LICK OBSERVATORY BULLETIN

NUMBER 350

ELEMENTS AND EPHEMERIS OF MINOR PLANET 1923 PE

The following observations were made the basis of the determination of a preliminary orbit of Minor Planet 1923 PE. The orbit represents a direct solution by Leuschner's method with a single differential correction to reduce residuals.

1923 Gr. M. T.	Planet's		Observed at
	α (1923.0)	δ (1923.0)	
Nov. 5.3440	1 ^h 17 ^m 59. ^s 9	+19° 47' 23"	Königstuhl
Nov. 10.6607	1 21 30.4	+16 54 14	Washington
Nov. 13.5843	1 23 56.5	+15 20 26	Washington

ELEMENTS

 $T=1923 \text{ Nov. } 29.9869 \text{ Gr. M. T.}$

$$\left. \begin{aligned} \omega &= 184^\circ 4'5 \\ \Omega &= 232 \quad 9.6 \\ i &= 11 \quad 19.8 \end{aligned} \right\} 1923.0$$

$$e = 0.3024$$

$$a = 1.8729$$

$$\mu = 1384''.3$$

 $\text{Period} = 2.56 \text{ years}$

O-C	I	III
$\cos \delta \Delta \alpha$	-2"	-1"
$\Delta \delta$	-22	-1

Because of the motion of the object, these residuals were considered satisfactory.

CONSTANTS FOR THE EQUATOR 1923.0

$$\begin{aligned} x &= r [9.99470] \sin (145^\circ 41'2 + v) \\ y &= r [9.98234] \sin (\quad 53 \quad 3.8 + v) \\ z &= r [9.50480] \sin (\quad 83 \quad 26.5 + v) \end{aligned}$$

The elements and an ephemeris based upon them were published in *Harvard College Observatory Bulletin*, Number 794.

A second orbit was based upon the following observations:

1923 Gr. M. T.	Planet's		Observed at
	α (1923.0)	δ (1923.0)	
Nov. 5.3440	1 ^h 17 ^m 59. ^s 9	+19° 47' 23"	Königstuhl
Nov. 21.8240	1 32 22.98	+11 12 10.5	Williams Bay
Dec. 10.6733	1 59 13.77	+4 18 34.3	Williams Bay

ELEMENTS

$$\left. \begin{aligned} T &= 1923 \text{ Nov. } 29.6504 \\ \omega &= 183^\circ 32' 14'' \\ \Omega &= 229 \quad 35 \quad 51 \\ i &= 15 \quad 42 \quad 42 \\ e &= 0.451017 \\ a &= 2.61196 \\ \mu &= 840''.538 \end{aligned} \right\} 1923.0$$

 $\text{Period} = 4.2213 \text{ years}$

$$\left. \begin{aligned} \omega &= 183^\circ 32' 13'' \\ \Omega &= 229 \quad 36 \quad 43 \\ i &= 15 \quad 42 \quad 42 \end{aligned} \right\} 1924.0$$

CONSTANTS FOR THE EQUATOR 1923.0

$$\begin{aligned} x &= r [9.990564] \sin (142^\circ 3' 17'' + v) \\ y &= r [9.989021] \sin (\quad 49 \quad 18 \quad 14 + v) \\ z &= r [9.481491] \sin (\quad 93 \quad 33 \quad 51 + v) \end{aligned}$$

CONSTANTS FOR THE EQUATOR 1924.0

$$\begin{aligned} x &= r [9.990559] \sin (142^\circ 4' 8'' + v) \\ y &= r [9.989020] \sin (\quad 49 \quad 19 \quad 3 + v) \\ z &= r [9.481537] \sin (\quad 93 \quad 35 \quad 2 + v) \end{aligned}$$

O-C	I	III
$\cos \delta \Delta \alpha$	-1"	+2"
$\Delta \delta$	0	+1

A comparison of the second orbit with other available observations reveals a discrepancy of about 1' in at least one observation. It appears, however, that the second orbit is consistent with additional observations made at the Yerkes Observatory on November 24 and 28.

The orbit of this object resembles that of (719) Albert (1911 MT) for which Dr. E. S. Haynes computed the elements (*Lick Observatory Bulletins* 216, 220, 222), except for a large discrepancy in the longitude of perihelion. The question of the identity of the two objects must be deferred until a somewhat definitive orbit of 1923 PE shall have been determined.

1923LicOB..11..1

This object was announced originally as of cometary appearance (*Harvard College Observatory Bulletin*, Number 793). Subsequent visual observation by Van Biesbroeck of the Yerkes Observatory with the 40-inch telescope indicates that the object should be classed as a minor planet.

EPHEMERIS FOR GREENWICH MEAN TIME					
1924	True α		True δ	log Δ	Br.
Jan. 8.5	2 ^h 54 ^m 20 ^s .7		+1° 01' 40"	9.8978	0.38
9.5	56 26.3		01 49		
10.5	2 58 32.4		02 17		
11.5	3 00 39.0		03 05		
12.5	02 46.1		04 11	9.9162	
13.5	04 53.7		05 35		
14.5	07 01.6		07 17		
15.5	09 10.0		09 15		
16.5	11 18.9		11 30	9.9344	0.31
17.5	13 28.1		14 00		
18.5	15 37.7		16 44		
19.5	17 47.7		19 42		
20.5	19 58.0		22 53	9.9524	
21.5	22 08.7		26 17		
22.5	24 19.7		29 53		
23.5	26 31.0		33 41		
24.5	28 42.7		37 39	9.9702	0.26
25.5	30 54.6		41 48		
26.5	33 06.8		46 06		
27.5	35 19.2		50 34		
28.5	37 31.9		55 11	9.9879	
29.5	39 44.8	1	59 57		
30.5	41 58.0	2	04 50		
31.5	3 44 11.5	+2	09 51		

1924	True α		True δ	log Δ	Br.
Feb. 1.5	3 ^h 46 ^m 25 ^s .2		+2° 14' 58"	0.0053	0.21
2.5	48 39.2		20 12		
3.5	50 53.4		25 32		
4.5	53 07.8		30 58		
5.5	55 22.5		36 29	0.0225	
6.5	57 37.4		42 04		
7.5	3 59 52.4		47 44		
8.5	4 02 07.6		53 27		
9.5	04 23.1	2	59 14	0.0395	0.17
10.5	06 38.8	3	05 04		
11.5	08 54.6		10 57		
12.5	11 10.6		16 52		
13.5	13 26.7		22 48	0.0563	
14.5	15 43.0		28 46		
15.5	17 59.3		34 45		
16.5	20 15.8		40 45		
17.5	4 22 32.3	+3	46 44	0.0727	0.14

Brightness November 21 = 1.00

Van Biesbroeck estimated the magnitude on November 28 to be 13.5.

SOPHIA H. LEVY,
C. S. YU.

BERKELEY ASTRONOMICAL DEPARTMENT,

January 8, 1924.

Issued January 23, 1924.