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ELEMENTS AND OPPOSITION EPHEMERIS OF MINOR PLANET
1922 ND. (Y.O.3)

Minor Planet 1922 ND was discovered by Van Biesbroeck at the Yerkes Observatory on November 14, 1922. It was observed in November and December, but could not be found in January. An ephemeris based on elements by Einarsson and Shane enabled Van Biesbroeck to photograph the asteroid on February 3 and 4, after which no further observations were secured.

Since more accurate elements are desirable for prediction at the next opposition, a second orbit has been computed. For this purpose Van Biesbroeck has kindly sent us the following accurate positions based on measures of the Yerkes plates by himself and Struve.

	Gr. M. T.	α (1922.0)	δ (1922.0)
I	(1) 1922 Nov. 20.6882	1 ^h 42 ^m 09 ^s .57	+9° 45' 41".3
	(2) Nov. 20.7042	1 42 09.10	9 45 36.0
II	(3) Dec. 15.6118	1 35 47.53	8 14 21.6
	(4) 1922 Dec. 20.6677	1 36 02.46	8 06 37.2
III	(5) 1923 Feb. 3.5426	1 58 29.61	9 11 24.1
	(6) 1923 Feb. 4.5694	1 59 21.39	9 15 03.7

Normal places corrected for aberration and parallax were found from these observations and are given below:

	Gr. M. T.	α (1922.0)	δ (1922.0)
I	1922 Nov. 20.6744	1 ^h 42 ^m 09 ^s .64	9° 45' 43".2
II	1922 Dec. 20.5521	1 36 02.52	8 06 36.7
III	1923 Feb. 4.5502	1 59 21.56	9 15 03.9

An accurate solution based on these normal places yielded the following elements:

ELEMENTS

Epoch	1922 Dec. 20.6521
M	213° 42' 18"
ω	339° 08' 59"
Ω	213° 10' 48"
i	10° 47' 08"
e	0.085971
μ	672".707
P	5.27450 years
$\log a$	0.481454

CONSTANTS FOR THE EQUATOR 1922.0

$$\begin{aligned} x &= r [9.997711] \sin (281^\circ 51' 49''.0 + v) \\ y &= r [9.986305] \sin (190 \quad 21 \quad 30.1 + v) \\ z &= r [9.427479] \sin (213 \quad 37 \quad 21.4 + v) \end{aligned}$$

The residuals are as follows:

	$\Delta \alpha \cos \delta$	$\Delta \delta$
(1)	-0".2	+0".4
(2)	+0.3	+0.3
(3)	-0.3	-2.2
(4)	+0.5	+2.5
(5)	+1.4	-1.4
(6)	-1.1	+1.4

EPHEMERIS FOR GREENWICH MEAN MIDNIGHT

Gr. M. T.	α (1924.0)	δ (1924.0)
1923 Dec. 19.5	7 ^h 25 ^m 40 ^s	+7° 10' 8"
1923 Dec. 27.5	7 19 45	6 58.4
1924 Jan. 4.5	7 13 09	6 54.3
Jan. 12.5	7 06 18	6 58.7
1924 Jan. 20.5	6 59 42	+7 10.8

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