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The Argument from Design in Early Modern Natural Theology

*This article traces the **argument from design** from its origins in pre-Christian **Stoicism** and its adoption by the **early Church Fathers**. It underwent a revival in the early modern period of the seventeenth and eighteenth centuries, when the **Scientific Revolution** provided new knowledge of the world which could be used to demonstrate the God-given design in nature. Its popularity was greatest in England, where it was encouraged by the religious open-mindedness, the interest in natural history, the **Baconian scientific empiricism** and the **Newtonian tradition** in physics and cosmology. Although it incurred the opposition of some philosophers, it was taken up not only by Christians but also by **Deists** and by writers of the **Romantic Movement**. The freedom of thought encouraged by the Newtonian cosmologically-slanted natural theology alarmed orthodox Christian divines, and under their influence there was a move to restrict the argument from design to natural history in the later eighteenth and early nineteenth centuries, a tendency which reached its peak with **Paley's Evidences of Christianity and Natural Theology**.*

What do we mean by natural theology? I quote Colin Russell: 'It argues for a Designer from the design and purpose in the world especially disclosed by science'.¹ It emphasizes what we can learn of God from the study of nature rather than from revelation. It was to be expected that the great leap forward in the scientific revolution of the early modern period—the seventeenth and eighteenth centuries—would stimulate Christians to use new discoveries of science to the glory of God. Natural theology became prominent then as never before.

Beginnings of the Argument from Design

Although the science was new, the argument from design had been familiar since ancient times. We find it in *The Nature of the Gods*,

¹ C. A. Russell, *Cross-currents. Interactions Between Science and Faith*, Leicester, England 1985, p. 111.

written in 45 B.C. by the Roman lawyer Cicero (106–43 B.C.), which gave the arguments for and against. This book was popular in the early modern period with both Christians and atheists, supplying ammunition to both sides. The argument from design for the existence of God was devised by the ancient Stoics. On their behalf, Cicero pointed out the beauty and regularity of the heavenly bodies, and the marvels of earth, sea and atmosphere. He depicted the variety of plant life and the wonderful ways in which animals catch their food, defend themselves and procreate. He showed the design and purpose of human physiology and anatomy, and the way in which the world is provided as our home, supplying us with food, shelter and simple comforts. These same arguments would continue to be used up to the nineteenth century.

From all this, Cicero inferred an intelligent Creator and a beneficent providence:

When we see a mechanism such as a planetary model or a clock, do we doubt that it is the creation of a conscious intelligence? So how can we doubt that the world is the work of the divine intelligence? . . . Everything in the world is marvellously ordered by divine providence for the safety and protection of us all . . . We may well believe that the world and everything in it has been created for the gods and for mankind.²

Cicero reported the atomists' anti-religious objections to the argument from design:

The world was made by a natural process, without any need of a creator . . . Atoms come together and are held by mutual attraction. Thus are created all the forms of nature which you imagine can only be created by some divine craftsman. You have smuggled into our minds the idea of some eternal overlord whom we must fear . . . a god who makes everything his concern . . . a universal busybody.³

Cicero's contemporary, the atomist Lucretius (99–55 B.C.), added another objection: the world is in some respects badly designed, with many faults.⁴

Cicero also recorded the religious objections of a priest to the argument from design:

2 Cicero, *The Nature of the Gods*, 2. 97, 132–3.

3 *Op. cit.*, 1, 53–4.

4 Lucretius, *On the Nature of Things* 4. 198–9.

I am convinced of belief in the gods by its traditional authority . . . as the belief of our ancestors. But you [Stoics] despise authority and appeal to reason . . . You deploy all these arguments to prove that the gods exist. But by these very arguments you cast doubt on something which to my mind is not doubtful at all.⁵

Both kinds of objections were echoed by opponents of natural theology in the early modern period.

The Early Christian Centuries

Within a century after Cicero wrote this book, Christianity was spreading rapidly. Some Christian thinkers, encouraged by the Bible (Ps. 19:1; Rom. 1:20) began to ponder the same questions: What is the world's relation to God, and what can it tell us about him? Many Church Fathers enthusiastically took up the idea of nature as a witness to God.⁶ Tertullian (A.D. 160–225) wrote, 'God must be first known from nature and afterwards recognized from doctrine; from nature by his works and from doctrine by his revealed words'.⁷ Thus Christian natural theology was born. Tertullian's notion of a double revelation of God gave rise to the conception of 'God's two books'—the book of nature and the book of the Bible—from which one can learn of him. This expression became very popular in the early modern period.

To convince the pagan world of the power, wisdom and providence of the Creator, the Fathers used the pagans' own arguments. Cicero's book proved most useful to them; they simply took over the Stoic argument from design and applied it to the God of the Bible. Some pagans even wanted Cicero's book suppressed because it was used so successfully by Christian writers! But in spite of this success, there were dangers in the use of this argument. The Stoics had a very different idea of God from the Christians. They were pantheists who identified God with the universe or the spirit that pervaded it; for them God and nature meant the same thing. So the argument from design could be held to glorify nature, and there was a risk that Stoic assumptions underlying the argument from design might displace the Christian interpretation. For the Fathers, with their firm grasp of doctrine, this was not a serious danger; but in the early modern period it became a real peril.

⁵ Cicero, *op. cit.*, 3. 9.

⁶ Minucius Felix, Lactantius, Eusebius, Athanasius, Augustine, Jerome, etc.

The Middle Ages

As Christianity established itself and pagan opposition dwindled, the argument from design became less important. And as the Roman Empire crumbled, science declined and interest in the natural world declined too. Some Christians discouraged this interest because they feared that it was a distraction from spiritual concerns. Many felt that the chief value of the natural world for faith was as an allegory, giving to each physical phenomenon a spiritual meaning. Sun, moon and stars were not the subject of scientific astronomy but were images of Christ, the Church and the saints; animal behaviour did not call for physiological study but exemplified moral virtues and vices.

In the thirteenth century, when long-lost classical philosophy and science were rediscovered in western Europe, the argument from design reappeared. Thomas Aquinas (1225–1274) listed five philosophical demonstrations of the existence of God; four were abstract, but the fifth argued from the order and design in nature that the world must have an intelligent Designer.⁸ He was well aware that intellectual demonstrations could not compel anyone to believe in the Creator; this was a matter of faith, not of proof. The argument from design either prepared the way for faith or strengthened a faith already present. Aquinas held that philosophical or scientific truth would not contradict revealed truth, because all truth comes from God.

The Reformation and Scientific Revolution

The sixteenth-century Reformation was a religious earthquake which shook Christendom to its foundations. Its after-shocks included savage persecutions, the seventeenth-century wars of religion, and long-drawn-out intolerance. At the same time began an explosion of knowledge in the scientific revolution—the new astronomy of Copernicus, Galileo and Kepler; Paracelsus's medical revolution; Vesalius's new anatomy; Harvey's discovery of the circulation of the blood; the experimental physics and chemistry of Boyle and others; the invention of the telescope and microscope; new mathematical techniques; then, to crown all, Newton's inauguration of a new epoch in science. There was much concern about the relations of the

7 Tertullian, *Against Marcion* 1. 18.

8 Thomas Aquinas, *Summa of Theology* 1. 2. 3.

new sciences to Christianity, which was undergoing such drastic upheavals.

All the old landmarks seemed to be disappearing. In this situation of religious and social turmoil, competing philosophies and rapid scientific expansion, people were seeking certainty and peace. They began to look with fresh interest at the argument from design. Could it become a basis for establishing religious certainty and for reconciling Christianity with the new sciences? People were weary of the bitter sectarian disputes that had been tearing the Church apart. Might natural theology offer a way of bypassing the controversies and uniting the Churches in agreed truth?

Francis Bacon

Caution was needed in harnessing science to faith. Science needed to maintain its own integrity. It was not just a quarry for arguments to prop up faith. That its proper concern with physical secondary causes must not be usurped by constant mention of final causes, God's purposes, was strongly emphasized by Francis Bacon (1561–1626), the founder of the new scientific approach in early seventeenth-century England. By using inductive reasoning and an empirical, experimental method of gathering data, Bacon aimed to free science from earlier modes of metaphysical thought. He criticized Cicero's examples of purpose in bodily design and the Stoic belief, echoed by many Christians, that the world was created for mankind's benefit.

Bacon believed that the study of physical secondary causes in natural science led the mind to the divine First Cause and thus glorified God. Like many of his contemporaries, he adopted Tertullian's conception of a double revelation; he wrote,

God's two books are . . . first the Scriptures, revealing the will of God, and then the creatures expressing his power; whereof the latter is a key unto the former.⁹

Bacon wanted to show that scientific rigour was compatible with the view that the study of the natural world was a way of learning about God. His example ensured that this approach to natural theology became especially popular in English scientific circles in the seventeenth and eighteenth centuries. The argument from design was now

9 F. Bacon, *The Advancement of Learning* (1605), 1. 6. 16.

reinforced by new evidence drawn from the experimental sciences and in particular from the newly-invented telescope and microscope.

Robert Boyle

Bacon's follower Robert Boyle (1627–1691), a devout Christian as well as an eminent experimental scientist, was foremost in affirming that nature is God's book. He wrote in 1648:

When with bold telescopes I survey the old and newly discovered stars and planets . . . when with excellent microscopes I discern . . . nature's curious workmanship; when with the help of anatomical knives and the light of chymical furnaces I study the book of nature . . . I find myself exclaiming with the psalmist, How manifold are thy works, O God, in wisdom hast thou made them all!¹⁰

Boyle used the argument from design to demonstrate God's power, wisdom and providence, citing the diversity, bodily design and procreation of animals. He used Cicero's material; in particular, he adopted Cicero's example of a clock (not the same kind of clock, of course!) as an instance of intelligent design—a comparison that was to become very popular in early modern natural theology.

Like Bacon, Descartes and many other seventeenth century scientists, Boyle was an advocate of the 'mechanical philosophy', which insisted that science should explain physical phenomena in terms of matter and motion alone, without recourse to immaterial forces, either natural or supernatural. But this did not mean that he denied God's hand in nature. The mechanical secondary causes were merely the working out of God's structural plan imposed on matter at the creation. This agreed with the comparison of the world to a clock or watch, which the maker's skill enabled to go on working without his further intervention. Such an approach has been criticized as suggesting that after the creation God turned his back on the world and left it to its own devices. But this criticism is unfair, certainly to Boyle and even to the advocates of natural theology in the next century, who were much concerned with God's continuing will for the world.

Boyle was aware of problems concerning natural theology. Scientific study was opposed by 'several divines . . . who deter men from . . . inquiries into nature, as from a study unsafe for a Christian'; on

10 R. Boyle, *Some Motives and Incentives to the Love of God*, Works, vol. 1, p. 167.

the other hand, 'Undervaluation . . . of the study of things sacred is grown rife among . . . students of physicks . . . Our new libertines deny natural theology . . . namely the existence and providence of a Deity'.¹¹ Although, like other Christian writers, Boyle used the Stoic argument from design culled from Cicero, he warned of the risks in the underlying attitude to nature. Less naive in this than some other Christian writers, he felt that the ambiguous word 'nature' was better avoided so as not to give the impression of nature as a 'semi-deity'—'I think it is dangerous to religion in general'.¹²

Some Contemporaries of Boyle

Boyle's reference to nature as a semi-deity probably referred to a group who, like him, were concerned to reconcile their faith with science and reason, and to promote tolerance: the Cambridge Platonists, including Henry More (1614–1687) and Ralph Cudworth (1617–1685). Like Boyle, they used the argument from design, seeing God in nature. Cosmology and the 'organization and formation of the bodies of animals' were proofs that things were 'not made by chance, but by counsel and design intentionally'.¹³ But, unlike him, they introduced a sort of life-force, a power intermediate between God and the world; in Boyle's words, a semi-deity. This 'plastic nature' modelled on the Stoic world-soul, existed to 'execute that part of [God's] providence which consists in the regular and orderly motion of matter'.¹⁴ Leibniz called it 'in part impossible and in part superfluous'.¹⁵

The Cambridge Platonists were not scientists; but there were many men of science who followed Boyle's example in promoting natural theology. The botanist and microscopist Nehemiah Grew (1628–1711) spelt out the argument from design in cosmology, matter theory, minerals, plants, animals and the human body. Emphasizing the God-given order and regularity in nature, he pointed out that inorganic objects such as crystals and even atoms witness by their regular symmetry to their Designer: 'It is evident

11 R. Boyle, *The Usefulness of Natural Philosophy*, *Works*, vol. 1, pp. 429–30; *The Excellence of Theology*, *Works*, vol. 3, pp. 405, 410.

12 R. Boyle, *A Free Inquiry into the Vulgarly Received Notion of Nature*, *Works*, vol. 4, p. 381.

13 R. Cudworth, *The True Intellectual System of the Universe* (1678), pp. 671, 684.

14 *Op. cit.*, p. 150.

15 G. W. Leibniz, *What is Nature?* (1698), 2.

that matter and motion, and the sizes and figures of the parts of matter, have their original from a Divine Regulator'.¹⁶

John Ray (1628–1705), an outstanding botanist who adopted the Cambridge Platonists' 'plastic nature', was an even more indefatigable searcher out of design in nature. He wrote:

The treasures of nature are inexhaustible . . . If man ought to reflect upon his Creator the glory of all his works, then ought he to take notice of them all and not to think anything unworthy of his cognizance.¹⁷

Ray's argument from design briefly touched on astronomy, then turned to a careful account of the earth and its living creatures, whose classification had been his life's work. He showed how their anatomy and physiology fitted them for their environment and for the service of mankind. Ray went into such great detail in pointing out the useful purposes underlying the design of the human body and its parts that his science risked being swamped by teleology. To modern readers, that part of his argument from design seems to go to almost absurd lengths.

Where did natural theology belong? Was it part of science or of theology? Bacon, echoed by Descartes, warned of the danger that it might submerge scientific explanations, as sometimes happened in the work of Ray. Others saw it as a natural extension of the study of nature and a useful tool for apologetics, but were anxious that it might submerge revelation; and this, too, happened in the eighteenth century. John Webster (1610–1682), a puritan divine and Paracelsian physician, expressed the latter opinion:

What can be discovered of God . . . by the power of reason and the light of nature, may be handled as a part of natural philosophy (unto which it doth belong), because it is found out by the same means that the other natural sciences are . . . and may be holden forth as a means to overthrow atheism . . . but not to build up anything in religion, nor like a wild boar to enter into the Lord's vineyard to root up and destroy it.¹⁸

Descartes, Spinoza and Leibniz

Seventeenth-century France enjoyed less religious freedom than

16 N. Grew, *Cosmologia Sacra* (1701), p. 17.

17 J. Ray, *The Wisdom of God Manifested in the Works of the Creation* (1691), pp. 125, 130.

18 J. Webster, *The Examination of Academies* (1653), p. 98.

England. French philosophy was dominated by René Descartes (1596–1650), who kept his scientific mechanical philosophy separate from religion. Consequently natural theology was not in vogue in France as it was in England. Descartes was inclined to infer the existence of the physical world from prior acceptance of the existence of God and the soul, rather than the other way round. Boyle remarked about Descartes, 'I have often wished that he had ascribed to the Divine Author of nature a more particular and immediate efficiency and guidance'.¹⁹ Descartes argued for the existence of God not from creation but from the existence of the thinking self and the reality of our ideas of God.

Descartes affirmed, 'We cannot think too highly of the works of God'; but he went on to say,

We ought to beware lest we imagine that the ends which God proposed in the creation of the world are understood by us . . . and lest we persuade ourselves that all things were created by God for us only . . . Although it may be a pious thought to believe that God made all things for us . . . this supposition would be plainly ridiculous in physical reasoning.²⁰

This was a point that Bacon had already made. It was not until after 1720 with the introduction of Newtonianism that natural theology took hold in France, and it lasted only about half a century, till it perished in the French Revolution.

In contrast to France, Holland was the home of religious liberty. The Calvinist majority accepted natural theology, although along more narrowly biblical lines than in England. But the freethinking Jewish philosopher Baruch Spinoza (1632–1677), Boyle's contemporary, was opposed to it. Spinoza was a pantheist who identified God and nature. The Stoics, who first devised the argument from design, had held a similar position, but unlike them, Spinoza repudiated any attempt to argue about God from his works. He wrote:

Men assert with assurance that God directs all things to a certain end . . . I shall enquire in the first place why so many fall into this error, and why all are by nature so prone to embrace it; then I shall show its falsity . . . Nature has no fixed aim in view, and all final causes are merely fabrications of men.²¹

19 R. Boyle, *An Hydrostatical Discourse*, Works, vol. 3, p. 269.

20 R. Descartes, *Principles of Philosophy* (1644), 3. 1, 2, 3.

21 B. Spinoza, *Ethics* (1677), 1. 1, Appendix.

The German principalities followed the rule 'to each region its own religion'. The great mathematician and philosopher Gottfried Wilhelm Leibniz (1646–1716) was an orthodox Lutheran who worked towards reconciling Roman Catholics and Protestants, also Lutherans and Calvinists, but without success. On philosophical grounds Leibniz was an opponent of both Descartes and Spinoza. Although it cannot be said that Leibniz wrote on natural theology or the argument from design, for his works were of a different type, yet his attitude to God and the world was in sympathy with that approach.

He believed that the world was a collection of units ('monads') created by God in 'pre-established harmony' that caused the order and regularity of the universe, which was thus a demonstration of the Creator's power and wisdom. It was Leibniz's belief, much misunderstood and ridiculed by sceptics such as Voltaire, that God had created the best possible world:

The infinite wisdom of the Almighty allied with his boundless goodness has brought it about that nothing better could have been created, everything taken into account, than what God has created.²²

Physical evil, thought Leibniz, might lead to some greater good, perhaps in the afterlife. Such optimism was challenged, at least for this world, by the terrible earthquake at Lisbon in 1755.

England: The Age of Newton

Isaac Newton was born in 1642, the year that Galileo died and the English Civil War began; he died in 1727, the year that George I died. In his lifetime, English religious and intellectual life underwent a considerable change. In spite of setbacks, toleration gradually increased, with the philosopher John Locke as its spokesman. England was admired abroad as the home of freedom, and Locke became the inspiration of those aspiring to liberation in other countries. In France, Voltaire popularized the writings of Locke and Newton.

The prevailing temper of the Church of England in the eighteenth century was latitudinarian, inheriting the reasonableness of the Cambridge Platonists without their mysticism. Orthodox but not intolerant, open to scientific insights but firmly opposed to atheism, it found natural theology useful as a weapon against atheism and as a

22 G. W. Leibniz, *A Vindication of God's Justice* (1710), 46.

reinforcement of Christian doctrine. In this it had the support of the leading scientists who, although not all orthodox, saw nature as God's book and its design as pointing to the Creator.

Robert Boyle had left money in his will to found annual Boyle Lectures 'for proving the Christian religion'. When Richard Bentley gave the first Boyle lecture in 1692, 'A Confutation of Atheism', he drew his arguments from 'the structure of animate bodies and the origin and frame of the world', and he wrote to Newton for his cosmological argument from design. Other Boyle lecturers, too, presented a Newtonian natural theology: Samuel Clarke in 1704–5, William Whiston in 1707, and William Derham in 1711–12. Later in the eighteenth century the Bampton Lectures joined the Boyle Lectures in defending the faith.

With the advent of Isaac Newton, it seems that a change came over natural theology. The argument from design was still popular, but it changed its focus to a certain extent. In all the works that had been composed on this topic from Cicero onwards, the argument from design had dealt with three aspects of creation: the beauty and order of the heavens, the anatomy and physiology of living creatures that fitted them for life on earth, and the usefulness of the earth and its contents for mankind. Some writers stressed one aspect, some another. But the main emphasis had always been on the last two aspects, which were dealt with in great detail, partly because more was known about them scientifically than about the heavenly bodies, and partly because they were closer to human concerns.

The value of the heavens for the argument from design had been aesthetic rather than scientific; it was the ordinary observer's point of view, not an astronomical analysis. But now the work of Newton gave a quantitative account of the celestial motions and made them as accessible intellectually as the subjects of anatomy and physiology. Now the design of the heavens could be dealt with in the same scientific detail as the design of living bodies, and its importance for the argument from design was greatly increased. What difference would this make for natural theology?

Newton took natural theology seriously. He said, 'When I wrote my treatise about our system, I had an eye upon such principles as might work . . . for the belief of a Deity'.²³ He listed the features of his cosmology which seemed to argue for a divine Designer and Preserver: the centrality of the sun, the regular orbits of the planets

23 I. Newton, First Letter to Richard Bentley (1692).

around it, the remoteness of the giant planets that counteracts their disturbing gravitational effect, the wide distribution of matter so that it does not all fall into the centre of the universe by gravity; also the composition of bodies from atoms moved by active principles such as gravity, and the symmetry and uniformity of living as well as of heavenly bodies.²⁴

It was easy to think of the essential but unexplained gravitational attraction that held the universe together as the direct action of God on his creation. Newton also felt that God's intervention was needed to prevent the running down of the universe caused by inevitable decrease of motion and to correct apparent instabilities in the planetary orbits, an opinion that Leibniz felt detracted from the perfection of creation. Nearly a century later, the French mathematician Laplace, being aware that the imagined planetary instabilities did not exist, was said to conclude, 'We have no need of that hypothesis [of God]'.

From the study of nature in general and of cosmology in particular, Newton believed that religion could be promoted:

For so far as we know by natural philosophy what is the First Cause, what power he has over us, and what benefits we receive from him, so far our duty towards him, as well as that towards one another, will appear to us by the light of nature.²⁵

And what was the God revealed by natural theology?

This Being governs all things . . . as Lord over all . . . The true God is a living, intelligent and powerful Being . . . He is supreme and most perfect. He is eternal and infinite . . . He endures forever and is everywhere present; and, by existing always and everywhere, he constitutes duration and space . . . We have ideas of his attributes, but . . . much less have we any idea of the substance of God. We know him only by his most wise and excellent contrivances of things and final causes; we admire him for his perfections, but we reverence and adore him on account of his dominion . . . for a god without dominion, providence and final causes is nothing else but fate and nature . . . And thus much concerning God, to discourse of whom from the appearances of things does certainly belong to natural philosophy.²⁶

24 I. Newton, *Letters to Bentley*; *Opticks* (2nd ed., 1717), Query 31.

25 I. Newton, *Opticks*, Query 31.

26 I. Newton, *Mathematical Principles of Natural Philosophy* (2nd ed., 1713), General Scholium.

Natural Theology and Moral Philosophy

Natural theology also had moral implications. The third Lord Shaftesbury (1671–1713), the moral philosopher, pointed to the harmony of the world, where each individual is part of a larger system, and where even flies are essential as food for spiders. He concluded that human behaviour, too, ought to harmonize with the divine plan of creation; this was virtue:

He who, as a sound theist, believes a reigning Mind, sovereign in nature and ruling all things . . . must necessarily believe virtue to be naturally good and advantageous . . . The admiration and love of order and harmony [in the world] is highly assistant to virtue.²⁷

The distinguished scientist Joseph Priestley (1733–1804), renowned for his radical political and religious opinions, agreed with this:

The contemplation of the works of God should . . . teach [us] to aspire to the moral perfections of the great Author of all things . . . The more we see of the wonderful structure of the world and of the laws of nature, the more clearly do we comprehend their admirable uses . . . [which] fill the heart with unbounded love, gratitude and joy.²⁸

Deism, Science and the Bible

The somewhat impersonal view of God as Creator, together with simple moral precepts, was called natural religion. Newton and many other people thought that this was the original true religion of Adam, Noah and the early inhabitants of the world, before it became corrupted by idolatry and superstition. Some eighteenth-century writers felt that this should be the whole of religion and that the doctrines of Christianity, too, were corruptions of the original pure religion, but most agreed that the Christian revelation (or a rationalized version of it) should be added to natural religion. The advocates of natural religion, called Deists, included Newton, Shaftesbury, Priestley and Pope in England, and Rousseau, Voltaire, and Kant on the continent. Atheists such as Hume and d'Holbach sometimes disguised themselves as Deists. Alexander Pope (1688–1744) defined a

27 Lord Shaftesbury, *An Inquiry Concerning Virtue* (1714), 1, 3, 3.

28 J. Priestley, *The History of Electricity* (1775), vol. 1, pp. xxii–xxiv.

Deist as one who is 'slave to no sect, who takes no private road, but looks through nature up to nature's God'.²⁹ Jean-Jacques Rousseau (1712–1778) said, 'Human natural religion . . . is simply the pure interior worship of the supreme God and the age-long duty of morality; this is the true religion of the Gospels'.³⁰

The prevalence of Deism or natural religion in the eighteenth century was the result of many causes, religious and social. It certainly was not solely or even mainly the result of the predominance of Newtonian natural theology. But the tipping of the scales towards the cosmological aspect of the argument from design encouraged a rather remote view of God, whereas the older emphasis on the earth and its creatures (which still remained popular in this century) stayed closer to human concerns. There were mixed reactions to the new cosmologically slanted natural theology. Some thought that 'Newton's distinguished work will be the safest protection against the attacks of atheists'.³¹ Others agreed with Leibniz: 'It appears that even natural religion is growing much weaker . . . Mr Newton and his followers have an extremely odd opinion of the work of God . . . This God . . . will be very like the Stoic God, who was the whole universe'.³²

One consequence of the new scientific confidence and the cosmological emphasis of natural theology was a series of attempts to rewrite the biblical accounts of the creation and the deluge in scientific terms—Thomas Burnet's *Sacred History of the Earth* (1684), John Woodward's *Essay towards a Natural History of the Earth* (1695), William Whiston's *New Theory of the Earth* (1696), *Astronomical Principles of Religion* (1717), and *New Theory of the Deluge* (1737). In spite of these authors' pleas that they were explaining the true, if not the literal, meaning of the Bible, and their use of the argument from design, these books horrified many orthodox divines. The orthodox John Keill, himself a Newtonian scientist, criticized these theories not only on scientific grounds but also, like Cicero's priestly spokesman, held that where religious tradition lays down certain positions it is harmful and useless to offer arguments from nature. Keill did not reject the argument from design in itself, but he recommended an older version of it, the one used by Boyle and Ray which rested on the design of living creatures

29 A. Pope, *Essay on Man* (1733).

30 J.-J. Rousseau, *The Social Contract* (1762), chapter 8.

31 Roger Cotes, preface to 2nd ed. of Newton's *Principia* (1713).

32 G. W. Leibniz, First and fifth letters to Samuel Clarke, Newton's supporter.

and not on cosmology, and which was accompanied by fervent orthodox faith.³³

The Poets and the Argument from Design

The use of the argument from design was not limited to scientists, divines and philosophers. In the eighteenth century it was a popular theme for poets. We still sing as a hymn Joseph Addison's ode 'The spacious firmament on high', which concludes with the words, 'For ever singing as they shine, The hand that made us is divine'. Alexander Pope's *Essay on Man* used the argument from design to promote optimism of a Leibnizian kind:

... The First Almighty Cause
Acts not by partial but by general laws . . .
All nature is but art, unknown to thee,
All chance, direction, which thou canst not see;
All discord, harmony not understood;
All partial evil, universal good.

Newton was revered by many writers as a prophet pointing to God, a 'pure intelligence, whom God to mortals lent to trace his boundless works', as James Thompson wrote in his poem *The Seasons*. Pope wrote, 'Nature and nature's laws lay hid in night: God said, Let Newton be! and all was light'.

But the Romantic movement of the late eighteenth and early nineteenth centuries turned literature away from science and natural theology, and opposed reason by the new cult of emotion. Instead of the ordered regularity of nature, it became fashionable to admire wild irregular scenery evoking turbulent feelings in the human heart. Former heroes now became villains. In his poem *Jerusalem*, William Blake (1757–1827) attacked the embodiments of unfeeling 'rational power', Bacon, Locke and Newton, for their 'terrors like iron scourges' and their 'cruel works', and Voltaire and Rousseau for their mockery of human values. He opposed natural religion and natural theology.

Yet the romantic poets eagerly espoused their own version of the argument from design. Blake claimed to see the sun not as 'a round disk of fire . . . I see the innumerable company of the heavenly host crying Holy, holy, holy is the Lord Almighty'. Wordsworth, less antagonistic to reason than Blake was, equally found divinity in nature, which evoked in him 'religious love', 'deep devotion' and

33 J. Keill, *An Examination of Dr Burnet's Theory of the Earth* (1698), pp. 52–4.

'worship'. In *The Prelude* he described his experience of nature as not only revealing God but as being itself divine; he spoke of 'Nature's self, which is the breath of God', and 'God and nature's single sovereignty'. The argument from design as used by the Romantic writers witnessed not to the transcendent Creator but to the Stoic world-soul or nature itself.

Philosophy and Natural Theology

Natural theology passed from the hands of the Latitudinarians to the Deistic champions of non-revelational natural religion, giving increasing disquiet to orthodox divines. The argument from design was certainly not the monopoly of Christians. Voltaire (1694–1778), who was instrumental in introducing Newtonianism to France, was a Deist, an enemy of the Church but also an opponent of atheism. He appealed, 'With me, adore the design that is manifested in all of nature, and consequently the Author of that design'.³⁴ He inferred the existence of God by the argument from design:

Every artefact which shows parts and a purpose reveals a maker; therefore this universe, composed of parts each with its own purpose, reveals a most powerful and most intelligent Maker.³⁵

As the eighteenth century went on, atheism began to be voiced freely, both in France and in Britain. The argument from design was repudiated by those who denied the existence of God. Once again we are back in the mental world of Cicero's book. If the orthodox John Keill spoke like Cicero's priest, the eighteenth-century atheists tended to repeat the arguments of Cicero's atomist spokesman. We see this in Paul d'Holbach (1723–1789), whose atheism was attacked by Voltaire:

Study botany . . . observe the human body . . . contemplate the stars . . . admire butterflies . . . All these things will not prove the existence of a God . . . but only your ignorance of nature . . . Nature does not require an invisible mover . . . Matter moves by its own energy . . . Everything that occurs in the world proves clearly that it is not governed by an intelligent Being . . . Good is everywhere accompanied by evil.³⁶

The most celebrated refutation of the argument from design came

34 F. M. A. de Voltaire, *Philosophical Dictionary* (1764), article 'God'.

35 *Op. cit.*, article 'Atheism'.

36 P. d'Holbach, *Good Sense* (1748): Refutation of the Arguments for the Existence of God.

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from the Scotsman David Hume (1711–1776), who went beyond the traditional arguments of atomism. In fact Hume's arguments, because they cast doubt on the usual mode of arguing from causation, were as destructive of science as they were of religion:

You have acknowledged that the chief or sole argument for a divine existence . . . is derived from the order of nature . . . This is an argument drawn from effects to causes . . . You find certain phenomena in nature. You seek a cause or author. You imagine that you have found him. You afterwards become so enamoured of this offspring of your brain that you imagine . . . he must produce something greater and more perfect than the present scene of things, which is so full of ill and disorder . . . You have no grounds to ascribe [this] to him . . . The religious hypothesis must be considered only as a particular method of accounting for the visible phenomena of the universe; but no just reasoner will ever presume to infer from it any single fact.³⁷

If Newton was the summit of early modern science, then Immanuel Kant, (1724–1804), heir to both Newton and Hume, was the peak of eighteenth-century philosophy. Kant remembered that his mother, using the argument from design, 'impressed on my heart a deep reverence for the Creator of all things'. Kant moved from Christianity to Deism, but he never lost this reverence for God in his works; he wrote, 'Two things fill my mind with ever-increasing wonder and awe . . . the starry heavens above and the moral law within'.³⁸ However, this feeling of awe was not translated into philosophical terms. Kant proposed a complete separation of religion and science; he thought that natural theology was a contradiction in terms, and he severely criticized the argument from design. His view of religion was largely bounded by morality; for him, God's existence was best demonstrated by the moral law within, and it was in moral arguments that he sought religious certainty.

The Last Stage: Paley

The argument from design had travelled a long way in the eighteenth century from the glowing hopes voiced by Boyle a century before. It had helped to promote Deism, it had challenged the Bible, it had been adopted by non-Christians, and it had been scathingly rebuked

37 D. Hume, *An Enquiry concerning Human Understanding* (1779): The Speech of Epicurus.

38 I. Kant, *Critique of Practical Reason* (1788), Conclusion.

by philosophers. Yet natural theology was not discredited; in fact, it became even more popular in the first half of the nineteenth century than ever before. But, as Keill had recommended, it retreated back to Boyle's and Ray's approach, making less use of cosmology and more of biology. This was the safe path that did not challenge traditional orthodoxy.

William Paley's (1743–1805) *View of the Evidences of Christianity* (1794) and *Natural Theology* (1802) were immensely popular and often reprinted accounts of the argument from design, from an orthodox anti-Deist standpoint. They were heavily dependent on Ray's *Wisdom of God Manifested in the Works of the Creation* (1691). Paley displayed the renewed preference for evidence from living creatures; he devoted 18 chapters of his *Natural Theology* to biology and only one to astronomy. He wrote:

My opinion of astronomy has always been that it is not the best medium through which to prove the agency of an intelligent Creator . . . it is not so well adapted . . . to the purpose of argument.³⁹

He admitted that to the believer cosmology 'shows the magnificence of God's operations . . . it raises [the mind] to sublime views of the Deity'; still, concerning 'natural history applied to the proof of an intelligent Creator, for my part I take my stand in human anatomy'.⁴⁰

The biological argument from design may have been theologically safe, but it was scientifically vulnerable. It lost its credibility after it was undermined by Darwin's arguments from natural selection in *The Origin of Species* (1859)—but that development is beyond the scope of this article. Natural theology has survived, but it now takes a different form from the tradition that prevailed from Cicero to Paley. It has moved back to cosmology and prefers to deal with general issues arising from the existence and nature of the universe.

On the personal level, wonder at the beauty, regularity and design in nature is a universal sentiment that can become a pointer towards the Creator. In the last resort, however much it is buttressed by scientific information, the argument from design is a simple one that can be grasped by any person. Paley put it crudely:

The marks of design are too strong to be gotten over. Design must

39 W. Paley, *Natural Theology* (1802), chapter 22.

40 *Op. cit.*, chapter 27.

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have had a designer. That designer must have been a person. That person is God.⁴¹

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41 *Op. cit.*, chapter 24.