# Thoughts On The Alleged "Fourth Leg of the Canon"

## Post by “Kalosyni” of May 2, 2025 at 9:48 AM

In preparation for the upcoming First Monday, I was thinking about how we know that the earth revolves around the sun, and that reasoning is sometimes needed.

I did this search query on Google: "before the space age did determining that the earth revolves around the sun require logic or reasoning beyond observations":

and reasoning. While observations of celestial bodies played a crucial role, scientists like Copernicus, Galileo, and Kepler also used mathematical models and principles to support the heliocentric theory.

Here's a more detailed explanation:

**1. Initial Observations and the Heliocentric Model:**

- Early astronomers, like Aristarchus of Samos, proposed the heliocentric model based on careful observations of the cosmos.
- However, without direct visual confirmation of Earth's movement, the geocentric model (Earth at the center) remained dominant for centuries.

**2. Galileo's Telescopic Observations:**

- Galileo's use of the telescope provided crucial evidence. He observed that Venus went through phases like the moon, which could only be explained if Venus orbited the sun, not the earth.
- This contradicted the geocentric model, as it suggested that Venus was a celestial body that orbited the sun and not the Earth.

**3. Stellar Parallax and the Need for Reasoning:**

- Astronomers searched for stellar parallax, the apparent shift in a star's position due to the Earth's orbit around the sun.
- Detecting this small shift, while challenging, would offer direct proof of Earth's motion.
- However, the reasoning behind parallax was also crucial. It required understanding that the Earth's orbit was not just a simple straight line, but a curve, and that the stars were far away, making the parallax effect very subtle.

**4. Kepler's Laws of Planetary Motion:**

- Kepler's laws, derived from Tycho Brahe's meticulous observations, provided a mathematical framework for understanding planetary orbits.
- These laws, which described the elliptical paths of planets, supported the heliocentric model and further solidified the idea that the sun was the center of our solar system.

**5. The Importance of Logic and Reasoning Beyond Direct Observation:**

- Scientists like Copernicus, Galileo, and Kepler not only observed the celestial bodies but also developed logical arguments and mathematical models to explain their movements.
- These arguments, based on reason and deduction, were essential for interpreting the observational data and establishing the heliocentric theory.

In conclusion, while observations were vital, the acceptance of the heliocentric model also required a logical and rational framework to interpret these observations. This included the development of mathematical models, understanding concepts like parallax, and challenging the established geocentric paradigm through reason and deduction.

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