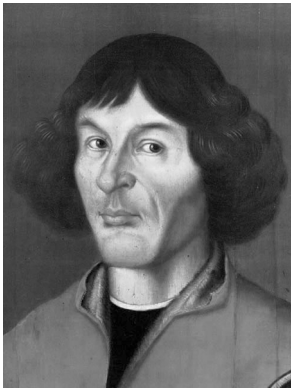




26.1 Nicolaus Copernicus

Nicolaus Copernicus was a church official, mathematician, and influential astronomer. His revolutionary theory of a heliocentric (sun-centered) universe became the foundation of modern-day astronomy.

Wealth, education, and religion



Nicolaus Copernicus was born on February 19, 1473 in Torun, Poland. Copernicus' father was a successful copper merchant. His mother also came from wealth. Being from a privileged family, young Copernicus had the luxury of learning about art, literature, and science.

When Copernicus was only 10 years old, his father died. Copernicus went to live his uncle, Lucas Watzenrode, a prominent Catholic Church official who became bishop of Varmia (now part of modern-day Poland) in 1489. The bishop was generous with his money and provided Copernicus with an education from the best universities.

From church official to astronomer

Copernicus lived during the height of the Renaissance period when men from a higher social class were expected to receive well-rounded educations. In 1491, Copernicus attended the University of Krakow where he studied mathematics and astronomy. After four years of study, his uncle appointed Copernicus a church administrator. Copernicus used his church wages to help pay for additional education.

In January 1497, Copernicus left for Italy to study medicine and law at the University of Bologna. Copernicus' passion for astronomy grew under the influence of his mathematics professor, Domenico Maria de Novara. Copernicus lived in his professor's home where they spent hours discussing astronomy.

In 1500, Copernicus lectured on astronomy in Rome. A year later, he studied medicine at the University of Padua. In 1503, Copernicus received a doctorate in canon (church) law from the University of Ferrara.

Observations with his bare eyes

After his studies in Italy, Copernicus returned to Poland to live in his uncle's palace. He resumed his

church duties, practiced medicine, and studied astronomy. Copernicus examined the sky from a palace tower. He made his observations without any equipment. In the late 1500s, the astronomer Galileo used a telescope and confirmed Copernicus' ideas.

A heliocentric universe

In the 1500s, most astronomers believed that Earth was motionless and the center of the universe. They also thought that all celestial bodies moved around Earth in complicated patterns. The Greek astronomer Ptolemy proposed this geocentric theory more than 1000 years earlier.

However, Copernicus believed that the universe was heliocentric (sun-centered), with all of the planets revolving around the sun. He explained that Earth rotates daily on its axis and revolves yearly around the sun. He also suggested that Earth wobbles like a top as it rotates.

Copernicus' theory led to a new ordering of the planets. In addition, it explained why the planets farther from the sun sometimes appear to move backward (retrograde motion), while the planets closest to the sun always seem to move in one direction. This retrograde motion is due to Earth moving faster around the sun than the planets farther away.

Copernicus was reluctant to publish his theory and spent years rechecking his data. Between 1507 and 1515, Copernicus circulated his heliocentric principles to only a few astronomers. A young German mathematics professor, George Rheticus, was fascinated with Copernicus' theory. The professor encouraged Copernicus to publish his ideas. Finally, Copernicus published *The Revolutions of the Heavenly Orbs* near his death in 1543.

Years later, several astronomers (including Galileo) embraced Copernicus' sun-centered theory. However, they suffered much persecution by the church for believing such ideas. At the time, church law held great influence over science and dictated a geocentric universe. It wasn't until the eighteenth century that Copernicus' heliocentric principles were completely accepted.



Reading reflection

1. How did Copernicus' privileged background help him become knowledgeable in so many areas of study?
2. Which people influenced Copernicus in his work as a church official and an astronomer?
3. How did Copernicus make his observations of the sky?
4. What did astronomers believe of the universe prior to the sixteenth century?
5. Describe Copernicus' revolutionary heliocentric theory of the universe.
6. Why did so many astronomers face persecution by the church for their beliefs in a heliocentric universe?
7. **Research:** Using the library or Internet, find out which organizations developed the Copernicus Satellite (OAO-3) and why it was used.