Museum of the History of Science

Science and Islam

Introduction to Astronomy in Islam

Science and Learning in Medieval Islam

- Early Islamic teaching encouraged the **pursuit of all knowledge** that helped to improve people's lives
- Muslims **translated important works** from ancient Greece and Egypt - **Arabic** became the international language of scholarship
- **Huge libraries** were established in big cities like Baghdad, Cairo and Damascus

Astronomy

Astronomy was important to Muslims for **practical reasons:**

- Observations of the sun and moon were used to **determine prayer times and an accurate calendar**
- Astronomical observations were important for purposes of **navigation**
- Astronomical observations were import for the practice of **astrology**

Photograph: The Whipple Museum, Cambridge

Raj Jai Singh II's observatory (C18th) in Jaipur, India

Large **observatories** were established and **new instruments** such as the **astrolabe** were developed

Ottoman observatory 1781

The quadrant

The quadrant is an observational instrument used to measure the angle or altitude of a celestial object.

Horary quadrants also had markings on one side that would enable the user to calculate the time of day.

Armillary sphere

The armillary sphere was a model used to demonstrate the motions of the celestial sphere (stars) and the annual path of the sun (the ecliptic).

It could also be used to demonstrate the seasons, the path of the sun in the sky for any day of the year, and to make other astronomical calculations.

Early Islamic models were based on a model of the Universe established by Ptolemy in which the Earth was placed at the centre.

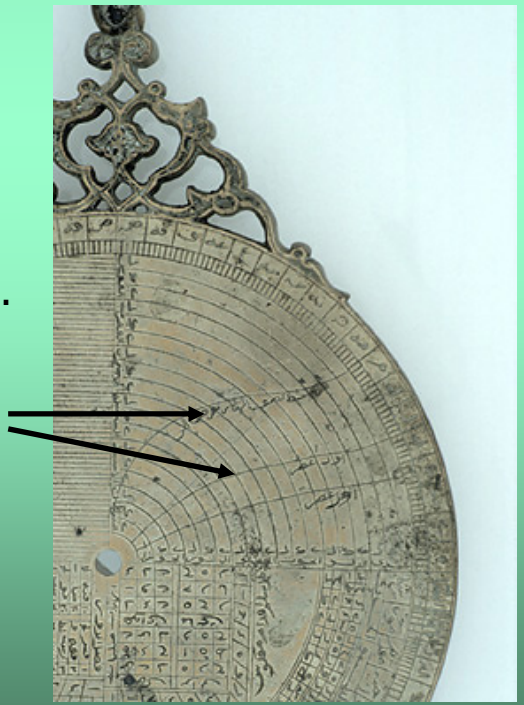
The astrolabe

Astrolabe, by Muhammad Muqim, Lahore, c. 1650

The astrolabe was a type of astronomical calculator and were developed to an extraordinary level of sophistication by early Muslim scholars.

They were often used for religious purposes to calculate prayer times and religious festivals.

This instrument has prayer lines marked on the back to indicate prayer times.



Ptolemy and Copernicus:
Two Competing Theories

Ptolemy's Universe

Harmonia Macrocosmica, by Andreas Cellarius, printed in 1661 – Museum of the History of Science

The ancient Greeks came up with different **theories** about the Universe.

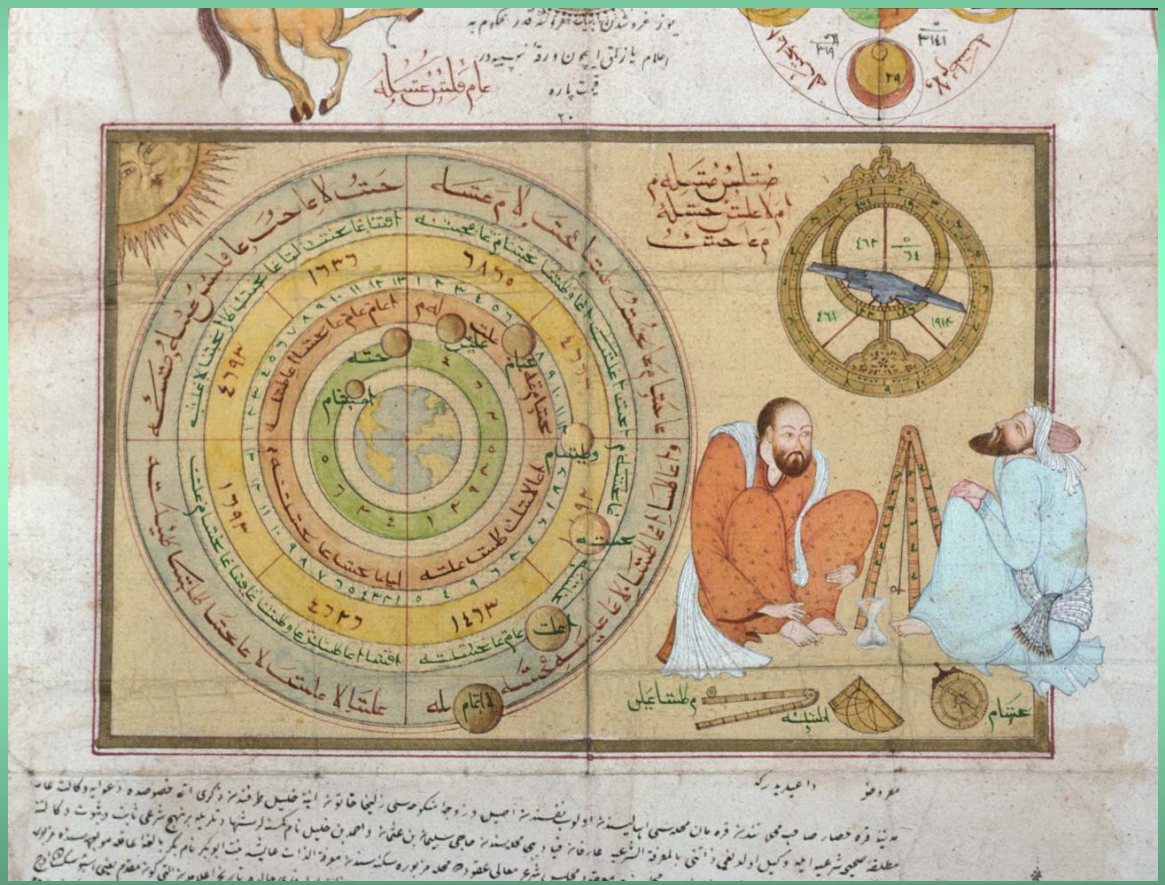
The geocentric model described by the influential Greek astronomer and geographer **Claudius Ptolemy (~85-165)** was unchallenged for well over 1000 years.

Muslim astronomers in Medieval Islam adopted the geocentric model

Muslim astronomers inherited much of their learning from the Ancient Greeks.

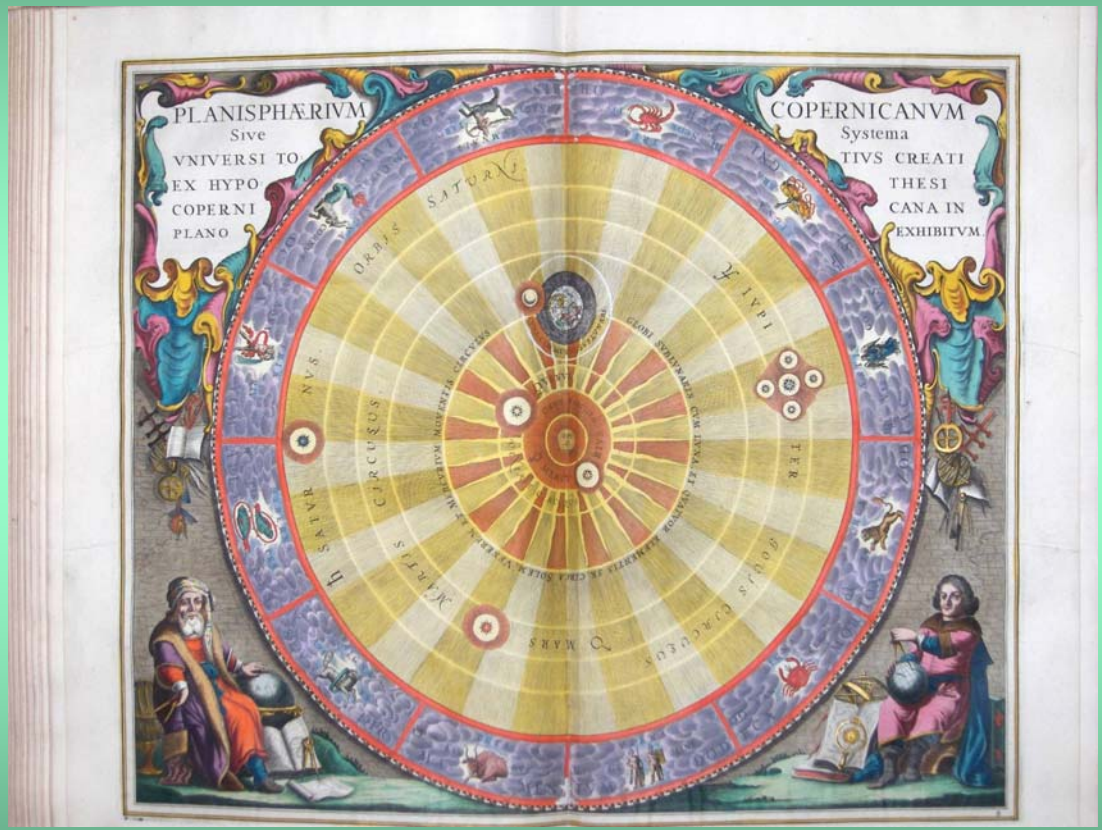
This included the **geocentric theory** about the Universe.

The geocentric model could be used to explain the apparent movement of the sun and stars and to make **accurate predictions**.



Ottoman manuscript, 1781 Photograph: The Whipple Museum, Cambridge

Copernicus' heliocentric theory



Harmonia Macrocosmica, by Andreas Cellarius, printed in 1661 – Museum of the History of Science

Nicolaus Copernicus (1473-1543) was a Polish astronomer and mathematician who made detailed observations and measurements.

He proposed a **heliocentric theory** in which he placed the sun at the centre of the solar system.

His idea was not accepted at first because it went against the teachings of the Catholic Church who accused him of **heresy**.