ELEMENTS OF (653) [1907 BK].

By ARTHUR SNOW.

This asteroid was discovered by METCALF at Taunton, Mass., on November 27, 1907. Elements were computed from three observations made at Washington, using the method given by WATSON in his Theoretical Astronomy.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α .	Apparent δ .	Log $p\Delta$.		Red. to 1907.0	
				α	δ	α	δ
1907	h m s	h m s	° ' "			s	"
Dec. 2	11 10 31	4 16 44.31	+5 44 13.1	8.660 _n	0.680	-1.67	-2.4
21	8 43 42	4 2 18.52	+6 0 3.3	9.200 _n	0.681	-1.87	-3.7
1908							
Jan. 6	9 51 21	3 54 33.22	+6 49 20.5	9.062	0.669	-2.24	-4.9

Elements.

Epoch: 1907, December 21.71407, Greenwich Mean Time.

$$\begin{array}{lll}
 \begin{array}{l}
 M = 250 \ 52 \ 2.9 \\
 \omega = 49 \ 0 \ 16.2 \\
 \Omega = 133 \ 45 \ 32.3 \\
 i = 11 \ 16 \ 47.5 \\
 \varphi = 2 \ 46 \ 34.1 \\
 \mu = 679''.1475 \\
 \log a = 0.478695
 \end{array}
 &
 \begin{array}{l}
 \begin{array}{l}
 \circ \quad ' \quad '' \\
 \omega = 49 \ 0 \ 17.7 \\
 \Omega = 133 \ 46 \ 21.1 \\
 i = 11 \ 16 \ 47.1
 \end{array}
 \end{array}
 &
 \begin{array}{l}
 \begin{array}{l}
 \circ \quad ' \quad '' \\
 \omega = 49 \ 0 \ 19.2 \\
 \Omega = 133 \ 47 \ 9.9 \\
 i = 11 \ 16 \ 46.7
 \end{array}
 \end{array}
 \end{array}
 \left. \begin{array}{l} \\ \\ \\ \\ \\ \\ \end{array} \right\} \begin{array}{l} 1907.0 \\ 1908.0 \\ 1909.0 \end{array}$$

Heliocentric Coordinates 1907.0

$$\begin{array}{l}
 x = r [9.995622] \sin (273 \ 19 \ 20.5 + v) \\
 y = r [9.984043] \sin (185 \ 34 \ 50.7 + v) \\
 z = r [9.479061] \sin (156 \ 28 \ 44.6 + v)
 \end{array}$$

Heliocentric Coordinates 1908.0

$$\begin{array}{l}
 x = r [9.995624] \sin (273 \ 20 \ 9.3 + v) \\
 y = r [9.984047] \sin (185 \ 35 \ 36.4 + v) \\
 z = r [9.478996] \sin (156 \ 29 \ 41.2 + v)
 \end{array}$$

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Ephemeris for 1907-1908.

Greenwich Mean Time	Apparent α .	Apparent δ .	Log d .
1907	h m s	° ' "	
Nov. 27.5	4 20 54.19	+5 47 54.6	0.32494
Dec. 1.5	4 17 30.79	5 44 41.5	0.32525
5.5	4 14 9.43	5 43 31.4	0.32650
9.5	4 10 53.64	5 44 29.2	0.32870
13.5	4 7 46.72	5 47 37.5	0.33178
17.5	4 4 51.56	5 52 55.5	0.33570
21.5	4 2 10.70	6 0 20.9	0.34041
25.5	3 59 46.30	6 9 49.8	0.34582
29.5	3 57 40.24	6 21 17.2	0.35188
1908			
Jan. 2.5	3 55 57.30	6 34 46.8	0.35851
6.5	3 54 32.33	+6 49 52.2	0.36563

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

Corrections to the Ephemeris.

Date.	O-C		Date.	O-C	
	α	δ		α	δ
1907	s	"	1907	s	"
Dec. 2	0.00	-0.1	Dec. 31	-0.07	+1.3
6	-0.13	+0.7	1908		
11	+0.12	-0.6	Jan. 3	-0.01	+1.3
21	-0.01	0.0	6	-0.02	+0.2
25	+0.05	+1.7			

An ephemeris for 1909 was computed from the above elements.

Heliocentric Coordinates 1909.0

$$\begin{aligned}
 x &= r [9.995626] \sin (273 \ 20 \ 59.6 + v) \\
 y &= r [9.984051] \sin (185 \ 36 \ 23.8 + v) \\
 z &= r [9.478936] \sin (156 \ 30 \ 40.9 + v)
 \end{aligned}$$

Ephemeris for 1909.

Greenwich Mean Time.	Apparent α .	Apparent δ .	Log d .
1909	h m s	° '	
Jan. 29.5	10 33 18	+13 6.3	0.29490
Feb. 2.5	10 31 6	13 36.9	0.28968
6.5	10 28 37	14 8.7	0.28537
10.5	10 25 55	14 41.3	0.28206
14.5	10 23 3	15 14.1	0.27977
18.5	10 20 4	15 46.7	0.27855
22.5	10 17 2	16 18.7	0.27840
26.5	10 14 0	16 49.6	0.27934
Mar. 2.5	10 11 2	17 18.9	0.28133
6.5	10 8 11	17 46.3	0.28431
10.5	10 5 30	18 11.5	0.28825
14.5	10 3 2	+18 34.3	0.29309

Opposition February 21, 1909, and magnitude 12.5.