

Manuscript fragment from *Propriétés des choses*

Paris, France, c. 1400 P-270

The armillary sphere, known from Greek antiquity, is sometimes credited as having been invented by Eratosthenes, a librarian from Alexandria perhaps known best for his estimate of the Earth's size in the 3rd century B.C. This device was also known in ancient China, though most likely from a few centuries later. It was used as a teaching device in Greece and as an observing instrument elsewhere; this was its function in China and also in the medieval Islamic world beginning in the eighth century. It came to Europe around 1000 as a result of efforts by the future Pope Sylvester II. It symbolizes the Earth-centered Universe, and it still serves as a very useful tool for understanding the heavenly motions that are visible with the naked eye.

English Franciscan priest Bartholomew (c. 1203–1274), who was connected to the universities in Paris and Oxford, authored an important

work *On the Properties of Things*, which addressed theology, physiology, medicine, physics, and more in 19 books. It served as the first medieval encyclopedia and as a model of future encyclopedic efforts. Its enormous popularity can be recognized by its appearance in numerous manuscripts and translations throughout the medieval era; it also appeared in more than a dozen printed versions prior to 1500, including ones in English, French, and Spanish.

This manuscript fragment of Bartholomew's encyclopedia features one of the earliest known illustrations of an armillary sphere, the iconic model of the medieval geocentric Universe. Along with the astrolabe, the armillary sphere was frequently included in portraits until the time of the Renaissance to convey wisdom, knowledge, and learning.



J. Rudolph

Refracting Telescope

Johann Gottlob Rudolph (1721–1776) was a director of the Mathematisch-Physikalischer Salon in Dresden. There he also made several handsome telescopes, two of which are currently in the Salon's renowned collections, including one that is a stunning reflecting telescope covered in Meissen porcelain.

The illustrated example includes a main tube with four draws and an objective mount with lens and protective threaded-metal cover with slider.

Part II Galileo and Early Telescopes

Dresden, Germany, 1750–1760 M-446

The maker's signature, "J.G. Rudolph fecit Dresden", along with its focal length ("5" in local units) is engraved on the well-polished objective lens, but the eyepiece does not survive.

The main tube and four draw ferrules are covered with gold-tooled light tan vellum, the circumference of which is decorated with stylized geometric and floral motifs. The draw tubes are covered with blue paste paper that offers a striking contrast with the tan vellum.



Grand Orrery

Thomas Heath (fl. 1714–1765) owned one of the many shops offering scientific instruments in 18th-century London. He began making instruments c. 1720 and established a family firm that sold devices made by other craftsmen as well, including sundials and surveying tools. Some of the makers who worked for Heath, such as George Adams, later established their own workshops and reputations.

By the early 18th century, the Copernican (Sun-centered) model of the Universe was widely accepted. Astronomers trained their telescopes on the Moon and the planets, looking for evidence that these other worlds might be similar to Earth. Models of the Universe became very popular and took many forms.

This large planetarium is also known as a grand orrery. It shows the planets known from antiquity

London, England, original c. 1740,
last expanded c. 1797 DPW-1

but displayed in the new Copernican arrangement. Although it does not indicate their relative distances, an elaborate clockwork mechanism moves the planets at their correct relative speeds.

When built around 1740, this orrery included a calendar, which had been replaced in Catholic countries in 1582 but was still used in England until 1750. When the calendar ring had to be altered. After William Herschel discovered Uranus in 1781, a skilled artisan added another outer ring to this orrery to show the new planet, labeled here as “Georgium Sidus” or King George’s star. At that time, or perhaps around 1797, the last of the six moons of Uranus featured here were added as well. Of these six, Herschel discovered two and imagined that he saw the other four.



