No. 154 THE ORBIT OF COMET NEWMAN 1932f-1932VII

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ABSTRACT

Using 82 observations covering an interval of 213 days, a definitive orbit is obtained, taking planetary perturbations into account. The orbit comes out very nearly parabolic.

This faint comet was discovered by K. A. Newman on a plate taken at the Lowell Observatory, Flagstaff, on June 20, 1932. It appeared as a 12.5 mag. centrally condensed, diffuse coma of about 40” in diameter, moving slowly in a northwesterly direction. Being conveniently located it was immediately taken under observation at many observatories. Newman found the comet also on two prediscovery Lowell plates, taken June 1 and 7, and this enabled F. L. Whipple and L. E. Cunningham (1932) immediately to compute an orbit showing that perihelion was due on September 24. Since the June 1 and June 7, 1932, positions were based on contact positives (HAC 249, 1932), I inquired at Lowell Observatory if I could measure the comet on the original negatives. Unfortunately, the originals could not be located, according to Henry L. Giclas. Most observers described the comet as a round coma, but H. M. Jeffers (1932) noticed, on a 20-minute exposure taken July 6 with the Crossley reflector, that there was a faint fan-shaped tail extending towards the southeast. With the 24-inch reflector at Yerkes Observatory I recorded a tail 2’ long in position angle 160° on July 8, and on August 6 the length was estimated as 3’ in the direction 150°. The brightness changed very little during the first two months of visibility, but the comet began to fade in October so that observations became scarce. I recorded Comet Newman for the last time on January 20, 1933, when the total brightness was reduced to 15 mag. After that the comet was lost in the evening twilight. The measures cover an interval of 213 days.

Preliminary orbits were deduced by Whipple and Cunningham, as well as by M. Davidson (1932). A more accurate parabola was computed by A. S. Schmitt (1933), who used observations from June 21 to July 22. He noticed a slight systematic run in the residuals, however, pointing to an eccentricity e = 0.999838. I have used his parabolic orbit as a basis for the differential correction:

\[
\begin{align*}
\omega &= 69° 48’ 20” 4 \\
\varpi &= 245 08 22.6 & 1932.0 \\
i &= 78 23 0.9 \\
q &= 1.647061 \text{ AU} \\
T &= 1932 \text{ Sept } 24.55930 \text{ UT}
\end{align*}
\]

Table I gives the residuals from the 82 measures between June 21, 1932, and Jan 20, 1933, that were kept after we discarded a few that showed abnormal deviations. The positions were re-reduced with improved values for the coordinates of the comparison stars.
The residuals were grouped in 11 normal places as shown in Table II. The equations of condition were computed in the form given by G. Stracke (1929). For that purpose the ecliptic elements were transformed into equatorial ones:

\[
\begin{align*}
\omega' &= 217^\circ 08' 56.7'' \\
\varpi' &= 251^\circ 28 58.3' \\
i' &= 69.35 55.5'
\end{align*}
\]

The corresponding final eclipsal elements become:

\[
\begin{align*}
\omega' &= 217^\circ 08' 55.4'' \\
\varpi' &= 251^\circ 28 48.8' \\
i' &= 69.36 05.6'
\end{align*}
\]

\[
e = 0.9999807
\]

\[
q = 1.647088 AU
\]

\[
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The corresponding final eclipsal elements become:

\[
\begin{align*}
\omega' &= 69.38' 08.9'' \\
\varpi' &= 245^\circ 23 24.6' \\
i' &= 78.23 10.6'
\end{align*}
\]

\[
e = 0.9999807
\]

\[
q = 1.647088 AU
\]

\[
T = 1932 Sept 24 55.931 ET
\]

The reciprocal semi-major axis turns out to be 12 units of the 6th decimal. The original and future values of 1/a can readily be found by using the planetary perturbations given by E. Everhart and N. Raghavan (1970) for this comet. They are computed by taking the perihelion as time of osculation. Our elements are referred to a date six days later. That small difference should be entirely negligible. The values of original and future 1/a come out +0.000319 and +0.000048 so that the future orbit becomes even more elliptical than the osculating one, although the corresponding period is many thousands of years.

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REFERENCES


