

HAPPY BIRTHDAY, NICOLAUS COPERNICUS

February 19, 1473. This is the birthday of Nicolaus Copernicus, a Renaissance astronomer and mathematician who sparked a revolution in cosmology that is still going on today.

Copernicus was born at a time when people believed Earth lay enclosed within crystal spheres at the centre of the universe. Can you picture the leap of imagination required for him to conceive of a sun-centred universe? The publication of Copernicus' book – *De revolutionibus orbium coelestium* (On the Revolutions of the Celestial Spheres) – just before his death in 1543, broke open the medieval idea of an enclosed, Earth-centred universe, and set the stage for all of modern astronomy.

Today, people speak of his work as the Copernican Revolution. By the way, Copernicus wasn't the first to conceive of a sun-centred universe. Early Greek philosophers like **Empedocles**, also spoke of it. But it was the towering figure in Greek philosophy, **Aristotle** and the Platonic Academy, who proposed that the heavens were literally composed of 55 concentric, crystalline spheres to which the celestial objects were attached with the Earth at their centre.

Updated and refined with epicycles by **Ptolemy** in the second century AD to account for the apparent retrograde motion of the planets, the model served society well for over one thousand years.

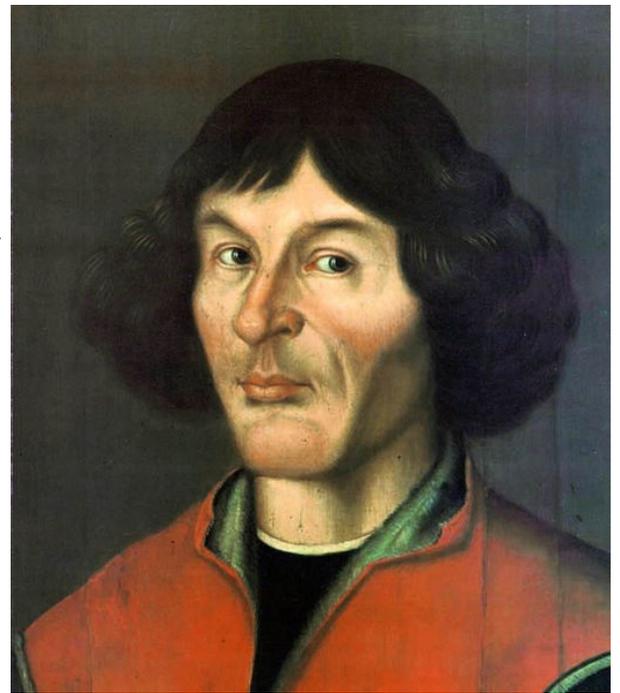
By the way again, Copernicus' Earth-centred proposal was not all that well received by the public. Calculations done using it turned out to be less accurate than the ones done with the time-proven Ptolemaic system. It took Kepler's ingenuity, some 40 years later, to work out the proper orbits of the planets and make sense of the Sun centred Solar System.

Today, the Copernican Revolution has far wider philosophical implications. Having been displaced from the centre of the Solar System the question naturally arises where does the Earth, where do we fit into the greater scheme of things. The Earth today is just one of eight (or nine?) planets of an average star in the outskirts of the Milky Way Galaxy, part of a group of some 20 local galaxies, moving slowly towards the Virgo Super Cluster of galaxies, which again is only one of those clusters amongst many.

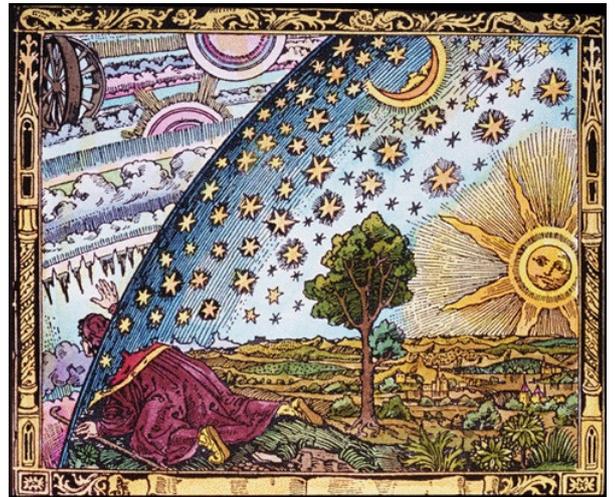
This is the deeper meaning of the revolution Copernicus started on this day in 1473: In an, to all intend and purposes, endless universe we are trying to find a meaning for us, for life, for the beauty that is all around us. Are we alone in this vast Cosmos? Are we unique with our questions and our understanding, our searching for answers?

Can an infinite and endless Universe have a meaning? Our understanding of "meaning" implies a use for something, an ultimate purpose, a progression forward. And the antitheses of the Copernican Revolution would be if we were the reason for all the universe around us. In one way or another it could be all there for us and we are responsible for it, for our environment and for its environment ad infinitum.

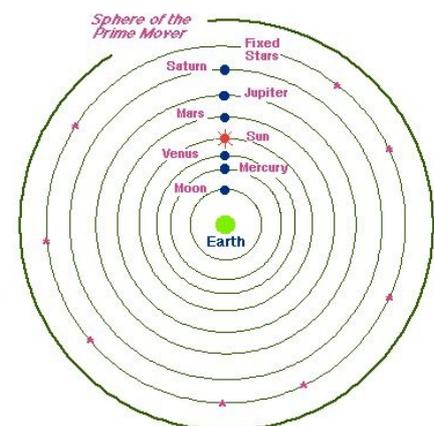
PS. The date of Copernicus' birthday is listed as a Julian Calendar day. With the change to the Gregorian calendar this would make it the 28 February! AK with EarthSky Notes



Copernicus set the stage for all of modern astronomy.



This Flammarion engraving, by an unknown artist, is called Empedocles Breaks through the Crystal Spheres. It first appeared in Camille Flammarion's 1888 book *L'atmosphère: météorologie populaire* (The Atmosphere: Popular Meteorology) with the caption: "A missionary of the Middle Ages tells that he had found the point where the sky and the Earth touch..."



Aristotle's Universe

Earth-centred model of the universe via **Aristotle**. In the medieval world, people thought Earth was the centre of the universe and lay enclosed within these crystal spheres.