Barry Lawrence Ruderman
Antique Maps Inc.

7407 La Jolla Boulevard
La Jolla, CA 92037

www.raremaps.com

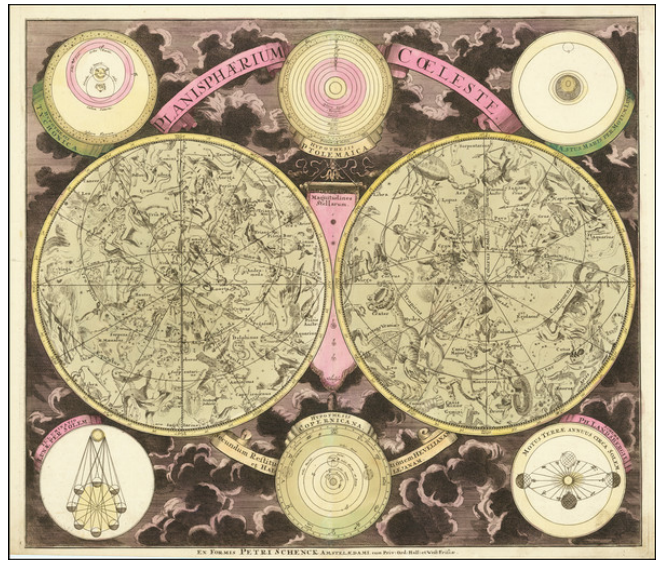
(858) 551-8500
blr@raremaps.com

Planisphaerium Coeleste

Stock#: 89543
Map Maker: Schenk

Date: 1700 circa
Place: Amsterdam
Color: Hand Colored
Condition: VG
Size: 22 x 19.5 inches

Price: SOLD



Description:

Mapping the Stars in the Seventeenth-Century Netherlands

Shenk's remarkable double hemisphere map of the sky, complete with competing models of the solar system and astronomical diagrams.

Two large hemispheres show the stars as they appear in the northern and southern skies. The constellations are splayed across the circles—a riot of animals, myths, and fables plotted against the tropics and the equator.

At center is a scale of stellar magnitude, which indicates the brightness of a star. The most brilliant stars are a magnitude of one, while dimmer lights rate from second to sixth magnitude. The scale originated with ancient astronomers like Ptolemy and Hipparchus and continues to be used today.

Arrayed around the central hemispheres are six smaller circles. Three of these illustrate astronomical phenomena, including a lunar eclipse, the lunar influence on the tides, and the passage of the earth around the sun.

The other three circles illustrate the solar system as hypothesized by Ptolemy, Brahe, and Copernicus. The precise order and organization of the solar system was a matter of debate in the seventeenth century, hence their prescient presence on this map.

7407 La Jolla Boulevard
La Jolla, CA 92037
www.raremaps.com
(858) 551-8500
blr@raremaps.com

Planisphaerium Coeleste

Modelling the solar system to 1700

Humans have watched the stars for hundreds of thousands of years and they have postulated many models for the make-up of the heavens and, in particular, of the solar system. Cave paintings reveal knowledge of the equinoxes and solstices dating to more than 30,000 years ago. Ancient Babylonians thought the world revolved around the Earth and used their lunar observations to plot a calendar with twelve months.

The Greeks were especially interested in discerning the order and shape of the cosmos. Parmenides claimed that the solar system was spherical. Anaxagoras made the observation that the moon is likely closer to Earth than the sun. Pythagoras and his followers thought that the moon and other planets likely orbited the Earth, with the Earth itself orbiting a larger fire at the center of the universe.

Other astronomers, like Aristotle, also assumed that the solar system was Earth-centric, with the planets and sun tracing orbits around humanity's home. Plato thought the Earth was the center, with stars in an outer ring radiating from the Earth. Within the star shell were the orbits of the planets, moon, and sun.

Ptolemy agreed that the system must be geocentric and theorized epicycles, or orbits within larger orbits, to explain planetary motion as seen from Earth. To him, Earth was surrounded by the moon, Mercury, Venus, the sun, Mars, Jupiter, and Saturn in concentric circles.

However, inconsistencies and questions remained with Ptolemy's model. Medieval Islamic astronomers continued to embrace a geocentric theory but combined more precise observations with corrections to try to explain away the issues with a geocentric solar system, including that the motion of the planets did not trace a steady, perfectly circular orbit around the Earth.

In the sixteenth century, Nicolas Copernicus (b. 1473) re-examined the issue of orbits. He thought the planets did orbit in perfectly uniform circles, despite the observation of complex retrograde motion that had flummoxed astronomers for centuries. His massive intervention, however, was to place the sun at the center of the system, not the Earth.

The heliocentric model better explained the varying brightness of the planets, but it also met with resistance from those who had trouble believing that God had not placed humans at the center of the known universe. The controversial nature of the work made Copernicus delay publishing for thirty years; his book, *De revolutionibus orbium coelestium*, only appeared in 1543, the same year he died.

Tycho Brahe (b. 1546) collected firsthand observations for years, leading him to believe in the changeability of the stars, rather than their fixity as had previously been accepted. Brahe came up with a new model wherein the planets orbited the sun, but the moon and sun orbited the Earth. This allowed for

7407 La Jolla Boulevard
La Jolla, CA 92037

www.raremaps.com

(858) 551-8500
bllr@raremaps.com

Planisphaerium Coeleste

the orbits of planets to cross with that of the sun, which resolved the problem of stellar parallax.

Johannes Kepler (b. 1571) was an advocate of the heliocentric hypothesis, but he used his teacher, Brahe's, observations to posit a slightly different configuration than Copernicus or Brahe. Rather than place the sun at exactly the center of the solar system, Kepler thought it was actually off to one side, at one of the two foci of an elliptic orbit. He posited that the planets orbit the sun in elliptical (not circular) orbits, that the radius vector joining the planet and the Sun has an equal area in equal periods, and that the square of the period of the planet (one revolution around the sun) is proportional to the cube of the average distance from the sun. This eliminated the need for epicycles—Ptolemy's circles within circles—and better accounted for the observed movement of the planets.

These laws of planetary motion were confirmed by Galileo Galilei (b. 1564) when he performed observations with a telescope. Galileo also observed the largest of Jupiter's moons, Io, Europa, Ganymede, and Callisto.

Finally, Isaac Newton (b. 1642) was able to postulate why the planets orbited the sun. With his law of universal gravitation, Newton explained that any two masses have an attractive force between them proportional to the inverse of the distance squared. This formula allowed for the calculation of the force exerted on each planet by the sun, which pulled the planets into elliptical orbit.

Detailed Condition:
Old Color