**Kepler on Patrizi, Ancient Wisdom, and Astronomical Hypotheses**

This study offers a new detailed comparison of the ideas of Francesco Patrizi and Johannes Kepler, two eminent natural philosophers of late Renaissance. This is not an unchartered territory. In fact, much has already been published on the details of their encounter, or rather a mutual misunderstanding regarding especially the status of astronomical hypotheses but also their broader philosophical commitments. But yet another account covering the most prominent subjects might help us see more clearly the similarities and differences in their respective, generally Platonic, approaches to the challenges which astronomy of their time was trying to tackle.

1. *A History of the Controversy*

The most notable passages in which Kepler confronts Patrizi appear in the *Contra Ursum*, a treatise directed against Nicolaus Reimars Baer, better known by his Latin name Ursus. Kepler wrote this remarkable text as a defence of Tycho Brahe. Unfortunately, though, it was not published until the nineteenth century.[[1]](#footnote-1) The *Contra Ursum* requires a brief introduction to situate it into its proper context. Kepler’s discussion of Patrizi is in effect an argument within an argument in defence of Brahe, who became entangled in a long and bitter disagreement with Ursus about the primacy of invention of the compromise, geo-heliocentric, system. Their public conflict became even more heated when Tycho was about to move to Prague to accept the position of imperial mathematician at the court of Rudolf II, that is, the post Ursus himself had held.

By contrast, Kepler’s more particular argument against Patrizi grew out of a mutual misunderstanding rather than bad will. In the *Pancosmia*, the fourth main part of his monumental *Nova de universis philosophia* (1591), Patrizi launches upon a general critique of astronomical theories which, he claims, misrepresent the true nature of the cosmos. Among others, he also mentions Brahe’s system and rejects it because it employs spheres in its explanations.[[2]](#footnote-2) Unfortunately, Patrizi’s criticism was based on indirect and scant knowledge of Tycho’s *De mundi aetherei recentioribus phaenomenis*, which appeared just few years earlier, in 1588.[[3]](#footnote-3)

Brahe, on the other hand, mentions Patrizi only once, in a long letter to Kepler from 9 December (29 November) 1599 whose main subject is his dispute with Ursus. Although otherwise Brahe finds Patrizi’s book ‘erudite’, he complains that Patrizi perverts his theories and says he would publicly protest against it (TBOO, VIII, 206.36–207.5 = KGW XIV, no. 145.130–140).[[4]](#footnote-4) By the time the letter was written, Brahe had already left Denmark and was moving slowly to Prague, where he later started his famous collaboration with Kepler. He wrote the letter while staying for several months in Wittenberg in the house of Johannes Jessenius (1566–1621), a philosopher and doctor who had a close connection to the Czech Lands. Jessenius ended up moving to Prague shortly after Brahe. He several times intervened when the uneasy relationship between Brahe and Kepler became particularly strained, and after Brahe’s death in October 1601 Jessenius was the person asked to deliver the official eulogy. In the years that followed, he maintained friendly relations also with Kepler and we may surmise that until 1608, i.e., during the time when they both lived in Prague, the two men often met in person.[[5]](#footnote-5)

Some years earlier, in 1593, Jessenius published in Wittenberg a book called *Zoroaster: Nova, brevis, veraque de univerrso philosophia*,which is basically an excerpt from Patrizi’s *Nova de universis philosophia.* Although in modern scholarly discussion Jessenius has often been labelled a plagiarist, the situation is somewhat more complex. At a minimum, one ought to concede that his work contributed to the dissemination of Patrizi’s ideas and editorial achievements in Central Europe, including its Protestant part, even if the texts they were often detached from their original author.[[6]](#footnote-6) Given that the cosmology presented in the *Nova de universis philosophia* forms the central part of *Zoroaster*, it is a reasonable conjecture to suppose that Brahe learned about Patrizi’s criticism of his new astronomical theory when staying with Jessenius. We know that there was a copy of Patrizi’s book in Brahe’s library. Moreover, a close reading of *Contra Ursum* shows that Kepler must have had direct access to its text and cannot have relied solely on Jessenius’s digest, although he may have used the opportunity to discuss some issues with him.[[7]](#footnote-7)

The *Contra Ursum* contains many important points regarding the history and philosophy of science, but it was the product of particular circumstances. Although both Ursus and Patrizi had already passed away at that time, Kepler had earlier agreed to write a treatise against Brahe’s critics partly to repair his own reputation tainted by his previous involvement with Ursus: in particular, before being engaged by Brahe, Kepler had approached Ursus in order to gain his academic support. The issue of establishing good working relations with Brahe became pressing when Kepler moved to Prague in October 1600 in search of Brahe’s patronage. He worked on the treatise until October of the following year but after Brahe’s death, he put the work aside.[[8]](#footnote-8)

1. *The Nature of Astronomical Hypotheses*

Let us now turn to the text of *Contra Ursum.* Kepler talks about Patrizi most extensively in first chapter, where at several points he refutes Ursus’ criticism of Tycho regarding the nature of astronomical hypotheses. When making his tenth point against Ursus, Kepler turns his critical attention to Andreas Osiander, a Lutheran theologian and author of the anonymous preface to Copernic’s *De revolutionibus* in which – against the author’s intentions – Osiander claims that the heliocentric system proposed in Copernicus’s book is merely a scientific hypothesis and not a depiction of the world as it truly is. Patrizi clearly viewed Copernicus’ astronomical system in the manner which Osiander expressed in his preface.[[9]](#footnote-9) Kepler in his *Contra Ursum* starts by revealing the true identity of the author of the anonymous preface,[[10]](#footnote-10) and then – contrary to the main claims of that text – goes on to emphatically affirm that the task of astronomy includes a determination of the real shape of the world and decisions upon other related cosmological issues (267.15–269.2 KGW XX,1,26.43–27.28). In the second edition of *Contra Ursum*,[[11]](#footnote-11) Kepler added few more pages where he analysed Osiander’s misinterpretation of Copernic’s theory by quoting from Osiander’s letter – which he had at his disposal, possibly thanks to Tycho Brahe.[[12]](#footnote-12) Then he drew a distinction between three types of hypotheses. The first is, he notes, the actual manner how, according to a particular astronomical claim, objects move in the cosmos. This typically amounts to answering a question about the real path of a celestial body. The second type of hypotheses address the manner in which such motions can be described using geometry. This kind of hypotheses can be developed in several ways depending on the use of various mathematical devices. And, finally, the third kind of astronomical hypotheses address the apparent motions of heavenly bodies whose movements in fact follow rules described by the first kind of hypotheses which were then expressed in geometric terms by the second kind of hypotheses (269.3–272.10 = KGW XX,1,27.29–29.5). Kepler thus concludes that the claim that astronomical hypotheses are supposed to provide just a mathematical description of the apparent motions of heavenly bodies is only partly true. Astronomy has also other tasks and produces other types of hypotheses, and these, too, give account of the real nature and form of the world.

In the next step, Kepler proceeds to criticise Osiander together with Patrizi, because Patrizi seems to go as far as to reject the validity of astronomical hypotheses altogether. Based apparently on a direct study of the *Nova de universis philosophia*,which was first published in 1591,[[13]](#footnote-13) Kepler presents Patrizi’s critique of astronomers for describing merely the apparent motions of planets. According to Patrizi, astronomers use ‘circles and solid orbs’ (*es variis circulis et solidis orbibus*) and claim that these exist in nature, though they are in fact just fabrications. Kepler then summarises Patrizi’s own explanation of the motion of heavenly bodies, according to which planets move freely among the fixed stars ‘in the liquid ether’ (*in liquido aethere*) and the resulting paths correspond to what we observe as their apparent motions in the sky. Heavenly bodies thus actually move in a non-uniform manner, passing along various kinds of spirals and lines in various directions, never repeating their paths. Their real motion corresponds directly to the irregularity of their paths as they appear in the sky. Variations in their motion are due to the fact that each planet is ‘living being endowed with reason’ (*animalia rationis capacia*). According to Kepler, Patrizi bases his claim on ‘barbarian philosophy’ (*authoritate philosophiae barbaricae*) and maintains that such explanation of celestial motions is ultimately possible because divine omnipotence could well create astral beings endowed with wisdom such that they could execute the motions, which we observe as more or less regular, as long as the world exists (272.7–23 = KGW XX,1,29.3–17). The ‘barbarian philosophy’ Kepler alludes to are obviously the *Chaldean Oracles*, whichPatrizi attributed to Zoroaster and his Magi and considered them to be the most ancient textual representation of ‘ancient wisdom’. Nevertheless, by using the adjective ‘barbarian’ Kepler draws a distinction between an alien – and possibly more primitive – tradition and Greek philosophy, which covers also astronomy and other sciences.

After summarising Patrizi’s iconoclastic opinions about astronomy and the motion of heavenly bodies, Kepler proceeds to refuting Patrizi point by point. First, he agrees with him on the nonexistence of heavenly spheres but also adds that this is exactly what Tycho believed as well – thus demonstrating that Patrizi misinterpreted his writings on this crucial point. In fact, however, Patrizi rejected the notion of solid spheres already in 1571, that is, earlier than Brahe who did so only in 1586. But the details of the sequence of events is perhaps not the most important issue. We should note that while Patrizi’s rejection of spheres was motivated by speculative reasoning, Brahe based his argument not only on contemporary cosmological discussion, but also on his ground-breaking astronomical observations on which Kepler also relies.[[14]](#footnote-14)

Second, although Kepler admits that the almighty God would have been certainly able to create planets that move along spirals etc. as allegedly claimed by Patrizi, he states that it is preferable to explain the apparent non-uniformity of planetary motions based on regular motions, such as circular ones. In that way, we could discover the simple causes of motions, which would explain the apparent irregularity of the paths of heavenly bodies as being solely due to way in which we perceive them. By contrast, Kepler argues, the ultimate consequence of Patrizi’s position would be that each planetary movement is ultimately a miraculous event (*miraculum contingere*) caused directly by the Creator. Moreover, examples of our perception of distant objects from our daily lives disprove both Patrizi’s claim that we can directly observe the real motion of planets and his assertion that planets must move in-between the fixed stars (272.24–274.11 = KGW XX,1,29.18–30.2). In other words, Kepler emphasises that the order and harmony of the universe is something that represents the deeper, true cause of the motion of planets.[[15]](#footnote-15) Its creation and maintenance is also a demonstration of how God acts in the world, which is not by a series of irregular divine interventions, which is a position Kepler ascribes to Patrizi’s theory.

Kepler concludes that Patrizi’s principal mistake consists in his failure to distinguish among three types of astronomy. Observation of the paths of the planets is the task of mechanical or practical astronomy, by which Kepler obviously means actual observations with the help of astronomical instruments. It is possible that this kind of astronomy includes the efforts to gather the data contained in ancient astronomical books (*historiam motuum libris promere*). Determination of the real paths of heavenly bodies is what contemplative (theoretical) astronomy does, while coming up with a geometrical description of planetary motions is the task of the lower rank of geometers. This distinction helps us differentiate between those who strive for a purely abstract capturing of astronomical problems and those who despise matter, ‘the one and only thing after God’.[[16]](#footnote-16) At the end of this section, Kepler claims he wanted to challenge Patrizi for sharing some mistaken ideas with Osiander and Ursus (274.12–23 = KGW XX,1,30.3–13). All these three authors relativise, each in his own manner, the validity of astronomical hypotheses and their relation to the structure of the world.

It is thus clear that Kepler fully agrees with Patrizi on there being in the heavens no place for solid spheres and on the planets moving in liquid ether. This new understanding of the cosmos was shared by various authors who became dissatisfied with the Aristotelian and Ptolemaic cosmology. It became an important issue after 1572, when a new star – nowadays colloquially known as Tycho’s supernova – appeared in the Cassiopeia.[[17]](#footnote-17) The main point where Kepler disagrees is Patrizi’s idea that planets are living beings that move in the heavens as they wish, that is, an approach which Paolo Rossi aptly calls ‘astrobiology’.[[18]](#footnote-18) Kepler downplays Patrizi’s ‘volitionist’ explanation of heavenly bodies acting as autonomous beings by claiming that planetary motions are caused by direct divine intervention. Interestingly, Patrizi is not the only Platonist to make a similar claim: he may have been inspired by the notion of planets as ‘living beings’ (ζῷα) moving in spirals (ἕλιξ) that appears already in Plato’s *Timaeus* (39d6–b2) and was further developed by Proclus.[[19]](#footnote-19) Kepler’s criticism of astronomical theories, including a refutation of heavenly spheres, on many points concurs with the explanation which Patrizi gives in the *Pancosmia*, where he moreover significantly and in a relevant context refers to Proclus (91a/b, c/d). Moreover, like Proclus, Patrizi claims that celestial bodies move because they are directed primarily by the World Soul, which moves the world as a whole in daily periods. But celestial bodies also have souls of their own and these are responsible for their daily rotation and motions through the ecliptic. Ultimately, though, these souls are ultimately connected with the motion of the World Soul.[[20]](#footnote-20) It is well known that Proclus exercised a profound influence on Kepler, too, and some other parts of his views, such as his theory of mathematics, can be observed especially in his *Harmonice mundi* (1619).[[21]](#footnote-21)

There is a further remarkable difference in Patrizi’s and Kepler’s respective contributions to the emerging significance of mathematical explanations in the study of the natural world. Patrizi has been celebrated for promoting the idea of infinite mathematical space, which is a precondition of the existence of physical bodies, in particular their three-dimensionality and corporeality as such. But although bodies, including the heavenly ones, move in an infinite mathematical space, this has no bearing on what they are themselves, that is, on their corporeality. That is defined rather by resistance and impenetrability, while space is conceived of as a principle that is simultaneously corporeal and incorporeal. Space thus serves principally as a container in which solid bodies move. Patrizi, however, did not think of their motions as primarily mathematical.[[22]](#footnote-22) By contrast, as became apparent in his criticism of Giordano Bruno, Kepler had his own good reasons not to accept the idea of an infinite universe.[[23]](#footnote-23) It should be noted that Kepler’s life-long quest had aimed at uncovering mathematical relations in the world and he was convinced that they are to be found especially in the motions of celestial objects, which are thus mathematical in their nature. At the same time, though Kepler maintained that heavenly bodies do exist in the physical reality, being ultimately derived from divine archetypes. Nevertheless, as attested by his later treatises, Kepler was by no means a mechanicist philosopher in the manner that became dominant in seventeenth-century philosophy. He believed that the Earth is ensouled and its soul is located in the Sun, which he viewed as the source of the motion of planets, a kind of a gigantic magnet, as he claims in *Astronomia nova* (see chapter 34, 36, 57).[[24]](#footnote-24) This then determines the regular motions of the heavenly bodies: their movement is therefore driven not from within, not by their souls, but instead is such that it conforms to the more general order of the world.[[25]](#footnote-25)

One could thus claim that although both Kepler and Patrizi took an important lesson from Proclus, they differ on some significant points. Patrizi emphasises the activity and spontaneity of the individual souls of celestial bodies. He claims that celestial bodies are animated by their own souls and the world soul, thus living both their own and a shared life and reasoning both by their own and the common intellect. Consequently, they are also moved (*vehi*) by both their own and the ‘common’ spirit. All these aspects of individual celestial bodies are thus linked to more general cosmic principles: their intellect is linked to the intellect of the world and their individual will is subjected to the command (*nutu*) of metaphysically higher realities (*Pancosmia*, 90c).[[26]](#footnote-26) Kepler, by contrast, stresses the general order of the world which, he adds, is derived from the universal animation of the cosmos. Within this view, however, the magnetic force responsible for planetary motions is clearly a more impersonal and physical force than Patrizi’s souls that animate celestial bodies, which are thus endowed with intelligence. The difference between the two thinkers is thus subtle but clear. The main shift in the employment of particular explanatory principles seems to consist in Kepler’s (successful) attempt to articulate calculable mathematical laws that describe the motions of the heavenly bodies. Patrizi (and Proclus), on the other hand, explained these motions in more vague metaphysical terms without providing any exact mathematical tools for calculating the positions of celestial bodies in the past or in the future.

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In his subsequent writings, Kepler mentions Patrizi in a letter to David Fabricius written in Prague on the 4th of July 1603. Similar to his critique in *Contra Ursum*,Kepler claims here that Patrizi refuses to explain the motion of heavenly bodies using circles. He focuses instead on the result (*apotelesma*) of all the motions involved, which we observe as a spiral in which planets move (KGW XIV, no. 262.896–899). Along with some Kepler’s ground-breaking ideas anticipated in the letter, the criticism of Patrizi found its way to the first chapter of *Astronomia nova* (published in Prague in 1609), where the notion of an ellipse as the real trajectory of planets was presented for the first time. This passage deserves to be quoted in full also because given the importance of this book, this is the most prominent comment on Patrizi which Kepler made publicly in writing in his lifetime. Kepler returns here to the status of astronomical hypotheses and astronomical research in general which, according to him, were misunderstood by Patrizi when he proposed his theory of spirals:

This first adumbration of astronomy consists, not of the unfolding of a cause, but solely of the experience of the eyes, extremely slowly acquired. It cannot be explained in figures or numbers, nor can be extrapolated into the future, since it is always different from itself, to the extent that no spiral is equal to any other in increments of time, and none carries over into the next with curvature of the same quantity. Nevertheless, there are some people today, who riding roughshod over two thousand years’ work, care, erudition, and knowledge, are trying to revive this, obtruding admiration of themselves far and wide (an attempt which has not been fruitless among the ignorant). Those with more experience consider them with good reason to be incompetent, or (if, like that man Patrizi, they want to be known as philosophers) to act mad with reasoning (*cum ratione insanire*). (KGW III,62.16–31)

Most notably, this text expresses Kepler’s conviction that astronomical knowledge over time increases. Patrizi’s radical stance is thus misguided, because he would discard all previous astronomical theories altogether. What Kepler proposes instead is to revise, reform, and complete the efforts of his predecessors. Innovation in astronomical science is justified only if it builds upon and develops the previous tradition without negating it. Moreover, a proper understanding of the world cannot be based solely on observation – and the same holds of purely rational considerations of the cosmos. Patrizi, a philosopher, is thus guilty of excessive philosophical speculation which leads to misguided theories. One clear advantage of Kepler’s approach is its aim to describe the motions of heavenly bodies using precise mathematical tools, which also enables him to predict their future positions.

A different, though analogous, line of criticism of Patrizi’s cosmology appears in the *De stella nova*, published in 1606, that is, while Kepler was still in Prague. Kepler discusses here the new star that appeared two years earlier in the Ophiuchus (and was later named Kepler’s Supernova). In the opening passage, he criticises Patrizi for claiming that stars are ‘little flames’ (*flammulas*). According to Kepler, this is a notion widespread not only among the common people (*vulgo*) but also among poets. Moreover, adds Kepler, Patrizi takes this to be the highest knowledge, because ‘either he thinks this himself, or he speaks from the barbarian philosophy (*ex barbarica Philosophia loquens*)’ (KGW I,242.4–11). In other passages from the same treatise, Kepler criticises Patrizi for the concept of incorporeal flames which originate in the heavens by compaction of the heavenly fire. *Pace* Patrizi, Kepler claims that the same physical principles apply both on Earth and in the heavens, which allows us to study the new star using the same knowledge and observational means as in our ‘earthly’ scientific research (KGW I,246.26–38, 247.5–7, 21–26). It should be noted, though, that this direction of Kepler’s criticism is due to differences in the two thinkers’ background, although both were strongly influenced by the Platonic tradition. Patrizi posits light as one of the four main cosmological principles, developing this idea at length in the *Panaugia*, the first part of his *Nova de universis philosophia*. Similar to his concept of space, it is an entity that is both corporeal and incorporeal but progressively transforms from the immaterial, intelligible, and divine light to the physical fire and heat we can observe on Earth. The stars consist of fire that is in-between the two extremes. Patrizi gives several examples of some extraordinary terrestrial phenomena to show how fire sometimes becomes coagulated or compacted to form visible light and heat. According to his explanation, this holds also in the case of stars, although he claims that they are immaterial (*Pancosmia*, fol. 98–100r).

This is the target of Kepler’s critique. After all, Kepler tried to explain even transient celestial phenomena, such as novae and comets, which had been observed several times at key moments in the history of astronomy. He asserted that they originate by spontaneous generation akin to what we can observe in some animals, metals, and minerals both on and in the earth. A new star consists of a watery or fatty substance that becomes ignited, possibly by the Sun or by the star’s inner light (KGW I,237.32–36).[[27]](#footnote-27) But Kepler overlooks the fact that Patrizi, too, attributes to celestial bodies humidity (*fluor*), one of the principles he uses to explain natural phenomena. In this case, humidity enables him to account for the different shapes and varying brightness we observe in the heavens (*Panaugia*, 99v–100r). Moreover, Kepler comes somewhat close to Patrizi’s concept of light as both a corporeal and incorporeal entity by claiming that light is immaterial but capable of interacting with physical bodies, as attested by our common experience (KGW II,20–23).[[28]](#footnote-28) Nevertheless, Patrizi claims that the principles of humidity (*fluor*) and warmth (*calor*), which are observable in physical bodies, are both derived from higher principle of light. The higher physical (not to mention metaphysical) levels of universe display different outward qualities because they unite aspects which, in the world we live in, are distinct.[[29]](#footnote-29)

The main difference between the two thinkers thus indeed seems to consist in Patrizi’s espousal of a progressive gradualism of metaphysical and physical principles from immaterial entities to the material ones.[[30]](#footnote-30) Kepler, by contrast, is strongly convinced about unity of the physical universe, where both celestial and earthy phenomena can be explained with the same natural principles. This initial scientific supposition does not seem to be diminished by his Platonic metaphysics which draws a sharp distinction between two ontological levels of the world. In particular, Kepler derives the existence of our world and its internal harmonic laws from a higher ontological level of archetypes, which serve as the ideal model. Although God created the world according to these archetypes contained in his mind, it also implies a clear-cut distinction between God and his creation.[[31]](#footnote-31) For Kepler, as we have just seen, the world thus created is subjected to the same natural laws in all its parts and all things in it have basically the same characteristics. On this point, he disagrees with Patrizi who maintains a gradual differentiation from a unity to multiplicity of metaphysical and physical principles.

To conclude this section: a general evaluation of Patrizi’s cosmology can be found in the preface to the fourth volume of Kepler’s *Epitome* published in Linz in 1620.[[32]](#footnote-32) In this text, Kepler claims that it is not his intention to formulate some new, fashionable theory. His astronomy builds upon the achievements of his predecessors, in particular Copernicus’ hypotheses, Brahe’s observations, and Gilbert’s theory of Earth magnetism. In contrasts, Fracastoro and Patrizi exemplify thinkers whose aim is to come up with novel and unfounded concepts of the world (KGW VII,254.38–255.5). This is obviously not the path Kepler himself opts for, because we saw that he both builds upon the previous tradition and confronts his philosophical reasoning with observable phenomena. Nevertheless, one should note that – at least in Patrizi’s case – it is not altogether fair to claim that his intention was to promote an entirely new concept of the world. We shall return to this question in the conclusion.

1. *A History of the (Most) Ancient Astronomy*

The other passage in *Contra Ursum* where Kepler mentions Patriziis the second chapter, which presents an outline of the history of planetary hypotheses. Its main purpose was to refute Ursus’ claim that all important astronomical hypotheses regarding the motion of planets originated already in antiquity. This was allegedly also the case of Brahe’s geo-heliocentric model, which was said to have been anticipated in the system of Apollonius of Perga, a thinker active at the end of the third century BCE.[[33]](#footnote-33) Kepler admits at the very beginning of the chapter that Ursus gives an impression of being well-versed in the history of astronomy, although he misinterprets it for his own goals (277.3–7 = KGW XX,1,31.3–6). Kepler therefore sets himself the task of providing a more detailed and persuasive history of astronomy. In the following chapters (III and IV), he then proceeds to analyse in more detail the teaching of Apollonius of Perga and the question of originality of Brahe’s astronomical solution. Although in the course of this exposition of the history of ancient astronomy Kepler mentions Patrizi only twice (279.22, 280.4 = KGW XX,1,32.12, 17), the presence of the *Nova de universis philosophia* is pervasive there. In fact, Nicholas Jardine and Alain-Philippe Segonds show in their magisterial and richly annotated edition of *Contra Ursum* that Kepler extensively relied for his sketch of the history of astronomy on book XII of Patrizi’s *Pancosmia*, that is, the same book where Brahe is criticised.[[34]](#footnote-34)

Let us start with Patrizi’s account of the history of astronomy (*Pancosmia*, fol. 90d–91b). According to it, the first astronomers among the Greeks were Thales and Pythagoras who, however, relied on a yet more antient tradition. Thales derived his knowledge from the ancient Egyptians and allegedly wrote a lost book about the sphere. This remark was probably supposed to indicate that even at the beginning of Greek philosophy, there already existed advanced astronomical knowledge. Pythagoras, meanwhile, acquired his knowledge from the Assyrian sage Zabracus. As Patrizi explains in the preface to his edition of the *Chaldean Oracles*, Assyria was a part of Chaldea (*Zoroaster* 98). Moreover, Assyrian origin links the legendary Zabracus to the tradition of Zoroaster and his Magi, that is, the putative authors of the *Chaldean Oracles*, which are according to Patrizi the most ancient text we have at our disposal. Throughout the *Nova de universis philosophia*,he often refers to the *Oracles* both in astronomical and cosmological context.[[35]](#footnote-35) Patrizi further adds that the Pythagoreans devised the theory of spheres in which the bodies of celestial objects, including the epicycles, are fixed. In fact, this theory originated only later in the history of ancient Greek astronomy. It is likely that Patrizi probably found this information in some late Neoplatonist text, which enabled him to claim the doctrine is truly ancient.[[36]](#footnote-36) He further claims that Eudoxus, relying on the astronomy of Egyptian priests, replaced this astronomical model with the theory of concentric spheres. Callippus then elaborated it further and influenced the astronomy of Aristotle. Later on, as Patrizi says, the astronomical theory with epicycles was revived by Hipparchus and later adopted by Ptolemy, who also introduced the theory of the precession of equinoxes. But this idea was refuted by Proclus in his *Commentary on Timaeus*.[[37]](#footnote-37) The overall development of ancient Greek astronomical knowledge is thus framed by Patrizi’s favourite idea of ancient wisdom which contains the most precious knowledge that survived since the beginning of time. Thales and Pythagoras and his followers are thus claimed to have based their thoughts on into even older traditions, which were preserved in Egypt and Chaldea respectively.

Kepler, as noted above, drew in his outline of the history of astronomy on Patrizi’s account, but he also relied upon and quotes from other ancient texts, most notably Diogenes Laërtius and Aristotle’s *De caelo* and *Metaphysics*, book 12.[[38]](#footnote-38) Without going into the details of the astronomical discoveries and practice, let us now focus on Kepler’s account of subjects related to the most ancient thinkers who were interested in observing the sky. Similarly to Patrizi, in Kepler’s account the first such thinker was Thales, who is said to have visited Egypt and who allegedly learned how to calculate the eclipses from the Babylonians, whom Kepler (as well as Patrizi) identifies with the Chaldeans. From Chaldea and Egypt, Thales brought the knowledge of astronomy to Greece (277.8–278.20 = KGW XX,1,31.6–35). It is noteworthy that Kepler mentions Zoroaster as one of the Chaldeans who were versed in the ‘occult arts’ already in 1596, in an unpublished chronographic manuscript. He also adds, though, that in this region ‘the science of heavenly things’ was likewise preserved, the Chaldeans being the most ancient nation in the world (KGW XXI,2,1,128.21–27). In short, Chaldea is considered the cradle of astronomy, although Kepler focuses on its development in Greece.

On the whole, Kepler’s aim is different from Patrizi’s: Patrizi wanted to provide an account of ancient ideas about the order of the world in order to refute the validity of astronomical models in general. Kepler, by contrast, claims that already the earliest and half-legendary Greek thinkers formulated hypotheses about the structure and order of the heavens. By this argument, Kepler targets Ursus, who maintained that the notion of astronomical hypotheses was invented only shortly after Aristotle (which is incidentally more in line with current scholarship).[[39]](#footnote-39)

Kepler then goes on to argue that already Pythagoras was familiar with the order of planets that was promoted later by Ptolemy. Starting from the Earth and the Moon, Mercury and Venus are placed below the Sun. In contrast, Heraclitus, Plato, Eudoxus, and Aristotle place Venus and Mercury above the Sun (278.21–279.21 = KGW XX,1,31.36–32.12, see also 309.27–311.2 = KGW XX,1,44.42–45.20). These were the two orders of planets which competed in antiquity, the former usually called Chaldean, while the latter was known as Egyptian and generally considered older. But the venerable authority of Pliny and Ptolemy, whom Kepler mentions in the course of his exposition, enables him to show that Pythagoras proposed a true and more advanced system of planets than the philosophers and astronomers who came after him. From today’s perspective, he based this claim on later testimonies which projected more recent discoveries onto the legendary ancient sage and mathematician.[[40]](#footnote-40)

In making these claims, including the assertion about Pythagoras’s advanced astronomical theory, Kepler generally follows Patrizi’s *Nova de universis philosophia*.[[41]](#footnote-41) But it is only at this point that he adduces Patrizi as the authority according to whom the Persian sage Zoroaster, who lived many centuries before Pythagoras, held a similar opinion about the order of planets. Kepler quotes two alternative versions of a couplet attributed to Zoroaster from the *Chaldean Oracles*,which he found in the *Pancosmia*: ‘He constituted them six (*alternatively:* Suspending six zones); casting into the midst / the fire of the Sun’.[[42]](#footnote-42) These verses are to prove that, even according to this most ancient sage, the Sun is in the middle of the planets, though not in the centre of the world (279.21–280.3 = KGW XX,1,32.13–16). Current scholarship, however, maintains that this order of heavenly bodies, traditionally called Chaldean, is the result of later developments in the Hellenistic era.[[43]](#footnote-43) Still, Patrizi himself chooses to follow the authority of Hermes Trismegistus and places the Sun immediately after the Moon – which also happens to be the order accepted by Plato and Aristotle (*Pancosmia*, fol. 109a).[[44]](#footnote-44) Being a Copernican, Kepler naturally accepts neither of these two orderings but, as we shall see, he will try to find some traces of heliocentrism already in antiquity.

We may note that Kepler did not pay attention to other, partly similar, Oracles quoted the *Nova de universis philosophia* in a passage where Patrizi begins to explain his peculiar cosmology:

For the Father congregated seven firmaments of the world,

circumscribing heaven in a round figure.

He fixed a great company of inerratick stars.

And he constituted a septenary of erratick animals (ζώων).

Placing earth in the middle, and the water in the middle of the Earth,

The air above these.[[45]](#footnote-45)

There is one important point where Patrizi’s reading differs from the manuscripts as well as from modern editions of the *Chaldean Oracles*. In the fourth verse quoted above, he drops one ‘nu’ from the key expression and reads not ‘zones’ or ‘bands’ (ζωνῶν) but ‘animals’ or, more generally, ‘living beings’ (ζώων).[[46]](#footnote-46) But cosmic zones in which heavenly bodies move are mentioned also in other Oracles, including the one quoted by Kepler who obviously drew upon the text of the *Nova de universis philosophia*.[[47]](#footnote-47) The expression ‘zones’ naturally suggests that the idea of celestial spheres was somehow present in the Oracles. But by his altered reading of the verse in question, Patrizi manages to find explicit support for his concept of heavenly bodies as living beings already in the most ancient document of human knowledge, which he ascribes to Zoroaster. Once again, already Proclus interpreted the term ‘zones’ in the Chaldean verses he quotes not as traditional spheres but as the result of ‘the various acts of cognitions (νοήσεις)’ of ‘the wandering stars’. Thus conceived, the zones are just tracks, that is, demarcated sections of heavenly space where heavenly bodies move being propelled and guided by their respective souls.[[48]](#footnote-48) This is in accord with Patrizi’s ‘astrobiology’, which Kepler resolutely rejects, although they both deny the existence of planetary spheres.

Kepler then adduces the authority of Patrizi for the second time in *Contra Ursum* in order to claim that Pythagoras adopted this doctrine from Zabracus, who was supposed to be Chaldean like Zoroaster.[[49]](#footnote-49) This link enables Kepler to connect the Pythagorean order of planets with the most ancient sources of human wisdom. He adds that the Pythagoreans later modified this conception of the world, introducing the same ordering of heavenly bodies that was proposed by Aristarchus of Samos, a thinker active not long after Aristotle. The heliocentric system was later revived by Copernicus, who lived not long before Kepler (280.3–14 = KGW XX,1,32.17–27). In fact, Copernicus, too, was aware of the heliocentric system proposed by Aristarchus. He mentions Aristarchus in his autograph of *De revolutionibus*, unfortunately in a part of the manuscript that was left out from the Renaissance editions of his great book and rediscovered only in nineteenth century (*De revolutionibus*,476.4 Lerner, Segonds, and Verder). The question of whether Copernicus was aware of Aristarchus’ heliocentric theory was debated already by Renaissance scholars, including Patrizi (*Pancosmia* fol. 91bis-b). But Copernicus’ merely cursory mention of this thinker in a single passage of the *De revolutionibus*, a passage which he moreover left out from the first edition, strongly suggests that he developed heliocentrism independently. It is most likely that he introduced the reference to Aristarchus’ cosmology only later, when he was searching for a confirmation of his claims in ancient sources.[[50]](#footnote-50)

In order to situate the origins of the heliocentric doctrine even further back in time, Kepler claims that already Philolaus of Croton located the Sun into the centre of the universe.[[51]](#footnote-51) To prove the antiquity of this opinion, Kepler refers to the texts of Diogenes Laërtius and to a passage from the *Placita* which was traditionally – though mistakenly – attributed to Plutarch. This text, too, was quoted already by Copernicus but this time in a prominent place in the preface to *De revolutionibus* where he mentions some precursors of his cosmology (though not Aristarchus).[[52]](#footnote-52) Based on a meticulous study of Aristotle’s *De caelo* II,13, Kepler further argues that the founder of the Peripatetic school misunderstood the true meaning of the cosmology of Philolaus and other later Pythagoreans. This was because they tended to express their doctrines in riddling formulations (280.15–283.19 = KGW XX,1,32.28–34.4). Kepler made this claim, with reference to the same Aristotelean passage, in a letter to Herwart von Hohenburg dated to 30 May 1599, that is, written before he moved to Prague and at a time when just started to become involved in the controversy. In this letter, he claims that Aristotle’s criticism is misguided because he ‘did not understand enough the mind of the Pythagoreans and astronomy’ (*Aristoteli nec mentem Pythagoraeoroum, nec astronomiam satis cognitam fuisse*) (KGW XIII,348.1–358).[[53]](#footnote-53) Moreover, already in the *Mysterium cosmographicum*, which waspublished three years earlier (1596), Kepler refers to Pythagoras who, he claims, would have been able to properly develop the theory of five Platonic solids had he known Copernicus (KGW I,26.30–27.7).[[54]](#footnote-54)

After a detailed analysis of ancient texts, Kepler can thus conclude against Ursus that the heliocentric theory existed long before Aristarchus (283.17–19 = KGW XX,1,34.2–4).[[55]](#footnote-55) But, he continues, other Pythagoreans did not endorse the heliocentric cosmology: they returned to the order of the planets proposed originally by Pythagoras, namely, with the Sun in the middle of other heavenly bodies, but not of the world. Kepler then reconstructs at length the systems of Eudoxus and Callippus (283.20–308.9 = KGW XX,1,34.5–44.2) and concludes that it was Aristarchus, who lived sometime after Aristotle, who revived the heliocentric hypothesis. In fact, his version in places agrees even verbatim with what was held by the previous Pythagoreans (312.1–313.9 = KGW XX,1,45.44–45.31).

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It is instructive to follow in Kepler’s work the subsequent fortunes of representatives of ancient wisdom, of traditions that played such an important role in Patrizi’s *Nova de universis philosophia*. First, we should note that in his later writings Kepler no longer mentions Zoroaster although he frequently refers to the Chaldeans, especially in connection with astronomy and chronology (KGW XXII,471, s.v. *Chaldaei*).

During Kepler’s Linz period, his friend Florian Crusius, in a letter sent from Strasbourg and dated to 31 January 1618, mentions the idea of ancient wisdom and stresses the importance of both Zoroaster and Hermes Trismegistus. Unlike Kepler in *Contra Ursum*, Crusius goes as far as to ascribe to these ancient sages Copernican principles. He even quotes, using Patrizi’s Latin translation, the last four verses of the fragment of the Oracles cited above and ascribes this teaching to Zoroaster.[[56]](#footnote-56) In the same breath, he adduces some Hermetic doctrines which he claims are in accord with the thoughts of Moses (KGW XVII, no. 780.19–23, 45–46, 120–127). But on the whole, Kepler’s interest in both Zoroaster and Hermes Trismegistus apparently over time dwindled. We can observe this in his celebrated *Harmonice mundi*, published in the following year (1619), where while discussing Pythagorean tetractys, Kepler gives a summary of a similar doctrine of Hermes Trismegistus with a significant qualification ‘whoever he was’. He concludes his reasoning by saying: ‘either ‘Pythagoras Hermetises or Hermes Pythagorises’ (*aut Pythagoras Hermetiset, aut Hermes Pytagoriset*) (KGW VI,98.22–99.9),[[57]](#footnote-57) which indicates that he considered the Pythagorean tradition more worthy of attention than the tradition of Hermes Trismegistus. Moreover, the short Latin quotation Kepler adduces here is not from Patrizi’s appendix to the *Nova de universis philosophia*, which was by far the most complete edition of Hermetic writings during this period. His source is the first translation by Ficino (1571),[[58]](#footnote-58) which appeared in several editions and was thus widely available.[[59]](#footnote-59) It is also possible that Kepler did not have access to the *Nova de universis philosophia* while writing in Linz, in contrast to his situation in Prague, where while working on the *Contra Ursum* he was clearly able to consult it directly.

Furthermore, in a manuscript containing his preparatory work for the *Harmonice mundi*, Kepler claims that Hermes Trismegistus was ‘surely later than Pythagoras, and, according to the opinion of most learned men, not as old as some boast’ (*Pythagora procul dubio posterior, nec ita vetustus [sententia doctissimorum virorum], ut jactant nonnuli*) (KGW XXI,2,1.32–33), after which he refers to the Hermetic *Poimandres* along with some Platonic texts. It is most likely that both here and in his remark ‘whoever it was’ in the previous passage, Kepler was influenced by the discussion started by Isaac Casaubon in 1614. Based on meticulous textual study, Casaubon argued that the *Corpus Hermeticum* is significantly later than the proponents of the idea of ancient wisdom who situate Hermes Trismegistus to the time of Moses would have it.[[60]](#footnote-60) Once more, it is Pythagoras whom Kepler gives not only doctrinal but also temporal precedence.

Kepler talks about Hermes Trismegistus at more length in his *Apologia*, which was published in 1622 as a response to Robert Fludd’s criticism of his *Harmonice mundi*.[[61]](#footnote-61) Kepler makes a connection between Hermes and Paracelsus (KGW VI,399.1–27) and repeatedly mentions ‘your Hermes’ (VI,401.5–6, 421.29–30), thus pointing to a specific version of Fludd’s hermetic inspiration. This suggests that Kepler refers here rather to Hermes of the ‘northern’, alchemical, tradition to which his opponent belongs and not to the notion of ancient wisdom developed by Ficino and Patrizi in Italy.[[62]](#footnote-62)

The previous discussion clearly indicates that of the thinkers viewed as belonging to the ‘ancient wisdom’, Kepler definitely prefers Pythagoras and his followers. In fact, it is so already in his first major work, the abovementioned *Mysterium cosmographicum*, where in a prominent passage at its very beginning Kepler claims that the theory of five Platonic solids which he develops on a cosmic scale is in fact an ancient teaching of Pythagoras (KGW I,4, 9.2–7). A little further, in the original preface, Kepler maintains that his work contains nothing new since the Pythagoreans treated a similar subject already two thousand years ago (KGW I,5.17–19, 26.33–37). Already at the start of his writing career, Kepler therefore viewed himself as reviving and perfecting their ancient doctrines.[[63]](#footnote-63) Similarly, in a letter to his teacher Mästlin written in Graz on 19/29 August 1599, when searching for harmonies among planets, Kepler jokingly boasts that if he is wrong, Pythagoras should come back to correct him ‘unless his soul has migrated into me’ (*nisi si eius anima in me migravit*) (KGW XIV, no. 132.466–468).[[64]](#footnote-64) In some of his later writings, Kepler repeats the conclusions he reached in his then unpublished treatise *Contra Ursum.* He returns to *De caelo*,chapter II,13, in another letter to Herwart von Hohenberg written in Prague on 28 March 1605. In the course of giving a detailed analysis of the passage, Kepler argues that the fire should be located in the middle of the universe and that it designates the Sun (KGW XV, no. 340.292–320).Similarly, in the *Astronomia nova* published in 1609, he repeats that by placing fire in the centre of the world the Pythagoreans had in fact the Sun in mind. For this reason, they can justly be considered the forerunners of Copernicus (KGW VI,24.21–26, 88.19–22). Kepler repeats similar claims several times in his *Epitome* as well(KGW VII,259.34–35, 261.39–262.6, 262.31–32, 262.45–263.4).

But it is in the *Harmonice mundi* that the Pythagorean inspiration comes to the surface most clearly. Already in the proem, Kepler defends Pythagorean (and Platonic) philosophy against misinterpretations by Aristotle as well as later, contemporary scholars. He claims that the Pythagoreans agree with his own position not only in placing the five regular solids in-between the planets but also regarding heliocentrism, which was later revived by Copernicus. In claiming this, Kepler has obviously once more Aristotle’s *De coelo*, II,13, in mind. Here, too, Kepler repeats that Aristotle misunderstood the Pythagoreans because they expressed their teaching ‘wrapped in words’ (*involucris verborum*) or ‘in a riddle’ (*in aenigmate*), because the teaching was part of Pythagorean mysteries (*in Mysteriis Pyhtagoreorum*) (KGW VI,17.2–18.21).[[65]](#footnote-65) In book II, proposition 25, of the *Harmonice mundi*, Kepler repeats this claim and maintains that the true cosmological significance of five Platonic solids was probably known to the ancients but they ‘kept it in secret, in the manner of their sect’ (*eandem doctrinam etiam veterum fuisse, sed ocultatam more sectae*). Afterwards, once again, Kepler presents Aristarchus of Samos as an ancient precursor of the Copernican worldview, which is in fact in line with Pythagorean teachings (KGW VI,80.12–82.7).[[66]](#footnote-66) Similarly, in the final chapter of the last book of this pivotal work, Kepler repeats several times that the ancient Pythagoreans placed the fire, i.e., the Sun, in the centre of the world (KGW VI,363.14–368.22).[[67]](#footnote-67) Kepler summarises his previous insights into Aristotle’s *De caelo* in his notes to a German translation which were written at some point during his stay in Linz in the years preceding the publication of the *Harmonice mundi*. Here he connects this text on ancient Pythagoreans explicitly with Aristarchus, who was moreover born on the island of Samos, just like Pythagoras. Kepler adds that the same doctrine was promoted two thousand years later by Copernicus without awareness of Aristarchus’s doctrine (KGW XX,1,161–163).[[68]](#footnote-68) We saw that this claim is not entirely true, although Copernicus indeed cannot be seen just as someone who simply revived this ancient heliocentric doctrine.

*Conclusions*

A comparison between Patrizi’s *Nova de universis philosophia* and Kepler’s writings, especially the *Contra Ursum*, offers a precious insight into key philosophical topics that were discussed in relation to nature and the world at the end of sixteenth and at the beginning of the seventeenth century. Broadly speaking, there are certain similarities in Kepler’s and Patrizi’s background: they both rejected the long-established authority of Aristotle and they both draw on many texts belonging to the Platonic tradition, most notably Proclus. They also both more generally react to the situation of late sixteenth century when the long-held image of the heavens consisting of spheres as well as Aristotelean physics crumbled and various attempts were made to replace it. In astronomy, it was felt that the competing hypotheses regarding the order of the heavens going back to antiquity should be replaced by more a philosophical and physical approach that would express the true and definitive description of the world.

But there are naturally also some important differences between Kepler’s and Patrizi’s respective projects. We have seen that Kepler criticised Patrizi for his astrobiology, that is, the idea that the motions of celestial bodies are directed primarily by their souls, meaning that celestial bodies literally move according to their own will. Nevertheless, we also saw that within the broader picture Patrizi presents in his *Nova de universis philosophia*, their motion is in fact subordinated to the influence of higher entities, such as the soul of the world and the metaphysical principles of all there is. Although the infinite space, which is one of Patrizi’s key principles, is in its nature mathematical, it does not lead to a proper mathematical description of the motions of celestial bodies. For Kepler, in contrast, that was the task on which he worked throughout his life. This effort resulted in the three famous laws that determine relations between the celestial bodies. Kepler thus developed further Copernicus’ cosmological intuition of a harmonic and symmetric arrangement of heavens. But for Kepler, as for Patrizi, mathematical laws are an expression of higher metaphysical principles, namely the divine archetypes.

There is yet another difference between the versions of Platonism Kepler and Patrizi rely on. Patrizi’s system elaborates a gradualist metaphysics where the main metaphysical and physical principle of light is progressively transformed from an incorporeal to a corporeal form. This results in a situation where different parts of the physical world have different qualities and thus for instance the newly appearing stars are in fact immaterial flames. This is not acceptable for Kepler, who argues for a more united cosmos in which the phenomena on the Earth and in the heavens have similar physical causes.

Another source of inspiration the two thinkers share is their interest in the development of ancient philosophical thought. We saw that although Kepler believes that Patrizi misunderstands the proper task of astronomy, in *Contra Ursum* he clearly treats him as an eminent scholar and uses his writings as a source of information about the history of ancient conceptions of the ordering of the world. But Patrizi’s history is of very special kind: it is shaped by the notion of unsurpassable ancient wisdom, in which Zoroaster and Hermes Trismegistus play a key role. Kepler, on the other hand, gradually lost interest in the teachings attributed to these legendary sages. He increasingly focused on his own line of thought, which had to do with the – albeit embryonic – presence of heliocentrism in the teaching of the ancient Pythagoreans, that was later more adequately developed by Copernicus (and Kepler himself). Kepler thus extended Copernicus’s rather casual quotation of Philolaus as a precursor of his own system into something one could call Copernican Pythagoreanism. This claim was later accepted by also Newton who likewise searched for the origins of heliocentrism in the most ancient layers of European thought.[[69]](#footnote-69)

There is another similarity and difference between Patrizi’s and Kepler’s approach to the development of human knowledge. It should be noted that their key works both propose a ‘new’ conception of the world: within the space of less than two decades, Patrizi published the *Nova de universis philosophia* (1591) and Kepler his *Astronomia nova* (1609). But we should not regard these books as the projects aimed at innovation or progress in their fields. The adjective ‘new’, which figures in both titles, indicates rather a renewal than a ground-breaking discovery. Patrizi believed in a perfect and complete original wisdom that deteriorated and became fragmented and half-forgotten over time. In fact, one of the main culprits of this decay was in his view Aristotle who, driven by his ambitions, criticised previous philosophers who had been much closer to the truth, and introduced questionable innovations of his own. Thus, the task Patrizi set for himself was to collect various pieces of ancient wisdom, most notably the texts attributed to Zoroaster and Hermes Trismegistus, and use them to create his own Platonising system.[[70]](#footnote-70)

Kepler, too, wanted to revive an ancient wisdom. He, however, focused on the heliocentric system of the world that was – as he alleges – known already to the Pythagorean Philolaus but then entirely forgotten to be only recently revived by Copernicus. Unlike Patrizi, he did not search for ancient knowledge in texts allegedly written by legendary oriental sages. His goal was to reconstruct the developments and discussions within ancient Greek astronomy. Kepler strongly believed in progress in astronomical knowledge, and it was this progress that led to the development of the tradition of heliocentrism, introduced already by the ancient Pythagoreans. He was convinced that its perfect form is one where heliocentrism is expressed terms of mathematical laws according to which celestial bodies behave.[[71]](#footnote-71) The development of astronomical science thus consists in a successful mathematisation (rather than mechanisation) of the physical world.

What Kepler and Patrizi share is that Renaissance Platonism significantly shaped their ‘new astronomy’. Both Patrizi’s astrobiology or Kepler’s search for Pythagorean harmonies in the world thus certainly played a significant role in the process which modern scholars call the scientific revolution.[[72]](#footnote-72)

1. On this dispute, see especially Jardine (1984) and Jardine and Segonds (2008), which alongside other relevant texts, all in a French translation, includes the best available edition of *Contra Ursum*. This study relies heavily on the work of these two scholars. [↑](#footnote-ref-1)
2. Patrizi, *NUPh*, *Pancosmia*, 12, fol. 91bis-b-c. [↑](#footnote-ref-2)
3. See Rossi (2006), p. 202–206, Vesel (2012); cf. also Jardine and Segonds (2008), vol. II/2, p. 432–434, and Vesel (2014). [↑](#footnote-ref-3)
4. See also a French translation in Jardine and Segonds (2008), vol. I, p. 240–241; cf. vol. II/2, p. 432. [↑](#footnote-ref-4)
5. Cf. Thoren (1990), p. 406–410, Christianson (2000), p. 229–232. On relations between Jessenius, Tycho, and Kepler, see Nejeschleba (2008), p. 129–137, (2014); cf. also Jardine and Segonds (2008), vol. I, p. 19, 244–245. In the catalogue of Brahe’s books and manuscripts which Kepler compiled after the death of his patron, it is noted that Brahe planned to discuss the Patrizi’s views (*inquirere in ... Patritii placita*) at the end of the first book of *Astronomiae instauratae progymnasmata* (KGW XX,1,92.26). The volume was published only posthumously in Prague in 1602/3. [↑](#footnote-ref-5)
6. Cf. Barnes (2009), Nejeschleba (2014), Palumbo (2018), esp. p. 60–65. [↑](#footnote-ref-6)
7. This suggestion is made by Jardine and Segonds (2008), vol. II/2, p. 434. For a detailed account of Jessenius’ use of Patrizi’s *Nova de universis philosophia* in his *Zoroaster*, see Nejeschleba (2008), p. 79–98, summarised briefly in Nejeschleba (2014), p. 362–363; for a detailed analysis of Jessenius’ knowledge of Patrizi’s cosmology and contemporary astronomical debates, cf. Horský (1955). [↑](#footnote-ref-7)
8. Cf. Jardine and Segonds (2008), vol. I, p. 199–251. [↑](#footnote-ref-8)
9. Cf. Rossi (2006), p. 190–191. [↑](#footnote-ref-9)
10. Cf. Lerner and Segonds (2008). [↑](#footnote-ref-10)
11. See Jardine and Segonds (2008), vol. II/2, p. 550–552. [↑](#footnote-ref-11)
12. See Jardine and Segonds (2008), vol. II/2, p. 430–431. [↑](#footnote-ref-12)
13. See the references to Patrizi’s *Nova de universis philosophia* along with quotations of the Latin text and French translation in Jardine and Segonds, vol. II/2, p. 434–439. For Patrizi’s criticism of the traditional astronomy and his own vitalist cosmology (astrobiology), see Rossi (2006), ch. 5, and Vesel (2014). [↑](#footnote-ref-13)
14. Cf. Granada (2006), p. 129 for Patrizi; see also Lerner (2008), vol. II, esp. p. 10, 43–64, 104–114. [↑](#footnote-ref-14)
15. Jardine and Segonds (2008), vol. II/2, p. 440. [↑](#footnote-ref-15)
16. Jardine and Segonds (2008), vol. II/2, p. 441–442. [↑](#footnote-ref-16)
17. Cf. Rossi (2006), ch. 6, Lerner (2008), vol. II, and Granada (2009). [↑](#footnote-ref-17)
18. See Rossi (2006), ch. 5. [↑](#footnote-ref-18)
19. See Proclus, *In Remp.* II,233.24–23413, *In Tim.* III,78.29–80.22, 128.13, cf. Siorvanes (1996), p. 146, 295, 299–300, Jardine and Segonds (2008), vol. II/2, p. 439. [↑](#footnote-ref-19)
20. See Proclus, *In Remp.* II,227.23–235.3, *In Tim.* III,116.22–121.4, cf. Siorvanes (1996), p. 278–284, with further references. [↑](#footnote-ref-20)
21. Cf. Siorvanes (1996), p. 310–311, Classens (2011), Regier (2016), and Adamson and Karfík (2017), p. 311–313. [↑](#footnote-ref-21)
22. Cf. Védrine (1996), Muccillo (2010), (2011), and De Risi (2016); Patrizi was inspired by late Neoplatonists, especially Proclus, but he developed their ideas further, *ibid.*, p. 56; 81, n. 52; 86; 89, n. 65. [↑](#footnote-ref-22)
23. Cf. Granada (2008). [↑](#footnote-ref-23)
24. Cf. Baker and Goldstein (2001), p. 107–110, and Bialas (2004), p. 78–80, 93; see further Lindberg (1986), p. 38–40, Martens (2000), p. 81–84, 94–95, 102–110, 137–138, 145, 156–157, 161–166, 173, with further references, and Granada (2010). [↑](#footnote-ref-24)
25. See a detailed discussion in Boner (2013). [↑](#footnote-ref-25)
26. Cf. Rossi (2006), p. 197–199; see also Granada (2010), p. 112–114, 118. [↑](#footnote-ref-26)
27. For a detailed analysis of Kepler’s criticism of Patrizi regarding the origin of stars, see Boner (2009), (2013), p. 97–103, 113. [↑](#footnote-ref-27)
28. See Lindberg (1986), p. 35–38, for a broader background of Kepler’s theory of light; Patrizi is mentioned in this connection at p. 29, 35. [↑](#footnote-ref-28)
29. Cf. Puliafito (1987), p. 192–196. [↑](#footnote-ref-29)
30. Cf. Puliafito (1988) and Deitz (1999). [↑](#footnote-ref-30)
31. Cf. Martens (2000), p. 48–49, 137–141, with further references. [↑](#footnote-ref-31)
32. Kepler voices a minor criticism of Patrizi in a letter to Herwart von Hohenberg written in Prague in late January 1607. Here, Kepler brings up Patrizi’s name in connection with the subject of the tides. He claims that ‘if he remembers well’, Patrizi in his explanation of the tides does not view the Moon as their possible cause (KGW XV, no. 409.34–36). This is indeed a topic which Patrizi discussed in his *Nova de universis philosophia* although in different chapters of the *Pancosmia* than Kepler invoked in his previous writings. See *NUPh. Pancosmia*, 29, fol. 141d–142d;cf. Akopyan (2019), p. 660. [↑](#footnote-ref-32)
33. Cf. Jardine and Segonds (2009), vol. I, p. 140–141. [↑](#footnote-ref-33)
34. *NUPh. Pancosmia*, l. 12, fol. 90d–91b;cf. Jardine and Segonds (2009), vol. II/2, p. 450–455; see also Rossi (2006), p. 193–196. [↑](#footnote-ref-34)
35. Cf. Hladký (2019) on the use of the *Chaldean (Magian) Oracles* in Patrizi’s *Nova de universis philosophia*. [↑](#footnote-ref-35)
36. Jardine and Segonds (2009), vol. II/2, p. 460, refer to Proclus, *Hypot.* I,34–35, and Simplicius, *De cael.* 507.9–14. [↑](#footnote-ref-36)
37. The reference is to Proclus, *In Tim.* III, p. 124.18–126.5; cf. Jardine and Segonds (2009), vol. II/2, p. 453. [↑](#footnote-ref-37)
38. See detailed notes of Jardine and Segonds (2009), vol. II/2; for Kepler’s use of Aristotle, see also Jardine and Segonds (2001). [↑](#footnote-ref-38)
39. Cf. Jardine and Segonds (2009), vol. II/2, p. 459–460. [↑](#footnote-ref-39)
40. Cf. Jardine and Segonds (2009), vol. II/2, p. 460–461. [↑](#footnote-ref-40)
41. Patrizi, *NUPh. Pancosmia*, l. 12, fol. 90d–91a; cf. Jardine and Segonds (2009), vol. II/2, p. 460–461. [↑](#footnote-ref-41)
42. The translation is based on Stanley (1661), p. 33, who follows closely Patrizi’s edition. Kepler quotes the couplet in Greek: Ἕξ αὐτοὺς ὑπέστησεν (*aliter* Ἕξ ἀνακρεμάσας Ζώνας) ἕβδομον ἡελίου / Μεσεμβολήσας πῦρ. The first version of the verse is quoted in *Pancosmia*, l. 5, fol. 76d; l. 18, fol. 105c, the second one in l 15, fol. 97b; l. 19, fol. 108a. Otherwise, the second version appears in *Panaugia*, l. 17, fol. 16c. Cf. also Jardine and Segonds (2008), vol. II/2, p. 461–462.

The first version appears in Patrizi’s edition of the *Chaldean Oracles* as verses *Zor.* 193-194 (192-193) = Proclus, *in Tim.* III,132.32–33 = *Orac. Chald.* fr. 200 des Places. The second version is significantly altered to become the following verse in Patrizi’s edition, *Zor.* 194 (195) = Proclus, *in Tim.* III,63.22–24 = *Orac. Chald.* fr. 58 des Places. For this reason, it is apparent that Kepler relied on reading of Patrizi’s exposition in the *Pancosmia* or, less likely, in the *Panaugia*, and not on the edition in the first appendix to the *Nova de universis philosophia*. [↑](#footnote-ref-42)
43. Cf. Majercik (1989), p. 166, on fr. 5, with further references. [↑](#footnote-ref-43)
44. Cf. Hladký (forthcoming), p. ??. [↑](#footnote-ref-44)
45. The verses are quoted at length in *NUPh. Pancosmia*, l. 7, fol. 80a.Procl. *in Tim.* I,317.22–28 = *Orac. Chald.* 57 des Places = *Zor.* 180–185 (181–186), transl. Stanley (1661), p. 32. Patrizi’s edition and his Latin translation:

῾Επτὰ γὰρ ἐξώγκωσε πατὴρ στερεώματα κόσμων. / Τὸν οὐρανὸν κυρτῷ σχήματι ἐπικλείσας. / Πῆξε δὲ πολὺν ὅμιλον ἀστέρων ἀπλανῶν. / Ζώων δὲ πλανωμένων ὑφέστηκεν ἑπτάδα. / Γῆν δ’ ἐν μέσῳ τιθείς, ὕδωρ δ’ ἐν γαίας κόλποις, / Ἠέρα δ’ ἄνωθεν τούτων. *Septem enim in moles formavit pater firmamenta mundorum.* / *Coelum, rotunda figura circumcludens.* / *Fixitque multum coetum astrorum inerrantium.* /*Animaliumque errantium, constituit septenarium.* / *Terram in medio posuit, aquamque in terrae sinibus.* / *Aeremque supra haec*. The key verse (183) 184 is also quoted in the *Pancosmia*,l. 18, fol. 105c. [↑](#footnote-ref-45)
46. See further Hladký (2019), p. 271–274. [↑](#footnote-ref-46)
47. Cf. *Orac. Chald.* 57, 188. [↑](#footnote-ref-47)
48. Proclus, *In Tim.* III,132.26–133.10; cf. Siorvanes (1996), p. 282, 296. [↑](#footnote-ref-48)
49. Cf. Jardine and Segonds (2008), vol. II/2, p. 462. [↑](#footnote-ref-49)
50. Cf. the commentary to Copernicus, *De rev.*, ed.Lerner, Segonds, and Verder, vol. I, p. 561–562, vol. III, p. 596–597. [↑](#footnote-ref-50)
51. For a reconstruction of Philolaus’ cosmology within the context of previous Pythagorean tradition, see Huffman (1993), p. 240–261, (2013); cf. also Kahn (2001), ch. 1–3. [↑](#footnote-ref-51)
52. Copernicus, *De rev.* praef., p. 8.11–16 Lerner, Segonds, and Verder, cf. commentary *ad loc*, vol. III, p. 57–??, and Casini (1994), p. 7–17, (1998), p. 98–106. Copernicus mentions Philolaus also in the suppressed part of the autograph, *De rev.* 476.3 Lerner, Segonds, and Verder, cf. commentary *ad loc.*, vol. III, p. 598. On Copernicus’s connection to the Pythagorean tradition, see also Kahn (2001), p. 159–161. [↑](#footnote-ref-52)
53. Cf. Jardine and Segonds (2008), vol. II/1, p. 50–51, vol. II/2, p. 470–471. [↑](#footnote-ref-53)
54. Cf. Jardine and Segonds (2008), vol. II/1, p. 50–51; vol. II/2, p. 470–471. [↑](#footnote-ref-54)
55. Cf. Jardine and Segonds (2008), vol. II/2, p. 469–470. [↑](#footnote-ref-55)
56. *Zor.* 182–185. [↑](#footnote-ref-56)
57. Trans. Aiton, Duncan, and Field, p. 136–137; cf. Casini (1998), p. 126–127, and Peruzzi (2014). Kepler mentions Hermes also further in passing at KGW 375.4–5. [↑](#footnote-ref-57)
58. *Unitas secundum rationem Denarium complectitur, rursumque Denarius unitatem.* KGW VI,98.24–25 = *Pimander*, XIII.125–126 = *CH* XIII,12 at the end. Ficino finished his translation in April 1463, and it was first published in a defective form in 1471. The editors suggest that Kepler quotes the passage from the translation of François de Foix de Candale published in 1574, fol. M1v (KGW VI,534, to 98.23) but the text is different. Patrizi’s version can be found in *NUPh. Hermes Trismegistus*, fol. 16v at the end. [↑](#footnote-ref-58)
59. Cf. Dannenfeldt (1960). [↑](#footnote-ref-59)
60. Cf. Casini, p. 131, on the demise of the authority of Hermes Trismegistus during this period; see Mulsow (2002). [↑](#footnote-ref-60)
61. See Westman (1984), and Casini (1998), p.130–136, cf. also a boog-length account of Michalík (2014). [↑](#footnote-ref-61)
62. See also other passages where Hermes is mentioned: KGW VI,432.20, 30–31, 449.24, 451.30, 453.29–31, 456.9–10. For a classification of diverse traditions ascribed to the legendary figure of Hermes Trismegistus, see Ebeling (2009). [↑](#footnote-ref-62)
63. Cf. Tangherlini (1972), p. 126–127, Casini (1994), p. 25–33, (1998), p. 120–123; see also Casini (2007), p. 449–454. [↑](#footnote-ref-63)
64. Cf. Caspar (1993), p. 95–96 (including the translation quoted above), see also p. 92–93, Kahn (2001), p. 165; on the place of Kepler in the Pythagorean tradition, see Kahn (2001), p. 161–172. [↑](#footnote-ref-64)
65. Cf. Jardine and Segonds (2008), vol. II/2, p. 471–473, 486. [↑](#footnote-ref-65)
66. Trans. Aiton, Duncan, and Field, cf. also Casini (1998), p. 123–125, and Jardine and Segonds (2008), vol. II/2, p. 473–474. On Pythagorean motifs in Kepler’s *Harmonic mundi*, see Tangherlini (1972). [↑](#footnote-ref-66)
67. For further references see Jardine and Sedgonds (2008), vol. II/2, p. 473–476. [↑](#footnote-ref-67)
68. On this text by Kepler, see KGW XX,1,494–495. [↑](#footnote-ref-68)
69. Cf. Hladký (forthcoming), p. ??. [↑](#footnote-ref-69)
70. Cf. Casini (1998), p. 140–143, (2007). [↑](#footnote-ref-70)
71. Cf. Jardine (1984), p. 222–223, Grafton (1997), esp. p. 188–189, 213–220, Martens (2000), p. 4, 103, and Methuen (2009). [↑](#footnote-ref-71)
72. For the role of Ficino’s and Patrizi’s Platonism in the Renaissance discussions of the new worldview, see Horský (1966), (1967). [↑](#footnote-ref-72)