CHAPTER SIXTEEN

"NOT IN THE LANGUAGE OF ASTRONOMERS": ISAAC NEWTON, THE SCRIPTURES, AND THE HERMENEUTICS OF ACCOMMODATION

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> The LORD reigneth, he is clothed with majesty; the LORD is clothed with strength, wherewith he hath girded himself: the world also is stablished, that it cannot be moved.
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> Psalm 93:1 (KJV)

> …the Scriptures [speak] not in the language of Astronomers… but in that of y^e^ common people to whom they were written.
>
> Isaac Newton

THE BIBLE IN THE *PRINCIPIA*

The first edition of Isaac Newton's *Principia mathematica* contains only the briefest of allusions to things theological.[1] A careful reader of the Latin text published in 1687 would have encountered a solitary mention of the Bible as well as a single reference to God as Creator, but no other language of an overtly theological nature.[2] The reference

[1] For permission to quote from manuscripts in their archives, I gratefully acknowledge the Syndics of the Cambridge University Library; the Jewish National and University Library, Jerusalem; and the Provost and Fellows of King's College, Cambridge. In quotations from Newton's manuscripts, Newton's deletions are represented with strike throughs, his insertions are placed within angle brackets and editorial additions are placed within square brackets. An ever-increasing number of Newton's theological manuscripts, including many of those cited in this paper, can be found on the website of the Newton Project. I am grateful for the useful advice of the two referees and the two editors of this volume.

[2] Newton scholars are indebted to I. Bernard Cohen for his valuable and groundbreaking 1969 study of the continuing presence of theology in the three editions of the *Principia* published during Newton's lifetime. This study, which serves as one of the starting points for my paper, demonstrates not only that theology was present in the *Principia* even before the addition of the famous General Scholium in the second edition of 1713, but also that some of the unpublished manuscript drafts of the first

to God as Creator occurs in Corollary 4 to Proposition 8 in Book 3. In a discussion about the relative densities of the planets in the solar system, Newton concludes: "Therefore God placed the planets at different distances from the sun so that each one might, according to the degree of its density, enjoy a greater or smaller amount of heat from the sun."[3] This expression of natural theology, although cursory in nature, is a reflection of Newton's deep commitments to the design argument and his belief that the majestic structure of the solar system could only have been the product of an intelligent agent. Newton's mention of the Bible comes much earlier in the *Principia*. After the Definitions placed at the beginning of the work, Newton included a Scholium that contains a discussion of the importance of the distinction between the absolute and the relative in physical phenomena. The Scholium on the Definitions begins with a statement asserting the need to distinguish "time, space, place, and motion…into absolute and relative, true and apparent, mathematical and common."[4] He then goes on to discuss these distinctions in greater detail.[5]

Newton's distinctions between absolute and relative time, space, place and motion are much celebrated in the history of science. Others before him, including, most famously, Galileo, had set out similar distinctions. Much less well examined is a paragraph that comes near the end of the Scholium in which Newton avers that the distinction between the absolute and the relative has a wider application than physics:

> Relative quantities, therefore, are not the actual quantities whose names they bear but are those sensible measures of them (whether true or erroneous) that are commonly used instead of the quantities being measured. But if the meanings of words are to be defined by usage, then it is these sensible measures which should properly be understood by the terms "time," "space," "place," and "motion," and the manner of expression will be out of the ordinary and purely mathematical if the quantities being measured are understood here. Accordingly those who there interpret these words as referring to the quantities being measured do violence to

edition of the *Principia* reveal that Newton was often thinking about the theological corollaries of his mathematical physics even when he did not in the end explicitly articulate them in his published work. See Cohen 1969.

[3] Newton 1999, 814, n. cc.

[4] Newton 1999, 408.

[5] Newton 1999, 408–13.

> the Scriptures. And they no less corrupt mathematics and philosophy who confuse true quantities with their relations and common measures.[6]

In addition to asserting that a distinction between the absolute and the relative must be maintained in the interpretation of the Scriptures as well as physics, this paragraph also implies that a failure to recognize this distinction in biblical hermeneutics will lead to corrupt interpretations. What is more, the placement of a sentence on biblical hermeneutics in a paragraph that otherwise discusses mathematics and physics implies that Newton saw some sort of relationship between natural philosophy and the interpretation of the Bible.

When he revised the *Principia* for the second edition, Newton removed the word God (*Deus*) from the discussion of the densities of planets in Book 3 and replaced the active verb attached to the word *Deus* (*collocavit*) with the passive construction "were to be placed" (*collocandi erant*).[7] Newton's assertion of the need to distinguish between the absolute and the relative in the interpretation of the Scriptures, on the other hand, is a consistent feature of all three editions of the *Principia*. One of the aims of this chapter is to suggest why Newton thought it important to include a statement on the interpretation of the Scriptures in his *Principia*, a work viewed by most as being exclusively devoted to mathematical physics. In order to recover Newton's rationale for doing so, several dynamics of his thought must be reconstructed. This chapter begins with an outline of some general principles of scriptural hermeneutics found in Newton's writings. After this, I discuss Newton's strategies for interpreting both the Genesis Creation and other scriptural texts that speak about the natural and physical worlds. Particular attention is given to Newton's deployment of the hermeneutics of accommodation in his interpretation of scriptural passages describing astronomical phenomena and his reconciliation of the Bible with the new knowledge coming from natural philosophy. I also show how Newton's use of accommodation relates

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[6] Newton 1999, 413–14. As Cohen expertly demonstrated in 1969, the 1930 Florian Cajori revision of Andrew Motte's 1729 English translation of Newton's *Principia* obscured this clear reference to the Bible (see Cohen 1969). As the above quotation shows, the recent Cohen-Whitman translation restores this reference to the Bible to the *Principia*.

[7] For more detail, see Cohen 1969, 529–30. Newton more than compensated for the removal of the word 'God' from this passage with the 1450-word General Scholium added to the second edition of 1713. Accounts of the natural theology and theology proper of the General Scholium can be found in Force 1990; Stewart 1996; and Snobelen 2001.

to views he held privately about a fundamental distinction between the abilities of the wise on the one hand and the common people on the other. Finally, this essay demonstrates that accommodation forms an essential part of some broader dynamics in Newton's thought that in turn help reveal tight methodological and conceptual links between his investigation of nature and his study of the Bible, together comprising the two books written by God himself.[8]

Newton on the Interpretation of the Scriptures

By the time Isaac Newton began to study and write on astronomy shortly after his arrival at Cambridge in 1661, large quantities of ink had been spilled on the reconciliation of the new astronomy with the Scriptures, including much advocacy for the hermeneutics of accommodation, a mode of biblical exegesis based on the view that the Word of God is accommodated to human levels of understanding.[9] As for heliocentrism, it was then well on its way to securing its position as the dominant model of the solar system. Nicolaus Copernicus's *De revolutionibus* had been published one hundred years before Newton's birth. By the time Newton died in 1727, heliocentrism was dominant in astronomy—at least in Protestant lands.[10] Beginning with Johannes Kepler, many had moved beyond Copernicanism, including Newton himself. Against the backdrop of these changed circumstances, there was less need for Newton to exert himself in the production of apologetic discourses supporting the heliocentric model. Moreover, there were no overt legal or ecclesiastical pressures to hold back his natural philosophy or his rhetoric in defence of it; unlike Galileo, Newton lived well beyond the reach of Rome and the Inquisition.[11] But, as we will see,

[8] While there is no prior study dedicated to Newton's use of accommodationist hermeneutics, shorter discussions are available in Mandelbrote 1994; Dobbs 1991, 57–66 (a section on the hexaemeral tradition); and Brooks 1976, 116–20.

[9] See Snobelen 2008, as well as Barker 2008, England 2008a, 2008b, Finocchiaro 2008, Granada 2008, Harrison 2008, Howell 2008a, 2008b, Remmert 2008, van der Meer & Oosterhoff 2008.

[10] With respect to Catholicism, Copernicus's *De revolutionibus* and Galileo's Dialogue were not removed from the Index of Prohibited Books until 1835, although Catholic astronomers had been writing in defence of heliocentrism and the motion of Earth for some time before this.

[11] In his notes for a projected biography of Newton, John Conduitt wrote: "Sr I had the happiness of being born in a land of liberty <& in an age> where he {might} speak his mind—not afraid of {the} Inquisition as Galileo was for {saying} the sun stood

Newton was certainly aware of the rhetorical battles over Copernicanism and the reconciliation of heliocentrism with the Scriptures that had occurred in the decades immediately preceding the time of his birth. And, even during his own adult life, there were some—including fellow Englishmen—who still tenaciously adhered to Ptolemaism and contended that heliocentrism flatly contradicted the Word of God.[12] Moreover, the powerful psychological effect of phenomenalistic geocentrism and geostasis remained for Newton, as it does for us. Thus, it remained necessary for him, as a believer committed to the veracity of the biblical text, to demonstrate how the apparently geocentric and heliokinetic language found in this one source of truth could be compatible with the findings of natural philosophy, another source of truth. These factors help explain why what little Newton wrote about the reconciliation of natural philosophy with the Bible sometimes manifests an apologetic edge. But if these reasons seem insufficient on their own to explain the apologetic tone of some of these writings, it is probably because they are. As is often the case with Newton, there is much more below the surface.

Like many natural philosophers of his age, Newton was committed to the doctrine of the two books—at least in general terms. A natural outworking of this belief that the Creator had written the book of nature as well as the book of scripture was a twin respect for the authority of natural philosophy and the authority of the Bible (that is, nature properly interpreted and Scripture properly interpreted). Since both books ultimately derived from God, one would expect to find concord between them. Near the beginning of a long treatise on the Book of Revelation that he apparently started to compose sometime

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still & the earth {moved} his works not in danger of being expunged as DesCartes's was nor he obliged to go into another country as Descartes was into Holland to vent his opinions" (Iliffe and Higgitt 2006, 1: 192).

[12] One late example is found in Edwards 1697, 23. In this work the fiery Calvinist theologian attacks the Newtonian William Whiston's attempt to explain Creation using Newtonian mechanisms. Roughly two decades later, Whiston and the instrument-maker Francis Hauksbee, Jr. began advertising in London for a course on astronomy, the surviving syllabus of which shows that the first two lectures were intended to demonstrate "the Falsity" of the Ptolemaic and Tychonic systems and establish "[t]he Truth and Certainty of the *Copernican* system" (Whiston and Hauksbee ca. 1718–1722). More than three decades after Newton's death, the Russian astronomer Mikhail Lomonosov, an adherent of the Orthodox faith, felt it necessary to publish an addendum to his 1761 work on the transit of Venus in which he argues that Copernicanism does not contradict the Bible when the latter is properly interpreted. See the English translation by Colin Chant in Oster 2002, 236–40.

in the mid-1670s, Newton set out a series of rules for prophetic interpretation. His ninth rule is To ~~prefer~~ <choose> those ~~interpretations~~ <constructions> w^{ch} without straining reduce things to the greatest simplicity." He goes on to elaborate:

> Truth is ever to be found in simplicity, & not in y^{e} multiplicity & confusion of things. As y^{e} world, w^{ch} to y^{e} naked eye exhibits the greatest variety of objects, appears very simple in its internall constitution when surveyed by a philosophic understanding, & so much y^{e} simpler by how much the better it is understood, so it is in these visions. It is y^{e} perfection of ~~all~~ God's works that they are all done wth y^{e} greatest simplicity. He is y^{e} God of order & not confusion. And therefore as they that would understand y^{e} frame of y^{e} world must indeavour to reduce their knowledg to all possible simplicity, so it must be in seeking to understand these visions.[13]

Since God employed rules of simplicity in his writing of both books, so both the student of nature and the investigator of the Scriptures must follow the same rule: reduction to simplicity. Harmony exists between the two books.

While simplicity may be at the core of biblical texts, Newton's unpublished writings suggest that he believed that only the spiritually astute are able to arrive at this simple yet profound message. Remaining with his treatise on the Apocalypse from the 1670s, Newton's second rule of prophetic interpretation is "To assigne but one meaning to one place of scripture . . . unless," he adds,

> it be perhaps by way of conjecture, or where the literal sense is designed to hide y^{e} more noble mystical sense as a shell y^{e} kernel ~~until such time~~ from being tasted either by unworthy persons, or untill such time as God shall think fit.[14]

Newton goes on to elaborate on this rule, arguing that

> [i]n this case there may be for a blind, a true literal sense, even such as in its way may be beneficial to y^{e} church. But when we have the principal meaning: If it be mystical we can insist on a true literal sense no farther then by history or arguments drawn from circumstances it appea[r]s to be true.[15]

A prophetic text certainly may have both a literal and a mystical meaning, but this must be established with more convincing reasons

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[13] Newton, *Yahuda MS* 1.1a, f. 14r.
[14] Newton, *Yahuda MS* 1.1a, ff. 12r–v.
[15] Newton, *Yahuda MS* 1.1a, f. 12v.

than "bare analogy."[16] Newton also cautions against double mystical meanings, although he does allow that they exist in the prophetic Scriptures. Too much freedom in multiplying the meanings of the Scriptures, Newton warns, "savours of a luxuriant ungovernable fansy and borders on enthusiasm."[17]

For Newton the mystical meaning of some biblical passages is part of a divinely-directed challenge meant to separate humanity into wheat and chaff. Writing about the mystical meaning of biblical prophecy near the beginning of his early treatise on Revelation, he alludes to the Scriptures in a comparison of the purpose of Christ's parables to that of prophecy:

> Consider how our Saviour taught the Jews in Parables that in hearing they <migh[t]> hear and not understand & in seeing they might see and not perceive. And as these Parables were spoken to try the Jews so the mysticall scriptures were written to try us.[18]

Several folios later in the same manuscript, Newton returns to this theme, contending that the aim of biblical prophecy is not "to convert the whole world to y^{e} truth", but rather

> …the designe of them is to try men & convert the best, so y^{t} the church may be purer & less mixed wth Hypocrites & luke-warm persons. And for this end it is that they are wrapt up in obscurity, & so framed by the wisdom of God that y^{e} inconsiderate, y^{e} proud, y^{e} self-conceited, <y^{e} presumptuous>, y^{e} sciolist, y^{e} sceptic…whose hearts are thus hardned in seeing should see & not perceive & in hearing should heare & not understand. For God has declared his intention in these prophesies to be as well that none of y^{e} wicked should understand, as y^{t} y^{e} wise should understand, Dan: 12.[19]

Using the divine authority of a passage from Daniel 12, Newton avers that there is a moral dimension to the interpretation of prophecy: the wicked will not be able to understand what God has written for the best.

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[16] Newton, *Yahuda MS* 1.1a, f. 12v.
[17] Newton, *Yahuda MS* 1.1a, f. 12v.
[18] Newton, *Yahuda MS* 1.1a, f. 2v. Newton is paraphrasing Mark 4:11–12, in which Christ alludes to the words of Isa. 6:9–10 (cf. Matt. 13:13–15 and Luke 8:10). In Acts 28:25–27, the Apostle Paul quotes the passage from Isaiah in his address to the Jewish leaders of Rome.
[19] Newton, *Yahuda MS* 1.1a, ff. 17r, 18r.

Although the fire of this youthful enthusiasm perhaps waned somewhat in Newton's advancing years, he continued to maintain similar distinctions throughout his life. Four interrelated categories of distinction will be considered here. First, Newton distinguished between scriptural and theological truths that were accessible to those immature in the faith and those that could only be understood by the spiritually mature. In his "Irenicum," which was written in the early eighteenth century, he contrasts the simple truths ("milk for babes") required for communion with the more involved truths ("strong meats") meant for those of advanced understanding, namely, "all that was to be learnt afterwards by <men of riper years in> studying the scriptures or otherwise."[20] Not surprisingly, Newton saw himself in this latter category.

Second, Newton argued that it was difficult to represent certain absolute truths in speech without recourse to figurative language. Evidence for this can be found in drafts for the "Avertissement au Lecteur" meant for the French edition of the correspondence between Gottfried Leibniz and Samuel Clarke published by Pierre Des Maizeaux in 1720. These drafts treat the profound themes of God's omnipresence and eternal duration, themes discussed both in Newton's General Scholium and in the Leibniz-Clarke correspondence itself. In Draft B of his "Avertissement au Lecteur" Newton declares: "When we speak of things w^{ch} come not within the reach of our senses, it's difficult to speak without Tropes & Figures ~~& danger of being misunderstood~~"[21] Draft D demonstrates that Newton believed this to be true of the Bible as well. Newton writes that

> <as the scriptures> generally spake of God by allusions & figures for want of proper language: ~~so I have used the words~~ Quality in these Letters [i.e., the correspondence between Leibniz and Clarke] the words Quality and Property ~~are~~ <were> used only by a figure to signify the boundless extent of Gods existence with respect to ~~duration~~ his ~~presence~~ <ubiquity> & ~~duration~~ eternity.[22]

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[20] Newton, *Keynes MS* 3, pp. 2–3 (quotations from p. 3; see also pp. 11, 32, 39, 41, 43–44, 46, 51). There were many precedents for this distinction between *fundamenta* (fundamentals) and *adiaphora* (indifferent things) in the thought of early modern Christian irenicists, including Desiderius Erasmus of Rotterdam. Newton here is basing this argument on the scriptural precedent of Heb. 5:11–6:3.

[21] Newton, "Advertissement au Lecteur," Draft B (private collection), cited in Koyré and Cohen 1962, 97. In this and the following quotation, I have adjusted the transcription style of Koyré and Cohen to conform with that used elsewhere in this paper.

[22] Newton, "Advertissement au Lecteur," Draft D (*Cambridge University Library* [hereinafter *CUL*], *MS.* Add. 3965, f. 289), cited in Koyré and Cohen 1962, 99. The clarification within square brackets is my own.

Interestingly, Newton's words here suggest that he believed Clarke (and by implication, himself) wrote in conformity to the style of the prophets.

Confirmation that Newton believed this of descriptions of nature is found in his Classical Scholia, a series of scholia likely dating from the early 1690s that he drafted as possible additions to a projected second edition of the *Principia*. This collection of texts argues, *inter alia*, that the ancients had grasped some of the essentials of astronomy and celestial mechanics, including heliocentrism and the Inverse-Square Law. Some of these ancient philosophers concealed these higher truths in figures. Thus Newton contended that the Greek philosopher Anaxagoras was aware that the Moon, like Earth, was heavy, and

> [t]hrough the fiction of the lion falling from the earth's moon and the stone falling from the sun he taught the gravity of the bodies of the sun and the earth's moon; through the figment of ascending stones he taught the force opposite to gravity, that of rotation.

But he is also quick to clarify this meaning: "This is not meant to be taken literally. The mystic philosophers usually hid their tenets behind such figments and mystical language."[23] The Inverse-Square Law was similarly hidden in the figure of the seven-string lyre. He writes:

> [t]hrough this symbol they indicated that the sun acts on the planets with its force in the same harmonic ratio to the different distances as that of the tensile force to strings of different length, i.e., in a duplicate inverse ratio to the distances.[24]

In a draft of Query 23 of the Latin *Optice* (which eventually became Query 31 of the *Opticks*), Newton speculated that God was the ultimate cause of gravity. The ancient philosophers who believed in the existence of atoms and a vacuum

> attributed gravity to Atoms without telling us the means unless perhaps in figures: as by calling God Harmony & representing him & matter by the God Pan & his Pipe, or by calling the Sun the prison of Jupiter because he keeps the Planets in their orbs.

[23] Newton, Classical Scholia, in Schüller 2001, 221. For accounts of Newton's Classical Scholia, see McGuire and Rattansi 1966 and Casini 1984.

[24] Newton, in Schüller 2001, 235.

To this he added: "Whence it seems to have been an ancient opinion that matter depends upon a Deity for its laws of motion as well as for its existence."[25]

Third, Newton argued for the need to make a distinction between absolute and relative senses in scriptural language. This was already hinted at in 1687 when in the Scholium on the Definitions he asserts that mistaking "sensible measures" for "actual quantities" can in turn "do violence to the Scriptures," by which he means the original sense and intent of God's Word. In the General Scholium he added to the second edition of the *Principia* in 1713, Newton offered a specific example of the importance of making this kind of distinction within the text of the Bible itself:

> 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. For we do say my God, your God, the God of Israel, the God of Gods, and Lord of Lords, but we do not say, my eternal one, your eternal one, the eternal one of Israel, the eternal one of the gods; we do not say my infinite one, or my perfect one. These designations [i.e., eternal, infinite, perfect] do not have reference to servants.[26]

In speaking about the meaning of the term 'God,' Newton is referring both to common usage and scriptural usage (the above passage includes several biblical titles of God). To secure his point, Newton introduces an expression for God that is arguably absolute ("the Eternal") and shows that it neither needs qualifications nor operates naturally with them. The term 'God,' on the other hand, is regularly given specificity through the addition of adjectives and other qualifiers. Newton is certain that there are absolute realities behind this relative language, for he goes on to stress that God is in fact "eternal" and "infinite."[27] But since God as presented in the Bible is God *in relation* to something (e.g., his people, his Creation), the meaning of the term 'God' itself is not *inherently* absolute and thus must be determined by context. Further evidence of the relative nature of the word 'God' is seen in its application in the Bible to individuals other than the one true God. Thus, Moses is

[25] Newton *CUL MS.* Add. 3970 (B), f. 619r.
[26] Newton 1999, 940–1. Clarification within square brackets added by the translators.
[27] Newton 1999, 941.

called 'God' in the Scriptures (Ex. 4:16, 7:1), as Newton points out in a footnote he added to the third (1726) edition.[28] Certainly Moses is not meant to be 'God' in an absolute or essential sense and it would thus be a gross error to mistake the meaning of 'God' in these cases as referring to the Almighty. To clarify his argument, at the point in the text where he added his footnote on God, Newton suggests that the word 'God' is like the word 'lord,' albeit stressing that "every lord is not a god."[29] As is more immediately obvious with 'lord,' this term is relative and its precise meaning does not emerge from a fixed, native and universal meaning in the word itself, but must be determined by context and qualifications in the form of adjectives and the like. Because this word is flexible in this way, one can have both a human lord (something Newton's argument seems to imply) and a supreme Lord (that is, the Almighty).[30] The term 'God' operates in a similar way. All this demonstrates that Newton believed that the recognition of a distinction between absolute and relative meanings of words is of pivotal importance to biblical hermeneutics.[31]

The fourth category of distinction is accommodation. Like other exegetes and natural philosophers from his era and before, Newton believed that the Bible sometimes accommodates its language to the sensibilities of the vulgar. One example of this comes in his interpretation of the accounts of demon possession in the synoptic Gospels. The demons that Christ cast out were not in reality evil spirit beings, but rather "distempers of y^{e} mind," or, as we would say today, mental illnesses:

> From this figure of putting serpents for spirits & spirits or Dæmons for distempers of y^{e} mind, came y^{e} vulgar opinion of y^{e} Jews & other eastern nations that mad men & lunaticks were possessed with evil spirits or Dæmons. Whence Christ seems to have used this language not only as a Prophet but also in compliance wth y^{e} Jews way of speaking: so y^{t} when he is said to cast out Devils ~~it cannot be known by his phra~~ those Devils may be ~~nothing but~~ diseases unles it can be proved by the circumstances that they are ~~sp~~ substantial spirits. For the ~~cure of a Lunatique is called~~ language of … casting out a spirit is used for ~~sp~~ y^{e} cure of a Lunatique Matt 17. 15, 18, 19.[32]

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[28] Newton 1999, 941 n. g.
[29] Newton 1999, 941.
[30] Newton 1999, 941.
[31] For more detail on Newton's argument about 'God' as a relative term, see Snobelen 2001.
[32] Newton, *Yahuda MS* 9.1, f. 21v.

The use of the term 'demon' in these texts does not assert the absolute reality of the demons popularly believed to exist by many Jews in the time of Christ; instead Christ is merely adjusting his speech to the language of contemporary vulgar demonology. In other words, Christ *accommodated* his speech and actions to conform to folk belief. As a prophet, Christ was well able to distinguish between this relative language and the absolute reality (namely, that demons have no ontological existence); it is just that in this case doing so did not serve the purpose immediately at hand.[33] One folio earlier in the same manuscript, Newton applies this same argument to the symbols of the dragon and serpent in the Apocalypse:

> A Dragon or serpent, if called y^{e} old serpent or y^{e} Devil signifies the spirit of error delusion & inordinate affections reigning in the world. ffor spirits good or evil are sometimes put for the tempers dispositions & persuasions of mens minds <much after y^{e} manner that we often take death for a substance>.[34]

Here Newton identifies the propensity in human language to hypostatize, personify and substantify abstractions. The dragon of the Apocalypse is a disposition, not a living being. Death is a condition, not something substantial. To use such language is well and good; after all, no less an authoritative text than the Bible does. What is wrong is to read this language mistakenly in an overly literal or absolutist manner. The language points to personification (the figurative) not real personalities (the literal). The astute reader and believer will recognize these crucial distinctions.

Immediately before penning the above-cited passage about demons, Newton argued against the view that the serpent that deceived Eve in the Garden of Eden was merely a symbol for a real, personal devil; if this were true, it would involve the punishing of "one thing for anothers fault, & <to> make y^{e} signe suffer in a litteral sense for the crime of the thing signified: w^{ch} is absurd & unagreeable to the nature & Designe of Parables." Instead, when the ancient sages wanted to represent one thing by another thing, "they framed a Metamorphosis of the one into the other." When Moses wrote the Genesis Creation account he adopted this mode of discourse. He concludes: "This was their way of

[33] For more on Newton's demonology and diabology, see Snobelen 2004.
[34] Newton, *Yahuda MS* 9.1, ff. 19v–20v.

making Parables, & Moses in this Parable of the Serpent speaks in the language of y^e^ ancient ~~sages~~ wise men, being skilled in all the learning of the Egyptians."[35] Thus, the biblical prophets, and preeminently Moses whom Newton believed had training in philosophy, wrote some of their texts in such a way that a literal, relative, conventional, or customary meaning could be found at the surface even while a spiritual or absolute meaning might be implied or discovered hidden in the depths beneath.

One of the pillars of Newton's accommodationist hermeneutics is his belief that the Bible is written primarily for unlearned, common people. In a manuscript in which he argues against infusing metaphysical and philosophical meanings into the biblical names and titles of Christ, Newton argues that the Old Testament must be the guide:

> So then for understanding these names of Christ, we are to have recourse unto the old Testament & to beware of vain Philosophy. For Christ sent his Apostles, not to teach Metaphysicks & Philosophy to the common people & to their wives & children, but to teach what he had taught them out of Moses & the Prophets & Psalms concerning himself.[36]

While Newton's argument here is related to his belief that Trinitarianism is the result of a corruption of biblical doctrine that involved the illegitimate intrusion of mainly Greek philosophical distinctions and categories, it is clear that Newton adhered generally to the belief that the primary meaning of the Scriptures is the meaning immediately accessible to the uneducated. In another manuscript Newton repeats in general terms his argument that the Gospel preached in the New Testament is directed to the common people, but also adds other elements. He writes:

> The Christian religion was <preached> by Christ & his Apostles to the meanest of the people & therefore was suited to theire capacity; And what it now <conteins> above their understanding has been introduced <since> by men of learning.[37]

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[35] Newton, *Yahuda MS* 9.1, f. 21v. Cf. Newton, *Yahuda MS* 41, f. 25v.

[36] Newton, *Sotheby's Lot* 255.8, f. 1r (private collection). I am grateful to Jean-François Baillon for granting me access to his transcriptions from this manuscript. A close parallel to this statement can be found in Newton, Keynes MS 3, 32. See also the first "Quære" of *Keynes MS* 11, f. 1r: "Whether Christ sent his Apostles to preach Metaphysicks to the unlearned common people & to their wives & children." An examination of *Keynes MS* 11 demonstrates that Newton intended the answer to be negative.

[37] Newton, *Yahuda MS* 15.5, f. 99r.

Here Newton not only explicitly speaks of the accommodation of the message to the capacity of "the meanest of people," but also attributes the more philosophical understandings of Christianity to later developments involving the intervention of the educated.[38] It is striking that in these passages there is no direct mention of inner, esoteric, or more mature layers of meaning in the Word of God; nevertheless, we have already seen that Newton believed that the Scriptures did at least sometimes contain these deeper meanings.

Newton on the Genesis Creation

Evidence for Newton's interest in the Genesis account of Creation begins early in his career, shortly after his arrival as a student at Trinity College, Cambridge. This evidence is contained in the undergraduate notebook that he entitled "Questiones quædam Philosophicæ" ("Certain Philosophical Questions") and that comprises the earliest substantial record of Newton's exploration of natural philosophy.[39] The Genesis Creation was also important to Newton as an alchemist.[40] For example, references to an alchemical interpretation of the Genesis Creation can be found in the "Praxis," an alchemical treatise of Newton's composition that dates to around 1693.[41] But the single most important source for Newton's hermeneutical views on the Genesis Creation comes in an epistolary exchange that took place in late 1680 and early 1681 between Newton and Thomas Burnet (1635?–1715) on schemes to illuminate Genesis with natural philosophy.[42] Although dated to 1681, the first two parts of Burnet's *Telluris theoria sacra* (*Sacred Theory of the Earth*) were apparently already printed by December 1680, and Burnet asked Newton

[38] Newton may be alluding here to his belief that philosophically-trained leaders in the early post-Apostolic Church ruined the simple truths of Christianity (which included pure monotheism) with the nice distinctions and abstractions of Hellenic thought (which in turn helped lead to the rise of the corrupt Trinitarian doctrine).

[39] Newton 1983.

[40] Newton's interest in alchemy began in the 1660s, after which time he experimented in alchemy for at least thirty years.

[41] Newton in Dobbs 1991, 305.

[42] For an expert analysis of Newton's correspondence with Burnet, see Mandelbrote 1994. Mandelbrote places the correspondence within its historical context and also discusses the different ways in which Newton and Burnet were committed to the hermeneutics of accommodation.

for advice on their contents around this time.[43] Burnet's work deployed Cartesian physics to explicate the Mosaic Creation and the Noachic Flood.[44] Unfortunately, the extant record of the correspondence is defective. What survives is a 13 January 1681 reply from Burnet to a 24 December 1680 letter written by Newton and an undated reply by Newton to Burnet's 13 January 1681 letter. Burnet's letter of 13 January 1681 contains a 139-word quotation from Newton's 24 December 1680 letter, along with some allusions to it; Newton's reply to Burnet's 13 January 1681 also includes some allusions to his 24 December 1680 letter that give some sense of its contents.[45]

The portion of Newton's 24 December 1680 letter quoted by Burnet, albeit short, contains some important illustrative features. Newton speaks of the effects of the heat of the Sun on the original chaos of Earth, along with "ye pressure of ye vortex or of ye Moon upon ye Waters," and how these might have brought about some of the "inequalities" in the surface of the earth, with the waters draining to the parts made low and the areas in the upper regions of the earth around its poles becoming dry land.[46] Aside from the interesting fact that this argument helps confirm that Newton was at that time still working with some conceptions derived from Cartesian physics, it is clear that Newton had begun to think in terms of what natural causes might have brought about the features of the earth described in the Mosaic account. The second argument presented in the fragment is that the original diurnal revolutions of Earth around the time of Creation might "have been very slow, soe yt ye first 6 revolutions or days might containe time enough for ye whole Creation" and so that there would be enough time for

[43] On this, see Mandelbrote 2006a, 345. Charles II viewed the work with favor and requested an English edition. The first two books appeared in English guise in 1684 and the final two books, with revised versions of the first two books, were printed in 1689 in Latin and English. Burnet's *Sacred Theory* elicited a great deal of controversy, including a range of literary responses. One of the most significant of these is Whiston's *New Theory* of 1696. Whiston, a convert to Newton's physics and a one-time admirer of Burnet's book, presented in his book a Newtonian counter-theory in part to combat Burnet's Cartesianism, which had become outmoded with the publication of the *Principia*. Whiston argued that his Newtonian accounts of Creation, the Flood, and the final conflagration were consistent with the biblical record.

[44] For background on Burnet's *Sacred Theory* and other contemporary accounts of the origin of Earth, see Mandelbrote 1994, 152–7 and Redwood 1996, 116–32. For more detail on Whiston's *New Theory*, see Force 1985 and Farrell 1981.

[45] The entire extant correspondence can be found in Newton 1959–1977, 2: 319, 321–35.

[46] Newton 1959–1977, 2: 319.

the heat of the Sun to produce inequalities in Earth's surface.[47] Two important dynamics emerge from this short fragment. First, Newton is keen to use natural philosophy to help explain how the Creation might have occurred. Second, he nevertheless holds to an essentially literal interpretation of the text in that he believes it describes physical processes that occurred in the natural history of Earth.

These two themes, and several others beside, are elaborated in the much more substantial body of evidence provided by Newton's reply to Burnet's letter of 13 January 1681. As Burnet's letter in part deals with objections Burnet raised against Newton's first letter, it will be useful to consider some of these. First, in response to the portion of Newton's first letter that he quotes, Burnet writes:

> But methinkes you forget Moses (whom in another place you will not suffer us to recede from) in this acct of ye formation of ye Earth; for hee makes ye seas & dry land to bee divided & ye Earth wholly formd before ye Sun or Moon existed. These were made ye fourth day according to Moses, & ye Earth was finisht ye 3rd day, as to ye inanimate part of it, sea & land, & even ye plants alsoe; you must then according to Moses bring ye Earth into this irregular forme it hath by other causes, & independently upon ye Sun or Moon.[48]

Burnet argues that according to his own principles Newton should not be offering an interpretation that both appears to deviate from the chronology of the hexaemeron and requires the introduction of forces not directly mentioned by Moses. Burnet's reminder "whom in another place you will not suffer us to recede from" suggests that Newton had insisted on taking the Mosaic account seriously in his first letter. Burnet adds: "Besides ye Earth at first was cover'd wth an Abyss of water as both Moses & philosophy assure us." This expression of allegiance to both Moses and philosophy suggests a species of concordism, an appeal to twin authorities presumed to be in harmony.

Yet when Burnet goes on to discuss Genesis 1 he appears to give priority to natural philosophical accounts of Earth's origin. What Moses describes in the hexaemeron is "ye present form of ye Earth," not "ye primæval Earth wch was gone out of being long before."[49] If Moses had given an accurate philosophical description of the Creation, "it would

[47] Newton 1959–1977, 2: 319.
[48] Burnet to Newton, 13 January 1681, Newton 1959–1977, 2: 322.
[49] Burnet to Newton, 13 January 1681, Newton 1959–1977, 2: 323.

have been a thing altogether inaccommodate to ye people & a useless distracting amusemt."[50] Thus, instead of a philosophical account

> hee gives a short ideal draught of a Terraqueous Earth riseing from a Chaos, not according to ye order of Nature & natural causes, but in yt order wch was most conceiveable to ye people, & wherin they could easily imagine an Omnipotent power might forme it, wth respect to ye conveniency of man & animals: Beginning first wth wt was most necessary, & proceeding by steps in ye same order to prepare an habitable world, furnisht wth every thing proper first for animals, & then for man ye Master of all.[51]

In the following paragraph Burnet reasons that the six days of Genesis 1 do not describe "physical reality" and therefore "neither is this draught of ye creation physical but Ideal, or if you will, morall."[52] Burnet is thus suggesting that the Mosaic account of creation is a fictional or mostly fictional account meant more for the satisfaction of vulgar human curiosity and spiritual instruction than to describe natural history.

Newton was unwilling to take the principle of accommodation this far.[53] While Burnet argued that Genesis 1 is an "ideal" account that is accommodated to the needs of the common people, and that the only concord between Genesis and the natural world relates to the world as it is now, Newton insisted that, while the Mosaic account certainly uses the language of accommodation, it nevertheless does describe natural history: "As to Moses I do not think his description of ye creation either Philosophical or feigned, but that he described realities in a language artificially adapted to ye sense of ye vulgar."[54] Newton is proposing a *via media* between the belief that Moses wrote a precise, philosophical account (in which case it should be read in a strictly literal way) and the view that he merely provided a moral story for the edification of the Israelites (in which case a literal reading of the text would be misleading if not erroneous). For Newton, it is important to understand that while Moses accommodated his language, he nevertheless still "described realities."[55] Newton next gives an example of what he means:

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[50] Burnet to Newton, 13 January 1681, Newton 1959–1977, 2: 323.
[51] Burnet to Newton, 13 January 1681, Newton 1959–1977, 2: 323.
[52] Burnet to Newton, 13 January 1681, Newton 1959–1977, 2: 324.
[53] Cf. Mandelbrote 1994, 157–8.
[54] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 331.
[55] If compared to modern Christian interpretation of the Genesis Creation, Burnet's approach would stand for an almost complete rejection of concordism (allowing only

> Thus where [Moses] speaks of two great lights I suppose he means their apparent, not real greatness. So when he tells us God placed those lights in ye firmament, he speaks I suppose of their apparent not of their real place, his business being not to correct the vulgar notions in matters philosophical but to adapt a description of ye creation as handsomly as he could to ye sense & capacity of ye vulgar.[56]

This example tells us two things. First, for Newton an astute reading of the Mosaic Creation will allow for the distinction between the absolute (the perspective of philosophy) and the relative (the perspective of the vulgar). The Sun and the Moon of the fourth day of Creation are described as to their relative appearance from the perspective of humans on Earth. While a philosopher will be able to determine their absolute luminosity and location, this is a mode of meaning with which Moses did not concern himself, given that he was writing for farmers and herdsmen, not philosophers. Second, despite the fact that Newton believes Moses accommodates his language for the sake of the unlearned, the Genesis Creation nevertheless describes physical reality insofar as it provides—at one level—a true natural history of early Earth after allowances are made for the phenomenalistic language that mirrors the appearances of things rather than absolute reality.

Newton goes on to discuss the description of the creation of the Sun, the Moon, and stars on the fourth day (Gen. 1:14–19) in relation to the rest of the account. Although the heavenly bodies are described as made on the fourth day, Newton does not believe "their creation from beginning to end was done ye fourth day nor in any one day of ye creation." Nor is Moses concerned about describing them *absolutely* as physical bodies in their own right, some of which are larger than Earth and "perhaps habitable worlds," but only *relatively* as luminaries that give light to Earth.[57] What is more, their creation cannot be assigned to any one particular day of Creation. Nevertheless, they belong to the world of appearances:

> yet being a part of ye sensible creation wch it was Moses's design to describe & it being his design to describe things in order according to ye succession of days allotting no more then one day to one thing, they

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that the Genesis Creation describes the world that now is), while Newton's stance would be considered an example of moderate concordism (allowing that there is some agreement between Genesis 1 and the history of Earth).

[56] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 331.

[57] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 331.

> were to be referred to some day or other & rather to ye 4th day then any other if the air then first became clear enough for them to shine through it & so put on ye appearance of lights in ye firmament to enlighten the earth.[58]

Newton here hints at some sort of literary framework that helps dictate where each created thing is mentioned in the text. He also posits that the Sun, Moon, and stars are assigned to the fourth day because it was at this time in the history of Earth that they were first visible through the atmosphere. Until their appearance in the heavens they could not be described as lights, even though it is possible their creation was not complete even by the fourth day. Newton finds this argument plausible, but not Burnet's completely fictional reading: "for Moses to describe ye creation of seas [on the third day] when there was no such thing done neither in reality nor in appearance me thinks is something hard."[59] For Newton, the Mosaic account must deal either in reality or appearance. Burnet's interpretation allows for neither.

Later in his letter, Newton further clarifies his position on the creation of the Sun, Moon and stars:

> And now while the new planted vegetables grew to be food for Animals, the heavens becoming clear for ye Sun in ye day & Moon & starrs in ye night to shine distinctly through them on the earth & so put on ye form of lights in ye firmament so that had men been now living on ye earth to view ye process of ye creation they would have judged those lights created at this time.[60]

Newton here expresses an interest in teleology in the order of Creation: vegetation (created on the third day) must come before animals (created on the sixth day). His concern for realism is evident in his argument that the account of the fourth day conforms to the hypothetical perspective of a human observer on Earth. Newton continues:

> Moses here sets down their creation as if he had then lived & were now describing what he saw. Omit them he could not wthout rendering his description of ye creation imperfect in ye judgment of ye vulgar. To describe them distinctly as they were in them selves would have made ye narration tedious & confused, amused ye vulgar & become a Philosopher more then a Prophet. He mentions them therefore only so far as ye vulgar had a notion of them, that is as they were phænomena in our

[58] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 331.
[59] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 332.
[60] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 333.

> firmament, & describes their making only so far & at such a time as they were made such phænomena. Consider therefore whether any one who understood the process of ye creation & designed to accommodate to ye vulgar not an Ideal or poetical but a true description of it as succinctly & theologically as Moses has done, without omitting any thing material wch ye vulgar have a notion of or describing any being further then the vulgar have a notion of it, could mend that description wch Moses has given us.[61]

Once again, Newton steers between the Charybdis of philosophical literalism and the Scylla of idealism to argue for a concise "theological" mode of discourse that is attuned to realism and thus satisfies the vulgar. Key to Newton's understanding of the text is that Moses' role in providing an account of Creation under inspiration is primarily that of a prophet rather than a philosopher. And, importantly for Newton, the Genesis Creation is also a "true description" of the "process of creation." While Burnet argued that Moses taught the moral truth of Creation alone, Newton was convinced that the Mosaic cosmogony conveyed both the theological truths *and* the physical *realia* of the acts of Creation, allowing for the fact that the latter elements were presented through the filter of common speech.

It is noteworthy that Newton employs the verb "accommodate" in his discussion of the literary strategy of Moses.[62] Newton uses the verb a second time to affirm accommodation as he continues from the above-quoted passage to complete the paragraph. In this extension of his discussion on accommodation, he provides other examples from the account of the Noachic Flood that help clarify his meaning:

> If it be said that ye expression of making & setting two great lights in ye firmament is more poetical then natural: so also are some other expressions of Moses, as where he tells us the windows or floodgates of heaven were opened Gen 7 & afterwards stopped again Gen 8 & yet the things signified by such figurative expressions are not Ideall or moral but true. For Moses accommodating his words to ye gross conceptions of ye vulgar, describes things much after ye manner as one of ye vulgar would have been inclined to do had he lived & seen ye whole series of wt Moses describes.[63]

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[61] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 333.

[62] Burnet also uses the term. The verb "accommodate," along with its cognate adjectives "inaccommodate" and "accommodate," is used by Burnet in his 13 January 1681 letter to Newton (Burnet to Newton, 13 January 1681, Newton 1959–1977, 2: 323, 325, 326).

[63] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 333.

Thus, just as poetic or metaphorical language is used in the account of the rain that came down in Noah's day without implying that the Flood never happened, so unphilosophical or less-than-literal language in the Genesis Creation does not imply that this account is fictional. But this discussion also makes clear that Newton believed that Moses played a *conscious* role in the rendering of the description of Creation into language accessible to *hoi polloi*. That Moses was in control of his language and that he understood the need to accommodate "his words to ye gross conceptions of ye vulgar" suggests that he was ultimately aware of a more philosophical understanding of Creation.

Two other aspects of Newton's reply to Burnet merit consideration. First, in the second and third paragraphs he uses an analogy from contemporary chemistry and metallurgy to explain how the irregularities in the surface earth and its sea beds may have been formed. Thus Newton notes that the crystallization of saltpeter dissolved in water is uneven. The upper crust of the globe could have been brought into its present state through the heat of the Sun and mineral action. In another example, he points out that melted tin congeals in lumps; a similar action on Earth could have produced the irregularities of the hills.[64] As an afterthought, Newton adds in the final paragraph of his letter the example of the congealing of a milk-beer mixture as another analogy for the formation of the "rugged & mountanous" surface of the globe.[65] Therefore, although the hexaemeron is not philosophical in nature or intent in the first instance, insights from natural philosophy might be able to illuminate and fill in the details of the Mosaic account. Second, in his penultimate paragraph, Newton contends that the six creative days may have been longer than twenty-four hours in length, suggesting a duration of a year for the creative work of each day. This argument is made in the context of a discussion about the gradual acceleration of the diurnal motion of Earth.[66] It is clear then that Newton is speaking about literal days insofar as he believes they are defined as the diurnal rotations of Earth. In stressing that he is committed to literal (even if not twenty-four hour) days, Newton reminds Burnet that one of the Ten Commandments (namely, the keeping of the Sabbath) makes reference to the days of Creation and that this

[64] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 329–31.
[65] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 334.
[66] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 333–4.

commandment "should not be grounded on a fiction."[67] Thus, although he is diplomatic with his correspondent and is careful to commend him in areas where they agree, Newton is firm in rejecting Burnet's fictional or ideal interpretative approach in favor of one that upholds the Mosaic Creation as a record of natural history.[68]

Newton on Astronomical Language in the Scriptures

Although natural philosophy might help illuminate the Scriptures, Newton, like Galileo, believed that the formal teaching of natural philosophy is not part of the mandate of the inspired Word of God. Thus, in one manuscript he declares: "The system of the heavenly bodies is not at all taught in Scripture."[69] This view allows Newton to reconcile phenomenalistic geocentric language in the Bible with the realist heliocentric view of the solar system he espoused. Accordingly, he is able to state in the same manuscript: "Nothing stands in the way of the Earth's moving around the Sun according to the law of the

[67] Newton to Burnet, ca. January 1681, Newton 1959–1977, 2: 334. Newton is alluding to Ex. 20:8–11; verse 11 describes God making heaven and earth in six days and resting on the seventh. As Mandelbrote suggests, Newton may reveal an element of his heterodoxy to Burnet, since his argument seems to imply that Christians kept the Sabbath rather than Sunday for three hundred years after the time of Christ (Mandelbrote 1994, 159–60).

[68] Newton's approach is similar to that outlined a decade and a half later by his disciple William Whiston in Whiston 1696, a Newtonian cosmogony intended in part to counter the Cartesianism of Burnet's work. In an introductory essay entitled "A discourse concerning the nature, stile, and extent of the Mosaick history of the Creation" (1–94), Whiston argues that the language of the Genesis account of Creation is accommodated to human understanding and thus Genesis 1 must not be read as a philosophical account. But neither is the account merely parabolic or mythological (Burnet would have been one of the targets of this declaration). Instead, Whiston argues for a form of moderate accommodation that upholds a sort of third way in which Genesis 1 is seen as depicting a true natural history of Creation. This moderate accommodationist position is based in part on his belief that the Genesis Creation uses phenomenalistic language and assumes a terrestrial perspective. Whiston states the main thesis of his introductory essay at the end of its second paragraph: "The Mosaick Creation is not a Nice and Philosophical account of the Origin of All Things; but an Historical and True Representation of the formation of our single Earth out of a confused Chaos, and of the successive and visible changes thereof each day, till it became the habitation of Mankind" (Whiston 1696, 3). Force 1985 discusses Whiston's "middle way."

[69] "Systema corporum coelestium in sacris literis minime doceri." Newton, *CUL MS* Add. 3965, f. 542v, in Cohen 1969, 526 (Cohen's translation).

Planets. Objections from Scripture are removed."[70] A little later in this manuscript are the words: "Objections from mechanics are removed,"[71] showing that in this case Newton was thinking about both scriptural and natural philosophical objections to his astronomy.

Newton can be compared to Galileo in a second way as well. As in the Tuscan astronomer's celebrated *Letter to the Grand Duchess Christina*[72] Newton believed certain truths about nature could be found in the Scriptures, notwithstanding the general principle about the language of accommodation in God's Word. Evidence for this can be seen in the single most comprehensive statement Newton made on the reconciliation of the new astronomy with the language of the Scriptures, which forms part of an incomplete three-paragraph manuscript bearing the title: "An Account of the Systeme of the World described in M^{r} Newton's Mathematical Principles of Philosophy."[73] I. Bernard Cohen dated this manuscript to the early 1690s, within five years of the publication of the *Principia* to which it refers. He suggests that it might have been prompted by Newton's 1692–1693 correspondence with Richard Bentley on natural theology.[74] Although Cohen does not specifically comment on how this manuscript conforms to previous attempts to deploy the hermeneutics of accommodation in the service of heliocentrism,[75] Newton's use of accommodation to find harmony between the Scriptures and astronomy follows the established tradition of hermeneutics that extends back to ancient Judaism and Christianity.

The summary of the first and longest of the three numbered paragraphs of this manuscript, placed in the right margin, reads: "Scripture abused to prove the immoveableness of the ~~earth~~ globe of y^{e} ~~Eart~~ Earth." The paragraph begins with a statement of purpose: "In determining

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[70] "Nihil obstare quo minus Terra pro lege Planetarum circa solem moveatur. Diluuntur objectiones ex sacris litteris." Newton, *CUL MS* Add. 3965, f. 542v, in Cohen 1969, 526 (Cohen's translation).

[71] "Diluunter objectiones ex mechanica." Newton, *CUL MS* Add. 3965, f. 542v, in Cohen 1969, 527 (Cohen's translation).

[72] Galileo, *Letter to the Grand Duchess Christina*, in Finocchiaro 1989, 114–18.

[73] A full transcription of this manuscript, with brief notes, is published in Cohen 1969, 544–8. I have produced my own transcription of the manuscript from the original, but include cross-references to Cohen's published transcription in the notes below.

[74] Cohen 1969, 542.

[75] Cohen does, however, briefly refer to the principle in Galileo's *Letter to the Grand Duchess Christina* that the Bible is written for the vulgar when commenting on Newton's reference to the Scriptures in the Scholium on the Definitions in the *Principia* (Cohen 1969, 525–6, 534 n. 13).

the true system of the world the main Question is whether the earth do rest or be moved."[76]

In another manuscript dating from the same period Newton used the expression "true systeme" to refer to the heliocentric solar system.[77] Thus it is clear that he is ultimately thinking in terms of the entire solar system even though his discussion focuses on the question of the motion of Earth. Newton continues: "For deciding this some bring texts of scripture, but in my opinion misinterpreted, the Scriptures speaking not in the language of Astronomers (as they think) but in that of y^{e} common people to whom they were written." Here those aware of the long history of accommodationist hermeneutics will find themselves on familiar terrain: Newton is echoing (perhaps consciously in some cases) the venerable arguments found in Augustine, Maimonides, Calvin, Kepler, Galileo, and others.[78] One should not expect to find astronomical discourse in a book written in the idiom of the unlearned and untrained.

Newton next presents his first category of misinterpreted Scripture, examples used to support the sphericity and immobility of Earth:

> So where tis said that *God hath made y^{e} round world so fast that it cannot be moved*, the Prophet intended not to teach Mathematicians the spherical figure ~~of the whole~~ & immoveableness of the whole earth & sea in the heavens but to tell the vulgar in their own dialect that God had made the great continent of Asia Europe & Africa so fast upon its foundations in the great Ocean that it cannot be moved therein after the manner of a flo<a>ting Island. For this Continent was the whole habitable world anciently known & by y^{e} ancient eastern nations was accounted round or circular as was also the sea encompassing it.[79]

Those hoping to find positive sanction in the Scriptures for a spherical and immovable earth are misguided, for the inspired authors are not writing for mathematicians or about things absolute in the natural world. At the same time, the language does have a literal referent: the round continental mass the ancient eastern people believed constituted

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[76] Newton, *CUL MS.* Add. 4005, f. 39r; Cohen 1969, 544.

[77] Newton, *Yahuda MS* 41, f. 7r.

[78] On accommodation, see Barker 2008, England 2008a, 2008b, Finocchiaro 2008, Granada 2008, Harrison 2008, Howell 2008a, 2008b, Remmert 2008, van der Meer & Oosterhoff 2008.

[79] Newton, *CUL MS* Add. 4005, f. 39r; Cohen 1969, 544. The references Newton gives for the underlined text are Ps. 93:2 and Psa. 96:10 (the first is a mistake for Ps. 93:1). Newton is not quoting from the King James Version.

the entire inhabited world. Newton bolsters this argument with a series of biblical texts that speak about the "foundations" of Earth.[80] After writing out these supporting passages, Newton concludes:

> So then the round world spoken of in scriptures is such a world as hath foundations <& is founded in the waters> & by consequence 'tis not the whole globe of the Earth & Sea but only the habitable dry land. For the whole Globe hath no foundations, but this <habitable> world is founded in the seas. And since this world by reason of the firmness of its foundations is said in scripture to be immoveable this immoveableness cannot be of y^{e} whole globe together, but only of its parts one amongst another & signifies nothing more than that those parts are firmly compacted together so that the dry land or Continent of Europe Asia & Africk cannot be moved upon the main body of y^{e} globe on w^{ch} tis founded.[81]

Once again, while Newton denies that passages that appear to speak about the immovableness of Earth can be used to support the geostatic model, he is nevertheless adamant that the Scriptures are speaking about physical reality. This conforms to the policy he laid down over a decade earlier in his correspondence with Burnet. Moreover, he will admit no conflict with the findings of astronomy and, in asserting that the globe is without foundation, relies on knowledge that comes from astronomy.

The second paragraph of this manuscript deals with the abuse of mathematics to prove the immobility of Earth. Newton argues that another set of arguments against Earth's mobility is based on our senses. He insists that "this way of arguing proceeds from want of skill & judgment in Mathematical things, & therefore is insisted upon only by the common people & ~~some~~ <such> ~~practical~~ mathematicians <as understand not so much as the principles of Mechanicks,> for our senses cannot tell us if Earth is in motion any more than "a blinded Mariner" can determine whether a ship is moving "fast or slow or not at all."[82] The third and final paragraph declares that neither arguments from the Scriptures nor those based on sensation are sufficient to determine a question such as the mobility of Earth. For this reason

[80] These are, in order of appearance in Newton's text: 2 Pet. 3:5, Ps. 102:25, Prov. 8:29, Job 38:4, Ps. 24:1,2, Ps. 136:6, Ps. 89:12, Prov. 8:27,29, Ps. 104:5 (Newton, *CUL MS* Add. 4005, ff. 39r–40r; Cohen 1969, 545).

[81] Newton, *CUL MS* Add. 4005, f. 40r; Cohen 1969, 545–6.

[82] Newton, *CUL MS* Add. 4005, ff. 40r–41r; Cohen 1969, 546.

> 'tis fit we should lay aside these & the like vulgar prejudices & have recourse to some strickt & proper way of reasoning. Now the Question being about motion is a mathematical one & therefore requires skill in Mathematicks to decide it.[83]

The tremendous mathematical skill required helps explain the relative lack of progress made by the ancients in astronomy, but since the recent revival and progress of this discipline, "some able Mathematicians as Galileo & Hugenius have carried it on further then y^{e} Ancients did." What is more, he adds:

> M^{r} Newton to advance it fur enough for his purpose has spent the two first of his three books in demonstrating new Propositions about force & motion before he begins to consider the systeme from the Propositions demonstrated in the two first.[84]

This reference to the *Principia mathematica* helps establish the authority of his own work in setting out absolute truths about the workings of the heavens and Earth.[85]

The Bible in the *Principia*, Again

It is now time to return to the passage in Newton's Scholium on the Definitions that refers to the interpretation of the Scriptures. Recall that Newton in this passage had claimed that the distinction between the absolute and the relative was important in the correct understanding of the Bible as well as in physics. But the principle is merely asserted;

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[83] Newton, *CUL MS* Add. 4005, f. 41r; Cohen 1969, 546.

[84] Newton, *CUL MS* Add. 4005, f. 41r; Cohen 1969, 547.

[85] If Newton's "Account of the Systeme of the World" was written in the early 1690s, as suggested by Cohen, it would be doubly significant that several of its positions parallel those found in the prefatory essay to his disciple Whiston's 1696 *New Theory*, especially since Newton read Whiston's text in manuscript and apparently approved of it. James Force has argued that the *New Theory* also reflects many of Newton's beliefs, including those he held privately. See Force 1985. Further evidence for this can be found in Snobelen 2000, section 2.2. (This is not to say that differences do not exist between Newton and Whiston, for they do). In his prefatory "Discourse concerning the Mosaick history of the Creation," Whiston states in the Scriptures the celestial bodies "are no otherwise…described than with relation to our Earth, and as Members and Appurtances of our Atmosphere" (Whiston 1696, 18). He goes on to discuss briefly the scriptural examples of descriptions of astronomical phenomena in Gen. 1:3–5, 14–17; Acts 2:20; Matt. 24:29; Josh. 10:12; Ps. 19:4–6; Ps. 104:1ff; and Isa. 40:22 (18–19). After this he asserts: "All which Expressions, with many others through the whole Bible, plainly shew, That the Scripture did not intend to teach men Philosophy, or accommodate it self to the true and Pythagorick System of the World" (Whiston 1696, 19).

no example is offered. Fortunately, there is a manuscript parallel to the passage from the Scholium on the Definitions that does offer an example—even if Newton at some point deleted the relevant line.[86] The manuscript containing the parallel is either fragmentary or incomplete and was apparently written in 1685. It bears the title: "*De motu corporum in mediis regulariter cedentibus*" ("On the motion of bodies in regularly yielding media"). The relevant passage reads as follows:

> ~~I have tried~~ It was necessary, moreover, carefully to distinguish absolute and relative quantities from one another; because all phaenomena depend on absolute quantities, and yet the common people, who do not know how to abstract their thoughts from their senses, always speak of relative quantities, to the point where it would be absurd for either wise men or even for the Prophets to speak otherwise among them. Whence both the Scriptures and the writings of Theologians are always to be understood of relative quantities, and he would be laboring with a gross prejudice who thence [i.e., on the basis of these writings] stirred up disputations about the ~~absolute~~ philosophical motions of natural things. ~~It's just as if someone should contend that the Moon in the first chapter of Genesis was counted among the two greatest lights not by its apparent, but by its absolute, magnitude.~~[87]

It is hard to imagine that the virulently anti-Catholic Newton, who once wrote of Jesuits that it was their business to cavil,[88] did not have in mind, amongst others, Galileo's ecclesiastical opponents when he wrote about those who would stir up disputations about "the philosophical motions of natural things." But it is the deleted portion that is most relevant to our purposes. Newton was not the first to deal with the potential conflict between the description of the Sun and the Moon as two great luminaries in the account of the fourth day of Creation (Gen. 1:14–19) and astronomical evidence that revealed that many stars were of greater brilliance in an absolute sense than not only the Moon, but also the Sun. Augustine, Calvin, and others, in their own ways, had tackled this matter.[89] For Newton, the language used in the fourth day of Creation is a perfect example of relative language accommodated to the human and terrestrial perspective. Absolute magnitude was another thing altogether: but such determinations were in the domain of astronomy, not the Scriptures. This single, deleted manuscript sentence confirms

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[86] Cohen was the first to identify this important parallel (Cohen 1969, 527).

[87] Newton, *CUL MS* Add. 3965, in Cohen 1969, 527 (Cohen's translation from the original Latin; insertion in square brackets by Cohen).

[88] Newton to Henry Oldenburg, 22 August 1676, Newton 1959–1977, 3: 83.

[89] See Snobelen 2008.

that when Newton wrote in the *Principia* about corrupt readings of the Bible derived from a failure to distinguish between the absolute and the relative, he was at the very least thinking of biblical passages that discuss natural phenomena, including those in the Genesis Creation. The Bible speaks about the *sensible* world, not the world of absolute realities. As he wrote in the published version of the Scholium on the Definitions shortly before the statement on the Scriptures:

> Relative quantities, therefore, are not the actual quantities whose names they bear but are those sensible measures of them (whether true or erroneous) that are commonly used instead of the quantities being measured.[90]

By including this general argument in his *Principia*, Newton was also confirming that such considerations were relevant to his great work of mathematical physics. But this manuscript draft also reveals something else the published version of the Scholium on the Definitions does not. By noting that the common people, unlike the wise, "do not know how to abstract their thoughts from their senses" and thus deal only with "relative quantities," Newton was also affirming his belief in the social corollary to the distinction between the relative and the absolute.

In the discussion above, attention was drawn to the linguistic argument on the relative nature of the term 'God' that Newton included in the General Scholium. It was his contention that one must take the relative nature of this word into consideration if one desired an authentic understanding of its scriptural usage. When used of the Almighty, the term 'God' is used in relation to his dominion, not his essence (although the reality of the latter is not denied).[91] In a manuscript parallel to the General Scholium, Newton declares: "ffor the word God relates not to the metaphysical nature of God but to his dominion."[92] One aspect of the usage of 'God' in the Bible that reveals it to be a relative term is its application to beings other than the one true God. Newton's anti-Trinitarianism comes into play here,[93] for his understanding of the word

[90] Newton 1999, 413.

[91] Newton did believe that God had some sort of substantial existence in absolute reality, for he uses the Latin *substantia* when speaking about the reality of God's omnipresence in the General Scholium (Newton 1999, 941).

[92] Newton, *Yahuda MS* 15.5, f. 154r.

[93] In saying this, I am not arguing that Newton's anti-Trinitarianism arose directly out of his arguments about the relative nature of the term 'God' or, more broadly, his use of accommodation only that it is tied up with these dynamics.

'God' offers a way of explaining precisely why it is that in the Bible beings other than God can be called God (and Newton considers Christ to be a being other than God).[94] Part of the logic of this argument is that humans do not have access to the absolute realities of God, only his relations, including his sovereignty and rule.[95] In other words, Newton adheres to a phenomenalistic understanding of the person of God: he can be known only through his actions and his attributes, not in his substance. After treating God's omnipresence several sentences later

[94] In the General Scholium, Newton gives the example of the Hebrew judges mentioned in Ps. 82:6 and by citing John 10:35 indirectly alludes to the example of Christ, who is called "God" a handful of times in the New Testament (Newton 1999, 941 n. g). Unlike Trinitarian exegetes, who consider these applications of "God" to Christ to be absolute uses of the term in which the word refers to the unique essence of God (in which case Christ would be God in essence rather than in some titular, honorary or derived way), Newton's private belief was that the word 'God' is used of Christ only in a relative and non-essential sense that befitted his status as Messiah and that such usage does not point to Christ being "true God from true God" in the orthodox Trinitarian sense (see Snobelen 2001, 180–6). By mistaking a relative sense of the term 'God' when used of Christ for an absolute sense, Trinitarian hermeneutics resulted in doctrinal error. Newton nevertheless seems to have believed that the term had an absolute sense when applied exclusively to the Father. Thus, in a list of twelve statements on God and Christ apparently dating from the 1670s, Newton writes: "The word God <put absolutly> without particular restriction to ye Son or Holy ghost doth always signify the Father from one end of the scriptures to ye other" (Newton, *Yahuda MS* 14, f. 25r). While we should be cautious in using this much earlier text to clarify an argument made four decades later, this declaration does not necessarily contradict the apparently categorical statement he makes in the General Scholium about the word 'God' being a relative term (while Newton never explicitly states in this text that the term can be absolute as well, this may be implied). Since the term is defined by its relations it can be rendered absolute by adjectives and qualifications such as "supreme," "eternal," "infinite," "omnipotent," and "omniscient," as he hints in the same text (Newton 1999, 940–1). As to the reality behind the language, in an unpublished manuscript draft of the footnote on the word "God" added to the General Scholium in 1726, Newton quotes from and glosses 1 Cor. 8:4–6 to state that while there are "gods many and lords many," the true God ("our God") is a spiritual being ("*Ens spirituale*") who is One and who Newton identifies as the Father (Newton, New College Oxford MS 361.2, f. 71r). In other words, there is a Being who is God in an absolute sense and this is the Father alone. If this had been stated in the published version of the General Scholium, Newton would have made his anti-Trinitarian explicit. In sum, it is precisely because the term 'God' requires such qualifications to provide specific meanings that it is shown to be a fundamentally relative word.

[95] Newton's handling of the concept of substance should be seen in the light of his opposition to the received doctrine of the Trinity (which asserts that the Father, Son, and Holy Spirit are united in one substance). For Newton, Christ and the Father are not united in a metaphysical unity of one substance, but a monarchical unity of dominion (see Snobelen 2001). Again, it is instructive that Newton embraces conceptions of God and his Son that are based on relations to which humans have some access (e.g., God's Providence) rather than realities to which we do not (e.g., God's divine substance).

in the General Scholium, Newton speaks of God's transcendence and incorporeality, writing that God "totally lacks any body and corporeal shape, and so he cannot be seen or heard or touched, nor ought he to be worshiped in the form of something corporeal."[96] Humans do not "have an idea of the substance of God" (by which he likely means a precise idea), and for this reason

> know him only by his properties and attributes and by the wisest and best construction of things and their final causes, and we admire him because of his perfections; but we venerate and worship him because of his dominion.[97]

Thus, without direct access to the person of God, recourse must be made to analogies that humans can grasp, and thus

> God is said allegorically to see, hear, speak, laugh, love, hate, desire, give, receive, rejoice, be angry, fight, build, form, construct. For all discourse about God is derived through a certain similitude from things human, which while not perfect is nevertheless a similitude of some kind.[98]

In making this statement, Newton takes his place in a long and noble tradition of Jewish and Christian scriptural hermeneutics that stretches back to the ancient world. For what is Newton's claim that "all discourse about God is derived through a certain similitude from things human" than a re-articulation of the principle summed up in both the Talmudic aphorism "The Torah speaks in the language of the sons of men" and the Christian Latin dictum *Scriptura humanē loquitur*? Consistent with his thinking on the use of metaphorical and other forms of indirect language in both theology and natural philosophy, Newton would consider literal readings of this anthropomorphic language (a type of accommodation) to be gross misunderstandings of the relative for the absolute. And so it is that in the final paragraphs of the second and third editions of his *Principia mathematica*—arguably the single most important work in the history of science—Newton included what he believed were biblical examples of the language of accommodation.

Newton was undoubtedly aware of many of the examples of Jewish and Christian schemes to reconcile astronomical knowledge with

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[96] Newton 1999, 942.
[97] Newton 1999, 942.
[98] Newton 1999, 942–3. Although this is not made explicit in Newton's text, every example of the allegorical language listed here can be found in the Bible.

the Bible as well as the many uses of accommodationist hermeneutics and explanations of anthropomorphic language used of God that had been developed from the time of Philo Judaeus through to his own era.[99] Evidence for this awareness comes from the record of Newton's library along with his citation of authors who made contributions in these areas.[100] Starting with Philo, he possessed a 1640 edition of the complete works of the Jewish philosopher in Greek and Latin;[101] references to Philo in his private manuscripts confirm that Newton read these works actively.[102] Newton specifically alludes to Book I of Philo's *Allegorical interpretation of Genesis* in the footnote on space added to the General Scholium in the third (1726) edition of the *Principia*.[103] A 1641 edition of the works of Clement of Alexandria in Greek and Latin formed part of his library and scattered references to this early Church writer appear in Newton's manuscripts.[104] Newton possessed five titles by Origen, including a two-volume *Opera* prepared by Desiderius Erasmus and the 1658 Cambridge edition of *Contra Celsum*.[105] Newton mentions Origen on several occasions in his writings.[106] He also owned the complete works of Augustine,[107] and thus possessed Augustine's

[99] Several significant examples, including some alluded to here, are outlined in Snobelen 2008. A useful evaluation of Newton's use of patristic writings, including an assessment of the presence of these works in his library, can be found in Mandelbrote 2006b.

[100] This is not to say that the mere ownership of books and citation of particular authors implies agreement, for it is evident that Newton did read these sources critically. For instance, while it is possible that Newton may have benefited from Augustine's writings on Genesis, he nevertheless brands him as a papist (Newton, *Keynes MS* 11, f. 1v). While Newton often used the authors identified here merely as historical sources, his use of at least some of them likely exposed him to historical examples of accommodationist hermeneutics.

[101] Harrison 1978, item 1300.

[102] See Newton's notes on Philo ("Ex Philone") in *Yahuda MS* 28.1, ff. 3r–v (this manuscript dates from ca. 1675–1685); *Babson College MS* 434, ff. 15r, 16r; *Yahuda MS* 8, f. 2r.

[103] Newton 1999, 941–2 n. j.

[104] Harrison 1978, item 398; references to Clement (including the *Stromata*) can be found in Newton, Yahuda MSS 1, 16 and 41; *Keynes MSS* 2 and 146; *New College Oxford MS* 361(4) ("The two notable corruptions"), as well as Newton 1728 and Newton 1733.

[105] Harrison 1978, items 1209–1213.

[106] Newton, *Yahuda MS* 1; *Keynes MS* 2; *New College Oxford MS* 361(4); *William Andrews Clark Memorial Library* (UCLA) MS **N563M3 P222; *Sotheby's Lot* 255.9 (private collection); Newton 1733.

[107] Harrison 1978, item 101 (an edition published in 1531–2).

important works on Genesis.[108] Many references to Augustine, including the *Confessions*, *City of God*, and *De Genesi ad litteram*, can be found in Newton's unpublished and published works.[109] Newton owned some works by Maimonides, another advocate of accommodation, although *The Guide of the Perplexed* seems not to have been among these.[110] Testimony to Newton's interest in Maimonides' works is seen in the various mentions of the Jewish philosopher in his manuscripts.[111] There is also a reference in Newton's theological notebook to Abraham Ibn Ezra, the medieval Jewish exegete whose commentaries on Genesis and other books in the Hebrew Bible generally focussed on the literal and grammatical aspects of the text and who also advocated accommodation.[112] Newton likely encountered Ibn Ezra through seventeenth-century Christian Hebraists.

Moving to the early modern period, the most significant resource for accommodation that Newton owned is the 1699 printing of the *Systema Cosmicum*,[113] a publication that is mostly made up of a Latin translation of Galileo's *Dialogue on the Two Chief Systems of the World*, but to which is also appended an excerpt from Kepler's introduction to his 1609 *Astronomia Nova* as well as a Latin translation by David Lotaeus of Paolo Antonio Foscarini's 1615 *Lettera Sopra l'opinione de' Pittagorici e del Copernico*, both of which texts advocate the hermeneutics of accommodation for the reconciliation of astronomy and the Bible.[114] Although

[108] Mandelbrote discusses Augustine's interpretation of Genesis, his use of accommodation and his value as a source for late seventeenth-century biblical critics in England, including Newton and Burnet, in Mandelbrote 1994, 150–2.

[109] Newton, *Yahuda MS* 41; *Keynes MS* 2, 5 and 11; *New College Oxford MS* 361(4) (reference to *De Genesi ad litteram* on f. 27); *Clark MS; Sotheby's Lot* 255.4 (private collection); Newton 1728; Newton 1733.

[110] Harrison 1978, items 1018–22.

[111] Extensive excerpts from Maimonides can be found in Newton, *Yahuda MS* 13.2. References to Maimonides can also be found in Newton, *Keynes MS* 5, ff. 9r, 10r and 31r and *Andrews University MS*, ff. 34 and 39.

[112] Newton, *Keynes MS* 2, f. 11v.

[113] Harrison 1978, item 648. Newton's copy bears a Leiden imprint. Newton was certainly aware of the *Systema cosmicum* before the publication of the 1699 edition, however, as he refers to it in his Classical Scholia of the early 1690s (see Schüller 2001, 222).

[114] Several editions of the *Systema cosmicum* appeared in northern Europe between 1636 and 1699, including a 1663 London printing. When dismissing as trivial "the several Objections made formerly against either the Diurnal or Annual Revolutions of the earth, either from Scripture or Nature", which "few of the truly Learned and Judicious…do now insist upon," Whiston directs his reader to the *Systema cosmicum* and William Derham's *Astro-theology* in his *Astronomical principles of religion, natural and reveal'd* (Whiston 1717, 39). Although the bulk of the *Systema cosmicum* comprises Galileo's *Dialogue*, and while Whiston refers to the book as "Galileo's *Syst. Cosmic.*" (no publication date is given), it seems likely that Whiston was referring to the arguments

there is no evidence from Newton's surviving library that he owned a translation of Galileo's Italian *Letter to the Grand Duchess Christina*, it is reasonable to assume that Newton would have been familiar with it from his undergraduate days.[115] The same can probably be said of John Calvin's counsel on accommodation, for while Newton owned a copy of Calvin's *Institutes*,[116] Newton does not appear to have owned any commentaries by Calvin (who used accommodation in his commentary on Genesis). Nor does Newton appear to have owned any of the works in the controversy that erupted in the 1630s between Alexander Ross and John Wilkins over Copernicanism and the Bible.[117] Newton would have had ample opportunity to encounter works he himself did not possess in the libraries of Cambridge and his scholarly acquaintances. At the same time, it is likely that some of his ideas on the interpretation of Genesis and the use of accommodating language in the Scriptures derive from his own innovation, especially in the case of his correspondence with Burnet. Whatever their origin, Newton's views stand in a long and noble tradition of accommodationist hermeneutics stretching back to the first century A.D. Using the typology of Robert S. Westman, who distinguished early modern theories of accommodation into "absolute accommodationism" and "partial accommodationism,"[118] we can conclude that Newton inclined more closely to the latter, which for him (as with others) was allied with a form of moderate concordism.

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from Kepler's *Astronomia nova* and Foscarini's *Lettera* on the reconciliation of heliocentrism and the Bible as well as the purely astronomical arguments of Galileo's *Dialogue*, in addition to arguments of both types found in Derham's oft-reprinted early eighteenth-century work.

[115] Thomas Salusbury's English translation of the *Letter to the Grand Duchess Christina* was published in 1661, the year Newton began his undergraduate studies in Cambridge. This text also includes English translations of Kepler's discussion of accommodation from the introduction to his *Astronomia nova*, extracts from Diego de Zuñiga's commentary on Job, as well as Foscarini's *Letter on the Motion of the Earth*, which also advocates accommodationist hermeneutics to reconcile the Bible with natural philosophy (for accounts of these texts, see Snobelen 2008). Salusbury's English translations are published in Salusbury 1661, 1: 427–503.

[116] Harrison 1978, item 335.

[117] Ross denied both Copernicanism and that the Bible accommodates its language to human understanding; Wilkins affirmed both and contented that no conflict existed between heliocentrism and the Word of God. Although it is marred by a caricatured, essentialist and Whiggish view of the relationship between science and religion, there is still some value in the seventy-year-old study of this exchange by Grant McColley. See McColley 1938.

[118] With the former position holding that the accommodation in the Bible is complete (and thus does not speak at all of physical reality), and the latter position holding that one can still discern descriptions of physical reality once one made allowances for the accommodated speech (Westman 1986, 90–1).

The Bible, Natural Philosophy, and the Hermeneutics of Accommodation

At the beginning of this paper, attention was drawn to Newton's argument in his *Principia* about the need to distinguish between relative and absolute language in the Scriptures. As we have come to see, this distinction is one of the foundation stones of his theory of accommodation. In fact, for Newton accommodated scriptural language is a species of relative speech; to mistake it for unaccommodated language or absolute speech will lead to error. Newton's writings on accommodation in turn dovetail neatly with other elements of his theology as well as his natural philosophy. One such element is his epistemological dualism. Recent scholarship has emphasized how epistemological dualism permeated every aspect of Newton's thought, from alchemy and natural philosophy to theology and prophecy. This belief that each of these disciplines embrace both cognitively open (exoteric) and closed (esoteric) content that are tied in with relative and absolute realities that must be distinguished link his reading of nature and his study of the Bible. Newton was convinced that abstract, absolute concepts had to be presented through figures in the Bible, and that it would be illegitimate to reify these figures through crude, over-literal readings. This kind of biblical language should no more be taken in an absolute sense than the figures the pre-Socratics used for the physical world should be taken literally. Newton argued that the Bible (at least in its surface meaning) was written for the common people. This helps explain why the language of accommodation is employed in the Scriptures, with examples of this language including biblical descriptions of diseases as demons and popular descriptions of celestial phenomena—realities that during biblical times were beyond the capacities of the common people to understand.

Although none of the published editions of the *Principia* provide examples of why the distinction between the absolute and the relative was so important in the interpretation of biblical passages that mention natural phenomena, the General Scholium that Newton appended to the second edition of 1713 does provide examples from theology. In the General Scholium Newton spoke about the limitations of language in adequately describing the transcendent God (as in the Bible). These limitations required the use of anthropomorphisms in portrayals of God and for this reason God is described as laughing, loving, and hating. Such anthropomorphic language is a form of accommodation.

Here the distinction between the relative and absolute is not merely a matter of hermeneutics, but also forms an element of Newton's understanding of God, who has an absolute existence, even though humans must experience him indirectly through his works. But Newton's commitment to a distinction between the absolute and relative also has a heretical application, for his argument about the relative nature of the term 'God' is directly connected with his anti-Trinitarianism. In his private manuscripts as well as in his published General Scholium, Newton articulates his belief that it is both necessary to recognize the existence of relative language in the Bible and to avoiding committing a fundamental error by mistaking it for absolute language (which is what he believed Trinitarians do when they mistake the relative title 'God' used of Christ for a declaration that Christ is "very God" in a metaphysical sense). Thus, while Newton on the one hand seems to want to argue that one layer of the Bible is accessible to both the vulgar and the philosophers, while another layer is only accessible to the later, he also makes another social distinction. Some scriptural texts have a deeper meaning at their core and thus the Word of God serves in part to challenge believers and to separate between the good and the bad. Ultimately, then, there were two types of people: those who get it and those who do not. Herein is seen an important social corollary to Newton's epistemological dualism.

The brief epistolary exchange with Burnet in 1680 and 1681 reveals advanced thinking on Genesis 1 and what it might say about natural history; while Newton does not opt for a strictly literal reading of the text, neither is he willing to go as far in the other direction as Burnet, who contended that the Creation account merely presented ideal or moral meaning. Instead, Newton preferred a *via media* that allows for accommodation and artificial constructs in the text, but still holds that it is at some level an account of natural history. The advantage of the middle path is that it allowed him to take the biblical text seriously without having to reject the discoveries of natural philosophy. Part of the realism of the account is explained by its phenomenalistic and terrestrial perspectives—perspectives that Newton mentions in his exchange with Burnet. Genesis 1 was written from the viewpoint of an observer on Earth and thus it is not completely contrived, but relates directly to the appearances of nature. His correspondence with Bentley also demonstrates that Newton felt that knowledge from natural philosophy could assist the interpretation of the Scriptures.

In the short treatise on reconciling natural philosophy with biblical descriptions of Earth and the heavens, Newton appeals directly to the principle of accommodation, arguing that those who want to use the Bible as an authority in disputes about the motion of Earth err, "the Scriptures speaking not in the language of Astronomers (as they think) but in that of y^{e} common people to whom they were written." In this, he comes close to the earlier and similar positions of Augustine, Calvin, Galileo, and others—even though it is difficult to be certain how much he owed to previous thinkers on these matters. The title of this treatise on accommodation indicates that it bore some relation to the *Principia mathematica*. Thus it is significant that in a manuscript draft related to the Scholium on the Definitions, Newton refers to the two luminaries of Gen. 1:16, revealing that scriptural descriptions of astronomical phenomena are among the examples behind the statement about interpreting the Scriptures that had appeared in print in 1687. Just as he wrote in the *Principia* about the need to distinguish between the absolute and the relative, the true and the apparent, the mathematical and the common when considering time, space, place, and motion in physics, so it was when interpreting passages in the Bible that speak about astronomical and other natural phenomena. Nevertheless, behind the relative language in the Bible that describes the apparent in nature for the common people, were absolute, true, and mathematical realities. What is more, Newton appears to be saying that the absolute standard for questions about the mobility of Earth—including when one is considering the meaning of the Bible—is found in mathematics (or mathematical physics), the success of which had been demonstrated in his *Principia mathematica* of 1687.[119]

As with Copernicans who used accommodation before him, Newton deemed a recognition of phenomenalistic perspectives and language pivotal to the right reading of God's Works and God's Word. The commonsense reading of the heavens and the literal way of reading the Scriptures can be at variance with the actualities of each revelation. With both nature and the Scriptures therefore, the astute reader will recognize this and adopt those counter-intuitive interpretations demanded by the best lines of evidence, even though one might want or need to employ figures to describe certain aspects of nature or biblical

[119] This can be compared with Kepler's view of the standard of knowledge produced by astronomy as discussed by Barker 2008.

theology when speaking *ad populum*. For Newton, the interpretation of the Scriptures and the observation of nature thus confronted the philosophically-minded scholar with similar problems. The fundamental distinction between the *actual* world and the *sensible* world (that is, between the absolute world and relative world), applied to nature as well as to the Scriptures and thus to biblical hermeneutics as well as to the practice of physics. Newton's understanding of this distinction helps explain his twin commitment to phenomenalism in physics (he was happy to describe the effects of gravity, but would not in the *Principia* speak of its cause) and in doctrine (he preferred to speak of God and Christ in functional rather than metaphysical terms). In this conceptual symmetry we see one of the most powerful relationships between Newton's theology and his natural philosophy. Another possible parallel is seen in his understanding of the unity of the Scriptures. Although Newton did recognize distinctions of genre in the Bible—after all, he speaks of the need to understand "the language of the prophets"[120]—his reference to the mystical meaning of Christ's parables in a discussion of the mystical meaning in prophecy does suggest that he believed there is an underlying homogeneity in the Scriptures, just as he believed there is a fundamental homogeneity in nature.[121]

Copernicus's *De revolutionibus* and Newton's *Principia mathematica* symbolize for many the commencement and the culmination of the Scientific Revolution. Issues relating to scriptural hermeneutics are hinted at near the beginning of both books.[122] In the first case the lack of elaboration is due in part to Copernicus's recognition that the reconciliation of a radical theory like heliocentrism with the Scriptures would be deemed extremely controversial by his contemporaries. In the latter case this was no longer true. Nevertheless, with respect to the *Principia*, Newton had pressing reasons to address hermeneutical questions. Evidence from his private manuscripts demonstrates that he had thought deeply about how the biblical depictions of natural phenomena might relate to the body of knowledge he and others were developing in natural philosophy. Manuscripts dating from shortly before and shortly after the publication of the *Principia* in 1687 reveal that he believed the reconciliation of astronomy with the Bible was immediately relevant to the contents

[120] Newton, *Keynes MS* 5, ff. Ir, 1r.
[121] This point has been developed from a helpful suggestion made by the editors.
[122] Copernicus 1978, 2: 5.

of his *magnum opus*. Newton was also committed to the doctrine of the two books, or something very much like it. This commitment to the truth of both Scripture and nature brought with it a need to find harmony between these two repositories of divine truth that both come from the One God. This necessary reconciliation depended on correct method in both the study of God's Word as well as of God's Works. It was also crucial for a man who was both deeply committed to the empirical program of natural philosophy and who had a fervent faith in the Bible as the Word of God.

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