

That is because both pagans and Christians share the same created perceptual competence. Next case.

## (2) Ptolemaic Geocentrism versus Copernican Heliocentrism

In encyclopedia articles and works in the history of science it is common to see Nicolaus Copernicus (1473-1543) characterized as the last great medieval astronomer, or as the last great positional astronomer. The reason for the qualifications "medieval" and "positional" is that it would not be until Newton's universal law of gravitation was combined with Kepler's three laws of planetary motion and the Galileo-Descartes law of inertia that there would come to be a genuine celestial mechanics. With the Ptolemaic astronomers of his day, Copernicus was concerned with planetary appearances—lights in the sky—moving against a fixed background.

He was, nevertheless, the first to *systematize* heliocentrism as the dramatic contrast to Ptolemaic astronomy that, by the mid-18th century, came to be accepted by virtually everyone. While it may be argued that Ptolemaic astronomy possessed, in 1543, equal predictive power with the Copernican system for predicting the line-of-sight locations of planetary appearances, the same cannot be said about *what* the two systems implied with regard to discrete "planetary" trajectories, epicycles, and circumsolar orbits. Ptolemaic astronomy and Copernican astronomy postulate *different* earth-sun-planet systems (although "system" is a bit of a misnomer when applied to Ptolemaic astronomy), and with further development of systematic astronomy that difference would greatly affect their respective *explanatory* values. (For example, do we explain the apparent retrograde movement of Mars, in which Mars appears to move *backwards* against its "fixed" background, by a literal Ptolemaic epicycle or by the appearance caused by the earth's circumsolar movement relative to that of Mars? In hindsight, we know that in the 16th century the smart money would have been on the Copernican model.)

Suppose, now, that it is the year 1543, the year Copernicus's famous *De Revolutionibus* was first published. (It was also the year that Nicolaus Copernicus died.) In 1543—*before* the invention of the telescope and *before* the brilliant work of Galileo, Tycho Brahe, Kepler, and Newton—the heliocentrism of Copernicus looked far from obvious to many able thinkers. Let us now suppose that *you* are one of those able thinkers