

The Alliance of Christianity and Mechanistic Philosophy in 17th-Century England

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Christian theologians through the ages have to a large extent devoted themselves to adapting reigning philosophical systems to the tenets of Christianity, first with the Neoplatonism of Augustine in the 4th century and later in the Aristotelian theology of Thomas Aquinas in the 13th century. In the schools of Western Europe throughout the medieval period, the doctrines of Christianity were stated in terms of prevailing philosophical principles and in many cases given sophisticated philosophical formulation that would have been wholly foreign to the early fathers of the Church. Although philosophy was nominally the 'handmaiden' of theology, the two were made mutually compatible through subtle changes in both, and in each case the ensuing synthesis inaugurated widely influential and lasting strands of Christian thought.¹

Another such synthesis – an odd alliance of philosophies – took place in England in the second half of the 17th century, where the inroads made by the new Epicurean matter theories of René Descartes and Pierre Gassendi called for efforts to incorporate and adapt them to Christian thought.² Mechanistic atomism or corpuscularianism – the idea that the basic constitutive parts of the natural world were tiny, irreducible particles, and that material phenomena could be explained in terms of their behaviour – was adopted to serve the ends of religion through a change of emphasis in theology. In its wake, empirical discoveries about a supposedly atomically constituted natural world were leveraged in support of religious truths.

Before discussing this revival of Epicurean philosophy, it is worth saying something about the Epicureanism of antiquity on which the natural philosophers of

¹ For a detailed outline of these developments, see Stephen Gaukroger, *The Emergence of a Scientific Culture* (Oxford: Oxford University Press, 2006).

² Richard Westfall, *Science and religion in seventeenth-century England* (Yale University Press, 1958), p. 3; William B. Ashworth, "Catholicism and Early Modern Science," *God and Nature: Historical Essays on the Encounter between Christianity and Science* (University of California Press, 1986), p. 139-143.

the 17th century drew. Early modern knowledge of Epicurus' philosophy was sketchy at best, much of it pieced together from subsequent commentators or through Lucretius' poetic exposition of Epicureanism in *De Rerum Natura*. The ancient Greek philosopher Epicurus had developed an atomistic theory of matter, much like his forerunner Democritus, according to whom the world was composed of tiny particles. Crucially, no intelligence supposedly guided these atoms: their natural movement accounted for everything, including the soul, and required no creator or interventionist deity to explain their formation and behaviour. Although Epicurus himself did not explicitly reject the existence of the gods, he allowed them no role in the formation or creation of the natural world, nor any interference or participation in human affairs. Epicurean philosophy was, in other words, a form of naturalistic materialism, rejecting all transcendental or otherworldly existence, including the notion of an afterlife, which Epicurus denounced as mere superstition. In ethics, furthermore, he preached the modest pursuit of pleasure in worldly life.³

As one might expect, this philosophy did not fit well with Christian teachings. Indeed, the Epicureans were despised by Christians through the ages as a particularly pernicious and loathsome sect of pagan philosophers whose teachings were explicitly and directly antithetical to Christian belief. In Dante's *Divine Comedy*, Epicurus and his followers are located in the depths of the sixth circle of Hell; and throughout learned Europe, the term "Epicure" was frequently invoked to describe hedonists or those who renounced God's providence in favour of a life of indulgence.⁴ Despite the apparent moral and metaphysical incompatibility between Epicureanism and Christianity, the second half of the 17th century saw an increasing number of natural scientists, philosophers and theologians abandon the philosophy of Aristotle and adopt some of the key principles of Epicurean physics. We might well ask why such a seemingly un-Christian philosophy would command their attention. This is no easy question, but any attempt to address it must look to the crisis confronting Christian Aristotelianism in the early 17th century. Natural theology, the branch of theology in which the existence and attributes of God were to be demonstrated through reason alone, had always been a significant part of the canon of Christian Aristotelianism,

³ Epicurus, *The Epicurus reader : selected writings and testimoni*, Brad Inwood & Lloyd Gerson (eds.), (Indianapolis : Hackett, 1994).

⁴ Dante Alighieri, *The Divine Comedy*, Canto X.

which had been the *de facto* philosophy of the schoolmen since the 13th century. By the early 17th century, however, new empirical discoveries and theories about the natural world – amongst them Copernican heliocentrism⁵ – had eroded the credibility of Aristotle's physics, and with it, the authority of a scholastic theology based on Aristotelian principles. A substitute natural philosophy was required to underpin both theology and the investigation of nature. But why Epicurean atomism rather than some other alternative?

This is a complicated, multi-faceted question, and one which falls outside the scope of this article. Perhaps no other physical theory, current or from antiquity, presented an explanatory framework of equal flexibility or aesthetic appeal.⁶ Reasons aside, the fact remains that a number of English natural philosophers clustered around the newly formed Royal Society – most notably Robert Boyle (1627-1691) and Walter Charleton (1619-1707) – adopted and made use of Epicurean philosophy in a way that modified and shifted the relationship of natural theology with natural science, giving birth to something distinctly unlike anything in the medieval schools.⁷ Within the span of a few decades, certain aspects of Epicurean atomist philosophy had been enthusiastically combined with Aquinas' Fifth Way, the so-called 'teleological argument,' giving birth to a highly religious way of examining the natural world. Despite Francis Bacon's admonitions, final causes – that is to say, explanation in terms of the goal for which a thing is made – were given a central role in demonstrating the existence of God within a theory of matter built on Epicurean principles.⁸

The arguments in English works of natural philosophy-cum-theology were the following: if the world was made of tiny atoms, how much more miraculous and incredible was it that they should conjoin in such a way as to give rise to the complex

⁵ See e.g. Alexandre Koyré, *From the Closed World to the Infinite Universe* (Baltimore : John Hopkins Press, 1957).

⁶ Catherine Wilson, *Epicureanism at the Heart of Modernity* (Oxford : Clarendon Press, 2008), p. 66.

⁷ For Charleton's importance in introducing Epicurean philosophy in England, see Walter Charleton, *Physiologia Epicuro-Gassendo-Charletonia: or a fabrick of science natural, upon the hypothesis of atoms* (London, 1654) and *The Darkness of Atheism Dispelled by the Light of Nature* (London, 1654). Also Jon Parkin, *Science, Religion and Politics in Restoration England* (Royal Historical Society, 1999), p. 149; Robert Kargon, "Walter Charleton, Robert Boyle and the Acceptance of Epicurean Atomism in England," *Isis*, Vol 55, No. 2 (Jun. 1964), pp. 184-192.

⁸ Francis Bacon, *The Advancement of Learning*, (New York: P.F. Collier and Son, 1901), ch. V.

and fortuitous forms observed in both the heavens and on earth. Reverence for the magnificence of creation was old, but prior to the 17th century it had not been proclaimed with as much knowledge of the enormity and intricacy of nature, made possible by the recent invention of the telescope and the microscope. From the 1650s onwards, adulation of God's handiwork filled the books of English naturalists and experimenters, irrespective of the subject of inquiry. Their investigations into nature were at once works of science and hymns of worship extolling the bounty of the Creator.⁹ The study of mechanical or efficient causes, explained in terms of the behaviour of atomic matter, was combined with the study of final causes – the purpose that particular arrangements of matter served within nature, and their role in the cosmic order of a providential God.

The European revival of the atomist philosophy of Epicurus and its integration with matter theory had been led by René Descartes (1596-1650), under whose influence much of English natural philosophy in the second half of the 17th century developed.¹⁰ Descartes, however, had rejected final causes as an explanatory tool. Explaining the behaviour of matter by atoms was one thing, but uncovering the *purpose* of the phenomena they gave rise to was an altogether different question. The much-maligned Spinoza rejected final causes altogether, but Descartes, who did not deny divine purpose in nature, had argued instead that it was presumptuous to speculate concerning the ends of God.¹¹ The English natural philosophers – many of them either clergymen or exceedingly devout – showed much less hesitancy. In embracing teleological arguments based on natural science, these gentleman scientists, or 'virtuosi', were keen to adopt the new developments in natural philosophy, but simultaneously wished to protect the central tenets of Christianity from subversion.¹² Their horror at the materialism of Thomas Hobbes (1588-1679), who was never invited to join the Royal Society, demonstrates this aptly: with his unapologetically materialist philosophy, the 'sage of Malmesbury' had taken

⁹ Westfall, pp. 26-28

¹⁰ See e.g. Peter Dear, *Revolutionizing the Sciences* (Palgrave, 2001); Paolo Rossi, *The Birth of Modern Science* (Blackwell, 2000); John Henry, *The Scientific Revolution and the Origins of Modern Science* (Palgrave, 1997); Peter Anstey, "Descartes' cardiology and its reception in English physiology" *Descartes' Natural Philosophy* Stephen Gaukroger, John Andrew Schuster, John Sutton (eds.) (Routledge, 2000), pp. 420-444.

¹¹ Descartes, *Meditations on First Philosophy*, IV, 55.

¹² Kargon, p. 184.

Epicurean principles in a direction that seemed antithetical to religion.¹³

Philosophical investigation of nature in general could easily be seen as harmful to Christianity, since it might promote intellectual arrogance and direct attention away from the spiritual world toward the material.¹⁴ And if investigation of nature could be construed as pernicious, it would be even more so when done using the theories of an atheist philosopher of antiquity who had wholly rejected divine providence. In the face of such charges, the virtuosi worked hard to justify the religious benefits of scientific investigation and the religious excellence of atomistic theories, irrespective of their suspect origins in antiquity.¹⁵ They themselves would simultaneously reinforce and protect the faith from the new philosophy by showing that the two – Christian teachings and neo-Epicurean physics – were entirely compatible and, in the final analysis, mutually conducive. Apart from a wish to support the Christian faith, they also recognised that the 'Book of Nature' might serve, to a much greater extent than previously, as a unifying basis for those who differed in their interpretation of Revelation. The peculiarly prominent English synthesis of science and natural theological design arguments may thus to some extent be traced to the unusual religious diversity in England.¹⁶ The great variety of religious confessions in the country after the Civil War caused thoughtful men to seek some compelling basis for mutual agreement, confronted as they were with the 'enthusiasm' of rival sects. A shared, rationally supported religious foundation was needed to extinguish the flame of theological discord, and the empirical matter theories of the natural world, suitably interpreted to demonstrate God's providence, were in many ways an ideal candidate for this very purpose.¹⁷

It is important to distinguish between two different aspects of the mechanistic philosophy making inroads in European learned culture in the 17th century: firstly, it postulated a method of analysing and describing the behaviour of matter in Epicurean atomist terms – that is to say, in terms of particles or 'corpuscles'; secondly, it

¹³ Noel Malcolm, *Aspects of Hobbes* (Oxford University Press, 2002), pp. 317-336; Westfall, p. 108.

¹⁴ See e.g. Richard Baxter, *Reasons of the Christian Religion* (London, 1667); Westfall, p. 24.

¹⁵ Robert Boyle's *Christian Virtuoso* (1690) stands out as a paradigmatic example of this.

¹⁶ Neal C. Gillespie, "Natural history, natural theology, and social order: John Ray and the 'Newtonian ideology'," *Journal of the History of Biology*, Vol 20, No. 1 (Mar. 1987), p. 3.

¹⁷ Westfall, p. 115.

involved a new willingness to see the world through the metaphor of the machine – as an enormous mechanical edifice. The first of these, atomism, was, as we have seen, associated with the much-reviled Epicurus. This required a nuanced approach on behalf of would-be atomists and created a pressing need to distance the atomic hypothesis from its materialist roots. It is the second aspect of mechanistic philosophy which proved well-suited for just this purpose. It was a simple step from the metaphor of the machine to the inference of teleologically determined, purposeful parts, each fulfilling a role intended by a cosmic designer or mechanic. Design arguments based on final causes were therefore wedded to the machine metaphor and employed with a frequency and prominence that would have been alien to the scholastics. If the world was like a machine made up of atomic parts, the English philosophers argued, there must surely be a divine 'Mechanic' or cosmic 'Architect' who had designed it.¹⁸ There could be no design without a designer, and the enormous but incredibly intricate universe of atoms suggested to them not a purposeless Lucretian maelstrom in perpetual flux, but a designer of great power – assuredly the almighty Christian God revealed to them by Scripture. The logic of this new formulation of the design argument must surely have been compelling, especially since its premises were continually fortified by the constant stream of new and aggrandising discoveries about the physical world during the period known as the Scientific Revolution.

Of particular and seemingly inexhaustible interest was the animal kingdom, which provided plenty of examples of the mechanical means-ends relationships that were seen as the product of providential design. To Robert Boyle, who arguably did more than anyone else to promote mechanical philosophy in England, the fortuitous properties of man and other living creatures were the clearest manifestation of final causes in nature.¹⁹ Nowhere was God's wisdom more evident than in the skill he showed in designing his creatures, all of whom fitted a cosmic, anthropocentric order. Likewise, the clergyman John Ray, in his day one of the most learned naturalists in England, was certain that "the vast Multitude of Creatures ... are Effects and Proofs of

¹⁸ John Ray, *The Wisdom of God manifested in the Works of Creation* (London, 1691), p. 30.

¹⁹ Wilson, ch. 2. See esp. Robert Boyle, *A Disquisition about the Final Causes of Natural Things* (London, 1688), easily the most philosophically sophisticated treatise on the role of final causes amongst the English virtuosi.

[God's] Almighty Power."²⁰ Although Ray knew of only a small fraction of the species of the Earth, he counted enough to feel secure in proclaiming that "if the Number of Creatures be so exceeding great, how great nay, immense must needs [*sic*] be the Power and the Wisdom of him who form'd them all!"²¹ And if the multitude and variety of creatures in the world bespoke a Creator, this paled in comparison with the evidently designed intricacy of individual creatures and their immaculately formed organs. In the works of Ray, Boyle and other naturalists, the eye was almost invariably cited as the paragon of skilful design. It was patently "absurd and unreasonable to affirm, either that it was not Design'd at all for [sight], or that it is impossible for Man to know whether it was or not."²² The ends of various phenomena throughout the natural world could be apprehended by the discerning, philosophically-minded naturalist. The Epicurean atomist hypothesis – once reviled as the most materialistic and atheistic philosophy of antiquity – was turned into a theory of which God was an essential component. Epicurus was thought to have been defeated by his own arguments since the *unguided* behaviour of atoms could not possibly produce the order observed in nature. The obviously law-bound and ordered behaviour of matter was a clear manifestation of divine will.²³ Just as Lucretius had invoked and defended Epicurean principles in his *De Rerum Natura*, so Robert Boyle resurrected and popularised Cicero's clock analogy from the anti-Epicurean *De Natura Deorum* in arguing for divine purpose in the world.²⁴

Although the animal kingdom provided the most 'indubitable' examples of design, the means-ends view of nature was extended to all the subjects of experimental science. Naturalists like Ray, medical doctors like Charleton and experimentalists such as Boyle saw the benevolent handiwork of God in everything they examined: human anatomy, plants and herbs, fossils and river channels, floods and mountains. Around them were innumerable examples of "the Wisdom, Power and Goodness" of the Creator.²⁵ Some things must have seemed purposeless or

²⁰ Ray, p. 24.

²¹ *Ibid*, p. 25.

²² *Ibid*, p. 40.

²³ P. M. Heimann, "Voluntarism and Immanence: Conceptions of Nature in Eighteenth-Century Thought," *Journal of the History of Ideas*, Vol. 39, No. 2 (Apr. - Jun., 1978), p. 272.

²⁴ Westfall, p. 73; Cicero, *De Natura Deorum*, ii. 34.

²⁵ Ray, p. 170.

arbitrary, as Epicurus had claimed, and seemingly inconducive to any ends, but almost invariably, the former were taken as an affirmation of the benevolence of God, while the latter were construed as actually having for their ultimate end some benefit to Man, no matter how obscure. All, or almost all, natural phenomena were to be explained teleologically. The Boyle lecturer William Derham, a much-read 'physico-theologian,' saw in the world "nothing wanting, nothing redundant or frivolous, nothing botching or ill-made, but that every Thing ... exactly answereth all its Ends and Occasions."²⁶ Divine purpose was discerned just as much in seemingly arbitrary features of the world as it was in those that appeared to be manifestly designed. He conceded that the layout of the continents, for example, might "seem rude and undesigned to a careless View" – even random – but by balancing each other out, the continents created conditions in which man could thrive, and thus testified to God's providence.²⁷ Given enough *ad hoc* assumptions, all natural phenomena could be seen in a light that showed them to be of some benefit to Man. Walter Charleton devised a particularly ingenious explanation for occasions when matter behaved in a way that seemed disordered or inconducive to humans, as was the case with earthquakes, thunderstorms and deformed animals: irregularity or disorder in nature was simply another aspect of God's benevolence, since it rendered order itself all the more "conspicuous and amiable."²⁸ In other words, phenomena that might seem ill-suited to human ends actually existed to make men more appreciative of the excellent arrangement of the world. Disorder could thus be seen as another form of benevolent order. If no plausible means-ends relationship could be uncovered for a given phenomena, a frequent strategy was to partially agree with Descartes and bemoan the weak and limited faculties of Man in the face of final causes. Evidence against providential design in the material world could then be written off as an example of God's mysterious ways, transcending frail and earthly human understanding. This humility in the face of the Creator existed uneasily alongside an enterprise that largely consisted in detecting and explaining His ends in the phenomena of the natural world. Nevertheless, the result was an oddly stable culture of natural philosophy which used the most uncompromisingly antifinalist philosophy of antiquity to demonstrate its

²⁶ William Derham, *Physico-Theology* (London, 1727), p. 36.

²⁷ Derham, p. 47.

²⁸ Walter Charleton, *Darkness of Atheism*, p. 127.

very antithesis – divine purpose.

At the close of the 17th century, atomism merged with the natural philosophy of Isaac Newton, and Cartesian principles were gradually abandoned, first in England and later in France, following the popularisation of Newton's work on the Continent.²⁹ However, the theological use of matter theory would remain a striking feature of English intellectual life for much longer.³⁰ Writing in the middle of the eighteenth century we find Thomas Nugent, the translator of Montesquieu's *Spirit of Laws*, describing England as "the cradle of natural religion" due to the close ties between natural theology and science, and by the early 19th century, William Paley would again invoke Boyle's watchmaker argument in his *Natural Theology*.³¹ Only with the growing influence of Pierre-Simon Laplace's interpretation of Newtonian mechanics, and later, Charles Darwin's theory of natural selection, would matter theory and proofs from the natural world lose their theological pre-eminence in England.

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²⁹ Jonathan Israel, *Radical Enlightenment* (Oxford University Press, 2001), pp. 515-527; Henry Guerlac, *Newton on the Continent* (Cornell University Press, 1981).

³⁰ J. Gascoigne, "From Bentley to the Victorians: The Rise and Fall of British Newtonian Natural Theology," *Science in Context*, 2 (1988), pp. 219-256.

³¹ Thomas Nugent, "The Translator to the Reader" in Charles de Secondat, Baron de Montesquieu, *The Spirit of Laws*, transl. Thomas Nugent, revised by J. V. Prichard (London: G. Bell & Sons, Ltd., 1914); William Paley, *Natural Theology; or, Evidences of the Existence and Attributes of the Deity* (London, 1802).

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