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JEAN LOUIS PONS
DISCOVERER OF COMETS

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The most successful discoverer of comets in the history of astronomy was Jean Louis Pons, who, in a quarter-century of active searching, found at least 37 comets. Born at Peyre (Hautes-Alpes) December 24, 1761, Pons began his astronomical career in 1789 when, at the age of 27, he became doorkeeper (conciierge) at the Observatory of Marseilles. The Directors of the Observatory gave him lessons in astronomy.

Pons found his first comet in July, 1801. From that year until 1827 it was a rare year that failed to register the discovery of at least one comet by Pons. Once he found five within eight months (1808 February - September), and later he found five more within twelve months (1826 August - 1827 August 2). Only two other astronomers have discovered five comets within so short a time: Francesco De Vico at Rome in 1846 and W. H. Brooks at Phelps, New York, in 1885 - 86.

Pons followed most capably in the footsteps of his countrymen Charles Messier and Pierre Méchain, the first astronomers to search especially for comets. Both Messier and Méchain had worked at Paris, where Messier made his first cometary discovery in January 1760. Méchain's first discovery was in June 1781. Incidental to his comet hunting Messier compiled his well-known catalogue of star clusters and nebulae (Leaflet No. 240); these were

the hazy objects that so often confused the comet observer. In 40 years of searching, Messier discovered at least 18 comets and acquired the nickname "the ferret of comets." Méchain in 20 years discovered 14 comets; but Pons, with 37 discoveries, surpassed both by a wide margin. It should be recognized that various writers credit each of these three astronomers with more discoveries than here noted. Evidently duplication of reports and an uncertain distinction between observations of already reported objects and discovery observations of new objects has led to confusion. The figures here quoted are based on the best available information. No "recoveries," in the sense of observations of expected objects, are involved. The first predicted returns of comets were those for (1) Halley's Comet beginning in 1758-59, (2) Encke's Comet in 1822, and (3) Biela's Comet in 1832.

By some quirk of fate, the first comet found by Pons, of which Messier was the co-discoverer, was also the last of Messier's discoveries. And the second comet found by Pons, of which Méchain and Olbers were co-discoverers, was the last of Méchain's discoveries. Of all the comets found during the following two and a half decades, Pons was a discoverer or co-discoverer of three-fourths.

Pons made both the telescopes and the lenses that he used in his cometary discoveries. Information about these instruments is not easy to find. Pons did state in one note that the field of his "Grand Chercheur" was nearly three degrees in diameter. This telescope was evidently of the "comet-seeker" type, with a wide field, short focal length, and low magnification.

Though Pons excelled in finding comets, his observing notes were often vague, and he seems to have taken little interest in making measures.

To demonstrate this point, let us quote the following account of observations of Comet 1818 I from a letter written by Professor von Zach who quoted Pons. The letter was published in *Zeitschrift für Astronomie* for 1818:

“On February 23, 1818, at 7 p.m., Herr Pons discovered a comet on the breast of the Whale, in south declination $15^{\circ} 15'$; he describes it thus: ‘This comet is almost as faint as that last mentioned; it is invisible to the naked eye and it bears no illumination of the field. It has neither a tail nor beard; its middle point is slightly brighter, the nebulosity little extended. On February 24, I only obtained a few glimpses owing to bad weather; I recognized, however, that it has a fairly rapid motion in right ascension, traveling 7^m daily toward the east, $40'$ toward the south. On February 26 it crossed the field of the equatorial about three minutes of time after a star of the 4th magnitude; this star is the most southerly of the four that form a quadrilateral on the breast of the Whale. On February 27, the comet was in the field of the telescope with a star under the foot of the Whale, some $50'$ to the east. About a fortnight ago I saw a faint nebulous spot a few degrees under the star B of the Whale, which bad weather prevented me from seeing again; I conjecture this was the comet’.”

How unhappy modern orbit computers would be with such inexact starting positions!

On another occasion Pons sketched a comet seen in the field with two nebulae, since identified as objects from Messier’s catalogue. He stated that the sketch was “reversed,” but it is not clear whether he meant reversed from the naked-eye orientation, or reversed from the telescopic view. It makes a difference of 4° in the position of the

comet whether north is at the top or the bottom of the drawing. The direction of the tail of the comet might be taken as an index of the orientation, but not everybody trusted Pons' drawing of the tail as correct. It is unfortunate that Pons' observations of position were not more accurate, for some comets were observed by him alone.

In recognition of his astronomical successes, Pons was promoted in 1813 to the post of Assistant Astronomer at the Marseilles Observatory. In 1819, Her Majesty, Maria Louisa of Bourbon, appointed him Director of the new observatory at the Royal Park La Marlia near the city of Lucca in Tuscany, where he discovered seven comets. His title was "Her Majesty's Astronomer Royal, Director of the Astroscopic Department of the Observatory, and Emeritus Professor of the Royal Lyceum." The queen also offered a cash prize from the royal purse for new discoveries. Pons found a comet immediately upon his arrival, and the observatory seemed off to a bright future. But the energy of the institution apparently was spent merely in its erection. Though the promise was great, accomplishment was small, and the observatory was abolished after about four years. Pons continued to observe with such means as he could obtain until in 1825 Leopold II invited him to become the Director of the Observatory of the Museum for Physics and Natural History at Florence, where he found seven more comets. He died in Florence on October 14, 1831.

Several of the comets discovered by Pons have proved to be of extraordinary interest. Among them are the famous comets now better known by the names of Crommelin, Encke, and Biela.

The comet of 1818 described by Pons' note above was one of these. Though too poorly ob-

served in 1818 to permit computation of a reliable orbit, the comet was rediscovered in 1873 by F. A. T. Winnecke at Strassburg and by J. E. Coggia at Marseilles. It was well observed in Europe for six days, but this was too short an interval to determine the period of revolution. Some of the elements were determined with sufficient accuracy, however, to arouse the suspicion that it was Pons' comet of 1818.

In 1928 a comet was discovered by A. F. I. Forbes at the Cape of Good Hope. An orbit computed for this object had elements resembling those of the comets of 1818 and 1873, and it was recognized that the various observations might refer to the same object. This was proved by A. C. D. Crommelin, who also identified observations at several other returns of the comet including one as early as 1457. The period is now known to be about 28 years, and the first *predicted* return was observed in 1956. Known for a while as Comet Pons-Coggia-Winnecke-Forbes, this comet was renamed Comet Crommelin in recognition of the enormous amount of skillful work done by that English astronomer on its orbit and history.

Also in 1818, on November 26, Pons discovered a comet that was followed until January 12, 1819. It was soon found that no parabolic orbit would represent the observations within their probable limits of error. J. F. Encke undertook a rigorous discussion of the observations and soon found that the orbit of the comet was an ellipse of quite moderate dimensions, the periodic time being only 1,208 days (Leaflet No. 236). He recognized the probable identity of this comet with those discovered in 1786 by Méchain, in 1795 by Caroline Herschel, and in 1805 by Pons. Various of these possible identities had also been suggested by

others on the basis of resemblance of the angular elements and perihelion distance of orbits assumed to be parabolic. But it was only by calculating backward the effects of planetary perturbations on the elliptic motion that the identifications could be made certain. Within a period of six weeks, by extraordinary effort, Encke carried back the planetary perturbations for 32 years. He not only established the identity of the comet of 1818 with those observed earlier, but also found that between 1786 and 1818 it had passed unnoticed through perihelion seven times. He then calculated a prediction for the next return, announcing that the comet would be at perihelion May 24, 1822, having been retarded about nine days by Jupiter.

The predicted position in 1822 was such that the comet could be observed only from the southern hemisphere. Early in June it was found near the prescribed place by Charles Rümker at Paramatta, New South Wales. The success of Encke was so complete that, following the suggestion of Bode and Olbers, his name is now associated with this comet. Encke's Comet was the second one, after Halley's Comet, to be recognized as periodic and successfully observed at a predicted return. In recognition of his triumph, the Gold Medal of the Royal Astronomical Society was awarded to Encke in 1824. Silver Medals were awarded at the same time to Pons and to Rümker for their observations of the comet.

Comet Encke has been observed at every return since 1819 except that of 1944 when it was missed although it could have been observed easily from the southern hemisphere for about a month following perihelion passage.

Though other astronomers called the comet "Encke's," Encke himself always referred to it as

the Comet of Pons, adding that Pons had earned this title by having made two independent discoveries of it. Pons made no claims in the matter. He already had so many comets he could spare one to Encke.

Another of the interesting comets found by Pons was that one which he observed on November 9, 1805. Independent discoveries were made by Bouvard at Paris on November 16 and Huth at Frankfurt on November 22. This comet was followed for about a month and elliptic elements were calculated by Bessel, Olbers, and Gauss. Identity with a comet discovered by Montaigne of Limoges on March 8, 1772, was suspected, but no one seems to have predicted the date of its return.

Accidental rediscovery came on February 27, 1826, by Wilhelm von Biela, an Austrian officer at Josephstadt in Bohemia. Independent discovery was made by Gambart at Marseilles on March 9. Observations during eight weeks were sufficient to establish that the orbit was an ellipse of moderate size and eccentricity, and that the comet was probably identical with those seen in 1772 and 1805. Several predictions were made for the return in 1832, and Olbers called attention to the fact that the separation between orbits of the earth and the comet was only about 20,000 miles at the descending node. Although the comet passed the critical point about a month ahead of the earth in 1832 many people were uneasy about the possible dire consequence to the earth in event of a collision.

Comet Biela was observed for more than four months in 1832, arriving at perihelion only 12 hours ahead of the predicted time—much better agreement of observation and prediction than could have been expected. The return of 1839 was not observed, owing to the unfavorable position of the

comet near the sun; nevertheless, it was recovered on November 28, 1845, right on schedule. But then an unexpected event occurred. On January 13, 1846, the comet was observed by M. F. Maury of the U. S. Naval Observatory to have split in two. This was confirmed on January 15 by various European observers. The two little comets, each with nucleus, coma, and tail, were followed all through February and until March 24, when the fainter one was no longer visible. By April 22 both had disappeared.

The two parts of Biela's Comet returned to perihelion in September 1852, one of them being considerably fainter than the other. In 1859 circumstances were unfavorable and the comet was missed. The next return in January, 1866, was anticipated with much interest, but neither comet appeared then or has ever been seen since.

On November 27, 1872, a splendid meteor shower occurred, the position of the radiant and the date of appearance corresponding to the orbit of the lost comet. Noteworthy recurrences of these "Andromedids" occurred in 1885, 1892, and 1899, but no significant number of these meteors has been seen in this country.

Pons discovered two other interesting periodic comets which have been observed recently: Comet Pons-Brooks (period 72 years, observed in 1954-55) and Comet Pons-Winnecke (period 6.2 years; 15th observed return in 1951, but missed in 1957).

Only parabolic orbits could be determined for 28 of Pons' comets so that returns were not to be expected. Lack of observations precluded any orbit determination for three. Several of Pons' periodic comets are still of great interest to modern astronomers. His record of 37 discoveries has never been approached.