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Hints into Kepler's method

ABSTRACT

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Some of Johannes Kepler's works seem very different in character. His youthful *Mysterium cosmographicum* (1596) argues for heliocentrism on the basis of metaphysical, astronomical, astrological, numerological, and architectonic principles. By contrast, *Astronomia nova* (1609) is far more tightly argued on the basis of only a few dynamical principles. In the eyes of many, such a contrast embodies a transition from Renaissance to early modern science.

However, Kepler did not subsequently abandon the broader approach of his early works: similar metaphysical arguments reappeared in *Harmonices mundi libri V* (1619), and he reissued the *Mysterium cosmographicum* in a second edition in 1621, in which he qualified only some of his youthful arguments.

I claim that the conceptual and stylistic features of the *Astronomia nova* – as well as of other "minor" works, such as *Strena seu De nive sexangula* (1611) or *Nova stereometria doliorum vinariorum* (1615) – are intimately related and were purposely chosen because of the response he knew to expect from the astronomical community to the revolutionary changes in astronomy he was proposing. Far from being a stream-of-consciousness or merely rhetorical kind of narrative, as many scholars have argued, Kepler's expository method was carefully calculated both to convince his readers and to engage them in a critical discussion in the joint effort to know God's design.

By abandoning the perspective of the inductivist philosophy of science, which is forced by its own standards to portray Kepler as a "sleepwalker," I argue that the key lies in the examination of Kepler's method: whether considering the functioning and structure of the heavens or the tiny geometry of the little snowflakes, he never hesitated to discuss his own intellectual journey, offering a rational reconstruction of the series of false starts, blind alleys, and failures he encountered. The critical dialogue he managed to establish in private correspondence with fellow astronomers he later transplanted into his printed works, whose structure closely resembles that of a dialogue, however implicit. And in the process of advancing ever new hypotheses and refuting them, either theoretically or experimentally, he displayed the imaginative power of his terrific intellect and the fruitfulness of his method by conjectures and refutations.