

ISAAC NEWTON (1642-1727)

Background to Newton's life

When a tiny and frail boy was born in the obscure Lincolnshire hamlet of Woolsthorpe on Christmas Day 1642, the attendant maids did not believe he would survive the hour, let alone eighty-four years. As it was, Isaac Newton went on to become a Fellow of Trinity College and the Royal Society, Cambridge's second Lucasian Professor of Mathematics, the author of the *Principia mathematica* (1687) and the *Opticks* (1704), a member of Parliament, Master of the Royal Mint, a knight and President of the Royal Society. When he died in 1727, he was given a state funeral and buried in a place of honour at Westminster Abbey. His work in physics gave us universal gravitation, a mathematical explanation for the elliptical orbit of planets and a precise celestial mechanics that still serves the world in the space age. His optical experiments confirmed the heterogeneous nature of white light, and he constructed the first practical reflecting telescope. He discovered calculus and showed more than any other thinker before him how well mathematics could explain the workings of the universe. Hagiographic celebrations of Newton in the years and decades after his death ensured his fame as an enduring icon of science and as having produced one of the greatest revolutions ever in the study of nature. But the range of his intellectual endeavour was even broader than this. What is less well known is that for more than half a century Newton was carrying out a private revolution in theology.

Newton's science and his religion

When the young Cambridge-educated clergyman Richard Bentley was called upon in 1692 to deliver the first Boyle Lectures for the defence of Christianity against infidelity, he buttressed his natural theological arguments for the existence of God with support from Newton's *Principia*. While revising his lectures for the press, he wrote the author of the *Principia* to determine if his deployment of its physics would meet the approval of the great man himself. In his first reply to Bentley Newton confirmed: "When I wrote my treatise about our Systeme I had an eye upon such Principles as might work wth considering men for the beleife of a Deity & nothing can rejoyce me more then to find it usefull for that purpose." Newton went on and asserted that "ye diurnal rotations of ye Sun & Planets as they could hardly arise from any cause purely mechanical . . . they seem to make up that harmony in ye systeme wch . . . was the effect of choice rather than of chance."

Even though Newton's letters to Bentley were published in 1754 and thus became part of the public record, the *Principia*'s original theological backdrop receded in the wake of the profoundly successful Enlightenment portrayal of Newton, which made him the patron saint of the Age of Reason. It was in the eighteenth century that the still-common association between Newton and the secular clockwork universe emerged. Yet the notion of a self-sustaining clockwork universe, originally wound up at the beginning by a remote deity, is precisely the sort of view of creation and providence that Newton himself opposed in the General Scholium, which portrays the biblical "Lord of Lords" as a personal God with an ongoing, interventionist relationship with creation. Enlightenment apologists and later positivist scientists also developed the two variations of the "Two-Newton" thesis: first, that Newton only turned to theology with old age and dotage (and thus after the "first Newton" had produced his great works of science) and, second, that Newton kept his science separate from his religion in a kind of early modern anticipation of methodological

naturalism. Although the vestiges of the second variant of the Two-Newton thesis can still be found in current literature, the recent availability of Newton's long-inaccessible manuscripts for study has made such claims untenable. A steadily increasing body of scholarly literature is both explicating Newton's theological views (the main contours of which were mainly in place *prior* to or around the time of the appearance of his *Principia*) and revealing ways in which his theology interacted with his natural philosophy. Although some of the conclusions will remain tentative until the manuscript corpus has been thoroughly analyzed, the view of Newton now emerging is that of a natural philosopher who was both profoundly religious and who saw no firm cognitive barrier between theology and the disciplines now called scientific. Isaac Newton the natural philosopher cannot be understood apart from his religion.

Newton's theology and prophetic studies

In addition to being the preeminent natural philosopher in the West in the late seventeenth and early eighteenth centuries, Newton was a theologian and prophetic exegete in his own right. It is also now known that he left behind one of the largest corpora of theological writings in the early modern period (totalling as much as four million words). In his zeal to plumb the depths of biblical theology and comb the records of the early church, Newton far out-stripped all but a few of his contemporaries, including those known as divines or religious figures in the first instance. Newton himself was to remain a lay member of the Church. When Newton was became a Fellow of Trinity College, Cambridge he was obligated to become ordained as a priest in the Anglican Church by 1675. The impending deadline was likely one motivation for the initiation of a comprehensive study of Christian theology and ecclesiastical history that began in the early 1670s. But as the deadline neared, Newton sought ways to avoid taking holy orders. An eleventh-hour exemption from ordination (granted by no less a personage than King Charles II) allowed him to avoid the resignation of his fellowship, which he had been prepared to do. Whatever academic reasons Newton may have had for avoiding ordination, theological discoveries that Newton made by the early 1670s made ordination (and subscription to the Anglican Thirty-nine Articles) impossible. Among the results of Newton's early theological studies was the conclusion that Christianity's chief doctrine, the Trinity, was a corruption deviously imposed on the Church in the fourth century by Athanasius.

Newton gravitated towards the position of the fourth-century Arians who, according to Trinitarian historiography, were the doctrinal losers in the Christological controversies of that era. As in Arianism, Newton viewed the Father as the only true God, while Christ was of a lesser status and nature, albeit pre-existent before his appearance on Earth. But Newton's Christology was not precisely isomorphic with Arianism, and his discomfort over the Athanasian injection of the Greek notions of essence and substance into Christian theology extended to the Arians, who conceived of Christ as being of similar substance (*homoiousios*) to the father, while the Athanasian Trinitarians saw Christ and the Father as of the same substance (*homoousios*). In his stress on the moral rather than the essential relationship between the Father and Son Newton's theology shows affinities with that of the seventeenth-century Socinians and English Unitarians, some of whose works were in his library. It is also evident that Newton's powerfully monotheistic conception of a unipersonal "God of dominion" owes something to Hebraic and Judaic thought.

Nor did Newton's heresy stop here. By the 1680s his study of key biblical texts led him to reject the orthodox doctrine of the soul's natural immortality in favour of a mortalist viewpoint. For Newton such texts as Psalms 6:5 and Ecclesiastes 9:5 and 9:10 demonstrate that there is no intermediate conscious state between death and resurrection. Around the same time Newton

concluded that demons (thought by many in his day to be departed spirits) in the Bible were not literal evil spirits, but rather delusions or distempers of the mind. Similarly, Newton rejected the belief that Satan is a fallen angel, asserting instead that the devil is a symbol of human lust and ambition. His final position on the devil is almost identical to the Jewish teaching of *yetzer ha-ra* (“the evil inclination”), in which sinful desires are personified as Satan. Newton’s conception of human temptation thus shifted from a focus on external and ontologically-real evil spirits to a psychology of the inner demons of the mind.

Denial of the Trinity was illegal in Newton’s day and for many years afterward. The rejection of the soul’s immortality was viewed as scandalous and the denial of evil spirits was seen, ironically, as tantamount to atheism. Until his dying day Newton hid these maligned heresies from the notice of all but a few trusted confidants. Although kept secret, Newton’s heterodox theology was at the core of his existence and helped to shape many aspects of his thought, including his natural philosophy. Although heretical from the perspective of traditional Christianity, these departures from orthodoxy do not make Newton into some sort of proto-deist. On the contrary, Newton was a fervent biblicist who always cast his theological language in scriptural terms and supported his views amply with biblical texts. Newton’s friend the philosopher John Locke, who was also a lay student of the Bible, once referred to Newton as “a very valuable man not onely for his wonderful skill in Mathematicks but in divinity too and his great knowledg in the Scriptures where in I know few his equals.” Newton knew his Bible; he believed it too.

No true deist adheres to the literal fulfilment of biblical prophecy and Newton was nothing if not passionate about just that. Newton wrote his first monumental treatise on the Apocalypse in the 1670s and continued to study prophecy until his death. He was fascinated by the symbols of biblical prophecy and methodically developed a lexicon of prophetic emblems. He also produced studies of the architectural structure of the Jerusalem Temple. Following Cambridge’s Joseph Mede, Newton’s eschatology was premillenarian. Newton believed that the Jews would be restored to Israel, the Temple rebuilt in Jerusalem and that Christ would return to the earth in the future to set up a terrestrial Kingdom of God (which he put off to no sooner than the twentieth century). As with his theology, Newton’s prophetic views were virulently anti-Catholic. Newton departed from most of his contemporary Protestant prophetic exegetes, however, in placing the doctrine of the Trinity at the centre of the great apostasy.

The fulfilment of prophecy also provided Newton with one of the best lines of evidence for the existence of God. In his posthumously-published *Observations* (1733), he wrote that “the event of things predicted many ages before, will . . . be a convincing argument that the world is governed by providence.” At the same time, he looked askance at exegetes who overconfidently set dates, believing that such enthusiasm inevitably brought discredit on Christianity when the predicted dates failed. When speaking about a particular prophecy in his *Observations*, he wrote: “The manner I know not. Let time be the interpreter.”

Religious motivations for Newton’s natural philosophy

Newton’s theology related to his natural philosophy at two levels. First, in a general way Newton’s piety and religious beliefs acted as a stimulus to the study of nature (the weak argument for science-religion interaction). Second, in some cases the particulars of Newton’s theology helped shape the cognitive content of his physics and mathematics (the strong argument for science-religion interaction). Beginning with examples of the first type, Newton had imbibed the seventeenth-century Protestant culture of natural theology and, like the chemist Robert Boyle, saw himself as a priest of

nature. Manuscripts dating from around the time of the *Principia* indicate that Newton believed the priests of the Ur-religion (for Newton a prescriptive ideal) were also adept natural philosophers. The study of nature, then, was intrinsically related to piety and could itself be a form of worship and devotion. Religion and piety served as a stimulus to unravel the secrets of nature. Newton's adherence to the Renaissance notion of the *prisca sapientia* (lost ancient wisdom) served as one common motivator of his natural philosophy and religion, with Newton striving to recover the original, pure manifestations of both. Like other natural philosophers of his age, Newton believed that natural philosophy had as one of its chief ends the understanding of God and his attributes. Thus, he held that one aim of experiment, which he promoted assiduously as President of the Royal Society, was to discover God's attributes. Moreover, because Newton also was committed to the *topos* of the Two Books—that God has revealed Himself in both the Book of Scripture and the Book of Nature—Newton employed similar methods of analysis in his natural philosophy and his theology. Strong analogies between Newton's prophetic hermeneutics and his natural philosophical methodology can also be explained by his commitment to the Two Books. Newton used the distinction between the absolute and relative in both his science (to distinguish absolute and relative time and space) and his theology (to distinguish between the absolute and relative use of the term *God*). In his theology Newton adhered to an epistemological dualism in which he divided knowledge into open and closed levels. This esoteric-exoteric divide, which may owe something to Newton's involvement with alchemy, was also operative in his natural philosophy. Even Newton's animosity towards Jesuit critics of his optics can be illuminated by an understanding of Newton's theologically-inspired animus against Catholicism.

Newton's aforementioned letters to Bentley confirm his adherence to natural theology. Newton's belief in the argument from design was given public acknowledgement when he added his General Scholium to the conclusion of the second edition of the *Principia* in 1713. In this new appendix Newton states confidently that "This most elegant system of the sun, planets, and comets could not have arisen without the design and dominion of an intelligent and powerful being." The theological part of the General Scholium concludes with the claim that discoursing of God "from phenomena is certainly a part of experimental philosophy" ("natural philosophy" in the third edition of 1726). This was not Newton's only public articulation of the design argument; the later editions of his *Opticks* also conclude with powerful expressions of natural theology. In one of his unpublished papers he wrote "God is known from his works," thus confirming a natural theological empiricism that he shared with such contemporaries as Boyle. In a document dating from the early 1690s, Newton stated: "there is no way (wthout revelation) to come to y^e knowledge of a Deity but by the frame of nature." There was also an apologetic edge to Newton's use of the design argument, and in one place he wrote that "Atheism is so se[n]seless & odious to mankind that it never had many professors," and then went on to speak about symmetry and unity in nature, citing the fact that animals share homologies in their physiological structures.

Newton's adherence to the Two Books tradition is made plain in his early treatise on the Apocalypse, where he argues that the same "God of order" who embedded simplicity in creation also ensured that the fundamental meaning of biblical prophecy would be simple. This analogy between parsimony in Scripture and nature helps explain why Newton believed that similar inductive methods could be utilized in the interpretation of both Books:

It is y^e perfection of God's works that they are all done wth y^e greatest simplicity. He is y^e God of order & not confusion. And therefore as they that would understand y^e frame of y^e world must indeavour to reduce their knowledg to all possible simplicity,

so it must be in seeking to understand these visions. For Newton all truth (God's Word and God's Works) is a unity because all Truth comes from the same, powerful Deity.

Newton's theology and the content of his natural philosophy

The weak argument for science-religion interaction in Newton's career serves as the substratum of the strong argument, which has only recently begun to be presented by scholars with force. It goes without saying that interaction between matters of faith and facts of nature should be entirely plausible for a scholar committed to the Two Books tradition, and for whom there were no rigid methodological or conceptual barriers between theology and natural philosophy. Nevertheless, the strong argument is more difficult to convey and, while certain examples (such as Newton's conception of space as God's *sensorium*) are transparent, some case studies used to confirm it still require further investigation and refinement.

First, it is evident that some examples of the weak influence or analogies, on closer inspection, lead into strong ones. This is the case with the symmetry between Newton's prophetic hermeneutics and his natural philosophical methods, for Newton's rules of reasoning in the final edition of the *Principia* were actually based in part on his rules of prophetic interpretation, which were written decades earlier. And the analogy between the methods of interpretation in both these disciplines is itself based on Newton's conception of God. Just as René Descartes used God to guarantee deductive logic, so Newton employed the guaranteeing God to support his use of induction. For Newton natural philosophers can use inference in experimental philosophy precisely because the faithful God of order allows one to expect parsimony in nature and since the unity of creation ensures that specifically observed principles and structures point to universals.

Newton's conception of space and time is thoroughly imbued with a profound sense of God's omnipresence and omnitemporality. For Newton absolute space is rigid and immovable, thus providing a stable frame of reference within which relative motion occurs. All of this is possible because absolute space is coextensive with God's omnipresence, and belief Newton came to in part from his exposure to the Rabbinical notion of God as *māqôm* ("place"). As J. E. McGuire put it, space for Newton was God's "sacred field." Similarly, Newton conceived of absolute time as flowing evenly and uniformly largely because it is co-terminus with God's eternal duration. Newton's calculus also depended on his conception of absolute time, which for Newton rested on a belief in God's eternal, evenly flowing duration. God's omnipresence also provided an explanation for the phenomenon of gravity, and in private Newton speculated that God was the upholder of universal gravitation. His notion of attraction may have also owed something to his engagement with alchemical doctrines. Newton saw the deity as a God of dominion who ruled creation directly and continuously, intervening with particular providence when necessary to keep history or nature on track. Here Newton's view of the providence of nature stands in stark contrast to that of Gottfried Leibniz, whose *Supramundana* used his supreme intelligence and perfect foreknowledge to set the world in motion at creation, obviating the need for intervention. The differences between these two views are articulated eloquently in the famous debate between Leibniz and Newton's disciple Samuel Clarke.

Newton's distinction between absolute and relative space and time has a heretical corollary, since in his theology God is equated with immovability and the absolute, and Christ with motion and the relative. It is also likely that Newton's antitrinitarian view of a unipersonal God supported his understanding of the unity of nature. That even the heretical elements of Newton's theology

permeated his natural philosophical programme is made plain by his General Scholium, which, although an appendix to an ostensibly purely natural philosophical work, is embedded with antitrinitarian biblical hermeneutics, in addition to its anti-Cartesian stance. For Newton, the feigned natural philosophical hypotheses of Descartes are no different than the vain doctrinal hypotheses of Trinitarianism. Corrupt interpretative practices in natural philosophy and theology are linked, just as the correct methods arriving at Truth are unified. Newton's General Scholium epitomizes his dual reformation, a grand programme that sought to restore the original, pure forms of natural philosophy and religion.

Newton's integrated programme for science and religion

The foregoing must not be taken as evidence that the Newton's theology informed his natural philosophy but not the other way around. The same considerations that explain the first dynamic also make the reverse reasonable. Thus, Newton's methodological approach to the interpretation of prophecy may owe something to his satisfaction with the results of mathematics, although when pressed he eschewed the notion that prophecy could be demonstrated. It is also clear that Newton's conception of God was in part based on a possibly unconscious desire to create God in his own image. And so in his letters to Bentley Newton spoke of the "cause" of the solar system as not "blind & fortuitous, but very well skilled in Mechanicks & Geometry"—a characterization of God in keeping with the views of Galileo and Johannes Kepler before him, and one in which a vestige of Platonism is in evidence.

Newton's published and unpublished writings demonstrate that his religion interacted with his science at a high level. Newtonian physics cannot be disentangled from Newtonian theology. Although it is clear that Newton recognized disciplinary and methodological distinctions, the lack of firm barriers within Newton's intellectual life suggests that it is problematic to speak in terms of "influence" of one sphere on another. Instead, Newton's lifework evinces one grand project of uncovering God's truth. Science and religion for Newton were not two completely distinct programmes, but two aspects of an integrated whole. For Newton, the unity of truth meant that there was ultimately one culture, not two.

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