Cometography

A Catalog of Comets
Volume 4: 1933–1959

Cometography is a multi-volume catalog of every comet observed throughout history. It uses the most reliable orbits known to determine the distances from the Earth and Sun at the time a comet was discovered and last observed, as well as the largest and smallest angular distance to the Sun, most northerly and southerly declination, closest distance to the Earth, and other details to enable the reader to understand the physical appearance of each well-observed comet. Volume 4 provides a complete discussion of each comet seen from 1933 to 1959. It includes physical descriptions made throughout each comet's apparition. The comets are listed in chronological order, and each listing includes complete references to publications relating to the comet. This book is the most complete and comprehensive collection of comet data available, and provides amateur and professional astronomers, and historians of science, with a definitive reference on comets through the ages.

GARY KRONK has held a life-long passion for astronomy, and has been researching historical information on comets ever since sighting Comet Kohoutek in 1973/74. His work has been published in numerous magazines, and in two previous books – *Comets: A Descriptive Catalog* (1984) and *Meteor Showers: A Descriptive Catalog* (1988). Kronk holds positions in various astronomical societies, including Coordinator of the Comet Section of the Association of Lunar and Planetary Observers, and Consultant for the American Meteor Society. The International Astronomical Union (IAU) named minor planet 48300 Kronk, in honor of the extensive research Gary Kronk has done in cometography.

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VOLUME 4: 1933–1959

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Introduction

The period of 1933–59 brought forth several improvements in the study of comets, which led to more discoveries and longer periods of visibility. The greatest advances came in the area of telescopes and photography.

Comet discoveries

The USA continued its dominance in discovering comets during this period, with amateur and professional astronomers being given official credit for 60 discoveries. Following the USA were South Africa (24 discoveries), Slovakia (19 discoveries), Japan (9 discoveries), Russia (8 discoveries), and Finland (7 discoveries).

The most prolific comet discoverer of this period was A. Mrkos (Slovakia), who found 11 new comets. Next in line were M. Honda (Japan) and L. C. Peltier (USA), who each found 7 new comets, M. J. Bester (South Africa), who found 6, and R. Burnham Jr. (USA) and D. du Toit (South Africa), who each found 5. Honda and Peltier were both amateur astronomers, while Burnham discovered comets as both an amateur and a professional astronomer.

Another important point concerning comets discovered during this period was that many were found during surveys. The most successful were the National Geographic–Palomar Observatory Sky Survey, which found 11 comets during the period of 1949–55, and the Skalnaté Pleso binocular comet search program, which found 19 comets during the period of 1948–59.

Comet observations

Several very active comet observers mentioned in *Cometography* volume 3 continued to observe during most, if not all, of the period covered by this volume. The most notable include G. van Biesbroeck, H. M. Jeffers, and M. Beyer. The most notable observers to make their first observations during these years were H. L. Giclas, A. F. A. L. Jones, and E. Roemer.

The most common type of observation remained those that are visual. Visual observers usually provided estimates of the total magnitude, coma diameter, and tail length, all of which are important when studying a comet's development. Although a few photographic observers obtained exposures that were long enough to reveal these same parameters, most obtained short exposures that enabled a comet's position to be precisely measured. This is why the reader will notice photographic observers frequently providing fainter magnitudes, smaller coma diameters, and shorter tail lengths for the brighter comets than the visual observers.

Although the "Bobrovnikoff method" of estimating comet magnitudes was still being used, a new method was gaining in popularity. S. K.

Vsekhsvyatskij (Russia) and W. H. Steavenson (England) had independently come up with a new technique. Where the "Bobrovnikoff method" had the observer defocus both the comet and the star until they were about the same size, the Vsekhsvyatskij–Steavenson method had the observer memorize the brightness and diameter of the comet and then defocus stars until they matched the memorized parameters. In other words, the new method compared the focused comet with defocused stars. The method was popularized by J. B. Sidgwick in his 1955 book *Observational Astronomy for Amateurs* (Faber and Faber, London) and the technique became officially known as the "Sidgwick method."

As with previous volumes of *Cometography*, some observers provided magnitude estimates of the "nucleus." These magnitude estimates can vary widely from one observer to the next, because the true nucleus is not really being observed. Instead, the observers were seeing a compact condensation, with the compactness varying according to the telescope type, telescope size, and magnification being used.

The reflector was making a bigger impression during this period primarily because of the invention of the Schmidt camera. Bernhard Schmidt built the first Schmidt camera in 1930 and it was used at Hamburg Observatory (Germany). Schmidt's camera was a mirror system, similar to the usual reflector; however, it used a correcting lens and allowed very fast focal ratios. The result was a telescope that could take wide-field photographs, which would reveal faint objects during rather short exposures. Observatories around the world began installing Schmidt cameras, with some of the largest being the 122-cm Samuel Oschin Schmidt Telescope (Palomar Observatory, California, USA) in 1948, the 61-cm Curtis Schmidt Telescope (University of Michigan's Portage Lake Observatory, USA) in 1950, and the 80-cm Hamburg Schmidt Telescope (Hamburg Observatory) in 1954.

Of course, the Schmidt cameras would not have performed as well as they did without good photographic plates. The films of choice at many observatories became Kodak's 103aO and 103aE during the 1940s, which were sensitive to blue and red, respectively. When used in conjunction with the 122-cm Samuel Oschin Schmidt Telescope at Palomar Observatory, these photographic plates allowed astronomers to obtain images of stars down to about magnitude 19–20. Several comets were found using this telescope during the National Geographic–Palomar Observatory Sky Survey of the early 1950s. In fact, astronomers are still finding comet images on these old survey plates at the present time!

Astronomical periodicals

The most dominant astronomical periodicals during the period covered by this volume were the *Astronomische Nachrichten*, the *Monthly Notices of the Royal Astronomical Society*, and the *Astronomical Journal*. Each published articles and papers concerning comets in nearly every issue.

The dissemination of news concerning comet discoveries was mostly handled by the *Bureau Central Astronomique Circulaire*, which was published in Copenhagen (Denmark); however, two other publications played smaller roles. These were the *British Astronomical Association Circulars* (England) and the *Astronomicheskij Tsirkulyar* (Russia). Most of what the *British Astronomical Association Circulars* published came from the *Bureau Central Astronomique Circulaire*, however, much of what the *Astronomicheskij Tsirkulyar* published rarely made it to other, more accessible, publications.

The most interesting comets from 1933 to 1959

Although this period enjoyed several naked-eye comets, exceptionally bright comets did not appear until the 1940s. So, during the 1930s, observers had to be content with C/1936 K1 (Peltier), C/1937 N1 (Finsler), and C/1939 H1 (Jurlof–Achmarof–Hassel), all of which peaked at magnitude 3.0–3.5.

C/1940 R2 (Cunningham) raised the hopes of observers when early calculations revealed the comet might attain a maximum magnitude of –2.6; however, the comet's rate of brightening began slowing about a month before perihelion and it peaked at only magnitude 3.5, or about 6 magnitudes fainter than predicted!

Comet C/1941 B2 (de Kock–Paraskevopoulos) became the brightest comet since 1931. It was discovered about 2 weeks prior to passing closest to the sun and Earth. Several observers reported magnitudes around 2.5 during late January, while the maximum tail length attained 5–6°.

The dearth of spectacular comets finally ended in the late 1940s and during the next decade no less than four comets appeared that attained a maximum brightness of 1 or possibly brighter.

Comet C/1947 X1 (Southern Comet) was independently discovered by many people in the Southern Hemisphere during 1947 December 7 and 8. It was then in evening twilight, about 14° from the sun. Magnitude estimates ranged from –5 to +2, with most around 1, while the tail length eventually reached 25–30°.

During the total solar eclipse of 1948 November 1, people located in Africa saw a comet 2° from the sun with a tail pointing toward the horizon. Following the few minutes of totality, the comet remained hidden in the sun's glare for the next three days before it finally emerged in the morning sky. The magnitude estimates at this time ranged from –4 to 2 and after a few more days the tail attained a length of 15–20°.

The most spectacular comet discussed in this volume has to be C/1956 R1 (Arend–Roland). The comet was discovered 5 months prior to passing perihelion. Following the comet's passing just 5° from the sun on 1957 April 16, it passed closest to Earth on April 20. During the next couple of days, observers reported the magnitude was near 1, while the main tail extended at least 15°. Most interesting was the appearance of a sunward-pointing tail, or anti-tail, that was about 10–15° long. Photographs revealed an even more

impressive display with the main tail 25–30° long and the anti-tail about 15° long.

The last really bright naked-eye comet of the 1950s was C/1957 P1 (Mrkos). Appearing barely 3 months after the spectacular appearance of C/1956 R1 (Arend–Roland), there were numerous independent discoveries around the time the comet was passing perihelion. The maximum brightness was then generally estimated as between magnitude 1 and 2. Maximum visual tail lengths were around 2–5°, while photographs revealed a tail at least 16° long.

Periodic comet 7P/Pons–Winnecke deserves attention, not because of a bright naked-eye appearance, but because of an especially close approach to Earth of 0.11 AU on 1939 July 1. Most visual observers reported a maximum magnitude around 8 and a coma diameter of 3–4′ during late June and early July, using binoculars and telescopes; however, M. Beyer (Germany) used a wide-field telescope to determine a maximum magnitude of 7 and a maximum coma diameter of 10′, while F. de Roy (Belgium) saw the comet with the naked-eye at magnitude 6 and noted a coma 21–24′ across.

Cometography

The format of this volume of *Cometography* is essentially the same as with volume 3, except for one alteration. As mentioned in volume 3, a change was going to be made in terms of how the full moon dates would be handled for the annual comets. Although I had stated that a limit would be placed on these dates, I opted to just not calculate them at all for these comets because it really served no point. The comets affected included 29P/Schwassmann–Wachmann 1 and 39P/Oterma. As a couple of amateur and professional astronomers pointed out, these two comets generally remained faint so that observations were generally never made when the moon was in the sky.

Something that I have neglected to explain in previous volumes was how I chose the orbits to display for each comet. The selection was simple, as I tended to use either the most recent orbit or the one with the smallest residuals. I converted all of the orbits to equinox 2000.0 myself. In looking through B. G. Marsden's various editions of his *Catalogue of Cometary Orbits*, I noticed that, in a few cases, he adjusted the orbit calculated by another astronomer to a standard epoch. Since I was not interested in competing with Marsden's excellent work, I decided not to include the epoch dates in *Cometography*. Consequently, all of the orbits presented are as originally published, with the exception of the conversion to equinox 2000.0.

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