-2.0	4	-0.02	-1.3
28	-0.14	-4.0				10	-0.01	-1.0

The estimated magnitudes were 11.0 on November 21, 11.2 on November 22, and 12.0 on January 4. From these we obtain $g=10.1$ and $m_0=12.8$.

An ephemeris for 1908 was computed from these elements by FREDERICKSON.

Heliocentric Coordinates for 1908.0

$$\begin{aligned}
 x &= r [9.998164] \sin (126 \ 32 \ 30.2 + v) \\
 y &= r [9.981712] \sin (\ 38 \ 6 \ 24.2 + v) \\
 z &= r [9.475150] \sin (\ 19 \ 25 \ 4.6 + v)
 \end{aligned}$$

ORBITS OF ASTEROIDS.

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Ephemeris for 1908.

Berlin Mean Midnight.	Apparent α .	Apparent δ .	Log d .	Aberr. Time.
1908	h m s	° '		m s
Mar. 23	13 9 45	+3 9.2	0.2886	16 9
27	13 6 25	3 39.8		
31	13 2 57	4 9.7	0.2872	16 6
Apr. 8	12 59 26	4 38.2		
8	12 55 56	5 5.0	0.2900	16 12
12	12 52 30	5 29.7		
16	12 49 11	5 52.0	0.2968	16 28
20	12 46 3	6 11.7		
24	12 43 7	6 28.6	0.3072	16 52
28	12 40 26	6 42.5		
May 2	12 38 3	6 53.4	0.3206	17 23
6	12 35 58	7 1.3		
10	12 34 13	+7 6.1	0.3364	18 2

Magnitude about 13.9.

Three observations made at Washington give the following corrections to this ephemeris:

Date.	O-C	
	α	δ
1908	s	'
Apr. 3	+19	-1.2
4	+19	-1.2
May 2	+16	-0.9