

4. OBSERVATIONS OF COMETS AT THE CRIMEAN ASTROPHYSICAL OBSERVATORY

N. S. CHERNYKH

Crimean Astrophysical Observatory, Crimea, U.S.S.R.

Abstract. The cometary observing programme at the Crimean Astrophysical Observatory is described.

Regular observation of bright comets with the 40-cm astrograph of the Crimean Astrophysical Observatory was initiated by the author in the autumn of 1965. The successful development of this work was facilitated by the following two factors:

(1) The ephemeris service for new comets was organized in autumn 1965 at the department of minor planets and comets of the Institute for Theoretical Astronomy, providing

(a) information to observers about newly discovered comets;

(b) urgent reductions of measurements of cometary positions from photographic plates;

(c) calculation of cometary ephemerides and dissemination of these to observers.

(2) Two years earlier systematic large-scale observations of minor planets were initiated with the 40-cm double astrograph. By the time work began on comets all the necessary tools for handling the photographic plates were available: star atlases, catalogues, a measuring engine, and considerable experience that could also be applied to cometary observations.

The main aim of the observations is measuring positions and obtaining direct photographs for the study of cometary structure. The establishment of constant links with the Kiev Comet Centre has had a particular stimulating effect.

The Zeiss double astrograph, with focal length 160 cm and relative aperture 1/4, was used for the purpose. The scale of 129"/mm readily permits an accuracy of measurement of 0".3 to 0".5. The limiting magnitude of the instrument for stars is 18, and for diffuse objects like comets it is 16 or 17.

By means of a guide telescope (aperture 15 cm, magnification 225 \times) we can directly track a comet brighter than magnitude 5 or 6. When taking plates of faint comets, the instrument is guided by the Metcalf method. A micrometer with a scale division of 2" and offset motions enables the instrument to have an additional motion relative to the guide star of up to 30" per minute.

The first stage in the treatment of observations is the selection of reference stars and the measurement of the plates. This is done at the Observatory. Both the observer and the members of the ITA Crimean team engaged in observations of minor planets with the same instrument take part in this work. The coordinates of the reference stars are obtained from the Yale catalogues, the Smithsonian Astrophysical Observatory catalogue and sometimes from the AGK₂. Four reference stars are selected for each position of a comet. The plates are measured with an SIP-5 instrument, which

has glass scales and spiral micrometers. The accuracy of reading the scales is up to 0.2μ . The measurements are recorded on forms and sent to ITA, where the next stage takes place – the computation of spherical coordinates using a BESM-4 computer. The computations are made using a programme for the six plate-constant method with the simultaneous determination of dependences.

The interval between photographing a comet and the production of an exact position depends almost entirely on the time needed for the data to reach Leningrad by mail. In some special cases we telephone the data so it can be used for computing an orbit the same day. Urgent information about our observations is printed regularly on the *Comet Circulars*, published in Kiev by the cometary studies group.

From September 1965 to May 1970, 23 comets were observed with the double astrograph and a total of 350 positions obtained for them; see Table I. The constant use of the instrument for intensive observations of minor planets does not permit us to pay proper attention to the short-period comets. This is why the list of observed comets contains more new comets than returning periodic comets.

TABLE I
Cometary observations at the Crimean Astrophysical Observatory

Comet	Interval of observations	Number of positions
1965 VIII Ikeya-Seki	1965 Sept. 26–Dec. 3	24
1965 IX Alcock	1965 Sept. 28–Oct. 2	7
1966 III P/Van Biesbroeck	1966 June 15–July 20	4
1966 V Kilston	1966 Aug. 13–Nov. 6	40
1966 II Barbon	1966 Aug. 21–Oct. 21	21
1966 IV Ikeya-Everhart	1966 Sept. 13–Oct. 13	17
1967 II Rudnicki	1966 Oct. 19–Dec. 30	25
1967 III Wild	1967 March 5–11	5
1967 XIII P/Encke	1967 Aug. 2–16	17
1967 XI P/Reinmuth 2	1967 Sept. 30–Oct. 6	3
1968 II P/Schwassmann-Wachmann 2	1968 Feb. 1–21	3
1968 I Ikeya-Seki	1968 Feb. 4–May 27	49
1968 IV Tago-Honda-Yamamoto	1968 May 6–27	9
1968 V Whitaker-Thomas	1968 June 28–July 26	5
1968 VI Honda	1968 July 26–Sept. 15	16
1968 VII Bally-Clayton	1968 Aug. 27–Oct. 23	17
1969b Kohoutek	1969 Aug. 4–1970 Apr. 28	36
1969 VII Fujikawa	1969 Aug. 18–Sept. 14	10
1969 IV P/Churyumov-Gerasimenko	1969 Nov. 8–15	4
1969 VI P/Faye	1969 Nov. 14	2
1969 IX Tago-Sato-Kosaka	1970 Jan 30–March 3	8
1969 VIII P/Comas Solá	1970 Mar. 13	2
1969i Bennett	1970 Apr. 1–28	24

Series of photographs of comets Ikeya-Seki 1965 VIII, Ikeya-Seki 1968 I, Honda 1968 VI, Tago-Sato-Kosaka 1969 IX and Bennett 1969i were obtained in order to investigate the detailed structure of these comets.

Acknowledgments

The author would like to express his sincere thanks to the members of the department of minor planets and comets of ITA engaged in the ephemeris service and to the Crimean team of the Institute for their constant and effective assistance.