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Maria Winckelmann Kirch

Maria Kirch (1670-1720) was a highly regarded German astronomer, although her opportunities were limited because of her gender. She discovered a comet in 1702, becoming the first woman to make such a finding.

Kirch was born Maria Margarethe Winckelmann on February 25, 1670, in Panitsch, Germany. Her father, a Lutheran minister, educated her at home until his death. At that point, an uncle continued her education. From an early age, Maria showed an interest in astronomy. She studied with Christopher Arnold, the "astronomical peasant." This self-taught man who also worked as a farmer, lived in Sommerfield, a German town near Leipzig. Arnold was known for his observations of the great comet of 1683 and the transit of Mercury of 1690. Maria showed promise in her studies and became Arnold's unofficial apprentice. Later, she worked as his assistant and lived with the Arnold family.

Married Gottfried Kirch

Through Arnold, Maria met Gottfried Kirch, one of the most important astronomers in Germany. She and Kirch fell in love and decided to marry. Her uncle initially disapproved of the union, preferring that she choose a Lutheran minister. He eventually relented and the two were married in 1692. Gottfried Kirch was 30 years her elder and had been married previously. Together they had one son and three daughters.

Gottfried Kirch had studied with Hevelius in Danzig, Germany. He was a calendar maker as well as an astronomer, who earned his living by making observations for calendars and ephemeredes (tables of the positions and motions of the stars, planets, and other heavenly bodies). Gottfried Kirch was one of the first scientists to use the telescope in systematic observation, discovering several comets. He trained his sisters in astronomy, and they used their knowledge to produce calendars and almanacs. Gottfried Kirch gave his new wife further education in astronomy, as he had his sister before him and many other students as well. At the time, women were not allowed to study at universities, but in astronomy that did not really matter. Much work and discourse was conducted outside of the university. Gottfried Kirch himself had not studied at a university.

The two scientists worked together as a team, though Maria Kirch was primarily regarded as her husband's assistant and not his equal. To produce the calendars and ephemeredes, they had to make observations and perform calculations. Sometimes they would divide the labor by viewing different parts of the sky. For example, he would observe the north, while she

took the south. Other times, they would take turns on different nights, so that one would watch while the other slept. Kirch preferred to begin her observations at about 9 p.m. Beginning in 1697, the couple began recording information about weather as well. Their children became involved, and the entire family made weather observations daily through 1774.

The data collected by the Kirch family was used to make calendars and almanacs. It was also useful for navigation. The Royal Academy of Sciences in Berlin sold their calendars, which constructed a time frame for planting crops. Such information as phases of the moon, the setting of the sun, eclipses, and the position of the sun and other planets was included.

In 1700, Gottfried Kirch was named the royal astronomer by Frederick III, elector of Brandenburg. The family moved to Berlin where a new observatory was being built. It took 11 years to complete this project. In the meantime, Kirch and her husband conducted observations from their home. They were also able to use the observatory owned by a family friend and amateur astronomer, Baron von Krosigk. Despite the success of their calendar, the Kirch family was not financially secure. However, Gottfried Kirch refused to accept a stipend from Frederick III because it would take funds away from students who needed them more.

Discovered a New Comet

While making her nightly observations, Kirch found a previously unknown comet on April 21, 1702. She was the first woman to do so. However, she received no recognition for this finding. The comet was not named for her, though most newly discovered comets were named for their first observers. When news of the comet was first published, Gottfried Kirch took credit for the discovery. He might have done so out of fear of ridicule if people had learned the truth. For her part, Kirch might not have staked her claim in her own name because she only published in German, while the language of preference in the scholarly German publication, *Acta eruditorum,* was Latin. She may have accepted the fact that her husband was the master astronomer and been content to remain in his shadow. Eight years later, Gottfried Kirch admitted the truth of the matter.

Kirch continued to do important work in astronomy, under her own name and with the proper recognition. In 1707, she discovered an aurora borealis, or northern polar lights. Two years later, she published, under her own name, the pamphlet *Von der Conjunction der Sonne des Saturni und der Venus,* about the forthcoming conjunction of Jupiter and Saturn. The pamphlet included both astrological and astronomical observations. Some scholars have claimed that it was more astrological than astronomical.

At this time, astronomy and astrology were closely linked. While astronomy is the science of the stars and heavenly bodies, astrology focuses on how the stars and planets influence humans by their relative positions and movements. Astrological calculations were common because the idea of planets conjoining was very interesting to people of the time. Many astronomers, including Kirch, tried to distance themselves from astrologers, though she did provide the needed observations. There might have been some interest on her part, but as Alphonse des Vignoles, president of the Berlin Academy, said in her eulogy (quoted by Londa Schiebinger in *The Mind Has No Sex?*) "Madame Kirch prepared horoscopes at the request of her friends, but always against her will and in order not to be unkind to her patrons."

On Her Own

After an illness, Gottfried Kirch died on July 25, 1710 in Berlin. Kirch tried to take her husband's place as astronomer and calendar maker at the Royal Academy of Sciences. She claimed that she had been doing much of this work while he was sick. At the time, it was not unusual for widowed women to take over their husband's business. Kirch tried to apply this tradition to her own situation. However, the executive council of the Academy refused to let her continue. Indeed, they never even considered the possibility before Kirch began petitioning them. They did not want to set a dangerous precedent.

The Academy's president, Gottfried von Leibniz, was the only one who supported her efforts. He had always encouraged her work. In 1709, he had arranged for her to be presented at the royal court in Prussia. She made a strong impression as she explained sunspots. However, the influence of Leibniz was not enough to change their minds, though Kirch was left without an income. They gave her a medal, but no job. Kirch fought the council for a year, even going to the king with her petition, but she was denied. The experience left her feeling bitter. Kirch believed that she was denied the position because of her gender. This claim may have had merit. Johann Heinrich Hoffmann, a man with little experience, was appointed to the position. He soon fell behind in his work, and did not make the necessary observations. It was suggested at one point that Kirch become his assistant. Though this did not happen, Hoffmann might have used her help unofficially, while publicly dismissing her.

Became Master Astronomer

In 1712, Kirch accepted patronage from a family friend named von Krosigk and began working in his observatory. Training her son and daughters to assist her, Kirch continued the family's astronomical calling. She was the master astronomer there, and had two students to help her. They continued to produce calendars and almanacs, as well as make observations. Kirch published pamphlets on her own as well. In 1711, she published the well-received *Die Vorbereitung zug grossen Opposition,* in which she predicted a new comet. A year or two later, she came out with *The Position of Jupiter and Saturn,* which again was a mix of astronomical calculations and the more popular astrological observations.

The family's financial situation took another blow when von Krosigk died in 1714. Though the Kirchs continued to use his observatory, it was not the perfect situation. Kirch moved to Danzig to assist a mathematics professor. She lasted only a brief time before returning. The family also worked in other observatories. In 1716, Kirch and her family got an offer to work for the Russian czar, Peter the Great, but preferred to stay in Berlin. She continued to calculate calendars for places such as Nuremberg, Dresden, Breslau, and Hungary.

That same year, Kirch's son Christfried became the director of the Royal Academy of Sciences' Berlin Observatory, after the death of Hoffmann. Kirch and her daughter, Christine, became his assistants. Within a year, the members of the Academy complained that she took a prominent role during the visits of strangers. She asked that she make herself more like an assistant and stay in the background. Kirch refused to do this and was forced to retire. She had to relinquish her home, on the grounds of the observatory.

Kirch continued to work out of the public eye. Eventually, conditions forced her to give up all astronomical work. She died in Berlin on December 29, 1720. After her death, her

daughters continued much of her work. All three assisted their brother in his position as master astronomer. Despite her struggles, Kirch accomplished much in her lifetime.

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