

Newton between history and philosophy: the case of space

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Newton's views of space have obviously shaped discussions in physical science and in philosophy since the early eighteenth century, spawning a vast modern literature. The extensive scholarly debate concerning the Scholium on space and time in the first edition of *Principia mathematica* (1687) has recently been overtaken by a rapidly expanding discussion concerning the unpublished anti-Cartesian tract now known as *De Gravitatione*. These texts represent two aspects of Newton's reaction to Descartes: whereas the unpublished work deals with fundamental metaphysical issues raised in the *Meditations and Principles*, including the question of whether space and body are distinct per se, the published discussion presents an alternative to the Cartesian view of space and motion, presenting a conception of space that enables us to make sense of true motion and its physical effects. Yet it would be unwise to regard these discussions as falling into distinct "metaphysical" and "physical" arenas, for by the publication of the General Scholium in the second edition of *Principia mathematica* (1713), Newton himself presented them as intertwined. By this mature period in Newton's life, he contended that the landscape of natural philosophy ought to include not only a discussion of space and motion, but also of the relationship between space and the creator (I discuss this in depth in *Newton as Philosopher* [Cambridge, 2008]). This conception presents a challenge to the modern scholar: to understand the linkages between the different threads in Newton's mature thinking about space, one must rely on the methods and literatures of the history of science, the philosophy of science, and the history of modern philosophy. Hence Newton's view of space can serve as a test case for our attempts to integrate the methods of these often disparate fields.

The fierce scholarly debates concerning Newton's "absolutism" in the Scholium in the last generation have been eclipsed in recent years by equally contentious discussions of *De Gravitatione*. It has long been recognized that in *De Gravitatione*, a text whose date remains uncertain, Newton sides with the Cambridge Platonist Henry More when criticizing Descartes's contention that extension and body are identical. More's influence can be traced back to Newton's undergraduate days at Trinity College in the 1660s and is not in dispute. But there remains a considerable controversy concerning Newton's now famous appropriation of More's Platonic concept of emanation. Philosophers of science, historians of science, and historians of philosophy—including John Carriero, J.E. McGuire, and Howard Stein—have debated how best to interpret Newton's puzzling notion that space itself "emanates" from the first existing being. Is this to be read as a neo-Platonic theory akin to More's own, or has Newton refashioned this well-known, albeit controversial, notion for his own purposes? In this paper, I argue that previous interpreters have missed a nuance in Newton's concept of emanation. In the first instance, he chooses this neo-Platonic term—as does More—to signal that space, unlike material bodies, is not created (it does not flow from the divine will). Like More, Newton seems to contend that space's existence flows from the mere existence of God (it requires no particular act of divine willing). But in my view, Newton then diverges from More's standard neo-Platonic view that emanation is a species of efficient causation, contending that space is a logical consequence of any kind of being, and not merely of God.

What might this confusing idea about emanation mean? The heart of my paper lies in trying to answer this question. I argue that Newton's notion of emanation reflects his nuanced view of what we might call the conceptual relation between space and its regions, a view with echoes in the more famous discussion in the Scholium. Very briefly put, I argue as follows: when Newton contends that space emanates from the first existing being—adding that if we "posit" any being, we posit space—he

expresses a fact about space's relation to beings in general. For Newton, to posit any being is to posit an entity that occupies space—clearly, for an entity to occupy space, there must be some region that it occupies. But for there to be a region of space, there must be some larger space in which that region is embedded, and a larger space in which that region is embedded, and so on ad infinitum. Hence Newton contends that to posit any being is to posit infinite space itself. Since Newton held the traditional view that God is the first existing being, in turn, it follows that space emanates from God. This complex view raises many questions; in particular, one wonders how it connects with the expansive treatment in the General Scholium, especially the contention that God is substantially omnipresent.

If twenty-first century scholarship is to understand Newton's fascinating adoption and transformation of the neo-Platonic idea of emanation, along with its intriguing connections to the canonical treatments of space in *Principia mathematica*, it must borrow methods, texts and interpretive approaches from history of science, philosophy of science and the history of philosophy. To interpret Newton's emanation doctrine is to consider sixteenth-century Platonic notions, mid-seventeenth-century Cambridge Platonism, and the broader context of English discussions, endorsements, and (ultimately) rejections of Cartesian metaphysics. To interpret Newton's view that true motion does not consist in a change in object relations, but rather is a change in absolute position, and that we must therefore rigorously distinguish between absolute (or mathematical) and relative (or common) conceptions of space, is to consider at least the history of the principle of inertia and the background set by Descartes's view of motion. Finally, to interpret Newton's famously challenging remarks about space and God in the General Scholium is to consider a series of philosophical debates concerning God's power and influence involving More and Descartes, along with Newton's attitude toward anti-Trinitarian conceptions of Christianity. Hence to understand Newton is to integrate.