LICK OBSERVATORY BULLETIN

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ELEMENTS AND EPHEMERIS OF COMET *d* 1927 (STEARNS)

BY

H. THIELE

Comet *d* 1927 was discovered at Middletown by Stearns on March 10. Its estimated magnitude at discovery was ten. Maxwell describes it as having a faint nucleus but no tail. Maxwell also has reported striking similarities in appearance on April 5 to the neighboring nebulae NGC 5846 and NGC 5850. The chief point of similarity is the faint nucleus which would make observations taken with large telescopes more comparable than a combination of such observations with measures of the integrated appearance in smaller telescopes.

A preliminary parabolic orbit was based on the following observations:

1927, U.T.	$\alpha(1927.0)$	$\delta(1927.0)$	Observer
Mar. 10.420	15 ^h 16 ^m 06 ^s	-7°21'43"	Stearns, Middletown
Mar. 13.4121	15 15 18.5	-6 24 56	v. Biesbroeck, Yerkes
Mar. 15.3049	15 14 43.2	-5 48 03	v. Biesbroeck, Yerkes

A direct solution by Leuschner's method without differential correction gave:

ELEMENTS			
T	1927, Mar. 18.3102 U.T.		
ω	10° 16' 15"	} 1927.0	
Ω	214 33 55		
i	87 16 31		
$\log q$	0.566338		

RESIDUALS		
O-C	I	II
$\Delta\alpha$	+9".7	+3".0
$\Delta\delta$	-2.5	+0.3

An observation of March 14.0835 by Vinter Hansen and Möller of Copenhagen was represented as follows:

$$O-C, \Delta\alpha = +3".0, \Delta\delta = +3".3$$

As the first telegraphic position was approximate, no attempt was made to improve this orbit.

The elements and ephemeris were telegraphed to Harvard College Observatory and are published in *H. C. O. Announcement Card No. 24*, March 21, 1927.

By a single differential correction of the geocentric distance and the heliocentric velocities derived from this orbit for March 26.49442, a second orbit has been derived from the following observations:

1927, U.T.	$\alpha(1927.0)$	$\delta(1927.0)$	Observer
(1) Mar. 13.4121	15 ^h 15 ^m 18 ^s .5	-6°24'56"	v. Biesbroeck, Yerkes
(2) Mar. 26.49442	15 09 40.70	-1 55 16.7	Maxwell, Lick
(3) Apr. 5.48441	15 03 07.97	+1 48 14.9	Maxwell, Lick

ELEMENTS

T	1927, Mar. 20.02161 U.T.
ω	10° 36' 11".5
Ω	214 35 43.2
i	87 32 21.0
e	0.991805
$\log q$	0.565875

As these three observations were taken with large telescopes and as the motion was principally in declination it seemed advisable to derive the elliptic orbit which would represent the observations exactly, rather than to attempt the best parabolic orbit with residual in the first declination.

CONSTANTS FOR THE EQUATOR 1927.0

$$\begin{aligned} x &= r[9.915686] \sin(282^\circ 17' 58".4 + v) \\ y &= r[9.829585] \sin(241^\circ 03' 49".7 + v) \\ z &= r[9.968649] \sin(356^\circ 32' 54".7 + v) \end{aligned}$$

EPHEMERIS

1927, U.T.	$\alpha(1927.0)$			$\delta(1927.0)$			$\log p$	Br.
Apr. 13.0	14 ^h	57 ^m	8 ^s	+ 4°	41'0"		0.442	1.21
17.0	53	38		6	12.5		0.440	
21.0	49	57		7	42.9		0.440	
25.0	46	10		9	11.4		0.440	
29.0	42	17		10	37.2		0.441	
May 3.0	38	22		11	59.9		0.444	
7.0	34	28		13	18.6		0.447	1.17
11.0	30	36		14	33.1		0.451	
15.0	26	51		15	42.9		0.456	
19.0	23	14		16	47.8		0.461	
23.0	19	47		17	47.7		0.468	
27.0	16	33		18	42.5		0.475	
31.0	14	13	31	+19	32.3		0.482	0.98

The unit of brightness is that of March 13.

The outstanding features of the orbit are: the perpendicularity to the ecliptic, the large perihelion distance of 3.7, and the proximity of the perihelion to the ecliptic.

BERKELEY ASTRONOMICAL DEPARTMENT,
April 16, 1927.

PRELIMINARY ELEMENTS OF OBJECT COMAS SOLÀ (1927 AA)

BY

ROBERT S. RICHARDSON, P. A. McNALLY, S. J., and ELIZABETH E. STERNBERG

Object Comas Solà (1927 AA) was discovered by Comas Solà at Barcelona January 10th. The magnitude for January 22d was 12.8. The retrograde motion of the body was very rapid. The discoverer suggested that the object was probably an asteroid.

On receipt, late in March, of *Bulletin de l'Observatoire de Nice, No. 25*, containing the following three photographic positions by Comas Solà:

1927, U.T.	$\alpha(1927.0)$			$\delta(1927.0)$		
(1) Jan. 22.87569	8 ^h	00 ^m	06 ^s .6	-0°	55'	56"
(2) Jan. 23.91528	7	58	34.9	-1	08	54
(3) Jan. 24.97986	7	57	02.7	-1	21	52

an attempt was made to derive a general orbit by direct solution. By inspection of the critical determinant:

$$\alpha'^3 \tan \delta - \alpha'' (\tan \delta)' + \alpha' (\tan \delta)'',$$

it was readily recognized that the precision of its numerical value depended exclusively on the accuracy of the accelerations and that the solution would become more or less indeterminate if the positions were not accurate to the nearest second of arc. The general equation resulted in the improbable geocentric distance of about five astronomical units at the middle date. As the geocentric motion indicated a large eccentricity of the orbit, and as the indeterminateness is reduced by a conditioned solution, a parabola was derived as a first approximation with the following residuals:

O-C	I	II
$\Delta\alpha$	+21".2	+25".0
$\Delta\delta$	+ 7.0	+ 7.4

Without computing the corresponding elements differential correction leading to a general orbit was undertaken to remove these residuals, with the unfavorable result:

O-C	I	II
$\Delta\alpha$	+7".8	+6".8
$\Delta\delta$	+0.6	+0.4

As the parabolic residuals should readily have disappeared by differential correction, an inconsistency in the observations was suspected and no further attempt was made to improve the orbit, particularly since in the meantime a longer arc had become available. The inconsistency of the observations is established by the orbit given below. The elements resemble those based on the longer arc and in case of need would have well served for ephemeris purposes. It is interesting to note that it was possible to derive an approximate orbit under the existing unfavorable circumstances.

BERKELEY ASTRONOMICAL DEPARTMENT,
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