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CLAUDIUS PTOLEMY

BIOGRAPHY

BIG HISTORY PROJECT



CLAUDIUS PTOLEMY

AN EARTH-CENTERED
VIEW OF THE UNIVERSE

By Cynthia Stokes Brown

Born
85 CE
Hermiou, Egypt

Died
165 CE
Alexandria, Egypt

The Earth was the center of the Universe according to Claudius Ptolemy, whose view of the cosmos persisted for 1400 years until it was overturned — with controversy — by findings from Copernicus, Galileo, and Newton.

An astronomer in ancient times

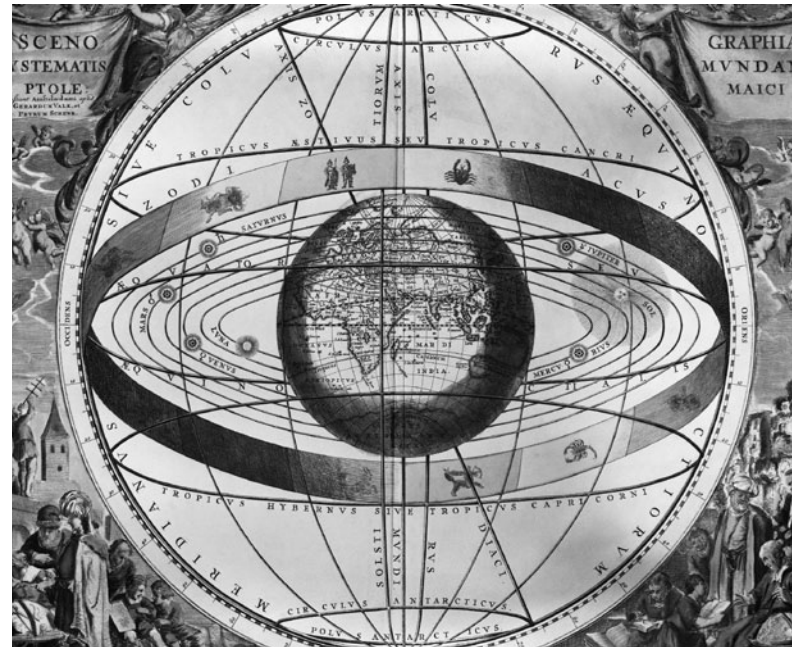
Claudius Ptolemy (about 85–165 CE) lived in Alexandria, Egypt, a city established by Alexander the Great some 400 years before Ptolemy's birth. Under its Greek rulers, Alexandria cultivated a famous library that attracted many scholars from Greece, and its school for astronomers received generous patronage. After the Romans conquered Egypt in 30 BCE (when Octavian defeated Cleopatra), Alexandria became the second-largest city in the Roman Empire and a major source of Rome's grain, but less funding was provided for scientific study of the stars. Ptolemy was the only great astronomer of Roman Alexandria.

Ptolemy was also a mathematician, geographer, and astrologer. Befitting his diverse intellectual pursuits, he had a motley cultural makeup: he lived in Egypt, wrote in Greek, and bore a Roman first name, Claudius, indicating he was a Roman citizen — probably a gift from the Roman emperor to one of Ptolemy's ancestors.

A geocentric view

Ptolemy synthesized Greek knowledge of the known Universe. His work enabled astronomers to make accurate predictions of planetary positions and solar and lunar eclipses, promoting acceptance of his view of the cosmos in the Byzantine and Islamic worlds and throughout Europe for more than 1400 years.

Ptolemy accepted Aristotle's idea that the Sun and the planets revolve around a spherical Earth, a geocentric view. Ptolemy developed this idea through observation and in mathematical detail. In doing so, he rejected the hypothesis of Aristarchus of Samos, who came to Alexandria about 350 years before Ptolemy was born. Aristarchus had made the claim that the Earth revolves around the Sun, but he couldn't produce any evidence to back it up.



Map of the Universe according to Ptolemy

Based on observations he made with his naked eye, Ptolemy saw the Universe as a set of nested, transparent spheres, with Earth in the center. He posited that the Moon, Mercury, Venus, and the Sun all revolved around Earth. Beyond the Sun, he thought, sat Mars, Jupiter and Saturn, the only other planets known at the time (as they were visible to the naked eye). Beyond Saturn lay a final sphere — with all the stars fixed to it — that revolved around the other spheres.

This idea of the Universe did not fit exactly with all of Ptolemy's observations. He was aware that the size, motion, and brightness of the planets varied. So he incorporated Hipparchus's notion of epicycles, put forth a few centuries earlier, to work out his calculations. Epicycles were small circular orbits around imaginary centers on which the planets were said to move while making a revolution around the Earth. By using Ptolemy's tables, astronomers could accurately predict eclipses and the positions of planets. Because real visible events in the sky seemed to confirm the truth of Ptol-

emy's views, his ideas were accepted for centuries until the Polish astronomer, Copernicus, proposed in 1543 that the Sun, rather than the Earth, belonged in the center.

After the Roman Empire dissolved, Muslim Arabs conquered Egypt in 641 CE. Muslim scholars mostly accepted Ptolemy's astronomy. They referred to him as Batlaymus and called his book on astronomy *al-Magisti*, or "The Greatest." Islamic astronomers corrected some of Ptolemy's errors and made other advances, but they did not make the leap to a heliocentric (Sun-centered) universe.

Ptolemy's book was translated into Latin in the 12th century and known as *The Almagest*, from the Arabic name. This enabled his teachings to be spread throughout Western Europe.

We know few details of Ptolemy's life. But he left one personal poem, inserted right after the table of contents in *The Almagest*:

Well do I know that I am mortal, a creature of one day.
But if my mind follows the wandering path of stars
Then my feet no longer rest on earth, but standing by
Zeus himself, I take my fill of ambrosia, the food of the gods.

Image credits

Portrait of Ptolemy by Andre Thevet

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Map of the Universe according to Ptolemy, from a 17th century

Dutch atlas by Gerard Valck

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