



The Scientific Revolution: Its Classical and Christian History with Dr. Ted Davis

Lecture 14: Kepler's New Astronomy: His Neoplatonist "Proof" of Copernican Astronomy

Outline:

Kepler's New Astronomy: His Neoplatonist "Proof" of Copernican Astronomy

- Hungarian writer Arthur Koestler depicted Kepler convincingly as a "watershed," standing like the continental divide on the landscape of the history of ideas. That is how I present him: looking back to the past for inspiration [this lecture], while pointing toward the future with bold new ideas [next lecture].
- This lecture looks at some of the ways in which Kepler's ideas reflect a type of Christian Neoplatonism, especially as mediated to him by Lutheran theologian Philipp Melanchthon. We examine his belief in God as a mathematician—specifically, a geometer: "Geometrical reasons are co-eternal with God."
 - This involved two big ideas, relative to Kepler's thought:
 - An emphasis on Plato's idea that "pure" mathematics holds the key to understanding the universe—especially the geometry of the "Platonic" solids. Like Plato, Kepler believed that God used the "purest" geometric forms to design the universe. He also believed that God "hears" in his mind the mathematical music played by the planets as they orbit the sun in elliptical orbits with changing speeds.
 - The belief that the Sun represents the light of reason (as it did for Plato) and the presence of God the creator within the universe.
- Fortunately for Kepler, the Dukes of Württemberg had established a state supported educational system for qualified students, regardless of income. Kepler benefitted from this, especially at Maulbronn Abbey, which Duke Christoph converted to a Lutheran seminary. Kepler studied there from 1586-89.
 - At Tübingen, where Kepler studied for an M.A. in theology and got his poorest grade in astronomy (an A-), he encountered mathematician Michael Mästlin. Mästlin was a Copernican: his studies of the comet of 1577 led him openly to declare the superiority of Copernicus' theory. He explained the Copernican theory to his better students.



- Certain ideas about mathematics and the image of God taught by the great Lutheran theologian Philipp Melanchthon had an enormous impact on Kepler at Tübingen. The Duke of Württemberg required the university to teach Melanchthon's *Loci communes* (originally 1521, but often revised), a primer on doctrine, starting in 1587—two years before Kepler arrived on campus.
- Melanchthon held that God had implanted mathematical truths in our souls as part of the image of God; that our knowledge of those truths was not hindered by the fall of humanity; that God had used mathematics in creating the heavens; and, that the heavens were not fallen either.
 - Therefore, we could have mathematically certain knowledge of the heavens, which could help lead us to God. This provided theological grounding for Kepler's astronomical work.
 - Consider the following passage from the 1559 edition of the *Loci*, concerning natural law: "As light has been set before our eyes by God, likewise certain knowledge has been implanted in the minds of men by which they understand and evaluate many things.
 - "The philosophers call this light the knowledge of the first principles, which they also call common notions or preconceptions. In popular speech a distinction is made: one category consists of principles visible to observation, such as the knowledge of numbers, order, logical syllogism, the principles of geometry and physics. They grant that all these are definite and the sources of the most useful things in this life. ... the second category consists of principles which relate to our actions, such as the natural difference between things which are honorable and those which are base. The matter of obedience to God comes under this category. To be sure, these principles governing our conduct ought to be as clear to us as the knowledge of numbers, and yet because of our original fall, a certain darkness has come over us..."
 - "Geometry, being part of the Divine mind from time beyond memory, from before the origin of things, has provided God with the models for creating the world, models that have been implanted in human beings, together with the image of God. Geometry did not arrive in the soul through the eyes." — *Harmonices mundi* (1619)
- As a university student, Kepler also came to believe that the heliocentric universe, with the sun (the neoPlatonic symbol of God the Father) in the center, was a physical representation of the Christian doctrine of the Trinity.
 - As he said many years later, in his *Epitome of Copernican Astronomy* (1618-21), "The philosophy of Copernicus counts up the principal parts of the world by dividing the form of the universe into parts. For



in the sphere, which was the image of God the Creator and the Archetype of the world, there are three parts, symbols of the Holy Trinity—the center, of the Father; the surface, of the Son; and the intermediate space, of the Holy Spirit.” (Translation by Owen Gingerich, *Theology and Science*, 2011, p. 45)

- With this Trinitarian notion, according to historian-astronomer Owen Gingerich, Kepler was reinterpreting an idea from Aristotle. Aristotle had taught that the source of celestial motion is love for God— God as ultimate cause of motion, with the stars speeding around. The earth— far from the Prime Mover— was absent of motion.
- Aristotle had explained the rotation of the celestial spheres as follows: The “Prime Mover” or Unmoved Mover is the ultimate good and the object of desire. “It produces motion by being loved.”
- Kepler, the student of theology, must have been attracted to Aristotle’s notion. In the Copernican theory, however, the stars stand still, so they must be further from God’s symbolic presence. How then could God still be the cause of heavenly motion?
 - Simply let the Sun represent God—put God in the center, not at the edge! In this way, God could still be the source of motion in the heavens: the planets move more quickly, the closer they are to the Sun, so the Sun must represent God in this new picture of the universe!
 - Thus, for Kepler, the Sun becomes the source of planetary motion in the Solar System. This insight underlies his famous “law of equal areas,” as we now call it. This was a crucial part of the background to Isaac Newton’s theory of gravitation as the cause of planetary motion.
- Upon graduating, instead of going into the Lutheran ministry, Kepler took a job teaching mathematics and astronomy to adolescent boys in Graz. There he had an epiphany while lecturing one day about inscribing a triangle within a circle.
 - The ratio of the radii of the two circles matched closely the ratio of the orbits of Jupiter and Saturn, as determined by Copernicus. He quickly saw how to extend this idea to 3D objects. He then saw how it might be used to “prove” that there can be only six planets (Copernicus), not seven (Ptolemy).
 - Plato had used the five Platonic solids as the basis for understanding the universe in his creation story, *Timaeus*. His creator god (“Demiurgos”) used four of them to make the atoms of each of the four terrestrial elements, and the fifth for the body of the heavens.
 - Kepler did something quite similar in his first book, *The Cosmographic Mystery* (1596). He believed he could prove in this way that Copernicus was correct— there are only six planets, not seven ... and, ultimately, that the Triune God exists. It was a vision he never abandoned.
 - It was his work on this project—discovering God’s mathematical design for the cosmos—that led Kepler to realize he had finally found



his true vocation. Writing to his teacher Mästlin at Tübingen, he said that originally, “I wished to be a theologian; for a long time I was troubled, but now see how God is also praised through my work in astronomy.”—Letter 23, Kepler to Mästlin, 3 October 1595, Johannes Kepler *Gesammelte Werke*, ed. Max Caspar (1945), vol. 13, p. 40.