6. RICHARD H. POPKIN'S CONCEPT OF THE THIRD FORCE AND THE NEWTONIAN SYNTHESIS OF THEOLOGY AND SCIENTIFIC METHODOLOGY IN ISAAC NEWTON AND SAMUEL CLARKE

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How precious [are] our teacher's teachings.
Time flies swiftly in this garden of learning.
So swiftly [/soon] after all these years
We must part. Goodbye.[1]

Introduction

In 1960, Richard H. Popkin published his paradigm-shattering *History of Scepticism from Erasmus to Descartes* in which he described the effects of the rediscovery of the writings of the Greek Pyrrhonian sceptic, Sextus Empiricus, upon the intellectual ferment of the sixteenth and seventeenth centuries. Popkin showed both how early modern adaptations of Sextus' arguments subverted the possibility of obtaining certain knowledge from the senses, reason, or authority and how some early modern philosophers in the rationalist and empiricist traditions addressed the ensuing "sceptical crisis" in religion, philosophy, and science. By 1981, when he was the Willam Andrews Clark Library Professor at UCLA, Popkin was embarked upon the project of widening his historical analysis beyond the canonical rationalists and empiricists of the traditional schools of early modern philosophy. He began to analyze non-traditional writers who characterized a strand of early modern thought which he christened the "Third Force." Popkin showed how a wide variety of reinterpreted, traditional, early modern thinkers, as well as non-traditional, early modern thinkers, attempted to defeat scepticism by combining elements of traditional philosophy with arguments and ideas drawn from such supposedly non-rational, non-philosophical arenas as Jewish messianism, Christian millenarianism, eschatology, and the interpretation of biblical prophecy.

[1] Song from *Tampopo*, directed by Juzo Itami, 1986. Transcribed from http://www.friesian.com/review.htm.

Popkin argued that by focusing exclusively on the traditional "line of development in European intellectual history from Erasmus and Montaigne to Bacon, Descartes, Spinoza, and the French Enlightenment…, we have lost track of one of the most vigorous sets of ideas that influenced the world view of Europeans."[2]

In this paper, I wish to analyze the attempt by Isaac Newton and Samuel Clarke to craft their particularly Newtonian response to scepticism and to show how they both attempt to defeat it through a uniquely Newtonian synthesis of a providentialist and voluntaristic God, drawn from both natural and revealed religion, and traditional scientific epistemology. The Newtonian synthesis of religion and science epitomizes what Popkin meant by the "Third Force." Popkin often told me that some of the best history of philosophy done in the 1970s and 1980s was done by historians of science but that too often historians of science anachronistically ignored what scientists really thought and what they really did in the religious contexts of their time because such views might seem to be "oddball, crankish, or irrelevant…."[3] Popkin often gently poked fun at Whiggish historians who resolutely ignored or apologized for Newton's religious views. Of Newton, Popkin once ironically suggested that the question should not be "why one of the world's greatest scientists should have spent so much time thinking and writing about religious matters," but "why did one of the greatest anti-Trinitarian theologians of the 17th century take time off to write works on natural science, like the *Principia Mathematica*?"[4]

By integrating the overlooked or ignored or underemphasized "Third Force" elements of Newton's thought with his scientific methodology, a new version of Newton emerges which stands in marked contrast to the traditional picture of Newton as the "first mover" of the modern scientific revolution.[5] Newton and his disciple Samuel Clarke (and to a lesser degree, William Whiston) craft a version of Newtonianism which explicitly synthesizes ALL of the

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[2] Richard H. Popkin, "Foreword," in James E. Force, *William Whiston: Honest Newtonian* (Cambridge: Cambridge University Press, 1985), p. xviii.

[3] Popkin, "Foreword," p. xviii.

[4] Richard H. Popkin, "Newton's Biblical Theology and his Theological Physics," in *Newton's Scientific and Philosophical Legacy*, eds., P. B. Scheuer and G. Debrock (Dordrecht: Kluwer, 1988), p. 81. This essay is reprinted in Richard H. Popkin, *The Third Force in Seventeenth-Century Thought* (Leiden: Brill, 1992), pp. 172–188.

[5] See James E. Force, "From the Scientific Revolution to Newton (And Back Again): The Nature of Newton's 'Holy Alliance' Between Science and Religion: Reconsidering Newton and the Scientific Revolution," in *The Canonical Imperative: Rethinking the Scientific Revolution in Memory of Betty Jo Teeter Dobbs*, ed. Margaret J. Osler (Cambridge: Cambridge University Press, 2000), pp. 247–270.

standard apologetic arguments of the day – the design argument, the argument from prophecy (especially millennial prophecy), the argument from miracles, and the cosmological argument – with the epistemology of the New Science.

The Argument FROM Design and the Argument TO Design in Newton and Clarke

One of the most characteristic arguments of Clarke and Newton in natural religion is the design argument which they use to illustrate the general providence of the creator who, in the beginning, designed and brought into being the realm of nature. The design argument has two versions: the argument **FROM** design and the argument **TO** design.[6]

In the argument **FROM** design, the premises of the argument are those observed natural phenomena, especially regular planetary motion, which seem to imply (for proponents of this argument) an extra-mechanical Divine Architect as the cause of such observed, clock-like motion. This version of the argument proceeds by analogy *from* the observed orderliness in the phenomena of the heavens *to* a first cause sufficiently skilled and powerful to produce the observed celestial order.

In the argument **TO** design, on the other hand, the premises of the argument are based upon observations of the seemingly purposive natural contrivances often observed in the biological realm. *From* the observed teleological design of men and animals, proponents of this argument argue *to* a cause who purposively designed these contrivances. Thus, the design of the eye-socket is designed with the goal of permitting the eye to swivel and "track" an object.

While useful, this distinction should be used with caution because both arguments move by analogy *from* empirical observations *to* a cause sufficient to produce the observed phenomena. The argument **FROM** design moves *from* observed orderly phenomena in the heavens *to* a divine artificer just as the argument **TO** design moves *from* the observed purposiveness of biological phenomena *to* a contriver of the observed teleological behavior in the natural realm. The argument **FROM** design emphasizes the observations of non-purposive but orderly arrangement usually (although not always) in celestial phenomena while the argument **TO** design emphasizes the seemingly purposive orderly relationships usually (but not always) in the parts of biological or unnatural organisms.

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[6] Robert H. Hurlbutt, III, *Hume, Newton, and the Design Argument* (Lincoln, NE: University of Nebraska Press, 1965), originates this incisive distinction in this groundbreaking book. See, for example, p. 10. I am greatly indebted to Hurlbutt's book throughout this section of the paper.

Whether one emphasizes the teleological nature of natural biological structures or the empirically observed regularity in the starry heavens, both versions of the argument rely upon the assumption that nature is uniform with respect to causes. The uniformity of causes in nature is stated by Newton in his second rule of reasoning according to which "*the causes assigned to natural effects of the same kind must be, so far as possible, the same*." Hume, of course, later puts this principle into the mouth of his character, Cleanthes, in his *Dialogues concerning Natural Religion*, who supposes that "this principle" – "That like effects arise from like causes" – is the "foundation of all religion."[7]

The argument **FROM** design appears in Clarke's first set of Boyle Lectures, delivered in St. Paul's Cathedral in 1704. Clarke wonders what Cicero would have made of the "*Modern* Discoveries in Astronomy" which display such "*Exquisite Regularity*":

> The *Immense Greatness* of the World; (I mean that Part of it which falls under our Observation); which is now known to be as much greater than what in His Time they imagined it to be, as the World itself, according to their System, was greater than *Archimede's* Sphere? The *Exquisite Regularity* of all the Planets Motions, without Epicycles, Stations, Retrogradations, or any other Deviation or Confusion whatsoever? The *inexpressible Nicety* of the Adjustment of the Primary Velocity and Original Direction of the *Annual* Motion of the Planets, with their distances from the Central Body and their force of Gravitation towards it? The *wonderful Proportion* of the *Diurnal* Motion of the Earth and other Planets about their own Center, for the Distinction of Light and Darkness; with that monstrously disproportionate Whirling of the whole Heavens, which the Antient Astronomers were forced to suppose? The *exact accommodating* of the *Densities* of the Planets, to their Distances from the Sun, and consequently to the Proportion of Heat which each of them is to bear respectively; so that neither those which are nearest to the Sun, are destroyed by the Heat, nor those whch are farthest off, by the Cold….[8]

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[7] For Rule II, see Isaac Newton, *The Principia: Mathematical Principles of Natural Philosophy*, A New Translation by I. Bernard Cohen and Julia Budenz (Berkeley and Los Angeles, CA: University of California Press, 1999), p.795. In his classic statement of the design argument, Cleanthes shows the efficacy of this Newtonian rule for the purposes of the design argument. [See David Hume, *Dialogues Concerning Natural Religion*, ed. Norman Kemp Smith (Indianapolis, IN: Library of the Liberal Arts, 1947), p. 143.)] Philo "supposes" that Cleanthes makes this Newtonian rule, the "foundation of all religion." (See, Hume, *Dialogues*, p. 170.)

[8] Samuel Clarke, *A Demonstration of the Being and Attributes of God, More Particularly in Answer to Mr. Hobbes, Spinoza, and Their Followers*, in *The Works of Samuel Clarke, D.D., Late Rector of St James's Westminster* (London, 1738; Garland Series of "British Philosophers and Theologians of the 17th and 18th Centuries," A Collection of 101 volumes ed. René Wellek, New York, 1978), 4 vols., 2:570. (Cited hereafter as *DBAG*.)

The argument **TO** design also appears in Clarke's first set of Boyle Lectures where he points out to "Atheists" that the intricate and purposive design in physiological structures provides the basis for arguing to the intelligent and wise nature of the divine artificer:

> If Galen so many Ages since, could find in the Construction and Contrivance of the parts of a Human Body, such undeniable marks of Contrivance and Design, as forced him Then to acknowledge and admire the Wisdom of its Author; What would he have said, if he had known the Late Discoveries in Anatomy any Physick, the Circulation of the Blood, the exact Structure of the Heart and Brain, the Uses of Numberless Glands and Valves for the Secretion and Motion of the Juices in the Body; besides several Veins and other Vessels and Receptacles not at all known, or so much as imagined to have any Existence.[9]

In the *General Scholium*, which dates from the second edition of his *Mathematical Principles of Natural Philosophy* (1713), Newton famously describes the beautiful orderliness of the solar system:

> The six primary planets revolve about the sun in circles concentric with the sun, with the same direction of motion, and very nearly in the same plane. Ten moons revolve about the earth, Jupiter, and Saturn, in concentric circles with the same direction of motion, very nearly in the planes of the orbits of the planets. And all these regular motions do not have their origin in mechanical causes, since comets go freely in very eccentric orbits and into all parts of the heavens.

From this detailed description of the orderly structure which he has observed in the solar system, Newton infers the existence of a divine architect sufficiently powerful and intelligent to cause this observed effect:

> This most elegant system of the sun, planets, and comets could not have arisen without the design and dominion of an intelligent and powerful being…. He rules all things, not as the world soul but as the lord of all. And because of his dominion he is called the Lord God *Pantokrator*. For "god" is a relative word and has reference to servants, and godhood is the lordship of God, not over his own body as is supposed by those for whom God is the world soul, but over servants. The supreme God is an eternal, infinite, and absolutely perfect being; but a being, however perfect, without dominion is not the Lord God.[10]

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[9] Clarke, *DBAG*, in *Works*, 2:570.
[10] Newton, *The Principia*, pp. 940–941.

In a fragment of conversation which David Gregory reports from December, 1691, Newton explains why he prefers to rely more heavily upon the argument **FROM** design: it is "easier" and more "Universall." Gregory records that:

> In Mr. Newton's opinion a good design of a publick speech (and which may serve well at one Act) may be to shew that the most simple laws of nature are observed in the structure of a great part of the Universe, that the philosophy ought then to begin, and that Cosmical Qualities are as much easier as they are more Universall than particular ones, and the general contrivance simpler than that of Animals plants etc.[11]

Nevertheless, Newton does, in fact, resort to the argument **TO** design, with its pointed teleological emphasis and its grounding in physiological structures, especially in his unpublished manuscripts. In a manuscript entitled "A short Schem [sic] of the true Religion," Newton writes that:

> Whence is it that the eyes of all sorts of living creatures are transparent to the very bottom & the only transparent members in the body, having on the outside an hard transparent skin, & within transparent juyces with a crystalline Lens in the middle & a pupil before the Lens all of them *so truly shaped & fitted for vision*, that no Artist can mend them? *Did blind chance know that there was light & what was its refraction & fit the eys of all creatures after the most curious manner to make use of it?* These & such like considerations always have & ever will prevail with man kind to believe that there is a being who made all things & has all things in his power & who is therfore to be feared.[12]

In an unpublished draft to the first edition of his *Opticks*, Newton again argues that the teleological symmetry evident in the physiological structure of animals points to a designer who had a particular purpose in mind for his designs:

> Nothing is more curious and difficult to frame of the eyes for seeing and of the ears for hearing and yet no sort of creatures has these members to no purpose. What more difficult than to fly? and yet was it by chance that all creatures can fly which have wings.?[13]

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[11] Cited in Henry Guerlac and Margaret C. Jacob, "Bentley, Newton, and Providence," *Journal of the History of Ideas* 30, No. 3 (July–Sept., 1969), p. 317.

[12] King's College, Cambridge, Keynes Ms.7. See Newton Project, http://www.newtonproject.sussex.ac.uk/texts/viewtext.php?id=THEM00007&mode=normalized. I have added emphasis in this text with italic type.

[13] Cited in J. E. McGuire, "Newton's 'Principles of Philosophy': An Intended Preface for the 1704 *Opticks* and a Related Draft Fragment," *The British Journal for the History of Science* 5 (1970), p. 183.

Newton's most famous statement of the argument **TO** design, and of his reliance upon it to demonstrate God's existence and nature, occurs in the *General Scholium* alongside another statement of the argument **FROM** design. After insisting that we can never form any idea of the "substance of God," he concludes that:

> We know him only by his properties and attributes and by the wisest and best construction of things and their final causes….[14]

The Argument from Prophecy in Newton and Clarke

For its Newtonian proponents, the design argument of natural religion demonstrates that God's nature is that of a supremely powerful Architect-Creator who, in the beginning, created the "book of nature" as the new scientists have described it in their investigations. Central to the thought of both Newton and Clarke is the conviction that, in the most accurate interpretations of Moses' history of creation in *Genesis*, in the scriptural record of other historically fulfilled prophecies, and in the crucial core of yet unfulfilled prophecies in the books of *Daniel* and *Revelation*, God's plan for natural history (what Newton called "the world natural") and for human history (what Newton called the "world politique") is extensively revealed to the "wise."

In an early treatise on the apocalypse, Newton urges a parallel methodology for understanding both the book of nature and the book of scripture. Just as Newton had urged in the first rule of reasoning in the first edition of the *Principia* that – when we interpret the book of nature – "*No more causes of natural things should be admitted than are both true and sufficient to explain their phenomena*."[15] so, too – when we interpret the book of prophetic scripture – we should also see that God "is pleased with Simplicity" and resolve:

> To choose those constructions which without straining reduce things to the greatest simplicity. The reason of this is manifest by the precedent Rule. Truth is ever to be found in simplicity, & not in the multiplicity & confusion

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[14] Newton, *The Principia*, p. 942. As Florian Cajori explains in the Appendix to his edition of the *Principia*, Newton uses the term "final causes" in this text in a thoroughly Aristotelian sense: "the purpose, aim, or end for which a thing is made." See *Sir Isaac Newton's Mathematical Principles of Natural Philosophy and His System of the World*. Translated into English by Andrew Motte in 1729. The translations revised, and supplied with an historical and explanatory appendix by Florian Cajori. 2 vols. (Berkeley and Los Angeles, CA, 1934), "An Historical and Explanatory Appendix by Florian Cajori," 2:670.

[15] Newton, *The Principia*, p. 794.

> of things. As the world, which to the naked eye exhibits the greatest variety of objects, appears very simple in its internall constitution when surveyed by a philosophic understanding, & so much the simpler by how much the better it is understood, so it is in these visions. It is the perfection of God's works that they are all done with the greatest simplicity. He is the God of order & not of confusion. And therefore as they that would understand the frame of the world must indeavour to reduce their knowledg to all possible simplicity, so it must be in seeking to understand these visions. And they that shall do otherwise do not onely make sure never to understand them, but derogate from the perfection of the prophesy; & make it suspicious also that their designe is not to understand it but to shuffle it of & confound the understandings of men by making it intricate & confused.[16]

Ultimately, our understanding of "Newtonianism," as it is found in Newton and Clarke, at least, must include an understanding of the way that they integrate their natural religion with the revealed religion of scriptural interpretation. God is the God of Order whether exhibited in the book of nature or the book of prophetic revelation.

Newton's progress in understanding God's book of nature was legendary in his own lifetime. In his notes toward a biography of Newton, his niece's husband, John Conduitt, elaborates on the excitement generated among the learned by Newton's progress in deciphering the book of nature:

> What can be more becoming an intelligent being, than to enquire into the increase of Natural discoveries to consider the various revolutions in the Commonwealth of Knowledge the Period of one *Hypothesis* System & the rise of *another*; [3]a new system; to travell with those speculative Conquerors who have extended the limits of humane science & opened new worlds to our understanding; & to pay a due homage & reverence to the great Deliverers who freed mankind from the *bondage* [4] of Error & Ignorance. Though wee should look around the present age & even go far back into the past, *difficult would it be* to find an instance of one who penetrated farther into the works of the Divine Author of Nature and laid so solid a foundation for a lasting & universal Empire in Philosophy as Sir Isaac Newton.[17]

This sentiment was shared by Newton's immediate circle including Whiston and Clarke who hoped that similar advances would soon be made in understanding the books of divinely revealed scripture:

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[16] Newton, Yahuda MS 1.1, f. 14r. See the Newton Project, http://www.newtonproject.sussex.ac.uk/texts/viewtext.php?id=THEM00135&mode=normalized.

[17] King's College, Cambridge, Keynes Ms. 130.2 is John Conduitt's account of Newton's life before going to university. See the Newton Project, http://www.newtonproject.sussex.ac.uk/texts/viewtext.php?id=THEM00165&mode=normalized.

> Since it has now pleased God, as we have seen, to discover many noble and important truths to us, by the Light of Nature, and the System of the World; as also, he has long discovered many noble and important Truths by Revelation, in the Sacred Truths; It cannot be now improper, to compare these two Divine Volumes, as I may well call them, together; in such Cases, I mean of Revelation, as related to the Natural World, and wherein we may be assisted the better to judge by the knowledge of the System of the Universe about us. For if those things contained in Scriptures be true, and really deriv'd from the Author of Nature, we shall find them in proper Cases, confirm'd by the System of the World and the Frame of Nature will in some Degree, bear Witness to the Revelation.[18]

Newton makes clear that he endorses the project of interpreting both God's book of nature and the involvement of God in the course of human and natural history as it is revealed in scripture. Newton writes that:

> He that would understand a book written in a strange language must first learn the language & if he would understand it well he must learn the language perfectly. Such a language was that wherein the Prophets wrote, & the want of sufficient skill in that language is the main reason why they are so little understood. Iohn did not write in one language, Daniel in another, Isaiah in third, & the rest in others peculiar to them selves; but they all wrote in one & the same mystical language as well known without doubt to the sons of the Prophets as the Hieroglyphic language of the Egyptians to their Priests.

Again, the Newtonian project of interpreting prophetic language, if one is to avoid the "ffansies & Hypotheses" of false interpreters, is rooted in:

> The whole world natural consisting of heaven & earth signifies [illeg] whole world politique consisting of thrones & people.… & the things in that world signify the analogous [illeg] in this.[19]

As God left a record of his generally providential attribute of omnipotent power inscribed in the "book" of nature (and traced out in the design argument of natural religion) so, too, in the properly interpreted "book" of scripture, there is to be found abundant evidence of God's continuous and direct involvement in human history. Furthermore, scriptural history contains clues

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[18] William Whiston, *Astronomical Principles of Religion, Natural and Reveal'd* (London, 1717), p. 133.

[19] King's College, Cambridge, Keynes Ms. 5, Chap. 1 of the first Book of this ms., which dates from the mid-1680s, entitled "Concerning the Language of the Prophets," p. 1. See the Newton Project: http://www.newtonproject.sussex.ac.uk/texts/viewtext.php?id=THEM00005&mode =normalized.

about the course of the future in both the "world natural" and the "world politique" in those prophecies that have not yet been brought to fulfillment through God's specially provident intervention. God's Lordship over his created dominion continues.

To illustrate the entire providential nature of God – his creative power as a wise and powerful divine artificer as well as his continuing specially provident intervention in and guidance of the affairs of men and nature – the Newtonian design theorists necessarily become interpreters of both those scriptural prophecies already fulfilled in natural and human history and those promised for future fulfillment. Instantiating the "Argument from Prophecy" is not a separate enterprise from that of the Newtonian design theorists. The proper interpretation of historically fulfilled prophecy shows another aspect of God's providence which supplements the general providence of the Lord God of creation illustrated by the design argument of natural religion. The alliance between science and religion consists, for the Newtonians, of a combination of natural religion (the design argument) and the properly objective and scientific interpretation of specially provident divine intervention in both the "world natural" and the "world politique."

The most specialized use of the argument from prophecy was to interpret messianic prophecies in a way which showed that they had been fulfilled in the person of Jesus. Newton is much concerned with showing how the messianic prophecy of the 70 Weeks in Daniel 9:24–5 is fulfilled in the historical person of Jesus.[20]

Regarding those prophecies which have not yet been fulfilled in history, Newton is quite bold in his private speculations. For Newton, the New Jerusalem will be the inheritance of the "mortal Jews" and the resurrected saints. This kingdom of mortals and the "children of the resurrection," ruled by Jesus, will be the fulfillment of God's covenant with Abraham "when he promised that his seed should inherit the land of Canaan for ever, and on this (promise) covenant was founded the Jewish religion as on that is founded the Christian."[21] He describes, for example, the possible interaction of the immortal "children of the resurrection" with the mortals who share their abode during the millennium and the possibility that they may teleport about the universe:

> we are not to conceive that Christ and the Children of the resurrection shall reign over the nations after ye manner of mortal Kings or convers wth

[20] James E. Force, *William Whiston: Honest Newtonian*, p. 73.

[21] Yahuda MS 6, f. 15r, at the Jewish National and University Library, Jerusalem. Yahuda MS 6, including this passage, is excerpted in Appendix B in Frank E. Manuel, *The Religion of Isaac Newton* (Oxford: Clarendon, 1974), pp. 126–136. (See p. 130.)

> mortals as mortals do wth one another; but rather as Christ after his resurrection continued for some time on earth invisible to mortals unless upon certain occasions when he thought fit to appear to his disciples; so it is to be conceived that at his second coming he and the children of the resurrection shall reign invisibly unless they shall think fit upon any extraordinary occasions to appear. And as Christ after some stay in or neare the regions of this earth ascended into heaven so after the resurrection of the dead *it may be in their power* to leave this earth at pleasure and accompany him into any part of the heavens, that no region in the whole Univers may want its inhabitants.[22]

In his more public pronouncements regarding millennial future prophecies, Newton insists that the "time is not yet come" for understanding this "main revolution" predicted in scripture prophecy. The following passage shows Newton's typical caution along with his belief that we have a sufficient guarantee of God's providence in the many prophecies which have already been seen, by a rightly guided Biblical exegete, to be fulfilled. Newton writes that:

> There is already so much of the Prophecy fulfilled, that as many will take pains in this study, may see sufficient instances of God's providence: but then the signal revolutions predicted by all the holy Prophets, will at once both turn men's eyes upon considering the predictions, and plainly interpret them. Till then we must content ourselves with interpreting what hath been already fulfilled.[23]

Newton's understanding of fulfilled prophecy is governed by rules whose purpose is to evade hypothetical "ffansies" about the nature of God and to show that God owns, possesses, and guides – i.e. has "dominion" over – history (past and future) in the same way that he owns, possesses, and guides – i.e., has "dominion" over – nature.

Though famous as the most astute Newtonian metaphysician, Clarke still retains a special place for the authority of scripture in his philosophical theology. Like Robert Boyle,[24] there are, for Clarke, "things above reason" which are knowable only through revelation, e.g., when the world was created and that the world was created in time. Clarke writes:

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[22] *Ibid*., f. 19r. I have added the emphasis to show that Newton is only speculating about what the power of God may enable the resurrected saints to do. Cited in Manuel, *The Religion of Isaac Newton*, pp. 135–136.

[23] Newton, *Observations upon the Prophecies*, pp. 252–253.

[24] Jan Wojcik, *Robert Boyle and the Limits of Reason* (Cambridge: Cambridge University Press, 1997), pp. 100–107.

> That the material world is not self-existent or necessarily existing but the product of some distinct superior agent may, as I have already shown, be strictly demonstrated by bare reason against the most obstinate atheist in the world. But the time *when* the world was created, or whether its creation was properly speaking *in time*, is not so easy to demonstrate strictly by bare reason (as appears from the opinion of many ancient philosophers concerning that matter), but the proof of it can be taken only from Revelation.[25]

But, when it comes to using scripture to bolster his rationally demonstrated understanding of God's attributes, Clarke is, like Newton, more famous for his use of fulfilled scripture prophecies than for his delineation of truths above reason. Clarke's delineation of the argument from prophecy grows out of his dispute with Anthony Collins, the famous deist, regarding the messianic prophecies which Christians claim are fulfilled by Jesus.

In 1724, Anthony Collins publishes *A Discourse of the Grounds and Reasons of the Christian Religion*. Collins' work is an attack on William Whiston's *Essay towards Restoring the True Text of the Old Testament* (1722) in which Whiston argues that scripture prophecies must be interpreted in the most straightforwardly literal manner as possible. Most of the voluminous lists of fulfilled prophecies – in Whiston's Boyle Lectures in 1708 and other works – are designed to illustrate the continuous providential care of the Lord God. In Whiston's view, most fulfilled scriptural prophecies have been literally fulfilled in one particular historical event. A very few prophetic predictions concerning the Messiah, however, seem to require an allegorical level of symbolic meaning if they are to be applied to Jesus. The prophecy in Isaiah 7:10–16 that a son named Immanuel would be born to the House of David is precisely such a case. But, for Whiston, if any prophecies are allowed to have more than one level of meaning, "We can never be satisfy'd but they may have as many as any Visionary pleases," or, as William Nicholls puts this point, "If we should once allow this typical or allegorical way of explaining Scripture, one might as well prove the history of Guy of Warwick out of the first chapters of Genesis."[26] For Whiston, the fact that some Old Testament messianic prophecies could not be literally interpreted as having been fulfilled only by Jesus was ample proof that those particular prophetic texts had been corrupted and, in his work of 1722, Whiston sets about recovering what must be the original, uncorrupted texts by using the most ancient texts available to check the standard scripture. In his 1724 polemic, Collins amusingly points out "that a

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[25] Samuel Clarke, *DBAG*, in *Works*, 2:537.

[26] Whiston, *Memoirs of the Life and Writings of Mr. William Whiston; Containing Memoirs of Several of his Friends also; Written by himself*, 2 vols. (London, 1753), 1:191.

Bible restored, according to Mr. W.'s Theory, will be a mere WHISTONIAN BIBLE, a BIBLE confounding and not containing *the True Text* of the Old Testament."[27]

Clarke enters the fray in 1725 with the publication of his *Discourse Concerning the Connexion of the Prophecies in the Old Testament, and the Application of Them to Christ*. In this work, while he agrees that a great many fulfilled historical prophecies in scripture are not allegorical and, in historical fact, have only one literal fulfillment, he argues, against Whiston, that some prophetic texts may indeed have a double signification, one which signifies a fulfillment during the immediate time of the prophet who uttered the prophecy and another one at a later time intended for later readers. As Clarke's biographer, J. P. Ferguson explains: "Thus when Isaiah said of the Jews that they heard with their own ears but did not understand, this was true of the people of his own time, but it was equally true of the people of the Lord's time when Jesus used the same words."[28]

Regarding the prophecy in Matthew 1:22–3 that the messiah would be born of a virgin, Clarke argues that if Jesus did not fulfill this prophecy, it is impossible for him to be the messiah but that, if he did fulfill it, to prove to later generations that he did requires the demonstration of his divinely appointed "Mission."[29] Fortunately, as we live long after the birth of Jesus, by the miraculous facts of his life we are able to see how he fulfilled this particular prophecy, something not apparent at his birth:

> But the *Beginning* of the *Life* of Christ, is a very different thing from the *History* of his *beginning* to *Preach* the Gospel. What happened *First* in *Time*, could not but of necessity be *Last* in *Proof*: the *Credibility* of the *Invisible* Miracle of his *Birth*, depending entirely on the *Visible* miraculous Proofs, by which our Lord afterwards gave Evidence of *his* own Commission ….[30]

Thus, Clarke tends to favor the argument from miracles as decisive in the proof that Jesus was in fact the prophetically predicted messiah because such events guarantee the divinely prophesied mission of Jesus. Even so, Clarke totally agrees with Newton that only after the fact is it possible to reconcile a prophetic prediction with a particular event in human or natural history. Of

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[27] Anthony Collins, *A Discourse of the Grounds and Reasons of the Christian Religion* (London, 1724), p. 196.

[28] J. P. Ferguson, *An Eighteenth Century Heretic: Dr. Samuel Clarke* (Kineton: Roundwood, 1976), pp. 156–157.

[29] Clarke, Sermon LXIX, "The Miraculous Birth of Christ," *Sermons on Several Subjects*, in *Works*, 1:427. Cf. Ferguson, *An Eighteenth Century Heretic*, pp. 156–157.

[30] Clarke, Sermon LXIX, "The Miraculous Birth of Christ," *Sermons on Several Subjects*, in *Works*, 1:428.

the claim in Matthew that Jesus fulfills the prophecy of the messiah born of a virgin, Clarke writes that, following the events of his life such as his Resurrection:

> The Apostle St *Matthew* therefore had a *just Right*, and *good and sufficient Grounds*, to apply to our Lord the *Prophecy* cited by him.... Nor is it of any moment, to what person *Ahaz* perhaps might think it confined; or in what sense even *Isaiah* himself, possibly might understand the words. For the Prophets themselves *saw These* things, but as *through a Glass darkly*; even as the *Apostles* afterwards did, and *We* still do, things that are yet future.[31]

Finally, Clarke believes in the fulfillment of Biblical prophecies about the world to come for those who are saved. God has provided in scripture the promise of salvation and an eternal "conversation" in heaven as well as the threat of future punishment as "rational motives to induce mankind to live virtuously and so gain admittance to the world to come."[32]

Regarding the passage in Romans 11.4 about the election by grace of a "remnant," Clarke writes that we ought to rest satisfied that it will come to pass as prophesied in a manner that will be congruent with our understanding of the divine attributes even if, now, we do not understand the details of how it will work out. He writes that such passages:

> may justly seem to be *hard sayings*, and *Who can hear them*? For if these things be so, *Who then shall be saved*? And how shall this be reconciled with those Divine Attributes, the Goodness, the Mercy, and the Compassion of God; of whom the Scripture declares, that he *would have* all *men to be saved*, that he *would not that* Any *should perish*, and that his *tender mercies are over* all his *Works*? Now to This Difficulty it might be sufficient to answer in general, that at the great day of Retribution, God will abundantly vindicate himself before Men and Angels, and *all Mouths shall be stopped before him*: Stopped, not by Power and Supreme Authority, but by conviction of the Justice, the Reason, the Equity, the Necessity of the Case.... This, I say, in the whole a sufficient ground of Satisfaction, (even though nothing further could be alleged,) to a rational, pious, and modest Mind, who can *trust* God till the final event of Things, to make it appear at last, that *the Judge of all the Earth will do what is right*.[33]

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[31] Clarke, Sermon LXIX, "The Miraculous Birth of Christ," *Sermons on Several Subjects*, in *Works*, 1:429–430.

[32] Clarke, Sermon IX, "Of the Omnipotence of God," *Sermons on Several Subjects*, in *Works* 1:56.

[33] Clarke, Sermon LXIII, "Of the Number of those that shall be Saved," *Sermons on Several Subjects*, in *Works* 1:389. Cf. Clarke, Sermon LXXXIV, "The Conversation of Christians is in Heaven," *Sermons on Several Subjects*, in *Works* 1:522.

The Argument from Miracles in Newton and Clarke[34]

For Newton, most of the miracle stories in prophetic scripture have a natural interpretation and, if interpreted properly, merely show that the generally simple, generally uniform production of natural effects by natural causes can, occasionally, be altered by the intervention of some other, less well understood but still quite "natural," cause. Most historical accounts of miracles are frauds. In an important variant of his manuscript entitled "Paradoxical Questions concerning y^{e} morals and actions of Athanasius and his followers" (located in the William Andrews Clark Memorial Library, Los Angeles), Newton baldly states his view that Athanasius "& his party" feigned miracles through the "magical use of the signe of y^{e} Crosse" in order to attract a following:

> These & such like stories sufficiently open the designe of Athanasius & his party in setting on foot this humour of pretending to miracles. They found by experience y^{t} their opinions were not to be propagated by disputing & arguing, & therefore gave out that their adversaries were crafty people and cunning disputants and their own party simple well meaning men, and there imposed this law upon the Monks that they should not dispute about y^{e} success of their cause to y^{e} working of miracles and spreading of monkery[35]

Newton is most wary of stories in scripture of miracles, defined as Humean "breaks" in the laws of nature, and famously states that miracles "are not so called because they are the works of God but because they happen seldom and for that reason excite wonder."[36]

For Newton, the historical creation of gravity demonstrates God's general providence but its continuous operation since that moment reveals a sustaining special providence. God's sustained preservation of the order of nature and natural laws since the creation demonstrates divine special providence because of the very nature of gravitational attraction. Newton claims that "a continual miracle is needed to prevent the sun and fixed stars from rushing together through gravity."[37]

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[34] The material in this section is adapted from James E. Force, "Providence and Newton's *Pantokrator*: Natural Law, Miracles, and Newtonian Science," in James E. Force and Sarah Hutton, *Newton and Newtonianism* (Dordrecht: Kluwer, 2004), pp. 71–76.

[35] Newton, "Paradoxical Questions concerning ye morals & actions of Athanasius & his followers," under the question: "Whether Athanasius did not start false miracles for his own interest" is taken from the ms. in the possession of the William Andrews Clark Memorial Library, University of California, Los Angeles. Cf. Newton to John Locke, 16 February 1692, in *Newton Correspondence*, 3:195.

[36] Cited in Herbert McLachlan, ed., *Newton's Theological Manuscripts* (Liverpool: Liverpool University Press, 1950), p. 17.

[37] *Newton Correspondence*, 3:336.

This point is echoed by Clarke and Whiston. Whiston is most adamant in adopting Newton's stance and asserts that the very fact of nature's continuous operations in accord with natural law proves specially provident divine dominion:

> 'Tis now evident, that *Gravity*, the most mechanical affection of Bodies, and which seems most natural, depends entirely on the constant and efficacious, and, if you will, the supernatural and miraculous Influence of Almighty God.[38]

When Newton and Whiston declare that the daily operation of gravity is a miraculous effect of God, they mean that, in obeying natural laws, physical objects continually exhibit signs of God's special providence. But if all instances of obedience to the laws of nature are miraculous in this sense, then the traditional sense of miracles as a special denial or negation or, to use Hume's term, "violation," of the laws of nature is set aside. Obeying the laws of nature becomes, if this view is taken to be the exclusive meaning and range of God's special providence, specially provident and the commonest natural event is itself a miracle. As Whiston says:

> I do not know whether the falling of a Stone to Earth ought not more truly to be esteem'd a supernatural Effect, or a Miracle, than what we with the greatest surprize should so stile, its remaining pendulous in the Open Air; since the former requires an *active Influence* in the first Cause, while the latter supposes *non-Annihilation* only.[39]

Newton and such Newtonian disciples as Whiston certainly often do maintain that most events regarded by the "vulgar" as miracles are not really Humean "violations" of natural law. For these Newtonians, the sustained operation of natural law itself is termed a miracle and illustrates God's providential dominion. Newton observes, and Whiston echoes, that miracles in the traditional (Humean) sense are often simply misunderstandings on the part of the vulgar. Miracles, writes Newton in his most widely known quote on this topic, "are not so called because they are the works of God, but because they happen seldom and for that reason excite wonder."[40]

Despite this general tendency to wariness, the Newtonians also often talk as if they believe at least in the possibility that an event may occur which really does contravene or "violate" nature and which is caused by God's direct will. Newtonians hold out for the possibility that miracles in the ordinary sense, i.e., as understood by the vulgar, may actually happen. It is a question, at this point,

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[38] William Whiston, *A New Theory of the Earth*, p. 284.
[39] *Ibid*.
[40] McLaclan, ed., *Newton's Theological Manuscripts*, p. 17.

of epistemology, of human ability to know and understand God's providential interactions in his created world. Clarke makes this element of the Newtonian understanding of "miracles" most clear.

Clarke is also vitally involved in the debate on miracles.[41] Leibniz famously observes that the Newtonian Lord God of creation so badly mangled the job that, "from time to time," nature wants a "Reformation" – which, for Leibniz, is scandalous. In 1715, he writes to Princess (later Queen) Caroline of Wales of his fears that Newton's notion of God is one of the primary causes of the moral lapses so evident in the England of their day. Clarke responds and the exchange of volleys between Leibniz and Clarke is first published in 1717. In *The Leibniz-Clarke Correspondence*, Clarke argues that it is precisely because God can and does providentially RE-interpose himself within the created order of natural law to govern directly his creation as the Lord God of particular providence that Leibniz levels against the Newtonians the charge of reducing God to an inferior clock repairman. "According to this Newtonian doctrine," scoffs Leibniz, "God Almighty wants to *wind up* his watch from time to time: otherwise it would cease to move. He had not, it seems, sufficient foresight to make it a perpetual motion."[42]

Clarke replies, in general, that Leibniz misunderstands the totality of divine providence due to his *a priori* doctrines of pre-established harmony and windowless monads which leave God without any sort of continuing, i.e., specially provident, dominion following his initial act of generally provident creation and, with it, the programming of the mechanized world order to unfold in accord with God's foreknowledge encoded in the fixed and irrevocable laws of nature. On Leibniz's view, the sins of mankind, for example, are foreseen through God's prescience at the moment of his generally provident creation when he also pre-ordains – programs – the Flood as a just punishment. The only sort of Providence which counts for Leibniz is God's creative general providence which is omniscient and perfect. If one shears this position of its Leibnizian metaphysical trappings, one is left, finally, with an interpretation of Clarke which fits nicely into the "*Medievalist-Rational*" school of interpretation

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[41] The material in this section is adapted from James E. Force, "Providence and Newton's *Pantokrator*," in Force and Hutton, *Newton and Newtonianism*, pp. 88–90.

[42] "Mr. Leibnitz's First Paper," in *The Leibniz-Clarke Correspondence, together with extracts from Newton's Principia and Opticks*, ed. H. G. Alexander (New York: Philosophical Library, 1956), p. 11. See also *Leibniz Selections*, ed. Philip P. Wiener (New York: Scribners, 1951), p. 216. Henning Graf Reventlow has also described this attempt by Newton and Clarke "to leave room for special special providence over against general providence." For Reventlow, "This is probably the most important issue in Clarke's correspondence against Leibniz." See, Henning Graf Reventlow, *The Authority of the Bible and the Rise of the Modern World*, trans. John Bowden (Philadelphia, PA: Fortress, 1985), p. 340.

whose essentially Augustinian position is that "In one way or another the marvelous events set down by Moses in the Pentateuch could be demonstrated to fall within the mechanistic order of nature."[43]

However, for Clarke and for all the Newtonians, in contrast, it corresponds much more closely with the true nature of God's providential dominion that God fabricates the universal natural order so that it may be canceled from time to time and superseded by direct, specially provident, contra-causal, immediate interpositions of the divine will. It is quite true that, ordinarily, the generally provident laws of nature established at creation are all that is necessary, as far as Clarke is concerned, for the governance of the Lord God's dominion over man and nature. Clarke does in fact argue that "the wisdome of God consists in framing originally the perfect and complete idea of a work, which begun and continues, according to that original perfect idea, by the continual uninterrupted exercise of his power and government."[44]

Finally, when Leibniz ridicules the Newtonian conception that the everyday operation of gravity is itself an instance of a kind of specially provident miracle,[45] Clarke does in fact reply that a miracle is what is unusual in nature and so, because the operation of gravity is regular and constant, "tis no miracle, whether it be effected immediately by God Himself, or mediately by any created power."[46] Thus, in Clarke's Boyle Lectures, he occasionally sounds like William Whiston when Whiston states that gravity results from a cause "superior to matter *continually* exerting on it a certain force or power" and thus that the world depends "every moment on some superior being, for the preservation of its frame."[47] Clarke similarly asserts that "The Course of Nature truly and properly speaking is nothing else but the *Will of God* producing certain Effects in a continued, regular, constant and uniform Manner which…being in every Moment perfectly *Arbitrary*, is as easy to be altered at any time, as to be *preserved*."[48]

But a continuous "miracle" which "sustains" the laws of nature in their current operation, finally, is only one kind of direct, specially provident interposition of arbitrary, omnipotent Divine will into the generally provident,

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[43] Peter Harrison, "Newtonian Science, Miracles, and Laws of Nature," *Journal of the History of Ideas* 56, No. 4 (October, 1995), p. 539.

[44] "Dr. Clarke's Second Reply," in *The Leibniz-Clarke Correspondence*, p. 22.

[45] "Mr. Leibnitz's Third Paper," in *The Leibniz-Clarke Correspondence*, pp. 29–30; "Mr. Leibnitz's Fourth Paper," *Ibid*., pp. 42–43; "Mr. Leibnitz's Fifth Paper," *Ibid*., pp. 91–95. Cf. *Leibniz Selections*, pp. 227–228, 235, and 275–278.

[46] "Dr. Clarke's Third Reply," in *The Leibniz-Clarke Correspondence*, p. 35.

[47] Clarke, *Works*, 2:601. Cited by H. G. Alexander in his Introduction to *The Leibniz-Clarke Correspondence*.

[48] Cited in Ezio Vailati, *Leibniz & Clarke. A Study of their Correspondence* (New York: Oxford University Press, 1997), pp. 141–142.

created order of nature. There always remains, for the Newtonians, the possibility for another sort of direct display of particular providence. As with Newton and Whiston, Clarke never strays from his commitment to the possibility of miracles as the direct and explicit RE-interposition of God's omnipotent will directly back into the world thereby, in an exceptional act, canceling and superseding created natural law. To repeat, in his Boyle Lectures for 1705, Clarke writes that a miracle:

> is a work effected in a manner *unusual* or different from the common and regular method of Providence by the interposition either of God Himself, or some intelligent agent superior to man, in the proof or evidence of some particular doctrine or in attestation to the authority of some particular person.[49]

For the Newtonians, God's present dominion – and the ever present possibility of his direct interposition of his power to alter nature and his prophetic promises to re-interpose himself within his creation in the future – is both the anchor for the emotional power of religion and the source of its greatest evidence in the scriptural history of God's particular providence throughout history. Newton's God is present and able, should he decide to do so, to intervene in the generally provident natural laws which ordinarily regulate every sparrow's flight. God listens to prayer and he is able, IF he chooses, to answer directly in a manner quite exceptional to the ordinary coursing of nature. Clarke explains his view to Queen Caroline with an apt political analogy:

> As those men, who pretend that in an earthly government things may go on perfectly well without the King himself ordering or disposing of anything, may reasonably be suspected that they would very well like to set the King aside…., so too those who think that the universe does not constantly need "God's actual government" but that the laws of mechanism alone would allow phenomena to continue, in effect to exclude God without the World.[50]

The Cosmological Argument in Newton and Clarke

Newton is justly famous for his statement of the design argument in the *General Scholium*. He is equally famous for his disdain for feigned metaphysical hypotheses.[51] But his disdain for metaphysical hypotheses does not extend to

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[49] Clarke, *A Discourse Concerning the Unalterable Obligations of Natural Religion and the Truth and Certainty of the Christian Revelation*, in *Works*, 2:698.

[50] Cited in David Kubrin, "Newton and the Cyclical Cosmos," *Journal of the History of Ideas* 28 (1967), p. 329.

[51] The material in this section is adapted from James E. Force, "Providence and Newton's *Pantokrator*," in Force and Hutton, *Newton and Newtonianism*, pp. 80–83.

the traditional cosmological argument which purports to prove God's existence from an observation of phenomena. In a draft for the *General Scholium*, Newton writes:

> He who shall demonstrate that there is a Perfect Being, and does not at the same time demonstrate that he is Lord of the Universe or Pantokrator, will not yet have demonstrated that God exists. A Being eternal, infinite, all-wise and most powerful, and the necessarily existing author of all things; yet the dominion or Deity of God is best demonstrated not from abstract ideas but from phenomena, by their final causes.[52]

Newton relies upon the idea of cause-and-effect, of course, in his design argument. But Newton verges on the cosmological argument in a manuscript dating from around 1672, when he states that "*natures obvious laws*" are contingent upon the voluntary act of God's will. Newton writes that:

> The world might have been otherwise than it is (because there may be worlds otherwise framed than this). It was therefore no necessary but a voluntary and free determination that it should be thus. And such a voluntary [cause must be a God]. Determination implies a God. If it be said the world could be no otherwise than it is because it is determin'd by an eternal series of causes, that's to pervert not to answer the first proposition. For I mean not that the world might have been otherwise notwithstanding the precedent series of causes, but that the whole series of causes might from eternity have been otherwise here, because they may be otherwise other places.[53]

If the Lord God's power is such that He could create completely different kinds of matter – with different kinds of properties – in "other places" in the universe, it seems to follow that He is not bound or necessitated in any way by the particular laws which he caused to be in effect in this remote corner of the Milky Way. This point is reinforced by Newton's criticism of Descartes's philosophy of nature. Descartes, according to Newton, identified matter with its essential primary quality, extension. Descartes consequently, and most dangerously in Newton's view, considered this essential extension to be eternal and immutable and thus naturally possessed of a sort of innate necessity, a position which led inexorably to atheism by intellectualizing matter and divorcing it from God's causal efficacy. Newton strongly challenges what he

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[52] Newton, "De Gravitatione et Aequipondio Fluidorum," in *Unpublished Scientific Papers of Isaac Newton*, ed. and trans. A. R. Hall and M. B. Hall (Cambridge: Cambridge University Press, 1962), p. 363. This passage is quoted by Robin Attfield, *God and the Secular* (Cardiff: University College Cardiff Press, 1978), p. 73.

[53] *Of natures obvious laws & processes in vegetation*, Dibner MSS 1031 B (part), Dibner Library of the History of Science and Technology, Special Collections Branch, Smithsonian Institution Branch, Smithsonian Institution, Washington, DC:

regards as the tendency to atheism implicit within Descartes's theory of matter and asserts against Descartes that matter is always an effect caused by God and that, for all poor old mankind may know, God can cause any sort of matter and any sort of laws to govern it. In his early (ca. 1668) manuscript entitled *De Gravitatione*, Newton asserts that matter:

> … does not exist necessarily but by the divine will, because it is hardly given to us to know the limits of divine power, that is to say whether matter could be created in one way only, or whether there are several ways by which different beings similar to bodies could be produced.[54]

This world, and the "whole series of causes" in it, could have been different given the absolute power of the Lord God. Newton hammers home this theme in his *Opticks* toward the end of Query 31[55] where he repeats his view about the unlimited nature of the providentially causal power of the Lord God:

> And since Space is divisible *in infinitum*, and Matter is not necessarily in all places, it may be also allow'd that God is able to create Particles of Matter of several Sizes and Figures, and in several Proportions to Space, and perhaps of different Densities and Forces, and thereby to vary the Laws of Nature, and make Worlds of several sorts in several Parts of the Universe. At least, I see nothing of Contradiction in all this.[56]

"The world might have been otherwise then it is (because there may be worlds otherwise framed then this) Twas therefore noe necessary but a voluntary & free determination y^t it should be thus. And such a voluntary [cause must be a God]. Determination implys a God. If it be said y^e w^{ld} could bee noe otherwise y^n tis determined by an eternall series of causes, y^{ts} to pervert not answer y^e I^{st} prop: ffor I meane not y^t y^e [symbol for the world] might have been otherwise $notw^{th}$ standing the precedent series of causes, but y^t y^e whole series of causes might from eterity [sic] have been otherwise <because they as well as, *deleted*> / because they may be otherwise *inserted* / in other places". [Transcribed and printed by Dobbs, *The Janus Faces of Genius*, pp. 256–270. See p. 266. The transcription apparatus has been slightly modified.]

[54] Newton, *De Gravitatione et Aequipondio Fluidorum*, Cambridge Ms. Add. 4003. This text is found in *Unpublished Scientific Papers of Isaac Newton*, p. 137. This text is cited by Margaret J. Osler, *Divine Will and the Mechanical Philosophy. Gassendi and Descartes on Contingency and Necessity in the Created World* (Cambridge: Cambridge University Press, 1994), p. 152, who kindly pointed it out to me.

[55] The first edition of the *Opticks* was published in London in 1704; it contained sixteen queries (1–16.) A second edition in Latin, the *Optice*, was published in 1706 with seven new queries (17–23.) Another eight queries were added to the second English edition in 1717. Quaestio 23 of the second Latin edition became, at that point, Query 31.

[56] Sir Isaac Newton, *Opticks or A Treatise of the Reflections, Refractions, Inflections & Colours of Light*, based on the fourth ed. London, 1730, with a Foreword by Albert Einstein, an Intro. By Sir Edmund Whittaker, a Preface by I. B. Cohen, and Analytical Table of Contents prepared by Duane H. D. Roller (New York: Dover, 1952), pp. 403–404.

Because the created world of nature is so clearly contingent upon God's original casual will and because there is no necessity in nature which forces God to choose what to create and what not to create, who are we to claim that the Lord God, who created nature and "*natures obvious laws*" (and who is so powerful that He could have created any other sort of nature which He chose), no longer possesses sufficient power to re-intervene directly in that order? If such an act of will is conceivably a part of God's power, and it clearly is for Newton, then it is possible. Newton sees "nothing of Contradiction" in such a conception of God's power.[57]

Clarke is the most famous Newtonian exponent of the cosmological argument. Just as Whiston devotes his Boyle Lectures to instantiating the argument from prophecy, Clarke devotes his first series of Boyle Lectures to tracing out the cosmological argument. Delivered at St. Paul's Cathedral in 1704, the year when Newton's *Opticks* is published, Clarke entitles his first set of Boyle lectures *A Demonstration of the Being and Attributes of God*. For Clarke, the cosmological argument is an *a posteriori* empirical argument. It begins not with observations of order or purposiveness in nature (as in the design argument) but with the simple existence of the world of contingent nature. From the observation that "Something NOW is,"[58] Clarke argues to both the causal principle and the causal chain:

> Whatever Exists, has a Cause, a Reason, a Ground of its Existence; (a Foundation, on which its Existence relies, a Ground or Reason why it doth *exist*, rather than not *exist*… [59]

Clarke goes on to argue that, in exploring for the possible cause of the existence of contingent nature, i.e., of the "temporary phenomena of nature" as it falls under our current observation, we trace effect to cause until we come eventually to an eternal, unchangeable, independent being or First Cause:

> To suppose an *infinite Succession* of changeable and *dependent* beings produced one from another in an endless Progression, *without* any Original

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[57] Newton writes in his manuscript *Of natures obvious laws & processes in vegetation* "Of God" that:

> "What ever I can conceive wthout a contradition [sic], either is or may (effected *deleted*) / bee made / by something that is: I can conceive all my owne powers (knowledge (*illegible word, deleted*) activating matter &c) wthout assigning them any limits Therefore such powers either are or may be made to bee." [Cited in Dobbs, *The Janus Faces of Genius*, p. 166.]

[58] Clarke, *DBAG*, in *Works*, 2:524.

[59] *Ibid*. This text is cited, and this point is first made, by Michael J. Buckley, S. J., *At the Origins of Modern Atheism* (New Haven, CT: Yale University Press, 1987), p. 176.

> Cause at all; is only a driving back from one step to another, and (as it were) removing out of Sight, the Question concerning the Ground or Reason of the Existence of Things.[60]

Clarke goes on to derive God's various attributes, beginning with self-existence in Prop. III and arriving finally at Infinite Goodness in Prop. XII, from the fact of the existence of the current, contingent natural order and from the causal maxim. Clarke never makes the ontological argument, i.e., he never argues that we can know that God exists simply through an examination of our concept of God. A Newtonian, not a Cartesian, Clarke begins with what we now observe to exist and uses a causal analysis of these "temporary phenomena of Nature"[61] to derive the necessary, self-existing First Cause and all of his attributes. Clarke directly rejects the Cartesian ontological argument when he writes that:

> *Our first Certainty of the Existence of God, does not arise from this, that* in the Idea *our Minds frame of him (or rather* in the Definition *that we make of the word*, God, *as signifying a Being of all possible Perfections,) we include Self-Existence*.[62]

Clarke is specific that merely having the idea of a self-existing First Cause is insufficient to prove that such a First Cause exists:

> The bare having an Idea of the Proposition, *There is a Self-Existent Being*, proves indeed the Thing not to be impossible; (For of an impossible Proposition, there can be no Idea;) But that it actually is cannot be proved from the Idea…[63]

Even though Clarke begins in an *a posteriori* fashion with experience of the current existence of contingent nature and even though he also rejects any

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[60] Clarke, *DBAG*, in *Works*, 2:526.

[61] Clarke, *The Answer to a Seventh Letter Concerning the Argument A Priori*, in Samuel Clarke, *A Demonstration of the Being and Attributes of God and Other Writings*, ed. Ezio Vailaiti, Cambridge Texts in the History of Philosophy (Cambridge: Cambridge University Press, 1998), p. 119.

[62] Clarke, *DBAG*, in *Works*, 2:529. See Buckley, *At the Origins*, p. 180.

[63] Clarke, *DBAG*, 2:530. See Buckley, *At the Origins*, p. 180. For a detailed analysis of Clarke's criticism of the Ontological Argument, see William Rowe, *The Cosmological Logical Argument* (Princeton, NJ: Princeton University Press, 1975), pp. 187ff. For an argument that Clarke's language is sufficiently equivocal to justify the charge that Clarke occasionally writes of the "antecedent necessity" of God "as if it were an ontological reality itself," see James P. Ferguson, *The Philosophy of Dr. Samuel Clarke and Its Critics* (New York: Vantage, 1974), pp. 94–95.

ontological argument which begins with the *a priori* definition of God, there is yet an element of the *a priori* in his argument. Clarke presumes that Hume's causal maxim, "*whatever begins to exist, must have a cause of its existence*,"[64] is a necessary truth, intuitively certain, and, hence, not in need of demonstration.[65] In a later edition of his published lectures, Clarke cites, at this point, the "*well illustrated*" example of the causal maxim made by William Wollaston. Wollaston urges his readers to suppose that:

> …a *Chain* hung down out of the Heavens, from an *Unknown* Height; and, though Every link of it gravitated toward the Earth, and what it hung upon was not visible, yet it did not descend, but kept its situation: And, upon This, a question should arise, *What* supported or kept up this Chain? Would it be a sufficient Answer, to say, that the *First* or Lowest Link hung upon the *Second*, of That next above it; the *Second*, or rather the *First and Second together*, upon the *Third*; and so *in infiniutm*? For, *What* holds up the *Whole*? A Chain of *ten links*, would fall down; unless something, able to bear it, hinder'd. One of *twenty*; if not staid by something of a yet Greater Strength, in proportion to the Increase of Weight. And therefore One of *infinite links*, certainly; if not sustained by Something *infinitely* strong, and capable to bear up an infinite Weight. And Thus it is in a *Chain of Causes and Effects*; tending, or (as it were) gravitating, towards some End. The Last, or Lowest, depends, or (as one may say) is *supposed* upon the Cause above it. This again, if it be not the First Cause, is suspended, as an Effect, upon Something above it, &c. And if they should be *infinite*; unless (agreeably to what has been said) there is some *Cause*, upon which *All* hang or depend; they would be an *infinite Effect*, without an *Effiicient*. And to assert there is any such Thing, would be as great an *absurdity* as to say, that

[64] David Hume, *A Treatise of Human Nature*, ed. L. A. Selby-Bigge, 2nd ed. with text revised and notes by P. H. Nidditch (Oxford: Clarendon, 1978), p. 78.

[65] Rowe, *The Cosmological Argument*, p. 73. Rowe (*Cosmological Argument*, pp. 3–4) makes it quite clear that, while the Cosmological Argument has elements of an *a posteriori* argument, it would be "misleading" to conclude that: "the really basic principles appealed to in the Cosmological Argument are *a posteriori*. The proponents of the Cosmological Argument insist that the fundamental principles appealed to in the argument are necessary truths, known either directly or by deduction from other *a priori* principles that are know directly." The *a priori* causal principle, or the Principle of Sufficient Reason, is, for Rowe, the "pivot" of this *a posteriori* argument. Cf. Clarke, *DBAG*, in *Works*, II:569, where Clarke insists that he is using, in his Cosmological Argument, the argument *a priori* instead of the argument *a posteriori*. Also, see *DBAG*, in *Works*, II:573, where Clarke discusses the one possible *a posteriori* objection to what he calls his "*a priori*" argument. (The objection is the problem of evil and Clarke's response is the same as that of the character Demea in Part X in Hume's *Dialogues*.)

> a *finite* or *little Weight* wants something to sustain it, but an *Infinite one* (or the *Greatest*) does not.[66]

Wollaston is not the only philosopher who urges the causal maxim in connection with empirical experience of the existing natural order. Hume, for example, lists "Mr. *Hobbes*," "Mr. *Locke*," "Dr. *Clarke* and others" as philosophers who rely upon a cosmological/causal argument to demonstrate God's existence and attributes.[67]

For Clarke, the foundation of his argument is the now existing world. The method which he follows to deduce God's existence and attributes is an "endeavour by One clear and plane Series of Propositions necessarily connected and following one from another, to demonstrate the Certainty of the Being of God, and to deduce in order the Necessary Attributes of his Nature, so far as by our Finite Reason we are enabled to discover and apprehend them."[68] After moving from a consideration of what now exists to the necessary being which first caused it to exist, Clarke moves on, beginning in Prop. IV, to argue that the self-existing first mover who is demonstrated to exist in the first three propositions has the attributes of the Lord God of Israel as described in scripture. It is in this second stage of his deductive argument that Clarke brings in the arguments **FROM** and **TO** design which he considers to be a part of the deductive chain of reasoning in his cosmological argument.[69]

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[66] William Wollaston, *The Religion of Nature Delineated* (London, 1724), p. 67. Cited in Rowe, *The Cosmological Argument*, p. 73.

[67] Hume, *Treatise*, pp. 80–81, notes. The "others" with whom Hume lumps Clarke as proponents of an *a posteriori* approach to theology may possibly include Colin Maclaurin, *Account of Sir Isaac Newton's Philosophical Discoveries* (London, 1748); Daniel Waterland, *Dissertation Upon the Argument a Priori* (Cambridge, 1734); and Phillips Gretton, *A Review of the Argument A Priori* (London, 1726.)

[68] Clarke, *DBAG*, in *Works*, 2:524.

[69] Rowe, *The Cosmological Argument*, p. 4, explains the main differences between what I call the Design Argument and the Cosmological Argument as follows:

(1) "…the fact about the world from which the [Design Argument] begins is vastly more complicated and, therefore, more difficult to establish by experience than is the fact from which the Cosmological Argument proceeds.";
(2) "…the [Design Argument] is an inductive argument; its premises, if true, may lend considerable support to its conclusion, but do not demonstrate or establish its truth."; and
(3) "…the [Design Argument] does not purport to be a complete argument for the existence of the theistic God. At best it may render it probable that the cause of the world has a high degree of intelligence and power."

Clarke argues that infinite power is an attribute of the self-existent because he alone is self-existent and the powers of all subordinate beings are dependent upon him. Clarke writes that:

> The *Self-Existent Being, the Supreme Cause of all Things, must of Necessity have infinite Power*. This Proposition is evident, and undeniable. For since nothing (as has been already proved) can possibly be Self-Existent, besides himself; and consequently all Things in the Universe were made by Him, and are entirely dependent upon Him; and all the *Powers* of all Things are derived from Him, and must therefore be perfectly Subject and Subordinate to Him; 'Tis manifest that nothing can make any Difficulty or Resistance to the Execution of his Will; but he must of Necessity have absolute Power to do every thing he pleases, with the perfectest Ease, and in the perfectest Manner, and once and in a Moment, whenever he Wills it.[70]

The causal steps (or propositions) which Clarke traverses in his deductive Cosmological Argument culminate in Proposition XII: "*The Supreme Cause and Author of all Things, must of necessity be a Being of Infinite Goodness, Justice and Truth, and all other Moral Perfections; such as Become the Supreme Governour and Judge of the World*."[71] For Clarke, God's power to order matter as he pleases is a deducible attribute. Samuel Clarke thus faithfully promotes Newton's view[72] that, because the concourse of the world depends entirely on God's will, that any "Alteration," including total "Annihilation," is possible to conceive without a contradiction. Clarke writes that:

> For whether we consider the *Form* of the World, with the *Disposition* and *Motion* of its Parts; or whether we consider the *Matter* of it, as such, without respect to its present Form; every Thing in it, both the *whole* and every one of its *Parts*, their *Situation* and *Motion*, the *Form* and the *Matter*, are the most Arbitrary and Dependent Things, and the farthest removed from Necessity that can possibly be imagined.[73]

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[70] Clarke, *DBAG*, in *Works*, 2:553. Cf. Clarke, *DBAG*, in *Works*, 2:573, where he states that it is because of his infinite power that mortals offer prayers to God:

> … the Divine Nature is under no Necessity, but such as is consistent with the most perfect Liberty and freest Choice; (which is the ground of all our Prayers and Thanksgivings; the Reason, when we *pray* to him to be *good to us and gracious*, and *thank* him for being *just* and *merciful*; where no Man *prays* to him to be *Omnipotent*, or *thanks* him for being *Omnipotent*, of for *knowing all Things*.)

[71] Clarke, *DBAG*, in *Works*, 2:573.

[72] See the end of Query 31 in the *Opticks*. Cf. Note 55 above.

[73] Clarke is controverting, in this passage, Spinoza who claims that the world is necessarily existent. See Samuel Clarke, *DBAG*, in *Works*, II:531.

In sum, after first positing that nothing might exist and next observing that something does exist, Clarke asks why there is this something rather than nothing?[74] He answers that this world, as we observe it, exists because God freely chose to exercise his infinite power to bring this particular world into existence and not some other possible world. The essence of genuine free will, divine or human, is "…having a continual Power of *choosing*, whether he shall *Act*, or whether he shall *forbear Acting*." Clarke goes on to make clear that we are unable to know, in advance, how God will choose to act:

> GOD is, by *Necessity of Nature*, a *Free Agent*: And he can no more possibly *cease* to be so, than he can *cease* to exist. He must of *Necessity*, every moment, either *choose* to *act*, or *choose* to *forbear acting*; because *Two Contradictories* cannot possibly be true at once. But *Which* of these Two he shall *choose*, in This he is at perfect *Liberty*: And to suppose him *not to be so*, is *contradictorily* supposing him *not to be the First Cause*, but to be *acted* by some *Superior Power*, so as to be *Himself* no *Agent at all*.[75]

Popkin's "Third Force"[76]

Now is perhaps the appropriate moment to summarize the results of the various Newtonian attempts to understand the being and, especially, the ubiquitous power of God through the use of the arguments from (and to) design, prophecy, miracles, and the existence of this particular world, i.e., through theology, natural and revealed.

For Newton and Clarke, the design argument shows a supremely powerful architect-creator who, in the beginning, created order and purposiveness in nature just as the new scientists have discovered and described.

For Newton and Clarke, the argument from prophecy shows that just as God left a record of his attributes of omnipotent, generally provident creative power inscribed in the "book" of nature so, too, in properly interpreted scripture prophecies, there is abundant evidence of God's continuous and direct

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[74] Clarke asks, "What is it that has from Eternity determined such a Succession of Beings to exist, rather than that from Eternity there should never have existed anything at all?" Clarke, DBAG, in Works, 2:527.

[75] Clarke, *DBAG*, in *Works*, 2:566.

[76] I have adapted this section from James E. Force, "Jewish Monotheism, Christian Heresy, and Sir Isaac Newton," in *The Expulsion of the Jews: 1492 and After*, eds. Robert Waddington and Arthur H. Williamson (New York: Garland 1994), pp. 259–280; and from James E. Force, "Newton, the Lord God of Israel and Knowledge of Nature," eds. Richard H. Popkin and G. M. Weiner, *Jewish Christians and Christian Jews* (Dordrecht: Kluwer, 1994), pp. 131–158.

involvement in natural and human history as well as hopeful hints – for Newtonian scientists-cum-biblical interpreters with ears to hear and eyes to see – about the course of the future in both the "world natural" and the "world politique." Newton is convinced that God will intervene in the future, as he has forecast in scripture prophecies yet unfulfilled, just as he has done in the immense record of historically fulfilled scripture prophecies, a prospect which ravishes Newton's imagination.[77]

For Newton and Clarke, it redounds to the greater glory of God that, after fabricating the universal natural order, he may also cancel and supersede its laws through direct, specially provident, immediate, miraculous interpositions of omnipotent divine will. The problem with modern deists,[78] says Clarke, is that they conclude, from the general regularity of the "course of nature," that it is impossible for nature to be altered by divine fiat and, hence, that fulfilled prophetic miracles, as well as future miracles, are impossible. Clarke makes very clear that miracles, i.e., unusual phenomena caused by the "immediate operation of *original, absolute*, and *underived* Power," are well within God's power.[79] For Clarke, the chief problem which arises in connection with miracles is not whether God has the power to change

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[77] In Newton's view, for example, during the millennium, the "children of the resurrection," his term for the resurrected saints and martyrs who will rule with the returned Jesus, God's vice-regent, in the New Jerusalem over the "race of mortal Jews," may possibly go transporting about among the stars in company with the Holy Ghost. See James E. Force, "Jewish Monotheism, Christian Heresy, and Sir Isaac Newton," in *The Expulsion of the Jews: 1492 and After*, pp. 268–270. The Newtonians assume that, because it takes omnipotent, specially provident, miraculous, divine intervention to empower chosen prophets to foresee the future, fulfilled historical prophecies are themselves miraculous interventions. Hume is one of the first writers to point out the fact that a fulfilled prophecy is, in fact, miraculous. I remember when Popkin and I read the relevant passage from Hume's first *Enquiry*, in the essay "Of Miracles," in the fall of 1977. It was in a classroom and we both looked at each other and said, "Oh, ho, this is an interesting facet of Newtonianism!" See James E. Force, "Hume and the Relation of Science to Religion Among Certain Members of the Royal Society," *Journal of the History of Ideas* 45, No. 4 (Oct.–Dec., 1984), pp. 517–536; reprinted in *Philosophy, Religion and Science in the 17th and 18th Centuries*, Library of the History of Ideas, Vol., 2, ed. John W. Yolton (Rochester, MN: University of Rochester Press, 1990), pp. 228–247.

[78] On the alleged "deism" of the Newtonians, see James E. Force, "Science, Deism, and William Whiston's 'Third Way'," *Ideas and Production. A Journal in the History of Ideas, Issue Seven—History of Science* (Cambridge: Cambridgeshire College of Arts and Technology, 1987), pp. 18–33.

[79] Clarke, *A Discourse Concerning the Unchangeableness Obligations of Natural Religion, and the Truth and Certainty of the Christian Revelation* (London, 1705), in *Works*, 2:697. (Cited hereafter as *DCUONR*.)

the generally provident natural order by an immediate act of will: he most certainly does. Rather, the chief problem in connection with an unusual phenomenon of nature is an epistemological one: how are human beings to determine whether an unusual phenomenon in nature is caused directly by a particular act of divine, special providence or indirectly by one of God's "subordinate Intelligent Beings," e.g., angels? Clarke concludes that observers of nature can simply "never be *certain*, that the miraculous Effect was beyond the Power of all created Beings in the Universe to produce."[80] Nevertheless, Clarke repeatedly emphasizes the complete power of God to interpose his will and directly to alter the laws of nature:

> The Course of Nature, truly and properly speaking, is nothing else but the *Will of God* producing certain Effects in a continued, regular, constant and uniform Manner: Which Course or Manner, being in every Moment perfectly *Arbitrary*, is as easy to be *altered* at any time, as to be *preserved*.[81]

Finally, the cosmological argument becomes, for Newton and, especially, Clarke, an effective way to demonstrate not only the existence of God, but also God's most important attribute: his infinite, absolute omnipotent power to create this particular world as we now observe it. All of the Newtonians agree with Clarke's final position that God "must of Necessity have absolute Power to do every thing he pleases, with the perfectest Ease, and in the perfectest Manner, and once and in a Moment, whenever he Wills it."[82]

Taken together, the most important attribute of God, for the Newtonian scientist-theologians, is God's omnipotent power to create existing nature, in all of its manifold beauty, to change it at will, and to empower selected prophets to know in advance the course of the future and to leave their divinely given foreknowledge as a legacy to interpreters who are as skilled in interpreting the book of scripture as they are in interpreting the book of nature.

Newton and Clarke ardently believe that the New Science supports the inference to a supremely powerful divine architect who also, as their prophetic-historical researches show, simultaneously fulfills prophecies and performs miracles. But can these theological views possibly have anything to do with Newton's science qua science? One prominent approach to answering this question has led simply to severing or disconnecting the religious aspect

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[80] Clarke, *DCUONR*, in *Works*, 2:697.
[81] Clarke, *DCUONR*, in *Works*, 2:698.
[82] Clarke, *DBAG*, in *Works*, 2:553.

of Newton's science from his more respectable work in science.[83] Newton's science, after all, is recognizably modern and fits neatly into the standard framework against which we view the history of philosophy in the early modern period. As Popkin has characterized this still widely prevalent interpretative framework:

> As heirs to the Enlightenment, we have seen the development of modern thought in terms of what led to the Age or Reason—scientific empiricism, and rationalism turning against the Judeo-Christian tradition.[84]

Because of the inability of interpreters within the standard interpretative framework to take seriously the Newtonians' concern with, for example, the argument from prophecy, in general, or the millennial prophecies, in particular,

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[83] In contrast to Popkin, some Newton scholars share an explicit assumption "that Newton's characteristic metaphysical theory of the nature of what he calls the "Lord God," though perhaps "important" to Newton psychologically, contains no necessary internal connection with Newton's science or, indeed, with any of the other diverse aspects of his thought—either with his Arianism and millennialism or with, to choose an arcane example, his curiosity about the exact dimensions, in true Biblical cubits, of the Jewish temple. For a detailed description of what I have often called the "Disconnectedness Thesis," see, for example, James E. Force, "Newton, the Lord God of Israel and Knowledge of Nature," in *Jewish Christians and Christian Jews*, pp. 151–152, n. 6. The inability to take seriously, for example, the millennialism of the Newtonians has led Charles Webster into the "quandary" of how to connect the science of Newton and Newtonians to their immediate Puritan predecessors. As James R. Jacob and Margaret C. Jacob long ago pointed out, Webster fails to see any connection because he disconnects the Newtonians and their science from their millennialism:

> That Newton and many of his associates were also millenarians, that they shared an intensely religious and social vision of science, that they held to distinct political positions - albeit different from the millenarian, religious and political interests of Puritan scientists during the 1640s - all this is still not enough to enable Webster to see the link between his science and theirs". [See James R. Jacob, Margaret C. Jacob, "The Anglican Origins of Modern Science: The Metaphysical Foundations of the Whig Constitution," *Isis* 71, Issue 2 (June 1980), p. 251.]

Stephen D. Snobelen has become the most prominent supporter of the view that Newton's religion and science are intimately connected. See, especially, the following articles by Snobelen: "'La Lumière de la Nature': Dieu et la philosophie naturelle dans l'Optique de Newton," *Lumières* 4 (2004), pp. 65–104; "'To discourse of God': Isaac Newton's heterodox theology and his natural philosophy," in *Science And Dissent in England,* 1688–1945, ed. Paul B. Wood (Aldershot, Hampshire: Ashgate, 2004), pp. 39–65; "'God of Gods, and Lord of Lords': The Theology of Isaac Newton's *General Scholium* to the *Principia*," *Osiris* 16 (2001), pp. 169–208; and "Isaac Newton, Heretic: The Strategies of a Nicodemite," *The British Journal for the History of Science* 32 (December 1999), pp. 381–419.

[84] Richard H. Popkin, "The Third Force in 17th-Century Philosophy," in *Nouvelles de la Republique des Lettres* I (1983), p. 63. This article is the first statement of Popkin's notion of the "Third Force" to see print.

Popkin typically proposed a new interpretative framework. As always, he started with the problem of tracing the historical impact of the rediscovery of scepticism in the early modern period. This "sceptical crisis," as he had showed in *The History of Scepticism*, led the rationalist and empiricist philosophers of the seventeenth and eighteenth centuries to their various attempts to defeat, or at least to ameliorate, the corrosive effects of scepticism. But, as Popkin came to see by 1983, there was far more to the story of early modern thought than the continental rationalists and the British empiricists. According to Popkin, all sorts of important figures, especially from the seventeenth century, are left out of this standard interpretative framework such as, for example, Herbert of Cherbury, Ralph Cudworth, Kenelm Digby, and Comenius. Many thinkers in this era simply do not fit into either the rationalist or empiricist camps because of their "irrational" interests in, for example, millennial prophecy. While doing research at the Clark Library on the Quaker, Samuel Fisher, Popkin began to trace the development of what he called the "Third Force" in seventeenth-century thought. He writes that:

> ...I believe I have found another line of reaction to the 17th-century sceptical crisis, which helps account for some of the strange combinations of new science and theology that develop during the century, and flower in the Royal Society of England, and especially in the thought of its most famous member Sir Isaac Newton. This group of views, which for want of a better name, I have called "the third force" since it seems to be neither rationalist nor empiricist but combines elements of both with theosophy and interpretation of Bible prophecies.[85]

The Newtonian Synthesis of Theology with Scientific Epistemology

In the remainder of this paper, I will show how Newton does indeed combine his theology with his science to produce the ultimate flowering of Popkin's "Third Force" in early modern thought. I have long argued that Newton's conception of the Lord God serves as the foundation of his scientific epistemology because, for Newton, the whole of creation is "subordinate to [God], and subservient to his Will."[86]

Twenty-six years prior to Hume's *Treatise of Human Nature* (1739), Newton, from a vastly different metaphysical and theological starting point, implies, in the second edition of the *Principia* (1713), that the future need not resemble the past simply because of the Lord God's absolute power and that, consequently, we must mark all of the consequences of this fact in regulating our expectations about what sort of human knowledge scientific empiricism can

[85] Popkin, "The Third Force," p. 36.
[86] Newton, *Opticks*, Query 31, p. 403.

provide. Natural laws, as we have understood them on the basis of our experience, and "Rules" to guide human expectations about future experience work in general and for the present moment but, in a miracle tomorrow or in the millennium to come, the old natural laws and regulative "Rules of Reasoning" need not apply.

For Newton, even the scientific knowledge which empirically grounded induction is able to provide is limited to the current nature of things which, in turn, is utterly dependent – both for its generally provident creation and its specially provident continued operation in its normal, causally connected fashion – upon the absolute, arbitrary will and power of the Lord God of supreme dominion described in the *General Scholium*. Scientific knowledge – which is confined strictly to empirically discovered, and empirically verified, probationary "Principles," or natural laws – depends on God leaving the current natural order well enough alone.[87]

As we have seen above, it is, for Newton and Clarke, thoroughly possible for God to intervene directly in this created natural order. There is nothing in Newton's conception of matter or natural law – no inherent, unlimited necessity, Cartesian or otherwise – which might impede God in the free exercise of his will. For these Newtonians, God indeed may effect a Humean "violation" of the laws of nature.

Newton takes the absolute power of God to alter nature, at any moment, into account in his "Rules of Reasoning." Encoded in these "Rules" is Newton's cautious and cautionary method which ought to enable natural philosophers to integrate God's absolute and arbitrary power into their scientific

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[87] Hume, *Dialogues Concerning Natural Religion*, pp. 134–135, well describes the familiar sort of religious scepticism which proponents of the "Disconnectedness Thesis" (see note 83) often seem to attribute to Newton:

> "But when we look beyond human affairs and the properties of the surrounding bodies: When we carry our speculations into the two eternities before and after the present state of things; into the creation and formation of the universe; the existence and properties of spirits; the powers and operations of one universal spirit, existing without beginning and without end; omnipotent, immutable, infinite, and incomprehensible: We must be far removed from the smallest tendency to scepticism not to be apprehensive, that we have here got quite beyond the reach of our faculties. So long as we confine our speculations to trade, or morals, or politics, or criticism, we make appeals, every moment, to common sense and experience, which strengthen our philosophical conclusions and remove (at least in part) the suspicion, which we so justly entertain with regard to every reasoning that is subtile and refined. But in theological reasonings, we have not this advantage; while at the same time we are employed upon objects, which, we must be sensible, are too large for our grasp, and of all others, require most to be familiarized to our apprehension".

accounts of natural phenomena. The "Rules of Reasoning" were published in Newton's *General Scholium* to the *Principia*. In the first edition of 1687, Newton published only three rules. The first is the rule of simplicity:

> *No more causes of natural things should be admitted than are both true and sufficient to explain their phenomena.*
> As the philosophers say: Nature does nothing in vain…."[88]

Newton is fond of the proposition that "Nature does nothing in vain." In Query 28 of the *Opticks*, he gives this proposition as an example of the sort of question that it is the "main Business of natural Philosophy" to answer by arguing "from Phaenomena," i.e., it is a speculative question: "Whence is it that Nature doth nothing in vain…?[89] To ascertain the answer, Newton states that we must argue from phenomena and not from speculative metaphysical hypotheses.

In Rule II, Newton states that "*Therefore, the causes assigned to natural effects of the same kind must be, in so far as possible, the same*."[90] As noted above, Hume immediately recognized this rule to be at the foundation of the design argument and that it is in fact the "foundation of all religion."[91]

In Rule III, in a manner reminiscent of Descartes describing the innately known, necessary essence of matter, Newton states that:

> *Those qualities of bodies that cannot be intended and remitted [i.e., qualities that cannot be increased and diminished] and that belong to all bodies on which experiments can be made should be taken as qualities of all bodies universally*.[92]

These first three "Rules of Reasoning" are first published in 1687 in the first edition of the *Principia*. In the second edition of 1713, Newton added his famous fourth "Rule":

> *In experimental philosophy, propositions gathered from phenomena by induction should be considered either exactly or very nearly true notwithstanding any contrary hypotheses, until yet other phenomena make such propositions either more exact or liable to exceptions.*

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[88] Newton, *The Principia*, p. 794.

[89] Newton, *Opticks*, Query 28, p. 369. Cf. William Whiston, *Sir Isaac Newton's Corollaries from his own Philosophy and Chronology; in His Own Words* (London 1729), p. 5.

[90] Newton, *The Principia*, p. 795. This rule is Newton's variation of the Principle of Sufficient Reason which is the foundation of the Cosmological Argument. See William L. Rowe, *The Cosmological Argument* (Princeton, NJ: Princeton University Press, 1975), chap. II.

[91] Hume, *Dialogues, p*. 170. Cf. Note 7 above.

[92] Newton, *The Principia*, p. 795.

> This rule should be followed so that arguments based on induction may not be nullified by hypotheses.[93]

Why, in the second edition of the *Principia*, does Newton add the fourth rule? I believe that Newton realized that his first three rules are too rationalistically rigid and, if not modified by the fourth rule, lead to the elimination of the possibility that God may reorganize nature if, when, and how he chooses. Built into the foundation of Newton's scientific method, as regulated and corrected by the addition of the fourth rule, there is an explicit openness to the possibility that God may miraculously contravene his own natural laws in the future.[94] In a "new heaven and a new earth," or here and now, or, perhaps, tomorrow, anything is possible given the ubiquitous and total freedom and power of the Lord God of absolute dominion. Newton's view about the contingency of human knowledge, in the light of God's absolute power and dominion over every aspect of creation, seems to parallel that of Robert Boyle who writes that:

> in this very phenomenal world of partial regularity, at any moment all our science may be upset by the elimination, or change of regularity through the operation of Him who is the guider of its concourse. For the most optimistic investigator must acknowledge that if God be the author of the universe, and the *free establisher* of the laws of motion, whose general concourse is necessary to the conservation and efficacy of every particular physical agent, God can certainly invalidate all experimentalism by withholding His concourse, or changing those laws of motion, which depend perfectly upon His will, and could thus vitiate the value of most, if not all the axioms and theorems of natural philosophy. Therefore reason operating in the mechanical world is constantly limited by the possibility that there is not final regu-

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[93] Newton, *The Principia*, p. 796.

[94] E. A. Burtt is clearly aware of Newton's openness to the possibility of miracles in his scientific methodology but he distinguishes between a passage such as Rule IV, "when the theological basis of Newton's science was uppermost in his mind," and Newton's "strictly scientific paragraphs." I answer that dividing Newton, by paragraphs or in fact, into a theologian, on the one hand, and a scientist, on the other, is impossible. See E. A. Burtt, *The Metaphysical Foundations of Modern Science*, Rev. ed. (Garden City, NY: Anchor Books, 1954), p. 219. Of Pythagoras, F. M. Cornford has written what is equally true of Newton: "The vision of philosophic genius is a unitary vision. Such a man does not keep his thought in two separate compartments, one for weekdays, the other for Sundays." Cornford continues with good advice for scholars of Newton (as well as of Pythagoras): "We begin to understand Pythagoras when we see that the two sides of his philosophy meet in the conception of harmony—a conception that has a meaning both in the spiritual and in the physical world." See Cornford, *Before and After Socrates* (Cambridge: Cambridge University Press, 1932), p. 66.

> larity in that world, and that existential regularity may readily be destroyed at any moment by the God upon whom it depends.[95]

Moreover, Newton's reading of prophecy leads him to expect a "new heaven and a new earth" when, in addition to the current laws of nature, the first three regulative "Rules" governing our future expectations within the current system may no longer apply. Here and now, experience, through the judicious use of the methodology of science,[96] has taught us that gravity obeys the inverse square law and, further, that we may justifiably expect that, in the future, "like effects show like causes" as they have regularly done in the past. Tomorrow, however, God's power is such that new experimental data may invalidate both this natural law and this regulative "Rule." For Newton, the primacy of God's "specially provident" power results in a distinctive contingency in the natural order even while Newton acknowledges the virtual necessity of that order in its ordinary, "generally provident," current operations. Newton's fourth "Rule" is, in my opinion, founded upon his view that the whole of creation is "subordinate to [God], and subservient to his Will."[97] Because the future need not resemble the past, we must regard both natural laws established by analysis and synthesis and regulative "Rules" governing our expectations about nature to be only "very nearly true…until yet other phenomena make such propoitions either more exact or liable to exceptions".

To conclude, in the 1960s, Richard H. Popkin changed the course of the history of modern philosophy by restoring to our understanding of that era

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[95] Robert Boyle, *Reconcilableness of Reason and Religion*, in *The Works of the Honourable Robert Boyle*, 6 vols., ed. Thomas Birch (London, 1772), 4:161. I have emphasized the phrase "*free establisher*" in this passage.

[96] Newton, *Opticks*, Query 31, pp. 404–405, states how his two-part method of Analysis and Synthesis works:

> "As in Mathematicks, so in Natural Philosophy, the Investigation of difficult Things by the Method of Analysis, ought ever to precede the Method of Composition. This Analysis consists in making Experiments and Observations, and in drawing general Conclusions from them by Induction, and admitting of no Objections against the Conclusions; yet it is the best way of arguing which the Nature of Things admits of, and may be looked upon as so much the stronger, by how much the Induction is more general. And if no Exception occur from Phaenomena, the Conclusion may be pronounced generally. But if at any time afterwards any Exception shall occur from Experiments, it may then begin to pronounced with such Exceptions as occur. By this way of Analysis we may proceed from Compounds to Ingredients, and from particular causes to more general ones, till the Argument end in the most general. This is the Method of Analysis: And the Synthesis consists in assuming the Causes discover'd and establish'd as Principles, and by them explaining the Phaenomena proceeding from them, and proving the Explanations."

[97] Newton, *Opticks*, Query 31, p. 403.

the centrality of the "sceptical crisis" in its religious context.[98] In 1983, Popkin then went on to revitalize one of the most important, but overlooked, responses to this "sceptical crisis" in the work of the thinkers he classified as representatives of the "Third Force."[99] Newton and Clarke represent the fullest flowering of this early modern response to scepticism in their distinctive manner of combining their empirical method with often little noted or under-appreciated aspects of religion. The primary hindrance to interpreting the Newtonians as an example of Popkin's "Third Force" has been precisely because of the way in which Newton and Clarke blend elements of "modern" scientific empiricism with elements which many modern scholars have seen as irrational and which they have Whiggishly ignored or disconnected from his positive scientific method. But Newton's metaphysical conception of the Lord God is at the foundation of his scientific method. Both scientific reason and revelation agree that the creator, owner, and operator of nature – as revealed by the theological arguments from design, prophecy, miracles, and cosmology in synthesis with the methodology of the New Science – is the Lord God of supreme dominion. While it is true that Newton's point that the future need not resemble the past foreshadows Hume, Newton makes this point about the future within the religious context of Popkin's "Third Force." Newton arrives at the Humean conclusion that the future need not resemble the past because, for Newton, natural laws and regulative "Rules" for guiding our reason in understanding nature, work for the moment but tomorrow, or in the millennium and beyond, the "children of the resurrection" will live in a "new heaven" and a "new earth" where both the old laws of nature and the old "Rules of Reasoning" need not apply IF God ordains it.

[98] Richard H. Popkin, "The Religious Background of Seventeenth-Century Philosophy," *Journal of the History of Philosophy* 25, No. 1 (Jan., 1987.)

[99] Richard H. Popkin, "The Third Force," passim.