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The Theological Origins of Jonathan Edwards's Philosophy of Nature

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An analysis of the works of Jonathan Edwards (1703–58) on natural philosophy, this article aims to show the affinities between the content and form of his philosophy of nature and some main features of medieval, scholastic and Renaissance thought: theology as the 'queen of sciences' ('regina scientiarum'), science as 'handmaiden to theology' ('philosophia ancilla theologiae'), the emblematic or typological understanding of world phenomena, and belief in the 'great chain of being' ('scala naturae'). It argues that Edwards's works are inseparable from the school of 'physico-theology', the English followers of which set out to prove the being and attributes of God by the order and harmony of nature, and through their worship of the God of nature to show 'the wisdom of God in creation' in face of the threats which new modes of scientific thought and reasoning were posing to traditional Christian thought and belief in the early modern period.

Of the extensive corpus of Jonathan Edwards's writings, no part is less explored, less analysed and less understood, than what is commonly called in Edwardsean historiography his 'scientific writings', those of his works related to natural philosophy, such as 'Of being', 'Of atoms' and so on.[1] So far only two major studies have attempted to deal seriously and systematically with Edwards's philosophy of nature: the first is a long chapter in Perry Miller's biography of 1949,[2] and the second is Wallace Anderson's lengthy introduction to his 1980 Yale edition of Edwards's works on natural philosophy.[3] As every reader of these works will agree, Miller and Anderson tend to perpetuate the myth of the modernity of Edwards's

[1] Edwards's various works on natural philosophy can be found in the *Works of Jonathan Edwards*, VI: *Scientific and philosophical writings*, ed. Wallace E. Anderson, New Haven 1980 (the Yale edition). All future references will be to this edition.

[2] Perry Miller, 'The objective good', in his *Jonathan Edwards*, New York 1949, 71–99.

[3] Wallace E. Anderson, 'Introduction', *Works* vi. 1–143. To this might be added Perry Miller's introduction to Perry Miller (ed.), *Images or shadows of divine things*, Westport, CN. 1972, 1–41, and, most recently, Josh Moody, *Jonathan Edwards and the Enlightenment: knowing the presence of God*, Lanham 2005, esp. pp. 94–118.

scientific thought. Constantly associating, and at times even identifying, Edwards's natural philosophy with modern scientific thought, they situate his philosophy of nature in the company of important scientists of his time, such as Newton, John Locke and others. This 'American student' of Locke and Newton, writes Miller, 'established certain readings' of both 'so profound that only from the perspective of today [i. e the. mid-twentieth century] can they be fully appreciated'.[4] Anderson follows suit: 'In its basic conception, Edwards's theory of the nature of the physical world belongs decidedly to the modern rather than the medieval age.'[5] However, whereas Miller's and Anderson's interpretations dwell on the close association which they see between Edwards's natural philosophy and the rise of modern scientific thought, it can be argued that the New England theologian's philosophy of nature in fact had more affinities with medieval theology and scholasticism, and certainly with the English school of 'physico-theology', than with the premisses of modern scientific thought.

Like most great, original minds, Edwards defies classification. This article does not, therefore, seek to identify him with any school of thought, but rather to point out the affinities between his ideas and some features of medieval, scholastic and Renaissance thought, as well as those of the school of physico-theology.

'*Philosophia ancilla theologiae*'

It is impossible to identify Edwards's natural philosophy with modern scientific thought if only in view of the affinities between his ideas and the medieval scholastic view which defined theology as the 'queen of sciences' and science as 'handmaiden to theology' ('philosophia ancilla theologiae'). In this traditional Christian view, the natural sciences and philosophy were assigned the role of servant: they had the privilege of being employed in the defence of revealed truths, providing support and aid in achieving soteriological understanding. The revealed, undemonstrated truths of faith thus had the ultimate priority over demonstrated truths of reason. Revelation was superior to all forms of knowledge, since in the study of salvation – soteriology – redemption is primarily through Christ, faith and grace, and not through reason. The rise of modern science during the sixteenth and seventeenth centuries signified to a large extent the rejection of the traditional Christian scholastic view through the exaltation of reason in the understanding of world phenomena, thus leading to the decline of theological and teleological considerations in the study of nature. For example, in his 'Ode dedicated to Isaac Newton' (1687), Newton's friend, the astronomer Edmund Halley (1656–1742), wrote that 'In reason's light, the cloud of

[4] Miller, *Jonathan Edwards*, 72–3.

[5] Anderson, 'Introduction', vi. 47.

ignorance/Dispelled at last by science'.[6] Instead of theological causation, wrote Roger Cotes, Fellow of Trinity College and Plumian Professor of Astronomy and Experimental Philosophy, in his preface to the second edition of Newton's *Principia* in 1713, 'this most excellent method of philosophy', namely experimental, mechanical philosophy, the predominant scientific doctrine of the time according to which all natural phenomena can be explained and understood by the mechanics of matter and motion alone, 'is founded on experiments and observations'.[7] In contrast Edwards believed that theology was the 'queen of sciences' and that science was 'handmaiden to theology'.

In his natural philosophy, Edwards reiterates the medieval view of 'philosophia ancilla theologiae', declaring that 'all arts and sciences, the more they are perfected, the more they issue in divinity, and coincide with it, and appear part of it'.[8] More specifically, he argues, 'after God had shown the vanity of human learning when set up in the room of the gospel', or 'was pleased to make foolish the wisdom' of classical learning and philosophy after Christ's first coming, 'God was pleased to make it [learning] subservient to the purpose of Christ's kingdom as an handmaid to divine revelation'.[9] In other words, first 'the gospel came to prevail without the help of man's wisdom', but 'then God was pleased to make use of learning as an handmaid'.[10] Throughout history, Edwards says, 'God has sufficiently shown men the insufficiency of [human reason]'. Hence, he repeats over and over that God ordered 'this great increase of learning' of the eighteenth century 'as an handmaid to religion'.[11] There could be no doubt that '*divinity*' is 'above all' variety of 'arts and sciences' since it 'concerned God and the great business of religion'.[12] Furthermore, in Edwards's rising apocalyptic expectations and eschatological visions after the 'little revival' of 1734–5 in Northampton, the most characteristic feature of the divine dispensation before the millennium would be the increase of learning, as in his own time: 'God will improve this great increase of learning as an handmaid to religion, a means of a glorious advancement of the kingdom of his Son, when human learning shall be subservient to understanding the Scriptures and a clear explaining and glorious defending the doctrine of Christianity.'[13]

[6] Edmund Halley, 'Ode dedicated to Newton', in *Sir Isaac Newton's mathematical principles of natural philosophy and his system of the world*, ed. Florian Cajori, Berkeley 1934, i, p. xiv.

[7] Roger Cotes, 'Cotes's preface to the second edition', ibid. i, p. xxxii.

[8] Edwards, 'Outline of "A rational account"', *Works*, vi. 397.

[9] Idem, *History of the work of redemption* (1739), ibid. ix. 278.

[10] Ibid. ix. 440.

[11] Ibid. ix. 441. For Edwards's adherence to 'philosophia ancilla theologiae' see also Allen C. Guelzo, 'Learning is the handmaid of the Lord: Jonathan Edwards, reason, and the life of the mind', *Midwest Studies in Philosophy* xxviii (2004), 1–18.

[12] Edwards, 'The importance and advantage of thorough knowledge of Divine truth', *Works*, xxii. 85–6.

[13] Idem, *History of the work of redemption*, ibid. ix. 441.

For Edwards, then, the great advance of learning during the age of Enlightenment, including the natural sciences, was part of a grand teleological enterprise. Based on his theological convictions, therefore, Edwards's natural philosophy evidently has more affinities with the scholastic view of science as 'handmaiden to theology', and thus more with the doctor of the Church, 'doctor of grace', St Augustine (354–430), and medieval theologians like the philosopher, 'doctor mirabilis', Roger Bacon (1214–92), and the 'doctor angelicus', Thomas Aquinas (*c.* 1225–74), who believed that theology is the queen of sciences, and much less with Galileo Galilei, René Descartes, Robert Boyle and Isaac Newton, the forerunners of modern science.

Edwards's typological and emblematic view of the world of nature

Edwards's natural philosophy cannot and should not be associated with modern scientific thought because for him theology was still the queen of sciences, and science itself a servant. Likewise, his emblematic, symbolic view of the world of nature, the typological reading of created order, contradicted the mechanistic conception of the nature of reality. Based on his symbolic, allegorical reading of world phenomena, Edwards believed that 'natural things were ordered for types of spiritual things'. The 'type', he explains, 'is only the representation or shadow of the thing, but the antitype is the very substance, and is the true thing'; hence Christ is 'the true light of the world in opposition to the sun, the literal light of the world, that is a type of the Sun of Righteousness', that is the antitype.[14] As in Renaissance thinking, nature for Edwards was a great treasure of divine signs and metaphors. In this grand theological teleology of typological order, the whole world is imbued with spiritual, divine meaning and significance. There are 'types of divine things' in 'the works of nature and constitution of the world'.[15]

> The emblematic worldview
>
> which sees nature as a vast collection of signs and metaphors, was a staple feature of Renaissance thought, but in the seventeenth century Bacon, Descartes, Galileo, and their followers rejected the notion that everything in nature carries a hidden meaning. Nature instead was to be taken at face value and investigated on its own terms … As long as one holds the view that nature is an elaborate hieroglyph, important only as a source of mystery and wonder, then the separation of true phenomena from false becomes secondary, if not irrelevant. Such a worldview produced enchantingly elaborate works of art and literature, but its dissolution was an essential feature of the revolution in science.[16]

[14] Idem, 'Images of divine things', ibid. xi. 62–3.

[15] Ibid. xi. 114.

[16] William B. Ashworth, Jr. 'Catholicism and early modern science', in David C. Lindberg and Ronald L. Numbers (eds), *God & nature: historical essays on the encounter between Christianity and science*, Berkeley 1986, 156–7.

In contrast, mechanical philosophy's notion of a homogeneous, uniform and symmetrical one-dimensional world of nature, could not view natural phenomena as carrying hidden meanings and significances. It emptied the created order of teleological purposes, thus stipulating that nature did not manifest the presence of God.

Seventeenth-century scientific thought constructed a new conception of the essential nature of reality, a new vision 'of nature as thoroughly homogeneous and therefore nonhierarchical'.[17] In classical and medieval theology, God 'authored *two* books: the Bible and the Book of Nature'. In such a system of thought, 'events in nature, like linguistic expressions, are signs. To study them is to decipher God's meaning. Here natural observations do play a part in the determination of belief, but they do so *only because they are a kind of testimony*'.[18] Thus, for Hugh de St Victor (1096–1141), 'the whole sensible world is like a kind of book written by the finger of God', and 'each particular creature is somewhat like a figure … instituted by the divine will to manifest the invisible things of God's wisdom'.[19] Edwards's natural philosophy evidently belongs to this classical and medieval tradition in which everything in the world of nature is an inextricable and essential part of a grand divine scheme. In contrast, 'the universe' for Galileo was rather a 'grand book' written 'in the language of mathematics', and 'its characters are triangles, circles, and other geometric figures'. Scientific thought has nothing to do with revelation and theology. Without the language of mathematics and geometry 'one is wandering in a dark labyrinth'.[20] This was also the view of Descartes, who attempted 'to build a universe to suit his methematical ideal of nature',[21] and of Boyle, who declared that the world 'was written in mathematical letters'.[22] Against this Blaise Pascal protested that 'The God of the Christians does not consist of a God who is simply the author of mathematical truths and the order of the elements; that is the job of the pagans and Epicureans.'[23]

With the developing notion of a one-dimensional and nonhierarchical world of nature, the 'testimony' of nature became more and more problematic, as did the notion of divine immanence and activity in the created

[17] Amos Funkenstein, *Theology and the scientific imagination from the Middle Ages to the seventeenth century*, Princeton 1986, 10.

[18] Nancy Murphy, *Theology in the age of scientific reasoning*, Ithaca 1990, 5.

[19] Peter Harrison, *The Bible, Protestantism, and the rise of natural science*, Cambridge 1998, 1.

[20] Galileo Galilei, *The assayer*, in *Discoveries and opinion of Galileo*, trans. Stillman Drake, New York 1957, 237–8.

[21] Peter Dear, *Revolutionizing the sciences: European knowledge and its ambitions, 1500–1700*, Princeton 2001, 80.

[22] Robert Boyle, *About the excellency and grounds of the mechanical hypothesis* (1674), in *Selected philosophical papers of Robert Boyle*, ed. M. A. Stewart, Indianapolis 1991, 152.

[23] Blaise Pascal, *Pensées and other writings*, trans. Honor Levi, Oxford 1999, fragment 690, p. 172.

order: 'Nature no longer comprised a vast array of symbols which points to a transcendent realm beyond it.'[24] Thus 'no longer were natural phenomena to symbolise and reflect each other and that which is beyond them; the symbolic-allegorical perception of nature as a network of mutual references was discarded as a source for protracted equivocation'.[25] For Descartes, for example, the world was not 'a collection of signs that demonstrated divine attributes or pointed the path to God. He rejected outright any doctrine of final causes, stating that whatever the purposes of God, they were not impenetrable to be discerned by mere observation of nature'.[26] As he wrote, 'I consider the customary search for final causes to be totally useless in physics.'[27] Descartes thus suggested that when 'dealing with natural things we will … never derive any explanation from the purposes which God or nature may have had in view when creating them and we shall entirely banish from our philosophy the search for final causes'.[28]

To Edwards, as in classical and medieval theology, the world of nature is ontologically inferior and subordinated to a higher divine reality beyond and above it. The 'whole outward creation is but the shadows of beings' and 'so made to represent spiritual things'. The reason for this is that 'it's agreeable to God's wisdom that it should be so, that the inferior and shadowy parts of his works should be made to represent those things that are more real and excellent, spiritual and divine, to represent the things that immediately concern himself and the highest parts of his work'.[29] Or, in another place, 'God does purposely make and order one thing to be in an agreement and harmony with another. And if so, why should not we suppose that he makes the inferior in imitation of the superior, the material of the spiritual, on purpose to have a resemblance and shadow of them?'[30]

[24] Harrison, *The Bible*, 168.

[25] Funkenstein, *Theology and the scientific imagination*, 28–9.

[26] Ashworth, Jr, 'Catholicism and early modern science', 140

[27] René Descartes, 'Fourth meditation', *Meditations on first philosophy* (1641), in *The philosophical writings of Descartes*, trans. John Cottingham, Robert Stoothoff, Dugald Murdoch and Anthony Kenny, Cambridge 1985, ii. 39. This was also the view of Francis Bacon: Ian Maclean, 'White crows, graving hair, and eyelashes: problems for the natural historian in the reception of Aristotelian logic and biology from Pomponazzi to Bacon', in Gianna Pomata and Nancy G. Siraisi (eds), *Historia: empiricism and erudition in early modern Europe*, Cambridge, MA 2005, 167.

[28] René Descartes, *Principles of philosophy* (1644), *Philosophical writings*, i. 202. Edwards's view is the opposite. While Descartes claimed that we cannot 'grasp the ends which he [God] set before himself in creating the universe' (*Principles of philosophy*, i. 248), Edwards strove to unveil God's aim and goal in the creation, as can be seen in his *Concerning the end for which God created the world* (1755).

[29] Edwards, *Miscellany*, no. 362, *Works* xiii. 434. For Edwards's typology see Janice Knight, 'Typology', in San H. Lee (ed.), *The Princeton companion to Jonathan Edwards*, Princeton 2005, 190–209.

[30] Edwards, *Miscellany*, no. 8, *Works*, xiii. 53.

Edwards's typological and emblematic reading of world phenomena resembles the views of the Jesuit Robert Bellarmine (1542–1621), for whom 'the observation that the moon sometimes shines on the earth while keeping a dark side to heaven, became a reminder that man too will often turn his back on God'.[31] Believing that the main function of the world of matter and motion, ontologically inferior and subordinated to the divine, is to reflect the images and shadows of the spiritual reality beyond and above it, Edwards insisted that 'the things of the world are ordered [and] designed to shadow forth spiritual things'.[32] Here lay the role he assigned to religion in explaining the world of nature: whereas the 'glories of astronomy and natural philosophy consist in the harmony of the parts of the corporeal shadow of a world; the glories of religion consist in the sweet harmony of the greater and more real worlds with themselves, with one another and with the infinite fountain and original of them'.[33] Conceiving nature as a specific though inferior mode of reality, Edwards could declare that 'the works of nature are intended and contrived of God to signify and indigitate [represent] spiritual things'.[34] In his cosmological vision, the created order is infused with transcendent meaning, and the existence of every being in the world is endowed with theological and teleological significance.

This view of world phenomena has more to do with medieval and Renaissance thought than with modern scientific reasoning. Michel Foucault wrote that until

> the end of the sixteenth century, resemblance played a constructive role in the knowledge of western culture. It was resemblance that largely guided exegesis and the interpretation of texts; it was resemblance that organized the play of symbols, made possible knowledge of things visible and invisible, and controlled the art of representing them.[35]

In this mode of reasoning, 'the world is covered with signs that must be deciphered', and 'nature, in itself, is an unbroken tissue of words and signs'.[36] And again, 'the nature of things, their coexistence, the way in which they are linked together and communicate is nothing other than their resemblance. And that resemblance is visible only in the network of signs that crossed the world from one end to the other'. Such, in sum, 'is the sixteenth century *episteme*'.[37] In this context, Edwards's typological and emblematic reading of the world of nature resembles the views of Paracelsus

[31] Ashworth, Jr, 'Catholicism and early modern science', 157.
[32] Edwards, 'Images of divine things', *Works*, xi. 53.
[33] Idem, *Miscellany*, no. 42, ibid. xiii. 224.
[34] Idem, 'Images of divine things', ibid. xi. 66.
[35] Michel Foucault, *The order of things: an archaeology of the human sciences*, New York 1994, 17.
[36] Ibid. 32, 39–40.
[37] Ibid. 29–30.

(Theophrastus Philippus Aureolus Bombastus von Hohenheim, 1493–1541), alchemist, physician, astrologer and general occultist, who declared that:

> We men discover everything that lies hidden in the mountains by external signs and correspondences, and thus also do we find all the properties of herbs and everything that is in the stones. There is nothing in the depths of the seas, nothing in the heights of the firmament, that man is unable to discover. No mountain, no cliff, is so vast as to hide or conceal what is in it from the eyes of man; it is revealed to him by corresponding signs.

Accordingly, there is 'nothing that nature has not signed in such a way that man may discover its essence'.[38]

Edwards reiterated this medieval and Renaissance view, saying that the 'things of the world are ordered [and] designed to shadow forth spiritual things'.[39] For him the book of nature reflects the transcendent meanings and symbols of divine things high above it. Scripture ought to be its 'interpreter' because only God's revelation can illuminate 'those spiritual mysteries that are indeed signified or typified in the constitution of the natural world'.[40] To Edwards, therefore, theology remained the 'queen of sciences'.

The great chain of being

Together with his belief in science as 'handmaiden to theology' and in a typological view of nature, Edwards adhered to the classical and medieval concept of the 'great chain of being' ('scala naturae'). Not only did he reject the mechanical vision of a one-dimensional world of nature, but he denounced the consequences of such a view, which implies the exclusion of value concepts from the order of creation. One of the main consequences of the mechanical view of the universe was the 'discarding by scientific thought of all considerations based upon value-concepts, such as perfection, harmony, meaning and aim, and finally the utter devalorisation of being, the divorce of the world of value and the world of facts'.[41] This transformation, affecting the whole fabric of the universe, was of course unacceptable to orthodox Christians such as Edwards. Hence, in his theology of nature, he returned to the Platonic and neo-Platonic notion of the great chain of being, or, as he called it, 'the order of creation', and strove to show that the fabric of the universe is indeed essentially founded on a teleology of values which in turn defines the ontological status of beings in the whole fabric of creation. Attempting to preserve God's presence and redemptive activity in the world, Edwards invoked the notion of a hierarchically ordered universe, declaring

[38] Paracelsus, *Selected writings*, ed. Jolande Jacobi, Princeton 1979, 120–1.
[39] Edwards, 'Images of divine things', *Works*, xi. 61.
[40] Ibid. xi. 106.
[41] Alexandre Koyré, *From the closed world to the infinite universe*, Baltimore 1968, 2.

that the whole created order is characterised by 'communication between one degree of being and the next degree of being'.[42] In other places he defines it as 'the scale of existence', 'ranks of creatures' or 'the gradation or succession of created things'.[43] This view had been developed previously by, among others, the Cambridge Platonists, a group of seventeenth-century philosopher-theologians including Henry More (1614–87), Ralph Cudworth (1617–88) and John Smith (1616–52), who 'adhered to the ancient doctrine of microcosm and macrocosm which they related to the great chain of being. Thus various levels of reality emanated from God in an ordered hierarchical structure'.[44]

Edwards clung to the classical and medieval notion of a hierarchical universe structured according to a chain of being. In the order of 'the creation', he said, 'there is an immediate communication between one degree of being and the next degree of being' according 'to the *order of being* [emphasis added]'.[45] Yet, because in Edwards's idealism the natural order was deprived of any participation in the affairs of divine providence, and since 'nothing else has a proper being but spirits',[46] therefore, 'in the various ranks of beings, those that are nearest to the first being should most evidently and variously partake of his influence', or 'be influenced by the operation of the Spirit of God'.[47]

The New England theologian's concept of a hierarchical chain of existence included all beings, material as well as spiritual, from the lowest in nature to the highest in heaven, and the place and value of every being in the universe was determined by 'the greater or lesser distance which separate it from the First Cause'.[48] However, in Edwards's idealism, the hierarchical ladder of being consisted of spirits only, because 'perceiving being only is properly being',[49] and not of material, tangible things which cannot be involved in or contribute to divine providence. The principle underlying his theological teleology of the order inherent in the structure of the universe was 'excellency', which defines the gradations within the hierarchy of spirits according to their consent to the supreme being, God. Thus, in 'the order of beings in the natural world, the more excellent and noble any being is, the more visible and immediate hand of God is there in bringing them into being; and the most noble of all' is 'the soul of man'.[50] Since 'so far as a thing consents to being in general, so far it consents to him' or to God, hence 'the more perfect

[42] Edwards, *Miscellany*, no. tt, *Works*, xiii. 190.

[43] Ibid. no. 1263, *Works*, xxiii. 206–7, 211.

[44] J. E. McGuire, 'Boyle's conception of nature', *Journal of the History of Ideas* xxxiii/4 (Oct.–Dec. 1972), 542. See also Michael Hunter, *Science and society in Restoration England*, Cambridge 1981, 182, and C. A. Patrides (ed.), *The Cambridge Platonists*, Cambridge 1980.

[45] Edwards, *Miscellany*, no. tt, *Works*, xiii. 190.

[46] Idem, 'The mind', ibid. vi. 337.

[47] Idem, *Miscellany*, no. 178, ibid. xiii. 327.

[48] Ernst Cassirer, *The philosophy of the Enlightenment*, Boston 1962, 39.

[49] Edwards, 'The mind', *Works*, vi. 363.

[50] Idem, *Miscellany*, no. 541, ibid. xviii. 89.

created spirits are, the nearer do they come to their creator in this regard'.[51] In other words, God determines the ontological status of beings according to the place he accords them in the cosmological hierarchy of the chain of beings: 'The nearer in nature beings are to God, so much the more properly are they beings, and more substantial … spirits are much more properly beings, and more substantial, than bodies.'[52]

Determining the created order's ontological status as inferior and thus subordinated to the divine reality beyond it, and conceiving the universe as structured according to a grand scheme of an hierarchical chain of beings, or spirits, was one of Edwards's main strategies in combatting mechanistic natural philosophy.[53] Through it he sought to close the growing gap between the order of grace and the order of nature and to combat the increasing disenchantment of the world. His return to the classical and medieval notion of the chain of being signified a radical departure from current scientific thought. The notion of the hierarchical order of the universe as a chain of created spirits, based upon the concept of 'excellency', which defined the relation of these spirits to God, enabled him to claim that 'God created the world for the shining forth of his excellency',[54] thus establishing world phenomena as a mode of reality in which 'the beauties of nature are really emanations, or shadows, of the excellence of the Son of God'.[55] Believing thus that the whole of creation is the overflowing of divine being, continuity in the course of nature depends moment by moment on God's immanent activity.

The school of 'physico-theology'

Edwards's natural philosophy should not therefore be identified or associated with the form and content of modern scientific thought; rather his philosophy, or rather his theology, of nature was closely related to some essential features of classical and medieval theology. There is, however, another important school of thought that merits consideration, that of 'physico-theology', or physical theology, since there are many affinities

[51] Idem, 'The mind', ibid. vi. 337.

[52] Idem, 'Things to be considered an[d] written fully about', ibid. vi. 238.

[53] On Edwards's attack on mechanical philosophy see Avihu Zakai, 'Jonathan Edwards and the language of nature: the re-enchantment of the world in the age of scientific reasoning', *Journal of Religious History* xxvi (February 2002), 15–41; *Jonathan Edwards's philosophy of history: the re-enchantment of the world in the age of enlightenment*, Princeton 2003; and 'The age of enlightenment', in Stephen Stein (ed.), *The Cambridge companion to Jonathan Edwards*, New York 2006, 80–99.

[54] Edwards, *Miscellany*, no. 332, *Works*, xiii. 410; *Concerning the end for which God created the world*, ibid. viii. 526–36.

[55] Idem, *Miscellany*, no. 108, ibid. xiii. 279; *Concerning the end for which God created the world*, ibid. viii. 530–1.

between the ideas of this school and Edwards's natural philosophy. Physico-theology was developed during the seventeenth and eighteenth centuries by various distinguished English philosophers and theologians who attempted to counteract the threat of atheism by proving God's power and wisdom through the fabric of the world of nature, using the design argument. Those who belonged to this school, the physico-theologians, strove to prove the existence of God from the order and harmony of nature, thus affirming the being and wisdom of the deity in creation. They emphasised the worship of the God of nature; their goal was theological in search for examples of God's providential plan in creation and his care for his creatures. In contrast to the natural theology of the sixteenth and early seventeenth centuries, however, physico-theology 'emphasized not the immediately perceptible regularities of the heavens and the *scala naturae* but, instead, the intricate contrivances of living organisms'.[56]

Physico-theology developed through a series of works: John Ray's *The wisdom of God manifested in the works of the creation* (1691) and *Three physico-theological discourses* (1692); Richard Bentley's *A confutation of atheism from the origin and frame of the world* (1692); William Derham's *Physico-theology: or, A demonstration of the being and attributes of God from his works of creation* (1711–2); William Paley's *Natural theology: or, Evidences of the existence and attributes of the deity, collected from the appearances of nature* (1802); as well as the Dutch natural philosopher Bernard Nieuwentijdt's *The religious philosopher: or, The right use of contemplating the works of the creator* (1724), and many others. For more than a hundred years defenders of the design argument bolstered their proofs with a variety of examples from astronomy and human physiology to show the intricate order and design of the world. They all expounded a natural theology, the belief that the nature of God could be understood by reference to his creation, the natural world. To this list might be added Cotton Mather's *Christian philosopher* (1721), and Jonathan Edwards himself, who was very much influenced by the ideas of the school, as can be seen in his works on natural philosophy where the theme of God's 'wisdom in the contrivance of the world' frequently appears, as well as many entries in the *Miscellanies*, where the theme of the 'wisdom of God in the work of redemption' recurs again and again.

Edwards's philosophy of nature has many affinities with the physico-theology tradition, the advocates of which attempted to prove the being and attributes of God from the fabric of the universe and to find evidence for the deity's power and wisdom by reference to nature, thus to confirm the validity of Christian theology. As physico-theologians attempted to locate all phenomena of nature in the 'wisdom of God', so too did Edwards in what he

[56] Brian W. Ogilvie, 'Natural history, ethics, and Physico-Theology', in Pomata and Siraisi, *Historia*, 95.

called God's 'wisdom in the contrivance of the world'.[57] Yet, unlike other physico-theologians, Edwards moved beyond the realm of nature to that of grace, or from space to time, as can be seen in the frequency in his writings of the notion of the 'wisdom of God in the work of redemption', most clearly in the *Miscellanies*, where he set out to prove the being and attributes of God not only with reference to the created order and the world of nature but also in relation to time and history, conceiving the whole of history as the history of God's work of redemption.[58]

Edwards's language of nature, as well as his concepts of natural philosophy, are very similar to those of the physico-theologians, since they all engaged in writing theology of nature. For example, in his 'Of insects' (1719–20) Edwards declared that 'we may behold and admire at the wisdom of the Creator, and be convinced that [he] is exercised about such little things' as insects.[59] In his 'Spider letter' (1723), he praised 'the wisdom of the Creator in providing the Spider', and 'all sorts of creatures', with 'all the necessities' for their existence, such as the spider's 'silver web'. This is evidence of 'the exuberant goodness of the Creator'.[60] In the series 'Wisdom in the Contrivance of the World' (1732–3), Edwards, among others, argued that the 'wisdom of God' appeared in ordering the 'weight of the atmosphere', in 'the contrivance of the eye', writing that 'the roundness of the earth shews the wisdom of God', and that the 'wisdom of God appears in placing of the Planets at a greater or lesser distance from the sun'.[61] This is not the language of experimental, mechanical philosophy. Rather, this is the language and the concepts of the physico-theologians in their defence of God against atheism and materialism.

Edwards's writings thus reflect a theological genre of his time, 'physico-theology'. That said, what were his overall intentions in his works on natural philosophy? He did not aim to contribute to current scientific thought, as Miller and Anderson argue, but rather to demonstrate, like the physico-theologians, God's glory and his infinite power and wisdom in the world, and thus to reinforce Christian belief against atheism and materialism. Edwards did not use scientific methods based on observation, experiment and demonstration, as did Benjamin Franklin, but rather looked for proof of God's wisdom and power in the marvellous fabric of the created order. Further, each element in his natural philosophy was composed with a definite aim. A few examples will suffice to confirm that Edwards's goal was not the advancement of science, but rather the glory of God and the truths of the Christian religion.

[57] Edwards, 'Wisdom in the contrivance of the world', *Works*, vi. 307–10.
[58] For Edwards's philosophy of history see Zakai, *Jonathan Edwards's philosophy of history*.
[59] Edwards, 'Of insects', *Works*, vi. 161.
[60] Idem, 'The "Spider" letter', ibid. vi. 164–5.
[61] Idem, 'Wisdom in the contrivance of the world', ibid. vi. 307–10.

In his essay 'Of being' (1722), Edwards wished to establish the essential connection between being and knowing, and to show that existence cannot be separated from consciousness in order to refute materialism. Since there is no being without knowing, Edwards claimed, 'it is really impossible that anything should be, and nothing know it'; hence 'nothing has any existence anywhere else but in consciousness'. Accordingly,

> those beings which have knowledge and consciousness are the only proper and real and substantial beings, inasmuch as the being of other things is only by these. From hence we may see the gross mistake of those who think material things the most substantial beings, and spirit more like a shadow; whereas spirits only are properly substance.[62]

The affirmation of an essential connection between existence and being was aimed at the refutation of materialism, or in Edwards's words, against 'Hobbes's notion that God is matter and that all substance is matter'. Instead, 'nothing that is matter can possibly be God, and that no matter is, in the most proper sense, matter'.[63] Here can be found the beginnings of Edwards's formulation of idealism, or idealistic phenomenalism, the theory that physical objects exist only in the mind or cannot exist unless they are perceived. For example, he argued in 'The mind' that 'all existence is mental'.[64]

As was the case with many other contemporary physico-theologians of that time, Edwards strove to prove God's existence in his sovereign majesty and glory within the created world. Accordingly, in the essay 'Of atoms' (1722), he tried to make manifest the deity's infinite and absolute power in the world. He claimed that 'it is God himself, or the immediate exercise of his power, that keeps the parts of atoms … together', thus proposing that God's divine activity controls and directs all the affairs of the material world, even the smallest particles of atoms. Accordingly, 'it follows that all body is nothing but what immediately results from the exercise of divine power'. These contentions were meant to serve as 'an incontestable argument for the being, infinite power, and omnipresence of God'. Like other physico-theologians, Edwards wishes here, as in all his writings on natural philosophy, to prove the existence of God from the order and harmony of nature, to make an exposition of natural theology according to which the nature of God could be understood by reference to his creation, the natural world. In 'Of atoms', however, Edwards had yet another goal in mind. To prove God's absolute sovereignty he had to show that 'what we call the laws of nature' are in fact 'the stated methods of God's acting with respect to bodies, and the stated

[62] Idem, 'Of being', ibid. vi. 204, 206.
[63] Idem, 'Things to be considered an[d] written fully about', ibid. vi. 235.
[64] Idem, 'The mind', ibid. vi. 341.

conditions of the alteration of the manner of his acting'.[65] The mechanical philosophers, who argued that the world of nature is operated by secondary causes or natural laws, set an intermediate realm between God and the created order, thus radically reducing divine immanence and redemptive activity by placing limitations on God's sovereignty. Against this mechanical view according to which God uses the laws of nature as the means of controlling world phenomena, Edwards spoke for the power of God's immediate immanence and the deity's redemptive activity in the world of nature. In another place Edwards put this case more boldly: 'Every atom in the universe is managed by Christ so as to be most to the advantage of the Christian, every particle of air or every ray of the sun.'[66] This line of reasoning of course leads to his rejection of mechanical philosophy: 'Hence we learn that there is no such thing as mechanism, if that word is taken to be that whereby bodies act each upon other, purely and properly by themselves.'[67]

Like the physico-theologians, Edwards used the scientific language of his time in order to prove the glory of God in the world. In contrast to Newton's definition of correct scientific procedure – 'for whatever is not deduced from the phenomena is to be called an hypothesis; and hypotheses, whatever metaphysical or physical, whatever of occult qualities or mechanical, have no place in experimental philosophy'[68] – Edwards's natural philosophy, like that of many physico-theologians, was based on unproved hypotheses.

Edwards's long series 'Things to be Considered an[d] Written fully about' provides further evidence that his work on natural philosophy belongs to physico-theology. He follows Ray, Derham and other physico-theologians in attempting to prove the being and attributes of God from the deity's works of creation and to show how the wisdom of God is manifested in the created order. He strives 'to shew how infinite wisdom must be exercised in order that gravity and motion will be perfectly harmonious'. He wants 'to shew how the least wrong step in a mote may, in eternity, subvert the order of the universe'. Accordingly he calls upon the reader to take 'notice of the great wisdom that is necessary in order thus to dispose every atom at first, as that they should go for the best throughout all eternity'. All these arguments, of course, were intended to show 'how God, who does this, must necessarily be omniscient and know every least thing that must happen throughout eternity'.[69] Edwards attacks 'that folly of seeking for a mechanical cause of gravity', claiming that gravity rather arises 'from the 'immediate operation of God', and 'depends immediately on the divine influence'. We 'may infallibly conclude that the very being, and the manner of being, and the

[65] Idem, 'Of atoms', ibid. vi. 214–16.
[66] Idem, *Miscellany*, no. *ff*, ibid. xiii. 184.
[67] Idem, 'Of atoms', ibid. vi. 214–16.
[68] Isaac Newton, 'General Scholium', in *Sir Isaac Newton's mathematical principles*, ii. 547.
[69] Edwards, 'Things to be considered an[d] written fully about', *Works*, vi. 231–2.

whole of bodies depends immediately on the divine power'.[70] Edwards's goal in his natural philosophical writings is obviously the glory of God. As he puts it, 'Thus infinite wisdom is as much concerned, not only in the excellent creation of the world, but merely the creation of it, as infinite power.'[71]

In the 'Beauty of the world' Edwards began to construct the thesis that the 'beauty of the world consists wholly of sweet mutual consents, either within itself, or with the Supreme Being'. Here is the genesis of his typology, or, as he said in another place, the belief that the function of the world of matter and motion, being ontologically inferior and subordinated to a higher divine reality, is to reflect the images and shadows of spiritual reality beyond and above it: the 'whole outward creation, which is but the shadows of beings, is so made to represent spiritual things'.[72] Accordingly, in the corporeal world 'the sweetest and most charming beauty' is based upon 'its resemblance of spiritual beauties'. For seeing that 'bodies being but the shadows of beings, they must be so much the more charming as they shadow forth spiritual beauties'.[73] In 'God's wisdom in the contrivance of the world', Edwards showed his allegiance to the premisses of physico-theology. A long series of natural phenomena – the weight of the atmosphere, the eye, the roundness of the earth, the order of the planets and comets and many more – are explained and defined in this essay as based solely upon 'the wisdom of God'. There he argued, for example, that the 'roundness of the earth shews the wisdom of God. If it were not round or nearly round, only some particular parts of it would be habitable'.[74] In 'The mind' Edwards again displayed his adherence to physico-theology, arguing that 'to find out the reasons of things in natural philosophy is only to find out the proportion of God's acting'. Hence, 'the corporeal world is to no advantage but to the spiritual'.[75] In other words, he resorted to the medieval notion of theology as the 'queen of sciences'. Finally, in his 'Outline of "A rational Account"', Edwards set himself an important goal which reveals what he thought about the proper relationship between science and religion: 'To shew how all arts and sciences, the more they are perfected, the more they issue in divinity, and coincide with it, and appear to be as parts of it.'[76] No other words so clearly and powerfully capture Edwards's intentions in his works on natural philosophy, as well as his deep and continuous indebtedness to classical, scholastic and medieval theology.

From the second half of the seventeenth until the end of the eighteenth century, western Christianity underwent a profound intellectual

[70] Ibid. vi. 234–5.
[71] Ibid. vi. 246.
[72] Idem, *Miscellany*, no. 362, ibid. vi. 434.
[73] Idem, 'Beauty of the world', ibid. vi. 305.
[74] Idem, 'Wisdom in the contrivance of the world', ibid. vi. 308.
[75] Idem, 'The mind', ibid. vi. 353–6.
[76] Idem, 'Outline of "A rational account"', ibid. vi. 397.

transformation; it experienced a prolonged series of critical re-examinations of its basic intellectual foundations in many spheres – religion and science, society and politics, morals and manners, gender and race, economy and markets, education and childhood, crime and punishment. This marked the disenchantment of the world, and the beginning of the modern age. 'Our age is, in special degree, the age of criticism', wrote Immanuel Kant (1724–1804) in the *Critique of pure reason* (1781), 'and to criticism everything must submit. Religion through its sanctity, and law-giving through its majesty, may seek to exempt themselves from it. But they then awaken just suspicion, and cannot claim the sincere respect which reason accords only to that which has been able to sustain the test of free and open examination'.[77] Edwards's works in general, and those on natural philosophy in particular, should be set against this broad intellectual transformation. During his time, as he lamented, 'every evangelical doctrine is run down', and many 'bold attempts are made' against 'Christ, and the religion he taught'.[78] No wonder that much of Edwards's intellectual life, as he wrote shortly before his death, can be characterised as a struggle 'against most of the prevailing errors of the present day', which tended to 'the utter subverting of the gospel of Christ'.[79] This applies to his many works on ethics and morality, on history, against deism and so forth.[80] The realm of natural philosophy, or science, is no exception. Indeed, Edwards's striving to preserve traditional Christian modes of thought and belief is very evident in his works on natural philosophy, where he tried, with other physico-theologians, to reassert the being and attributes of God from the order and harmony of nature, and to preserve God's glory and majesty within the confines of the order of creation against the menaces of atheism, materialism and mechanical philosophy.

Eventually, in the dialectic of the history of ideas, the premisses of the school of physico-theology were rejected in the light of Darwin and the triumph of the theory of evolution during the second half of the nineteenth century. At the end of the nineteenth century, William James called it 'the naturalist superstition' of 'the worship of the God of nature':

> There were times when Leibnitzes with their heads buried in monstrous wigs could compose Theodicies, and when stall-fed officials of an established church could prove by the valves in the heart and the round ligament of the hip-joint the existence of a 'Moral and Intelligent Contriver of the World'. But those times are past; and we of the nineteenth century, with our evolutionary theories and our mechanical

[77] Immanuel Kant, *Critique of pure reason*, ed. Norman K. Smith, New York 2003, 9.

[78] Edwards, 'To the Reverend Thomas Foxcroft' (1757), *Works*, xvi. 695.

[79] Idem, 'Letter to the trustees of the College of New Jersey' (1757), ibid. xvi. 727.

[80] On Edwards's reaction to the variety of Enlightenment thought see Zakai, 'Age of enlightenment', and *Jonathan Edwards's philosophy of history*.

philosophies, already know nature too impartially and too well to worship unreservedly any God of whose character she can be an adequate expression.[81]

In the course of the development of modern scientific thought, mechanical philosophy gained more and more prominence and power. Yet this should not disguise the fact that during the early modern period the scientific explanation of the essence of reality faced a significant reaction within the circles of orthodox Christians, who struggled with the mechanical interpretation of the world of nature because it radically transformed the traditional dialectic of God's utter transcendence and immanence by diminishing the divine sovereignty with respect to creation, providence and redemption, thus leading to the disenchantment of the world. Edwards's works on natural philosophy testify that he participated in the struggle against modern scientific reasoning.

[81] William James, 'Is life worth living?' (1895), in Fredrick H. Burkhardt and others (eds), *Will to believe and other essays in popular philosophy*, Cambridge, MA 1979, 43.