

Biographical Encyclopedia of Astronomers

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Encke, Johann Franz

Born Hamburg, (Germany), 23 September 1791

Died Spandau, (Berlin, Germany), 26 August 1865

Johann Encke was the leading German astronomer of his generation, contributing substantially to celestial mechanics, observation of the Solar System, and the professional development of the German-speaking astronomical community. He was the son of Johann Michael Encke and Marie Misler

Educated at Göttingen University as a student of Carl Gauss, Encke, the eighth child of a Lutheran pastor of Hamburg, began his career as a professional astronomer thanks to Gauss's recommendation for a position as assistant at the Seeberg Observatory near Gotha. Having already published calculations of orbital elements of several of the newly discovered minor planets as a student, Encke distinguished himself in his examination of the orbit of the third known short-period comet (2P/Encke), discovered in November 1818 by Jean Pons and now called Encke's comet (though not by Encke himself in his many publications). Restricted to the inner Solar System, with a period of only 3 years, the orbit of Encke's comet changes constantly due to the relatively strong gravitational attraction of the nearby planets, particularly Jupiter. To solve this problem, Encke devised a convenient mathematical reduction of the series of differential equations representing its perturbed orbital elements

Applied to a wide variety of objects with relatively perturbed orbits, Encke's method failed completely, even when applied by a variety of investigators in ever more sophisticated ways to explain the complexities of the comet's motion. In the 20th century, it was shown that the orbit of this much-studied comet cannot be explained by Newtonian laws alone, even assuming (as Encke and others did) motion in a resistive medium; the loss of mass due to outgassing has to be taken into consideration

Having made significant improvements in the instrumentation of the Seeberg Observatory, Encke was offered membership in the Berlin Academy of Sciences in 1825 and the directorship of its observatory. Here he not only expanded the publication of its *Berliner Astronomisches Jahrbuch* (Berlin Astronomical Yearbook) and delivered well-attended lectures on astronomy at the request of the Ministry of Education, but also oversaw a substantial renovation of the observatory itself, including a new structure at a more appropriate suburban site and new, research-grade instruments, including a large Fraunhofer refractor. An ongoing project of the academy, now put under Encke's direction, was the preparation of accurate star charts. The new instruments and the new charts were both crucial in the short, successful search for Neptune. In 1838, he discovered a gap in Saturn's rings (between the A and F rings), later known as Encke's gap

Perhaps Encke's greatest triumph was the observation at the Berlin Observatory of the planet Neptune by his assistant Johann Galle the day after receiving its predicted position calculated

by Urbain Le Verrier, in contrast to more than 6 months of unsuccessful search at the Cambridge University Observatory and months of bureaucratic delay at the Paris Observatory. Instrumentation ordered and installed by Encke, accurate charts compiled under his direction, and observers he had trained all contributed to this signal accomplishment.

In 1844, Encke received recognition of appointment as professor of astronomy at the University of Berlin, the leading university in Prussia. Among his many influential students, Benjamin Gould, Franz Brünnow, author of a leading astronomical textbook, Galle, and Giovanni Schiaparelli may be mentioned. A congenial man, Encke advised Friedrich Struve on how to equip a new observatory in Russia as early as 1820 and acknowledged in 1852 that George Bond, of Harvard College Observatory, had preceded him in an application of perturbation theory. Encke retired as professor in 1863 but continued as director of the observatory until his death.

Michael Meo

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