Wolf, Maximilian Franz Joseph Cornelius

Born **Heidelberg, Germany, 21 June 1863**
Died **Heidelberg, Germany, 3 October 1932**

Max Wolf, considered a pioneer in astrophotography, observed many new nebulae both within the Milky Way and outside our Galaxy. He discovered more than 200 asteroids along with three comets that now bear his name.

Wolf was born to Franz Wolf and Elise Helwerth in Heidelberg, where Max spent most of his life. As Wolf became interested in astronomy, his father, a physician, constructed a private observatory for him, which he used from 1885 until 1896. In 1884, when only 21 years old, he discovered comet 14P/Wolf. This discovery was remarkable because the object was first thought to be an asteroid.

Wolf received his Ph.D. from Heidelberg in 1888 working under Leo Königsberger. He then studied with **Hugo Gyldén** in Stockholm from 1888 to 1890. Wolf became *Privatdozent* in 1890 and served as professor of astrophysics and astronomy at the University of Heidelberg from 1893 to 1932. He prompted the building of a new observatory near Heidelberg at Königstuhl, and became its director. Wolf is now also known as the "Father of Heidelberg astronomy."

Wolf developed several new photographical methods for observational astronomy, and was the first astronomer to use time-lapse photography, useful, for example, in detecting asteroids. Wolf brought the "dry plate" technique to astronomy in 1880, and introduced the blink comparator in 1900 in conjunction with the Carl Zeiss optics company in Jena. Using a blink comparator, a microscope that optically superimposes two photographic plates onto the same viewing region by blinking between them so quickly that the two plates look like only one, an astronomer can compare two plates and easily find differences between them. The blink comparator turned out to be a valuable useful astronomical tool, used in the discovery of Pluto by **Clyde Tombaugh** in 1930. While Wolf himself did not contribute to this discovery, he was able to locate the new planet on his older plates.

Wolf discovered more than 200 asteroids using various photographic techniques. The first, discovered in 1891 during a search for the minor planets (10) Hygiea and (30) Urania, was (323) Brucia, named by Wolf in honor of Catherine Wolfe Bruce, who had contributed $10,000 for one of his telescopes. Already by 1892, while overcoming difficulties with the optics, Wolf had found 17 new asteroids. In 1906, Wolf discovered (588) Achilles, the first of the so-called Trojan minor planets, which orbit the Sun in low-eccentricity stable orbits with semi-major axes very close to that of Jupiter. These objects manifest the triangular three-body system analyzed and predicted theoretically by **Joseph Lagrange** in the 18th century.

Wolf was the first to observe comet 1P/Halley when it approached Earth in 1909. Halley's Comet produced much excitement the following year because it was so close to the Earth that some expected the earth would pass through its tail.

Wolf used wide-field photography to study the Milky Way. He discovered about 5,000 nebulae and galaxies and also found new stars, such as Wolf 359, an extremely faint star, the third closest to the Earth after Alpha Centauri 3 and Barnard's Star. Though Wolf 359 is much too dim to be visible to the naked eye, Wolf was able to discover it with photographic techniques.

Wolf used statistical star counts to prove the existence of dark nebulae. Independently of American astronomer **Edward Barnard**, Wolf discovered that the dark "voids" in the Milky Way are in fact nebulae obscured by vast quantities of dust. In studying their spectral characteristics and distribution, he was among the first astronomers to show that spiral nebulae have absorption spectra typical of stars and thus differ from gaseous nebulae like planetary nebulae.

Around 1905, Wolf suggested building an observatory in the Southern Hemisphere, though it was not until 1930 that such plans were realized by Berlin and Breslau astronomers in Windhoek (Namibia). Observations there were stopped by World War II. In the 1950s, the European Southern Observatory (ESO) tested two sites in South Africa and South America, with a new observatory opening eventually in 1969 in northern Chile.

Wolf was a codeveloper of the stereo comparator together with Carl Pulfrich from the Zeiss company. The stereo comparator consists of a pair of microscopes arranged so that one can see simultaneously two photographic plates of the same region taken at different times. Wolf seems to have experimented with such techniques as early as 1892, but without success. When Pulfrich approached him to adapt the technique from geodesy to astronomy, Wolf was delighted. A steady exchange of letters followed. Wolf and Pulfrich then worked together to analyze the rapidly growing accumulation of photographic plates. Tragically, Pulfrich lost one eye in 1906, preventing him from using the stereographic tool from then on.

Wolf also provided in 1912 suggestions for the idea of the modern planetarium, while advising on the new Deutsches Museum in Munich, Germany. Wolf was a gifted teacher who attracted students from all over the world. He was also highly esteemed by amateur astronomers, helping them out with pictures and slides. In 1930, Wolf became a Bruce Medalist, awarded each year by the directors of six observatories—three in the United States and three abroad. He received the Gold Medal of the Royal Astronomical Society in 1914.

Wolf was survived by his wife Gisela Wolf (born Merx), whom he married in 1897. She had assisted him often with his work at the blink comparator. In addition to the three comets, Wolf has a lunar crater, a star (Wolf 359), the minor planet (827) Wolfiana, and an irregular galaxy (Wolf–Lundmark–Melotte) named in his honor.

Oliver Knill

Selected References

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Keywords

Asteroids; Astrophotography; Blink comparator; Comets; Heidelberg Observatory