

Abstract (in English)

Title: A study on history of science and theology in dialogue and in conflict: heliocentric idea, Kepler, Galilei and Newton

Author: Petr Miencil

This thesis aims to survey a history of European heliocentric thought in the 16th and 17th centuries in the scientific works of lay (i.e. non-clergy) astronomers of Johannes Kepler, Galileo Galilei or Isaac Newton. All three were also members of their denominations: a Lutheran Kepler, a Catholic Galilei and an Anglican (and, in reality, a clandestine Arian) Newton. This thesis focuses on the heliocentric idea from a historical and theological perspective. It encompasses topics like theological cosmology, anthropology, or biblical exegesis confronted with new astronomical discoveries. This text also surveys the conflict between the geocentric and the heliocentric ideas in the Czech lands as reflected in the lives and works of scientists like Tycho Brahe, Tadeáš Hájek z Hájku (Hagecius), David Gans, Jan Marek Marci, Jan Amos Komenský (Comenius), Valerianus Magni and the generation of Jesuit scientists in the Catholic restoration period post-1620 or during the early Enlightenment period. The author aims to verify a hypothesis stating that a new natural theology formulated by lay Christian scientists came into existence during a given period.

A summary of this thesis, i.e. the following aspects are characteristic of the emerging natural theology of the 16th and 17th centuries:

- **Categories of space and time in theology.** Apart from a well-known narrative of the scientific heliocentric revolution (i.e. the Sun, not the Earth, is the centre of the known cosmos), there is also a shift in theology, especially concerning theological cosmology and philosophical anthropology. The theological direction of "up" and "down", or towards the centre of the Earth (i.e. hell, damnation) or towards the periphery of the cosmos (i.e. heavens, salvation), is no longer self-evident and becomes problematic. While the medieval and renaissance periods accepted the influence of the heavenly bodies on humans (the influence of the planets, the position of the planets in the

Zodiac, in short, the astrological narrative), this view is no longer prevalent at the end of the Renaissance period in Europe. The categories of space and time are mathematically defined. However, Kepler still tries to assign them a symbolic meaning (a trinitary interpretation of the cosmic sphere's centre and periphery – with a platonic twist). Newton perceives the space as *sensorium Dei*.

- **Autonomy of Science.** During the period of significant astronomical discoveries of the 17th century (disagreeing with antiquity's geocentric cosmological model), a need to reconcile dissonance of the Renaissance hermeneutics and exegesis of the Bible vis-à-vis the new developments in astronomy has grown in prominence. Renaissance scientists professing heliocentric hypotheses led by Galilei are proposing a new construct: mutually complementary sources of knowledge: the Book of Scripture and the Book of Nature. God the Creator is the author of both Books, so there is no dissonance between them. The application of literal exegetical concepts causes such perceived discord. The message of the Bible must be interpreted in such situations using a symbolical exegetical approach. The Bible is not an authority in science, which enjoys autonomous status, especially in the Protestant part of Europe. The Catholic scientists are kept on a short leash by central Roman authority, which uses the Congregation of the Index to thwart publications of heliocentrism-related scientific works and prevent the heliocentric hypothesis from being taught at Catholic schools and universities (formally till the first third of the 19th century).
- **Conflict with the church mainstream.** Renaissance scientists like Kepler, Galilei, and Newton experienced attitude of suspicion coming from their church authorities. Kepler, a Lutheran, has rejected some of the articles of the Book of Concord – and his mother has been prosecuted as a suspected witch by the Lutheran church elders so that Kepler had to defend her against such allegations with extreme effort to fight such constructs in the age of universal witch psychosis. The story of Galilei, a Catholic, represents a memento of a titanic struggle for the autonomy of science in a conflict with the post-Tridentine Roman church authority, which tried to limit and minimize Scripture exegesis by lay persons. Newton, formally an Anglican, rejected in private both the Trinitarian and Christological concepts of mainstream Anglicanism and

professed in private a version of Christianity compatible with Arianism or Socinian teachings.

- **Laws of Nature as an expression of God's mind.** René Descartes considered God's will as a driving agent that enforces the specific unfolding of natural processes. Michel Montesquieu – a philosopher of the Enlightenment, thinks of God's hand as a basis of natural processes and regularities. Johannes Kepler, however, thinks of laws of nature in the language of mathematics and liberates the concept of the laws of nature from its theological connotations. For Isaac Newton, the laws of nature express both mathematically described and quantified interdependencies of regularly repeating natural phenomena, which can be derived from observations or experiments – as well an expression of God's perfection, providence and intelligence.
- **An impact on politics and social science.** The massive availability of Newton's *Principia* in Europe during the Enlightenment period was followed by the birth of the political Newtonianism. The light of the Law (comparable to the Sun) enlightens all citizens (inhabitants of the Earth) equally. Arbitrary abuse of political power is against the natural Law. Freedom and the pursuit of happiness have been considered an expression of nature. Tyranny and oppression have been declared an enemy of the natural Law. These and similar ideas of political Newtonianism inspired both the United States' founding fathers and the French Enlightenment philosophers.
- **Proponents of astronomy in the Czech Lands during the Renaissance and Baroque periods.** The heliocentric intellectual milieu of the Czech Lands is dominated by Johannes Kepler (by denomination a Lutheran), who worked for the Emperor Rudolf II. as a royal mathematician. In his early works, he tried to use ideal platonic bodies as a blueprint for the solar system. Kepler abandoned this idea vis-à-vis observational facts and replaced platonic ideal circles with elliptical trajectories. Tadeáš Hájek z Hájku (Hagecius), by denomination, the so-called *new utraquist*, has been instrumental in helping Kepler get access to the court and the emperor. Tycho Brahe (a Lutheran by denomination) unwillingly helped the cause of the heliocentric hypothesis (while proposing his own geo-heliocentric hypothesis) since Kepler was able to use Tycho Brahe's highly accurate observations of planet Mars' positions and

realized that the observations make sense only if elliptical (instead of circular) trajectories of planets are considered.

- **Loyalty and dissent during the Catholic Counter-Reformation.** After the battle of Bílá Hora (1620) and the Catholic Restoration period, the heliocentric hypotheses were censored by the Roman Catholic Church and were prohibited at universities, schools and the press. However, the thought process of a Jesuit Arriaga suggests that there has been a slight dissent with the official Roman Catholic position on heliocentrism. The historical research of Jerzy Cygan, a 20th-century Polish historian of the Capuchin order, suggests that Valerian Magni (a Capuchin Counter-Reformation proponent) attempted to publish Galilei's *Il Dialogo* while supported by Cardinal Dietrichstein (and possibly by Cardinal Harrach).
- **A Corrective of the Enlightenment.** Once the Enlightenment finally reached the intellectual milieu of the Czech Lands, the heliocentric idea started to take ground in Czech universities and the public discourse. Czech (and Czech-German) Jesuits like Josef Stepling or Jan Tesánek, who initiated the publication of Newton's *Principia* in the Czech Kingdom, are examples of heliocentric proponents. Both Jesuit mathematicians opposed the still overwhelming Aristotelian narrative dominating theological cosmology discussions of 18th-century Roman Catholic academia.