ON THE ORBIT OF COMET 1932 c (CARRASCO)

By PAUL HERGET

In a previous paper (*Astr. Jour.* No. 997) the elements of a first determination of the orbit of comet 1932*c* (Carrasco) were given. These resulted in a hyperbolic orbit (e = 1.002673). When more time was available it was decided to investigate the validity of this hyberbolic eccentricity. Definitive positions of the comparison stars of all except the photographic observations were derived, which, in general, reduced the magnitude of the residuals; and all the positions were referred to the Standard Equinox of 1950.0. The prediscovery positions were all rejected because they are only approximate, and more recently published positions were added to the previous list to form the basis of another general least squares solution for the equatorial rectangular coördinates and their velocities. This solution gave the following

Elements (1950.0)
Epoch 1932, June 2.0 U. T.

x −2.9772838	x′ −0.3920859
y −0.7957687	y′ −0.2238064
z +0.1710908	z′ −0.6772969
T 1931, Nov. 30.6743	i 58°04′58″
ω 110°18′49″	q 2.330831
Ω 18°05′08″	e 1.002637

A parabola, fitted through three normal places covering the longest possible arc, left a residual of +37″ in the unconditioned third declination. The relative positions of the comet, *Sun*, and planets indicated that *Jupiter* and *Uranus* had attracted the comet counter to the attraction of the *Sun*, which would result in an increased eccentricity. This indication was verified by computing the perturbations by Encke's method, taking into account the attractions of *Jupiter*, *Saturn*, *Uranus*, and *Neptune*. The closest approach of the comet to the *Earth* was 1.78 A. U. and even greater for *Mars* and *Venus*, so that these were safely neglected.

The mechanical integrations were computed for negative values of the time, as far back as January 29, 1929. The work might have been carried further, but this does not seem to be warranted, as the short interval of observation (64 days) and the small range of true anomaly (14°.75) do not determine the orbit with sufficient accuracy. At this date the comet was 9.5 A. U. from the *Sun* and 6 A. U. from *Jupiter*, so that the perturbations before then could not be large.

The rectified heliocentric elements for this epoch are

x +9.153526	x′ −.383988
y +2.453852	y′ −.064129
z −.484576	z′ +.244729
e 1.001547	

When these are referred to the barycenter of the solar system they become

x +9.150929	x′ −.383773
y +2.452617	y′ −.064414
z −.485087	z′ +.244603
e 1.001245	

Thus more than half of the hyberbolic excess has been removed from the eccentricity. The integration table shows that if the computations were continued, the change in each coördinate would be such as to produce a still lower eccentricity at any earlier epoch. Therefore we conclude that the orbit of this comet was so situated that, during this perihelion passage, its eccentricity was increased, due to the perturbations of the planets, and the first set of elements given above is the most probable set deduceable from the observations.

Cincinnati Observatory,
Cincinnati, Ohio,
January, 1934.

CONTENTS

Editor, Benjamin Boss, Albany, N. Y.; Associate Editors: Ernest W. Brown, F. R. Moulton and Ralph E. Wilson. Published by the Dudley Observatory, Albany, N. Y., U. S. A., to which all Communications should be addressed. Price $5.00 the Volume. Press of Thos. P. Nichols & Son Co., Lynn, Mass.
Closed, May 7, 1934.