ELEMENTS OF (636) [1907 XP].

By ASAPH HALL, jr.

This asteroid was discovered by METCALF at Taunton, Mass., on February 8, 1907. Elements were computed from observations made at Washington using the method of GAUSS as given in his *Theoria Motus*, translated into English by DAVIS, page 185 et seq.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α .	Apparent δ .	Red. to 1907.0	
				α	δ
1907	h m s	h m s	° ' "	s	"
Feb. 14	10 1 48	9 44 45.42	+24 55 36.7	+0.62	+0.1
Mar. 2	8 12 9	9 31 18.86	+25 35 23.1	+0.50	+0.6
20	7 54 53	9 20 12.52	+25 39 15.0	+0.39	+1.2

Elements.

Epoch: 1907, March 2.5, Berlin Mean Time.

$$\begin{array}{rcl}
 M = 171 \ 51 \ 57.75 & & \\
 \omega = 294 \ 7 \ 53.9 & & \\
 \Omega = 35 \ 24 \ 23.5 & \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} 1907.0 & \begin{array}{rcl}
 \omega = 294 \ 7 \ 56.2 & & \\
 \Omega = 35 \ 25 \ 11.45 & \left. \begin{array}{l} \\ \\ \end{array} \right\} 1908.0 & \\
 i = 7 \ 56 \ 27.7 & & \\
 \varphi = 9 \ 57 \ 10.5 & & \\
 \mu = 714''.6833 & & \\
 \log a = 0.463929 & &
 \end{array}
 \end{array}$$

The residuals (O-C) for the middle place are $\cos \beta \Delta \lambda = +2''.1$ and $\Delta \beta = -0''.6$.

Heliocentric Coordinates 1907.0

$$\begin{array}{l}
 x = r [9.998605] \sin (59 \ 16 \ 40.35 + v) \\
 y = r [9.938265] \sin (331 \ 55 \ 1.4 + v) \\
 z = r [9.702307] \sin (321 \ 21 \ 54.65 + v)
 \end{array}$$

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Ephemeris for 1907.

Berlin Mean Time.	Mean α .	Mean δ .	Log d .
1907	h m s	° ' "	
Feb. 6.5	9 51 57.29	+24 23 56.8	0.386049
10.5	9 48 27.03	24 40 16.5	0.385680
8 14.5	9 44 54.12	24 55 6.2	0.386191
18.5	9 41 21.94	25 8 10.9	0.387568
22.5	9 37 53.95	25 19 20.2	0.389788
26.5	9 34 33.30	25 28 23.9	0.392815
Mar. 2.5	9 31 22.86	25 35 18.5	0.396597
6.5	9 28 25.13	25 40 0.6	0.401088
10.5	9 25 42.47	25 42 30.7	0.406222
14.5	9 23 16.96	25 42 49.8	0.411940
18.5	9 21 10.34	25 41 2.2	0.418169
22.5	9 19 23.71	25 37 13.3	0.424838
26.5	9 17 57.92	+25 31 29.5	0.431873

The observations at Washington give the following corrections to the ephemeris:

Corrections to the Ephemeris.

Date.	O-C		Date.	O-C		Date.	O-C	
	α	δ		α	δ		α	δ
1907	s	"	1907	s	"	1907	s	"
Feb. 14	+0.09	-1.0	Feb. 22	-0.08	+0.6	Mar. 11	+0.09	+0.2
15	+0.14	-2.4	Mar. 2	+0.01	-0.6	15	+0.15	+2.5
18	+0.17	-1.9	6	+0.02	-1.3	20	+0.11	-0.6

An ephemeris for 1908 was computed from the above elements.

Heliocentric Coordinates 1908.0

$$\begin{aligned}
 x &= r [9.998603] \sin (59\ 17\ 30.5 + v) \\
 y &= r [9.938270] \sin (331\ 55\ 54.3 + v) \\
 z &= r [9.702294] \sin (321\ 22\ 34.2 + v)
 \end{aligned}$$

Ephemeris for 1908.

Berlin Mean Time.	Mean α .	Mean δ .	Log Δ .
1908	h m s	° ' "	
Mar. 20. 5	13 56 5.44	-8 55 28.6	0.354995
24. 5	13 53 39.87	8 47 39.2	0.348524
28. 5	13 50 57.91	8 38 50.1	0.342761
Apr. 1. 5	13 48 1.61	8 29 5.4	0.337784
5. 5	13 44 53.50	8 18 35.5	0.333654
9. 5	13 41 36.33	8 7 34.5	0.330418
13. 5	13 38 14.31	7 56 17.5	0.328115
8 17. 5	13 34 47.83	7 44 58.9	0.326743
21. 5	13 31 22.25	7 33 52.6	0.326331
25. 5	13 28 0.07	7 23 14.2	0.326864
29. 5	13 24 44.25	7 13 17.9	0.328330
May 3. 5	13 21 37.93	7 4 19.6	0.330685
7. 5	13 18 43.83	6 56 32.7	0.333880
11. 5	13 16 4.19	6 50 8.4	0.337848
15. 5	13 13 40.93	-6 45 16.4	0.342517

From the estimated magnitudes $m_0=12.35$ and $g=8.65$. Opposition April 15, magnitude 12.75.