Kepler's Cosmological Synthesis: Astrology, Mechanism and the Soul by Patrick J. Boner

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Johannes Kepler has always been something of a puzzle if not a scandal for historians of science. Even when historians acknowledged Renaissance, magical, mystical, Neoplatonic/Pythagorean influences, they dismissed or minimized them as due to youthful exuberance later corrected by rigorous empiricism and self-criticism. The pressure to see Kepler as a mathematical physicist and precursor to Newton's synthesis remains seductive because it provides such a neat and relatively simple narrative. As a result, the image of Kepler as a mechanistic thinker who helped to demolish the Aristotelian world view has prevailed—and this despite persuasive characterization of Kepler as a transitional figure, the culmination of one tradition and the beginning of another by David Lindberg [1986] in referring to Kepler's work on optics and by Bruce Stephenson [1987, 1–7] in discussing Kepler on physical astronomy.

In this brief study, Patrick Boner once again challenges the image of Kepler as a reductivist, mechanistic thinker by summarizing and quoting passages of works and correspondence covering many of Kepler's ideas, both early and late, that confirm how integral Kepler's animistic beliefs were with his understanding of natural, physical processes. Among Boner's targets, Anneliese Maier [1937], Eduard Dijksterhuis [1961], Reiner Hooykaas [1987], David Keller and E. Brummer [2002], Carolyn Merchant [1989], and Max Oelschlaeger [1991] stand out.

In a brief introduction, Boner summarizes the chapters in the book, with chapter 1 providing preliminary remarks emphasizing the continuity in Kepler's cosmology and the indispensability of vitalistic agency for Kepler's

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mature conception of cosmic harmony. In this context, Boner discusses Kepler's notion of 'aspects', by which he meant mathematically meaningful configurations, a geometrical proportion or geometrical harmony, formed by two or more planets to which the soul of the Earth responds [33–37]. An aspect is a relation of terms, a being of reason, not a substantive thing in itself, for it is a geometrical connection between the light rays of two planets here on Earth. In other words, celestial harmony belongs to the Earth and in Kepler's version this meant, of course, a moving Earth. One cannot overestimate the importance of this conception for Kepler's understanding of astrology and how this doctrine contains in embryo the guiding principle behind Kepler's reform of astrology.

With chapter 2, Boner proceeds with a more chronological ordering.[1] Kepler's early career in astrology (1594–1599), the subject of chapter 2, rehearses the complexity in Kepler's evaluation of astrology. A selective reading could easily mislead one into thinking that Kepler saw no value in astrology whatever. His brutal critique of predictive astrology and its practitioners obscures Kepler's acceptance of a physical or natural philosophical connection between the planets and Earth, with astronomy and astrology sharing the same *metaphysical* foundations in geometry. According to Boner [42], 'Kepler applied geometrical principles to the two by way of analogy'. Boner understands 'analogia' in the sense of a 'method of reasoning from parallel cases'.

> [A]ll material phenomena, from the motions of the planets to the effects of the heavens on the weather to the production of particular melodies, derived from the same singular set of geometrical principles. Seen in this way, astronomy, astrology, and music shared the same archetypal origins.

In my view, this is the philosophical crux of the matter, namely, what Kepler understood by 'analogy', 'geometrical principle', 'archetype', and 'harmony'. The relation between archetypical principles in nature and the principles already present to our intellect suggests a kind of Platonic remi-

[1] The reader should check the dates of works cited since, on occasion, Boner reaches back and projects forward, citing Kepler's works by reference to the modern edition by Caspar and Van Dyck [1937–], which makes for brief footnotes but leaves readers to check the date of the text's composition or first publication in the bibliography. The author could have saved the reader some trouble here by including the original date of publication in brackets.

niscence found in the *Meno* but without the doctrine that the archetypical principles recollected have a being separate from nature: for Kepler, these principles are *in* nature.

Boner's treatment of metaphysical archetypes, geometrical principles, and harmonic proportions, and of their connection with Kepler's interpretation of astrological aspects is persuasive. The aspects do not determine but rather shape the daily activities of individuals by 'stamping' an original imprint on the soul at the moment of birth. Useless for purposes of prediction, they serve an explanatory function. What his astrology focuses on, then, are 'the causes of aspects' [63]. Typical of Kepler, from what we know of his astronomy, he tested these ideas against observation.

Chapters 3 and 4 summarize Kepler's reactions to new observations that coincided with the composition of the *Astronomia nova*. Already analyzed and given some emphasis by Rabin [1987, 1997], Kepler's *Treatise on the New Star* [1606] took the appearance of a new bright star in 1604 as an opportunity to explain it 'according to his new and causal astronomy' [71]. The star appeared close to the conjunction of Mars, Jupiter, and Saturn shortly after the beginning of an astrological period known as the Fiery Trigon. Even as Kepler denounced the astrological interpretations of others, he saw the appearance of the star in conjunction with Mars, Jupiter, and Saturn in the fiery signs of Aries, Leo, and Sagittarius as a sign of divine intervention. To Kepler, the event provided an example of why God had set Earth in motion around the Sun, namely, as he expressed it more explicitly in 1610, to allow us to survey the heavens and by triangulation make measurements from the separation of Earth's stations [73].

Beyond that result, however, Kepler used the event to defend and reform astrology [76]. The context is the devastating attack on astrology by Pico della Mirandola in his *Disputationes adversus astrologiam divinatricem* of 1496. The reaction to that critique is now the subject of a highly controversial account of the origin of the Copernican theory and the complex developments of the long 16th century [Westman 2011]. I comment on Westman's study here only to the extent that it relates to Kepler's reading of Pico and his effort to reform astrology. The central question is the explanation for Copernicus' decision to formulate/adopt the heliocentric theory. Many of us are satisfied that Copernicus formulated his theory in reaction to some problems with geocentric astronomical models and assumptions that geocentric

theories could not resolve. There are disagreements about which problems but defenders of this approach are satisfied that the explanations are adequate to account for Copernicus' formulation of a heliocentric alternative. Westman and others consider such accounts to be underdetermined because they do not supply a sufficient explanation. Pico's critique, according to Westman, made the problem of the unique ordering of the planets not just an astronomical problem but constituted a threat to astrology.

Whatever problems of detail there may be, the real question here, in my view, is whether a weakness in geocentric theory was sufficient to explain Copernicus' theory or whether something more imminent, concrete, and relevant to the role of the stars in the comprehension of the cosmos and of the human relation to it was at stake. Here is not the place to discuss this issue with regard to Copernicus further. There is no doubt in Kepler's case that he reacted to Pico's critique of astrology. Four chapters of the *De stella nova* defend astrology from Pico's critique by reforming it in accord with his emphasis on aspects and natural correspondences as opposed to those he regarded as purely cultural and coincidental. Kepler departed from Pico in affirming the influence of sunlight directly on Earth and indirectly by reflection from the other celestial bodies. The influence here, however, he attributed more to a kind of terrestrial sense organ in the souls of Earth and human beings which by 'a divine instinct' allowed terrestrial souls to recognize configurations in the heavens. 'Kepler considered this sudden correspondence of external appearances with the internal archetypal principles of the soul a reawakening' [83].

Although Boner makes no reference to Plato here, the resemblance to the Platonic doctrine of recollection seems unmistakable, interpreted, however, mathematically not just as an allegory but as a power in souls to identify 'order and proportion' in sensible harmonies by reference to their own archetypical principles [83]. This explanation comes from the later *Harmony of the World* but already in his *De stella nova* Kepler refers to the archetypical principles as part of a spiritual formative faculty and seminal reason. Kepler's empirical bent, however, pushed him to seek physical confirmation and he thought he could find it in weather conditions.

Boner struggles with Kepler's analogies and their relation to reality but there can be no mistaking Kepler's belief that the archetypical principles stamped on the soul of Earth triggered the Earth soul's sensitivity to celestial configu-

rations and astrological aspects. The communication is formal, 'expressed in the language of the geometrical archetypes' [90]. The correspondence between evidence and geometrical polygons is a well-known feature of Kepler's cosmological vision. Yet, at times, Kepler suggests a physical and causal relationship between the celestial and terrestrial. The famous account in his *Mysterium cosmographicum* [1596] of the regular polyhedra and the number of planets might be taken as merely explanatory (*ratio numeri planetarum*). But Boner interprets 'ratio' as causal: 'Kepler positioned the polyhedra among the planets in order to determine the physical structure of the cosmos' [93]. They are explanatory but they are evidently more than that. Kepler believed that the ratios determine the structure of the universe. In his *De stella nova*, however, Kepler elaborated the way in which metaphysical archetypes produced new forms and celestial novelties by means of a kind of natural faculty in the celestial ether, again relying on anatomical analogies. Likewise, he thought that the soul of Earth had a natural faculty similar to the one in the celestial ether. Boner interprets this as 'another dimension of Kepler's "integrated physics of the heaven and the earth,"…' [94]. Even though the natural faculty acted everywhere, Kepler did not homogenize ether and air, and so material differences remained even as processes generated new forms according to the same underlying principles.

Likewise, although he affirmed the role of God and the appearance of the new star as a sign *of* God, he rejected or resisted almost every interpretation of the new star as a sign *from* God with some determinate political significance. For Kepler, it provided an opportunity for individuals to reflect on their spiritual condition. The new star was the result of divine providence and a sign of our weakness and dependence.

The appearance of comets in 1607 and 1618 evoked from Kepler conjectures about the natural effects of the comet, mostly of a meteorological kind. Yet, following Tycho, Kepler regarded the comets as celestial objects, the motions of which, however, he interpreted heliocentrically, that is, as affected by Earth's diurnal and annual motions. The most controversial feature of his first report concerned the suggestions that comets could pass into and out of existence, and that the heavens are corruptible, an idea that the theologians at Leipzig found objectionable.

Kepler did not deny altogether astrological influences on one's character but in keeping with the principle of a general, not a special, divine providence.

Three comets appeared in 1618 which Kepler again interpreted as a call to reflect on the human spiritual condition. In considering specific predictions, the lesson that Kepler drew is that such events, in that they are consistent with general providence, were, in fact, warnings against the danger of specific predictions. They were *retrospectively revealing*. These were divinely caused events intended for the human race but not for the foolish reasons concocted by most astrologers.

Kepler seems to have thought that we could account for the location and motion of the comet of 1607 only 'by supposing the motion of the earth' [121]. It is doubtful that he regarded his argument as proof but he presented the evidence from this and the comets of 1618 as more consistent with the heliocentric theory. His account was furthermore coherent with his beliefs about the finiteness of the universe and its material constitution as 'fluid and everywhere penetrable' [124].

Finally, Kepler applied his ideas about geometrical archetypical principles to comets. Comets 'followed a course according to architectonic principles that were realized by a natural faculty and recalled the essence of the divine author' [128]. It followed that he saw a natural connection as well between a comet and an internal terrestrial faculty that affected weather, a connection which required careful observation of correlations.

Kepler was, however, more cautious about the celestial substance on which the natural celestial faculty acted. In his *Apology for* The Harmony of the World [1622], the subject of chapter 5, and in correspondence related to it, Kepler returned to his theory of aspects that he linked both with his geometrical archetypes and with the physical causes of motion. The Sun played an important part in the Earth's daily and annual motions and here Boner repeats Kepler's well-known views about magnetic dispositions and faculties. Boner uses Kepler's *Epitome of Copernican Astronomy* [1618] and *Astronomia nova* [1609] to fill out his account, especially regarding Kepler's critique of Robert Fludd [139–158]. It is of relevance here because Kepler's astrology 'continued to center the stars on earth even after he put it in motion at a point away from the center of the cosmos' [152]. The stars do not act on us themselves for it is Earth that determines the efficacy of the aspects. The Earth draws an impulse for its activity of producing and exhaling vapors that influence the weather 'by relating the configuration of the heavens to an internal archetypal constitution' [153]. A soul is a circle and the regular

plane figures derive from the divisions of the circle. Angular separations of two or more celestial bodies correspond to the angles of the vertices of regular plane figures. The archetypical figures are only the ones that can be constructed with a compass and ruler because they express rational proportions with the regular plane figures determining certain harmonic proportions. Using scholastic philosophical language, Kepler describes the geometrical principles as acting *objectively*, that is, as a things of reason that act on the soul. These principles lay in the mind of God from eternity; and when the sublunar soul discerns the archetypical principles from the appearances of the aspects on Earth, it discerns the very essence of God.

Kepler mentions explicitly Proclus' references to *anamnesis* or recollection. The soul, as if asleep, awakes when it identifies archetypical principles in sensible things. The soul, then, is an exemplar of the Creator and on the soul the archetypes were inscribed from the beginning. Of the infinite number of constructible figures, only 12 are congruent—those that emerge in some bodily form—and these 12 underlie 12 of the aspects that Kepler accepted as influential. Kepler's refinements in the *Harmony of the World* led him to acknowledge that aspects and consonances originated from the same set of geometrical principles but in different ways, the aspects relying completely on the circle and consequences on the straight line measured by the side of an inscribed polygon. It is noteworthy here that Kepler criticized Robert Fludd's numerology for attributing causal powers to abstract numbers, perhaps indicating a departure from Platonic and Pythagorean influences.

The book contains a bibliography with indexes of persons, places, and subjects; but the index of persons refers to individuals mentioned in the body of the text and only rarely to those mentioned in footnotes, leaving readers to locate authors cited only in the footnotes for themselves.

Conclusion

The point of this study is to demonstrate that Kepler's theory of world harmony and his system of celestial physics did not preclude the consideration of vitalistic principles in his synthesis of astronomy and natural philosophy. For Kepler, the celestial novelties of the early 17th century and the fact of celestial change and terrestrial reactions required explanation, which he took up by appealing to a sublunar soul possessed of animate faculties, thus making astrology, as Rabin [2010, 63] has already argued, 'an integral part'

of his cosmology. As Boner suggests [170], there is an epistemological theory underlying Kepler's vision, the presence of universal principles in the sensible world that a terrestrial soul can recognize. The soul plays a powerful analogical role in the new cosmology. The vitalistic analogies are not just empty metaphors but a fundamental form of knowledge. In his conclusion, Boner stresses the role of vitalistic principles in Kepler's system and the role of the soul as a source of analogy and metaphor in Kepler's philosophy.

Remaining questions

The author has reconstructed features of Kepler's thought that earlier generations of historians have largely discounted, buried, or neglected. Here and there in Boner's account, however, and especially in the last two pages, one glimpses a hint of a problem that requires deeper analysis. Kepler's use of analogy and metaphor, and what he meant by 'proportion' and 'harmony', though acknowledged, needs clarification. It is clear from Boner's own assertions that Kepler assigned an indispensable epistemological role to the recognition of geometrical principles in creation itself. In addition, the logical foundations of his philosophical views require examination, especially in relation to their historical foundations. From Boner's own citations, we know that Kepler relied on Proclus and one suspects that Kepler also absorbed selectively some Platonic doctrines, that were mediated very likely by other sources that were Neoplatonic or Stoic [here Barker 1991, 1997 are cited] as well as by the Medieval and Renaissance interpretations and elaborations of these sources. In other words, thanks to works such as those by Simon [1975, 1979], Field [1988], Stephenson [1987, 1994], Martin [2011], Kozhamthadam [1994], Rabin [1997, 2005, 2010], and now Boner, scholars are perhaps in a position to reconstruct the epistemological and logical foundations of Kepler's vision of cosmological harmony. Boner appears to possess the textual resources to attempt such a reconstruction or, at least, to point us in the right direction.

Although brief, this study constitutes a significant contribution to a more complete and comprehensive picture of Kepler and of early modern science.

BIBLIOGRAPHY

Barker, P. 1991. 'Stoic Contributions to Early Modern Science'. Pp. 135–154 in M. J. Osler ed. *Atoms, Pneuma, and Tranquility. Epicurean and Stoic Themes in European Thought*. Cambridge.

Barker, P. 1997. 'Kepler's Epistemology'. Pp. 355–368 in D. A. Di Liscia, E. Kessler, and C. Methuen edd. *Method and Order in Renaissance Philosophy*. Aldershot.

Caspar, M. and Van Dyck, W. 1937–. *Johannes Keplers Gesammelte Werke*. 22 vols. Munich.

Dijksterhuis, E. J. 1961. *The Mechanization of the World Picture: Pythagoras to Newton*. Trans. C. Dikshoorn. Oxford.

Field, J. V. 1988. *Kepler's Geometrical Cosmology*. London.

Garin, E. 1946–1952. *G. Pico della Mirandola. Disputationes adversus astrologiam divinatricem*. 2 vols. Edizione nazionale dei classici del pensiero italiano 2–3. Florence.

Hooykaas, R. 1987. 'The Rise of Modern Science: When and Why?' *The British Journal for the History of Science* 20:453–473.

Keller, D. and Brummer, E. 2002. 'Putting Food Production in Context: Toward a Postmechanistic Agricultural Ethic'. *Bioscience* 52:264–271.

Kepler, J. 1596. *Prodromus dissertationum cosmigraphicarum continens mysterium cosmigraphicum*. Tübingen.

___ 1606. *De stella nova in pede Serpentarii*. Prague.

___ 1609. *Astronomia nova*. Prague.

___ 1618. *Epitome astronomiae Copernicanae*. Linz/Frankfurt.

___ 1619. *Harmonices mundi libri quinque*. Linz.

___ 1619–1620. *De cometis libri tres*. Augsburg.

___ 1621. *Mysterium cosmographicum de admirabili proportione orbius coelestium*. Frankfurt.

___ 1622. *Pro suo opere Harmonices mundi apologia*. Frankfurt.

Kozhamthadam, J. 1994. *The Discovery of Kepler's Laws: The Interaction of Science, Philosophy, and Religion*. Notre Dame, IN.

Lindberg, D. 1986. 'The Genesis of Kepler's Theory of Light: Light Metaphysics from Plotinus to Kepler'. *Osiris* 2nd series 2:5–42.

Maier, A. 1937. *Die Mechanisierung des Weltbildes im 17. Jahrhundert*. Leipzig.

Martin, C. 2011. *Renaissance Meteorology: Pomponazzi to Descartes*. Baltimore.

Merchant, C. 1989. *The Death of Nature: Women, Ecology, and the Scientific Revolution*. New York.

Oelschlaeger, M. 1991. *The Idea of Wilderness: From Prehistory to the Age of Ecology*. New Haven.

Pico della Mirandola. 1496. *Disputationes adversus astrologiam divinatricem*. 2 vols. Florence. See Garin 1946–1952 for edition and translation.

Rabin, S. 1987. *Two Renaissance Views of Astrology: Pico and Kepler*. PhD dissertation, City University of New York. New York.

____ 1997. 'Kepler's Attitude toward Pico and the Anti-Astrology Polemic'. *Renaissance Quarterly* 50:750–770.

____ 2005. 'Was Kepler's *species immateriata* Substantial?' *Journal for the History of Astronomy* 36:49–56.

____ 2010. 'The Astrological Cosmos of Johannes Kepler'. Pp. 59–66 in A. B. Kavey ed. *World-Building and the Early Modern Imagination*. New York.

Simon, G. 1975. 'Kepler's Astrology: The Direction of a Reform'. *Vistas in Astronomy* 18:439–448.

____ 1979. *Kepler astronome astrologue*. Paris.

Stephenson, B. 1987. *Kepler's Physical Astronomy*. New York.

____ 1994. *The Music of the Heavens: Kepler's Harmonic Astronomy*. Princeton.

Westman, R. S. 2011. *The Copernican Question: Prognostication, Skepticism, and Celestial Order*. Berkeley.