

Cotton Mather,
The Christian Philosopher,
and the Classics

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THE ANCIENT BELIEF that God reveals himself in both nature and Scripture was reinvigorated by the scientific revolution of the early modern period, and the Puritan priest Cotton Mather (1663–1728) was a leader in disseminating this view in British North America. Like most New England clergymen of his age, Mather welcomed experimental philosophy as a handmaid of theology, a new instrument for discovering the Mind of God. Mather kept in close touch with intellectual currents and wrote prolifically in theology, history, medicine, and science. His interest in ‘natural philosophy’ was far-reaching, and his scientific communications to the Royal Society led to his election as a fellow in 1713.¹

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¹ The best recent studies of Mather are Robert Middlekauff, *The Mathers: Three Generations of Puritan Intellectuals, 1596–1728* (New York, 1971), and David Levin, *Cotton Mather: The Young Life of the Lord’s Remembrancer, 1663–1703* (Cambridge, Mass., 1978). Raymond P. Stearns, *Science in the British Colonies of America* (Urbana, 1970), places Mather in a scientific context. Kenneth Silverman’s *The Life and Times of Cotton Mather* (New York, 1984), appeared too late to be available in the preparation of this article.

Mather's most important writing on science is *The Christian Philosopher: A Collection of the Best Discoveries in Nature, with Religious Improvements*. He completed the manuscript in 1715, and the book was published in London in 1720, though it bears the date 1721. The author's purpose was to demonstrate 'that *Philosophy* is no *Enemy*, but a mighty and wondrous *Incentive* to *Religion*' (p. 1).² Mather's order is approximately the conventional scheme for the study of natural philosophy in the schools, which was based ultimately upon the order in which traditional Aristotelian texts were taken up. He treats the heavenly bodies first (astronomy), then earthly phenomena and the earth itself (physics in the largest sense), and finally living bodies, including man (the life sciences). Under each chapter heading, Mather collects the 'best discoveries' in nature encountered in his reading, to which he adds scientific observations of his own and reflections upon the religious significance of the facts and theories presented. Each section ordinarily closes with a 'rhapsodical statement of how the new knowledge redounds to the glory of God.'³

Scholars agree that this book is the best example of the way in which Newtonian science was first disseminated in British America, and that it is one of the major intellectual achievements of the colonial period.⁴ In his effort to harmonize science with religion, Mather emphasized the argument from design. This holds that one may reasonably infer the existence of a

² In this essay, references to *The Christian Philosopher* will appear in the text immediately following the material paraphrased or quoted, as here. Mather is usually accurate in quoting his sources, although he changes case, alters syntax, and condenses to meet his stylistic needs. I have quoted Mather accurately without using *sic* to note lapses, but I have silently changed the ampersand to et and corrected obvious printer's and spelling errors. I have retained Mather's Greek diacritical marks (although many are erroneous). The English translations are from the Loeb editions where possible (with a few adaptations). The Theophilus translation is from Robert M. Grant.

³ Theodore Hornberger, 'Notes on The Christian Philosopher,' in Thomas J. Holmes, *Cotton Mather: A Bibliography of His Works*, 3 vols. (Cambridge, Mass., 1940), 1:135.

⁴ Middlekauff, *The Mathers*, pp. 302-4, and Stearns, *Science in the British Colonies*, pp. 403-5, 409, 424-26, may be taken as representative of authors who published on the subject from 1907 to 1972.

purposeful Creator, responsible for the universe, from evidences of intelligent planning found in physical nature. The design argument originated with the pre-Socratics, but Plato was the first philosopher to give it full expression. Christian writers later reaffirmed it, and the doctrine gained new vitality in England, along with the birth of natural science in its distinctively modern form.

In his book, Mather cites some 415 authors. His greatest reliance is on men who lived during the early modern period, but he also draws on ancient, medieval, and Renaissance worthies. The present essay will emphasize his debt to classical and Christian antiquity. Mather had been educated in these traditions, for the revival of learning had made Greek and Latin authors more available, and the learned languages were still the mark of the educated man. Puritans insisted upon the need for an intellectual comprehension of the faith, but despite their commitment to classical learning, they always took care to ensure that the pagan classics would not undermine Christian truth.

Young Mather began his studies at the free public grammar school under Benjamin Thompson and later under Ezekiel Cheever. The Boston Latin School prepared youngsters for college, and Cheever was one of the most respected schoolmasters in Massachusetts. At school, Mather composed many themes and verses in Latin and learned to take Latin notes on sermons preached in English. He read several standard Latin authors, went through a great part of the New Testament in Greek, read considerably in Isocrates and Homer, and made 'some entrance' in Hebrew grammar. Cheever brought the dead languages to life and taught Mather to love Christ above the classics.⁵

⁵ Cotton Mather, *Paterna: The Autobiography of Cotton Mather*, ed. Ronald A. Bosco (Delmar, N.Y., 1976), p. 7; Cotton Mather, *Corderius Americanus: An Essay upon the Good Education of Children . . . In a Funeral Sermon upon Mr. Ezekiel Cheever* (Boston, 1708), pp. 21-33. See also Robert Middlekauff, *Ancients and Axioms: Secondary Education in Eighteenth-Century New England* (New Haven, 1963), pp. 53, 75-88.

Harvard College in the seventeenth century was devoted to both Renaissance and Reformation ideals. Its purpose was to give Christian gentlemen a liberal arts education, not merely to train ministers. When Mather entered Harvard in 1674, he already knew more Latin and Greek than was required for admission. President Leonard Hoar himself tested the eleven-year-old boy's fluency in Latin and his ability in the Greek tongue.⁶ The Harvard curriculum was designed to give students a mastery of the learned languages and some knowledge of classical literature. Latin was the official language of college life; scholars were not to use English with each other, unless called upon to do so in public exercises of oratory or the like. Mather's class spent most of their first two years studying Greek and Hebrew. Both were considered of general cultural value as well as of practical use in reading the Scriptures. Greek literature was available in a fat little anthology published by Jean Crespin, a sixteenth-century Protestant scholar who had a press in Geneva. The emphasis on Hebrew and kindred languages, 'the most distinctive feature of the Harvard curriculum,' aimed primarily at improving Old Testament scholarship. The first two Harvard presidents had been excellent Hebraists, and Hebrew was their favorite subject. Although the study of Hebrew had fallen off before Mather entered, he composed Hebrew exercises as an undergraduate. In 1680, he started a revival of the language by arguing in his master's thesis that Hebrew vowel points were of divine origin.⁷

In addition to classical languages and literature, Harvard emphasized most of the traditional studies—logic, ethics, metaphysics, mathematics, rhetoric, oratory, and divinity. Disputations and declamations were conducted two afternoons a week after students became proficient in logic. Mather ordi-

⁶ Samuel E. Morison, *Harvard College in the Seventeenth Century*, 2 vols. (Cambridge, Mass., 1936), is authoritative; Levin, *Cotton Mather*, pp. 23, 25–26.

⁷ 'Harvard College Records, Part III,' *Collections of the Colonial Society of Massachusetts* 31 (1935): 329–39; Morison, *Harvard*, 1:200 (for the quotation); Levin, *Cotton Mather*, pp. 42–43.

narily chose natural philosophy for his declamations, thus killing two birds with one stone. Harvard students also gained proficiency with the original languages in which the Holy Scriptures were written by translations at prayer. At morning prayer every student took a turn in reading some portion of the Old Testament out of Hebrew into Greek (freshmen read it out of English into Greek), and at evening prayer everyone in turn translated a portion of the New Testament from English into Greek.⁸

Mather received a good grounding in the learned languages and was an omnivorous reader who bought many books and had access to an excellent family library.⁹ He continued to learn about antiquity from the time of his graduation to the time he wrote his treatise on Newtonian science. His knowledge of classical and Christian antiquity is evident in *The Christian Philosopher*. Mather makes many references to the ancient world in his book. Most of these are to authors, several of whom are frequently cited. The Greek authors include Aelian, Aristotle, Democritus, Dio Cassius, Diodorus Siculus, Epicetus, Galen, Hippocrates, Homer, Plato, Plutarch, Strabo, and Theophrastus. Those named five times or more are Galen (twenty), Aristotle (sixteen), Plato (seven), Hippocrates (five), and Plutarch (five). The Latin writers include Ammius Marcellinus, Ausonius, Cato, Cicero, Claudian, Columella, Curtius, Aulus Gellius, Horace, Juvenal, Livy, Lucretius, Ovid, Petronius Arbiter, Pliny, Seneca the Elder, Seneca the Younger, Suetonius, Tacitus, Valerius Maximus, Vergil, and Vitruvius. Those named five times or more are Pliny (thirty-two), Cicero (sixteen), Vergil (seven), Ovid (six), and Seneca the Younger (five). The Christian authors or writers on Scripture include Ambrose, Augustine, Basil, Chrysostom, Clement, Gregory of Nazianzus, Lactantius, Mi-

⁸ Mather, *Paterna*, p. 8; Morison, *Harvard*, 1:208-84 passim, 195-96.

⁹ Morison, *Harvard*, 1:292; Julius H. Tuttle, "The Libraries of the Mathers," *Proceedings of the American Antiquarian Society* 20 (1911): 296-356.

nucius Felix, Origen, Philo, John Philoponus, Theodoret, and Theophilus. Only Augustine (six) is named five times or more.

Mather's intention in *The Christian Philosopher* is to harmonize Newtonian science and religion, and at the outset he asserts the Platonic idea of the physical creation as an expression of the Mind of God. 'The whole *World* is indeed a *Temple* of GOD, *built* and *fitted* by that Almighty *Architect*,' he writes, 'and in this *Temple*, every such one . . . will *speak* of *His Glory*' (p. 2).

Mather quotes many authors, and in his introduction states the hope that his constant quoting will not be censured as a proud display of his learning. In this connection, he quotes, in Latin, St. Augustine's reproach of Julian and, in English, Jean La Bruyère's satire on Herillus of Carthage (fl. ca. 260 B.C.) for always citing others whether he speaks or writes (pp. 2-3). The source of the quotation from Augustine is *Contra Julianum Pelagianum*, 4. 15 (Migne, *PL*, 44: col. 776); the source of the latter quotation is the 1699 English translation of La Bruyère's *Characters: Or, the Manners of the Age* (1688), p. 134.

Mather is grateful to those whom he quotes; he acknowledges that Pliny has given him a rule: '*Ingenuum est profiteri per quos profeceris*' ['pleasant it is to assign responsibility to those who were the means of one's achievements'].¹⁰ He also believes it is just to name discoverers, especially 'the Industrious Mr. Ray, and the Inquisitive Mr. Derham; *Fratrum dulce par*: upon whom, in divers Paragraphs of this *Rhapsody*, I have had very much of my Subsistence; (I hope without doing the part of a *Fidentinus* upon them) and I give thanks to Heaven for them' (p. 3). Marcus Valerius Martialis (ca. A.D. 40-ca. 104) had named Fidentinus as a plagiarist of his verses (*Epi-grams*, 1. 29, 38, 53, 72). Mather may have been tender on

¹⁰ Pliny the Elder, *Natural History*, preface, 21. Hereafter, references to this work will appear in the text with only the author's name and location of the reference in the source. The English translations in this article are from editions in the Loeb Classical Library, where such editions exist, except in a few cases where Mather has altered the Latin substantially; in these cases, the translations are my own.

this point, for he borrows extravagantly from the 'delightful pair of brothers.'

John Ray (1627–1705) was the leading English botanist and zoologist of his day. He published many scientific studies and became a fellow of the Royal Society. His most influential writing was *The Wisdom of God Manifested in the Works of the Creation* (1691). This popular work went through four editions during the author's lifetime and many reprintings after his death. 'More than any other single book,' Charles E. Raven writes, 'it initiated the true adventure of modern science.' Ray not only presented an interpretation of the significance of organic life (rather than merely describing and classifying it) but, beyond this, his delight in the physical universe was a new and important attitude. As Raven points out, 'The direct insistence upon the essential unity of natural and revealed, as alike proceeding from and integrated by the divine purpose, had not found clear and well-informed expression until Ray's book was published.'¹¹

William Derham (1657–1735) was a theologian and scientist who 'pursued both avocations with confidence in their essential harmony.' He conducted research in many fields of science and became a fellow of the Royal Society. His Boyle Lectures were published as *Physico-Theology: Or, A Demonstration of the Being and Attributes of God, from His Works of Creation* (London, 1713). Ray's *Wisdom* forms the basis of this book, in which the footnotes, a relatively novel device which neither Ray nor Mather used, contain many valuable references.¹²

¹¹ Charles E. Raven, *John Ray, Naturalist: His Life and Works*, 2d ed. (Cambridge, 1950), pp. 452–57, 466–67 (the quotations are at pp. 452 and 467). Hereafter, references to Ray's *Wisdom*, will appear in the text with only the author's name and page. All references are to the fifth edition (1709).

¹² Basil Willey, *The Eighteenth-Century Background: Studies on the Idea of Nature in the Thought of the Period* (New York, 1940), pp. 39–42 (quotation on p. 39). On Ray and Derham, see also Richard S. Westfall, *Science and Religion in Seventeenth-Century England* (New Haven, 1958), pp. 62–69, 92–95, 127–30. Hereafter, references to Derham, *Physico-Theology*, will appear in the text with only the author's name and page.

In addition, Mather drew much on George Cheyne, whose *Philosophical Principles of Natural Religion* (London, 1705) explored the theological significance of Newtonian science, and on Nehemiah Grew's *Cosmologia Sacra* (London, 1701), which sets forth the religious and philosophical beliefs that serve as a background to Grew's achievement as a plant anatomist. He also borrowed substantially from John Harris's *Lexicon Technicum: Or, An Universal English Dictionary of Arts and Sciences* (London, 1704; 2d. ed., 2 vols., 1708–10).

In his introduction, Mather acknowledges that he has consulted scores of philosophers besides Ray and Derham, and adds that those who value the essays of 'the memorable Antients, Theodoret, and Nazianzen, and Ambrose, upon the Works of the Six Days, count it a Fault, if among lesser Men in our Days, there be found those who say, *Let me run after them*' (p. 4). Mather obviously knew the Hexaemeral literature, and here he names three Christian authors who wrote on the creation story as told in Genesis. Theodoret (ca. 393–ca. 466) was bishop of Cyrus in Syria and one of the greatest Greek interpreters of Scripture in Christian antiquity. An English translation of his *Orations on Providence* appeared as *The Mirror of Divine Providence* (London, 1602). St. Gregory of Nazianzus (329–89), a Cappadocian Father, wrote on the work of God in creation and on Divine Providence. St. Ambrose (339–97), bishop of Milan and one of the four traditional Doctors of the Latin church, treated the works of the six days in his *Hexaemeron*.¹³

The Christian Philosopher is avowedly a treatise on philosophical religion, and in the introduction Mather quotes a 'Mahometan Writer' to demonstrate that reason leads to admiration of the works of Creation. Mather adds, 'I was going to say *O Mentis aureae Verba bracteata* [‘O gilded words of a

¹³ For a brief modern treatment, see Frank E. Robbins, *The Hexaemeral Literature: A Study of the Greek and Latin Commentaries on Genesis* (Chicago, 1912). For the larger context, see also Peter Brown, *The World of Late Antiquity: From Marcus Aurelius to Mubammad* (London, 1971).

golden mind"]! But the Great *Alsted* instructs me, that we *Christians*, in our valuable Citations from them that are Strangers to *Christianity*, should seize upon the Sentences as containing our *Truths*, detained in the hands of *Unjust Possessors*; and he allows me to say, *Audite Ciceronem, quem Natura docuit* ['Listen to Cicero, whom Nature taught'] (pp. 5–6). The '*O Mentis*' quotation is based on Ausonius (d. ca. A.D. 395; *Gratiarum actio ad Gratianum*, 4).

Johann Heinrich Alsted (1588–1638), a German Reformed theologian, directed Mather to several classical references. He was professor of theology and philosophy at the gymnasium in Herborn and subsequently at the University of Weissenberg in Transylvania. A believer in the fundamental unity of divine and secular knowledge, Alsted wrote on nearly every branch of learning, although focusing primarily on theology. Mather relied heavily on Alsted's *Theologia naturalis exhibens augustissimam naturae scholam* (Hanover, 1623), but Alsted's fame rests ultimately upon his role in compiling the first encyclopedia of all human knowledge. Mather considered the four-volume *Scientiarum omnium encyclopaedia* of Alsted (Leiden, 1630), 'a *North-West Passage*' to 'all the *Sciences*.'¹⁴

Mather's introduction concludes with a quotation from Minucius Felix (fl. A.D. 200–40), a Roman lawyer whose apology for Christianity in the form of a dialogue between a Christian and a pagan was modeled on Cicero's *De natura deorum*. This work draws on Stoic ideas, and was probably dependent on Tertullian's *Apology*. 'If so much Wisdom and Penetration be requisite to *observe* the wonderful Order and Design in the Structure of the World,' Mather quotes from the dialogue *Octavius*, 'how much more was necessary to *form* it' (p. 6)!¹⁵

¹⁴ Cotton Mather, *Manuductio ad Ministerium: Directions for a Candidate of the Ministry* (Boston, 1726), p. 33. Hereafter, references to Alsted, *Theologia naturalis*, will appear in the text with only the author's name and page.

¹⁵ English translations of the dialogue called *Octavius* were published in 1636, 1682, 1695, and 1708, but Mather's quotation (of 17.6) follows none of these editions closely.

Astronomy enjoyed great prestige in the eighteenth century, and this section of *The Christian Philosopher* includes some twenty classical references. Acknowledging that he can treat only some of the works of God, Mather adds that 'Theophilus writing, *of the Creation*, to his Friend *Autolycus*, might very justly say, That if he should have a *Thousand Tongues*, and live a *Thousand Years*, yet he were not able to describe the admirable Order of the Creation, διὰ τὸ ὑπερβάλλον μεγαθὸς καὶ τ[ὸν] πλοῦτον σοφίας τοῦ θεοῦ' ['because of the surpassing greatness and riches of the wisdom of God'] (pp. 7-8). Theophilus, bishop of Antioch in the second century, wrote to demonstrate to the pagan world the Christian idea of God and the superiority of the doctrine of creation over the immoral myths of the Olympian religion. His *Apology*, addressed to Autolycus, is the earliest Christian work in the Hexaemeral literary tradition.¹⁶

Chrysostom, Mather continues, mentions 'a *Twofold Book* of GOD; the Book of the *Creatures*, and the Book of the *Scriptures*: GOD having taught first of all us διὰ πραγμάτων, by his *Works*, did it afterwards διὰ γραμμάτων, by his *Words*. We will now for a while read the *Former* of these *Books*, 'twill help us in reading the *Latter*' (p. 8). The source is Chrysostom's ninth homily to the people of Antioch. Next, Mather adds, 'The Philosopher being asked, What his *Books* were; answered, *Totius Entis Naturalis Universitas* ['the whole universe of natural things']. All Men are accommodated with that *Publick Library*' (p. 8). The ultimate source may have been either Socrates (ca. 380-450) 'Scholasticus,' *Ecclesiastical History*, 4. 23 (Migne, *PG*, 73: col. 518), or *Vitae Patrum: sive historiae eremeticae libri decem*, 6. 4, 16. Someone asked St. Anthony of Egypt (251?-356) how he managed to live without books, both sources relate, and the hermit replied that the whole world was his book. But Mather's immediate source is Mat-

¹⁶ *Theophilus of Antioch: Ad Autolycum*, text and translation by Robert M. Grant (Oxford, 1970), 2.12. Theophilus says ten thousand mouths and tongues.

thew Barker's *Natural Theology: Or, the Knowledge of God, from the Works of Creation* (London, 1674), p. 17.

The twelve essays on the heavenly bodies, about 15 percent of the book, discuss light, the stars, the fixed stars, the Sun, the planets, comets, heat, and the Moon. In the first essay, Mather writes that 'Aristotle's Definition of Light; *φῶς ἐστὶν ἡ ἐνέργεια τοῦ διαφανοῦς* *Light is in the Inworking of a Diaphanous Body*; is worth an attentive Consideration' (p. 9). His source is Harris's *Lexicon Technicum* (1: s.v. 'light'), but the ultimate source is Aristotle's *On the Soul*, 2. 7, 418b 9–10.¹⁷

In discussing light, Mather, desiring to fetch lessons of piety from the whole creation, writes that 'even a Pagan *Plutarch*' reminds one 'that the World is no other than the *Temple* of GOD; and all the *Creatures* are the *Glasses*, in which we may see the *Skill* of Him that is the Maker of all. And his Brother *Cicero* has minded us, *Deum ex Operibus cognoscimus*' ['we know God from his works']. He then adds, 'The famous *Hermite's* Book, of those three Leaves, the *Heaven*, the *Water*, and the *Earth*, well studied, how nobly would it fill the *Chambers* of the Soul with the most *precious and pleasant Riches*? *Clement of Alexandria* calls the World, *A Scripture of those three Leaves*; and the *Creatures* therein speaking to us, have been justly called *Concionatores Reales* ['natural preachers'], by those who have best understood them' (pp. 13–14). The complete passage, of which these quotations are a part, is based on Alsted, pp. 244–45. In Plutarch, Mather finds reaffirmation of the Platonic idea that he had previously mentioned, which is found in Plutarch's treatise *De Iside et Osiride*. The quotation from Cicero is found in *Tusculan Disputations*, 1. 28, 70. The 'famous Hermite' is Anthony, earlier identified as 'the Philosopher.'

Mather returns to his beloved Platonic theme in his essay on the stars. Here he declares, 'It was a good Remark made by one of the Antients, *Quid est Coelum, et totius Naturae Decor*,

¹⁷ A modern translation of Aristotle's definition by W. S. Hett in the Loeb Classical Library reads, 'Now light is the activity of this transparent substance *qua* transparent.'

aliud, quam quoddam speculum, in quo summi Opificis relucet Magisterium [‘what are the heavens and the beauty of all of nature other than a kind of mirror, in which the magistracy of the highest artificer shines back’] (p. 18)? Alsted cites the passage, attributing it to Plutarch’s *Of Isis and Osiris*, but identifying the concept as Platonic. Asserting that Plato had given this idea in the *Timaeus*, Alsted writes, ‘The world is an epistle of God the Father to the human race. And gentile philosophers and Christian savants rightly advise that the creatures are mirrors, in which we observe the singular art of him, who created the world’ (Alsted, p. 265; *Encyclopaedia*, 3:327). ‘The Pagan Tully,’ Mather continues, ‘contemplating, *Coelestium admirabilem Ordinem, incredibilemque Constantiam*, the admirable Order, and the incredible Constancy of the Heavenly Bodies and their Motions, adds upon it, *Qui vacare Mente putat, ne ipse Mentis experts habendus est*: Whosoever thinks this is not governed by *Mind* and *Understanding*, is himself to be accounted void of all *Mind* and *Understanding*’ (p. 18). Here Mather borrows from Ray, pp. 76–77, who is quoting *De natura deorum*, 2. 56.

In treating the ‘Fixed Stars,’ Mather writes that Claudian mentions a new star in A.D. 388 (p. 21). Claudian, an Alexandrian who went to Italy, discusses the nova in his *Panegyric on the Third Consulship of the Emperor Honorius*, 7. 172, but Mather’s information is from Joseph Walker’s *Astronomy’s Advancement: Or, News for the Curious; Being a Treatise of Telescopes* (London, 1684), p. 23.

Mather alternately displays and hides his knowledge. At the beginning of his essay on the Sun he writes, ‘There will be no *Athenians* now to arraign me for it, if I call it, *The Carbuncle of the Heavens*’ (p. 25). Learned readers would have recognized the allusion to the philosopher Anaxagoras (ca. 500–ca. 428 B.C.), who was tried, fined, and exiled from Athens for saying that the Sun was stone and the Moon was earth at a time when people regarded Sun, Moon, and stars as divini-

ties. Mather may have been reminded of or directed to the story in a note (which does not recount the tale) in the preface to David Gregory's *Elements of Astronomy, Physical and Geometrical*, 2 vols. (London, 1715). Plato relates the episode (*Apology*, 26D), as does Diogenes Laertius, in *Lives of Eminent Philosophers*, 2. 3, 8. 'Virgil and Ovid intimate such a Darkness upon the Sun once for a whole Year together,' Mather writes, 'that the Fruits of the Earth could not be ripened' (p. 27). The author undoubtedly had read the classical sources in Vergil's *Georgics*, 1. 463–68, and Ovid's *Metamorphoses*, 15. 785–86, but in all probability he was reminded of these lines by Walker's *Astronomy's Advancement*, p. 9, which identified authors and locations. The darkness is said to have occurred in 44 B.C., the year of Caesar's assassination.

The essay on Saturn attributes the motions of the heavenly bodies to God alone and quotes two ancients to support this view. One is the early Christian apologist Lucius Caecilius Lactantius Firmianus (A.D. 240–320), who had argued, 'There is indeed a Power in the Stars, of performing their Motions; but that is the Power of God who made and governs all things, not of the Stars themselves that are moved' (p. 34). The source is Lactantius's *The Divine Institutes*, 2. 5, but Mather quotes it verbatim from Derham's *Astro-Theology: Or, a Demonstration of the Being and Attributes of God, from a Survey of the Heavens* (London, 1715), p. 61. The other author is Plato, who, Mather says, had previously argued, 'Let us think, how it is possible for so prodigious a Mass to be carried round for so long a time by any natural Cause? For which reason I assert God to be the Cause, and that 'tis impossible it should be otherwise' (p. 34). Plato's *Epinomis*, 983A–B, is the source, but Mather takes it from Derham's *Astro-Theology*, p. 63.

In his essay on Mercury, Mather writes, 'The Philosopher, who gazing on the Stars with his attentive Observation, tumbled into a Pit that he observed not, was not so unhappy as he that has visited Heaven on the noble Intentions of Astronomy,

but by an ungodly Life, procures to himself a Condemnation to that *Hell*, which is a State and Place of *Utter Darkness*. Wretched Astronomers' (p. 40)! 'The Philosopher' is Thales, and the source is Diogenes Laertius's *Lives of Eminent Philosophers*, 1. 1, 33-34.

In treating comets, Mather refers to Seneca's prediction that a time should come when the mysteries of comets should be unfolded, although Seneca has not obliged us with the observation that encouraged this prediction. The forecast appears in Seneca the Younger's *Natural Questions*, 7. 25, 3-4, but one cannot be certain that Mather knew that work, since he probably took the reference from Edmond Halley's 'A Synopsis of the Astronomy of Comets,' in Halley's anonymously edited *Miscellanea Curiosa*.¹⁸ Reaffirming the ancient superstition that comets demonstrate the wrath of God, Mather quotes '———*Si fractus illabatur Orbis, | Impavidum ferient Ruinae*' (p. 45), which is from Horace's *Odes*, 3. 3, 7-8. Horace is celebrating justice and steadfast purpose, and his immediately preceding lines make Mather's quotation (the translation of which is in italics) more clear: 'The man tenacious of his purpose in a righteous cause is not shaken from his firm resolve by the frenzy of his fellow-citizens bidding what is wrong, not by the face of threatening tyrant . . . *Were the vault of heaven to break and fall upon him its ruins would smite him undismayed.*'

Mather combines the classics with superstition in discussing the Moon. Its influences upon sublunary bodies are wonderful, he writes, and lunatics are not the only instances of that effect. He states, 'Our *Husbandmen* will multiply the Instances upon us, till they make a Volume, which neither a *Columella*, not a *Tom Tusser* have reached unto. The *Georges* of my Neigh-

¹⁸ Edmond Halley anonymously edited a collection of papers that first appeared in two volumes as *Miscellanea Curiosa: Being a Collection of Some of the Principal Phenomena in Nature, Accounted for by the Greatest Philosophers of This Age. Together with Several Discourses Read before the Royal Society for the Advancement of Physical and Mathematical Knowledge* (London, 1705-7). A second edition, with a slightly variant title, was published in three volumes in 1708. The 'Synopsis' is found in the appendix of volume 2.

bourhood just now furnished me with two Instances, which have in them something that is notable' (p. 51). Lucius Junius Moderatus Columella, a contemporary of Seneca the Elder, wrote *De re rustica*. 'The Georges' is a pun on the Greek *georgos*, meaning 'farmer.' Mather goes on to relate some stories about how cutting wood in the waxing or waning of the moon affects its properties.

As we have seen, Mather demonstrates an affinity with Plato and argues that nature is the product of a designing mind—the Creator of the universe. It comes as no surprise that he devotes little attention to Epicurus, an Antiplatonist who held that atoms and the void alone are real and that an infinite supply of atoms moving in infinite space and time leads, by chance, to every possible combination or world. Lucretius, who taught Epicureanism, is mentioned once on the subject of ice (p. 73). Epicureans (or Epicurism) are mentioned only fleetingly and usually deprecatingly (pp. 76, 134, 165, 289).

Mather turns from astronomy to physics in the broadest sense, devoting fourteen essays, about 23 percent of the book, to the subject. He treats rain, the rainbow, snow, hail, thunder and lightning, the air, wind, cold, the terraqueous globe, gravity, water and fluids, the Earth, magnetism, and minerals. Over twenty classical authors appear in these pages, and some of them two or three times. Mather usually quotes Scripture in making the religious 'improvement' on the report of scientific discoveries, but occasionally a classical quotation serves the purpose. 'We are to expect,' the essay on the rainbow concludes, '———*Affore Tempus | Quo Mare, quo Tellus, correptaue Regia Coeli, | Ardeat, et Mundi Moles operosa laboret*' ['a time would come when sea and land, the unkindled palace of the sky and the beleaguered structure of the universe should be destroyed by fire'] (p. 58). He is citing Ovid's *Metamorphoses*, 1. 256–58.

Mather weaves the classics into his essay on thunder and lightning, arguing that the natural causes of thunder do not

release one from considering the Providence of God in it. 'It is He, who *Fulmina molitur dextra, quo maxima motu | Terra tremat, fugere Ferae, et mortalia Corda | Per Gentes humilis stravit Pavor*' ['wields his bolts with flashing hand. At that shock shivers the mighty earth; far flee the beasts and o'er all the world crouching terror lays low men's hearts'] (p. 63). Thus, Vergil's *Georgics* (1. 329-31) reinforces a point. Thunder has the voice of God in it, as paganism itself owned, and the voice heard relates that that power belongs to God. 'The very *Mountains* are torn to pieces, when ————*Feriunt summos sua Fulmina Montes*' ['his lightning strikes the mountain peaks'] (p. 63). Horace (*Odes*, 2. 10, 11-12) does duty here. Yet God is merciful to a sinful world: 'The Desolations of the World, how wonderfully would they be, *Si quoties peccant Homines sua Fulmina mittat*' ['if at every human error he should hurl his thunderbolts'] (p. 64)! The source is Ovid (*Tristia*, 2. 33), who writes of Jupiter hurling his thunderbolts. Men die as a result of such a calamity, and 'their being *asleep* at the time has not preserved them, though there be a Fancy in *Plutarch* that it would' (p. 64). The statement shows familiarity with Plutarch (*Moralia*, 665B-66D). Guilt makes men 'startle at a *Thunder-Clap*; *Hi sunt qui trepidant, et ad omnia Fulgura pallent, | Cum tonat, exanimes primo quoque Murmure Coeli*' ['these are the men who tremble and grow pale at every lightning-flash; when it thunders, they quail at the first rumbling in the heavens'] (p. 64). Mather may have remembered these lines from Juvenal (*Satire* 13, 223-24), but he probably takes them from Alsted, p. 198. Mather takes this entire passage on thunder and lightning, including the classical quotations, from his own previous publications. He reorders and paraphrases material found in his *Magnalia Christi Americana: Or, the Ecclesiastical History of New England from . . . 1620 unto . . . 1698* (London, 1702), bk. 6, ch. 3, pp. 14-20. That portion of the *Magnalia* reprints, with a new introduction, a work Mather had published anonymously, *Brontologia Sacra:*

The Voice of the Glorious God in the Thunder (London, 1695).

In his scientific description of air, Mather declares that air is necessary to the animal world. Insects have many orifices on their bodies to admit large quantities of air, and they die if these openings are stopped up with honey or oil: '*Pliny* knew not the reason of his own Observation; *Oleo illita Insecta omnia exanimantur*' ['all insects are killed when olive oil is smeared on them'] (p. 68). Here Mather copies Ray, p. 82, who had simplified a phrase in Pliny (11. 21). In the individual essays, Mather normally cites ancient authority first, then relates recent scientific discoveries, and concludes with a rhapsody. The essay on wind begins with the statement that '*Plato* long since defin'd it, *The Motion of the Air about the Earth*' (p. 69). This is from Plato's *Definitions*, 411c, a work that scholars no longer attribute to Plato. Mather probably took it from Harris's *Lexicon Technicum* (1: s.v. 'wind').

Mather also begins his treatment of the cold with the ancients. Philoponus, he writes, tells us that Democritus assigned the cause of cold to '*Frigorifick Atoms*' (p. 73). John Philoponus (500–65), an eccentric Alexandrian philosopher and theologian, contributed to the Hexaemeral literary tradition that Mather knew well, and Democritus of Abdera (ca. 460–357? B.C.) was a mathematician and physicist. Mather incorporates this information from Robert Boyle, *New Experiments and Observations Touching Cold: Or, An Experimental History of Cold, Begun* (London, 1665), p. 461. Lucretius is then named, and the author asks, was it not a mistake when Pliny defined ice as '*Aquae Copia in Angusto*' ['an abundance of water in a small space'] (p. 73)? Mather quotes Livy as saying of the Alps '*Aeternis damnati Nivibus*' ['damned by eternal snows'] (p. 74)!¹⁹ Concluding the essay, Mather draws a moral lesson from nature by quoting a reflection of Petronius:

¹⁹ Mather is normally accurate in quoting, but I cannot locate these two quotations from Pliny and Livy.

'*Incultis asperisque Regionibus, diutius Nives haerent; ast ubi Aratro domefacta Tellus nitet, dum loqueris levis Pruina dilabatur. Similiter in Pectoribus Ira considit; Feras quidem Mentis obsidet, Eruditas praeterlabitur*' ['on the wild rough uplands the snow lies late, but when the earth is beautiful under the mastery of the plough, the light frost passes while you speak. Thus, anger dwells in our hearts; it takes root in the savage, and glides over the man of learning'] (p. 75). The source is the *Satyricon*, 99.

The Copernican hypothesis is now generally preferred, Mather states, and the Earth's motions oblige us to acknowledge God as governor of the world. 'Even a *Pagan Cleanthes*,' as Cicero will tell us, would assign this as sufficient cause for belief in a deity. Cleanthes (331-232 B.C.) succeeded Zeno as head of the Stoic school. Mather then quotes Cicero on the uniform motion and revolution of the heavens and the ordered beauty of the Sun, Moon, and stars. Plutarch says this observation was the first that led men to acknowledge a God (p. 76). The ultimate sources are *De natura deorum*, 2. 5, 15, and Plutarch's *Moralia*, 880A-B, but Mather takes the material from Derham, p. 44, n. 3. (Plutarch is cited also in *Astro-Theology*, pp. 3-4.)

Gravity is an effect 'insolvable by *philosophical Hypothesis*,' Mather thinks, and it must therefore be 'religiously resolv'd into the *immediate Will*' of the Creator (p. 82). After discussing a particular aspect of the subject, he quotes Cicero: '*Quod facit Natura per omnem Mundum, omnia Mente et Ratione conficiens*' ['and this function is fulfilled by that rational and intelligent substance which pervades the whole world as the efficient cause of all things'] (p. 84). Mather takes the statement from Derham, p. 34, n. 4, who cites *De natura deorum*, 2. 44, 115. In a paragraph on various '*unintelligible Beings*' or '*subservient Divinities*' that animate the world, Mather says there is no such thing as '*an universal Soul*,' as Plato taught, nor any '*substantial Forms*,' as Aristotle held, nor any '*omni-*

scient *radical Heat*,' as Hippocrates contended (p. 87). He bases this on George Cheyne's *Philosophical Principles of Natural Religion: Containing the Elements of Natural Philosophy, and the Proofs for Natural Religion Arising from Them* (London, 1705), p. 3.

In the essay on the Earth, following the assertion that earth and water nourish many vegetables and animals, Cicero is quoted: '*Quorum omnium incredibilis Multitudo, insatiabili Varietate distinguitur*' ['all of them incredibly numerous and inexhaustibly varied and diverse'] (p. 96). Mather borrows from Ray, p. 101, but Derham also (on p. 37, n. 1) quotes this passage from *De natura deorum*, 2. 39, 98. The variety of soils declares the Wisdom of the Creator in providing for such diverse intentions, and yet, he remarks, '*Nec vero Terrae ferre omnes omnia possunt*' ['nor yet can all soils bear all fruits'] (p. 96). Mather takes this from Derham, p. 62, n. 3, who attributes it to Vergil's *Georgics*, 2. [109]. Mountains have advantages for man, Mather notes; Hippocrates usually repaired to them for the plants by which he wrought the chief of his cures (p. 99). This detail about the famous Greek physician is from Arndt's *True Christianity*, 4. 3. The German theologian Johann Christian Arndt (1555–1621) first published that work in German (1606–9); it was later translated into Latin and English. Though Arndt is a favorite author, he provides few classical references. A discussion of mountains as a bulwark and defense prompts the statement that the '*Barbarians in Curtius*' were confident of the safety they provided (p. 99). The source is Quintus Curtius Rufus, a historian in the first century A.D. who wrote a ten-book history of Alexander the Great. Mather's information comes from Ray, p. 255, and from Derham, p. 71, n. 1, who is quoting John Wilkins, *The Discovery of a World in the Moon: Or, a Discourse Tending to Prove, That 'Tis Probable There May Be Another Habitable World in That Planet* (London, 1638). Mather calls upon the Greek physician Galen of Pergamon, an ardent believer in teleology, to

chastise the pseudo-Christians who reproach the work of God in the conformation of the Earth (p. 99), borrowing for the purpose a Latin quotation cited by Derham (p. 80, n. 12) from *De usu partium*, 10. 9.

The subject of earthquakes leads to mention of Ovid's reference to the 'old sinking of *Helice* and *Buris*,' the twelve cities swallowed up in the days of Tiberius, and to 'huge *Atlantis*, mentioned by *Plato*, now at the bottom of the *Atlantick Ocean*' (p. 101). Ovid's reference is in *Metamorphoses*, 15. 293-95, Pliny's on the twelve cities in 2. 86, 200, and Plato's in the *Timaeus*, 24E-25D. But surely Mather draws this information from Ray's *Three Physico-Theological Discourses: Concerning I. The Primitive Chaos, and Creation of the World. II. The General Deluge, Its Causes and Effects. III. The Dissolution of the World, and Future Conflagration* (London, 1693), pp. 163-64, 183. Speaking of casualties induced by earthquakes, Mather observes that Ammianus Marcellinus tells us that, in the year 365, '*Horrendi Tremores per omnem Orbis Ambitum grassati sunt*' ['horrible phenomena suddenly spread through the entire extent of the world'] (p. 102). Here, too, Ray's *Discourses* is followed (p. 13), though the ultimate source is the ancient author's *Rerum gestarum libri qui supersunt*, 26. 10, 15. Mather writes, '*Chrysostom* did well . . . to call the Earth *our Table*; but it shall *teach* me as well as *feed* me: May I be a *Deipnosophist* upon it' (p. 103). Here Mather draws on Chrysostom's seventh homily to the people of Antioch and also alludes to a work by Athenaeus (fl. ca. A.D. 200) that describes a 'learned banquet' at which the guests discussed several weighty topics as well as the dishes before them.

In a chapter on magnetism, Mather says that the ancients knew of the magnet, that Pliny writes on the subject, and that '*Aristotle* speaks of *Tbales*, as having said, the *Stone* has a *Soul*, *ὅτι τὸν σιδηρὸν κινεῖ* because it moves Iron' (p. 104). He takes the first part of this description from Harris's *Lexicon Technicum* (2: s.v. 'magnet'), adding the reference to Aristotle from

Derham, p. 315, n. 21. Derham, however, neither mentions Pliny nor quotes Aristotle, whose statement is in *On the Soul*, 1. 2, 405a21. In discussing the disposition of the 'magnetical *Vertue*' throughout the globe, Mather writes, 'The Medium itself may be always luminous; or the concave Arch may shine with such a Substance as does invest the Surface of the *Sun*; or they may have peculiar *Luminaries*, whereof we can have no Idea: As *Virgil* and *Claudian* enlighten their *Elysian* Fields; the latter, *Amissum ne crede Diem; sunt altera nobis | Sydera; sunt Orbis alii; Lumenque videbis | Purius, Elysiumque magis mirabere Solem*' ['think not thou hast lost the light of day; other stars are mine and other courses; a purer light shalt thou see and wonder rather at Elysium's sun and blessed habitants'] (p. 110). This entire passage, including the classical quotations, is taken from Halley's 'An Account of the Cause of the Change of the Variation of the Magnetical Needle, with an Hypothesis of the Structure of the Internal Parts of the Earth,' *Philosophical Transactions* 17 (Oct. 19, 1692): 568, 574-77, reprinted in *Miscellanea Curiosa*, 1:48, 55-58. The Vergil lines are from the *Aeneid*, 6. 640-41, and the Claudian lines from the 'Rape of Proserpine,' 2. 282-84.

Mather makes sophisticated use of classical learning in his chapter on minerals. In discussing various kinds of salt, he writes: 'He deserves to be herded with the Creatures, which *Animam habent pro Sale* ['have a soul in the place of salt'], who shall be so *insipid* an Animal, as to be insensible that the Benefits of *Salt* call for very great Acknowledgements. *My God, save me from what would render me unsavory Salt*' (p. 119)! The last sentence echoes Matthew 5:13 and Luke 14:34. The Latin phrase is found in various forms in Varro, Cicero, Pliny, Plutarch, Clement of Alexandria, and Porphyry. Mather's wording differs from that of the authors named, which suggests that he is rephrasing a familiar idea. The wordplay is clever. The Latin *sal* means both 'salt' and 'wit' or 'intelligence.' The English 'insipid' means 'without savor or taste'

or 'lacking salt,' and, more generally, 'dull' or 'uninteresting.' In the classical writers, the point of the Latin phrase, to have a soul instead of salt, is that the pig, being good for nothing except banquets, has a soul for no other reason than to serve as a preservative (salt) for the flesh. Mather employs the classical tag not only to characterize the brute beast but also to suggest a vital function of the mineral under discussion.

In treating gold and silver, Mather speaks of the trade of '*effodiuntur Opes*' ['digging out wealth'] (p. 120), words that occur in Ovid's description of the Bronze Age in *Metamorphoses*, 1. 140, although Mather probably saw the phrase in Alsted, p. 399. Castigating the love of gold, Mather notes that 'the *Auri sacra Fames*' ['accursed hunger for gold'] is the worst of all Distempers' (p. 121). Perhaps he quotes the *Aeneid*, 3. 57, from memory.

The essay's conclusion contains a baroque assortment of classical references. He writes: 'The antient Pagans not only worshiped the *Host of Heaven*, [justly called *Zabians*] but whatsoever they found *comfortable* to Nature, they also *deified*, even, *Quodcunque juvaret* ['whatever brought pleasure']. The River *Nilus* too must at length become a Deity; yea, *Nascuntur in hortis Numina* ['divinities springing up in their gardens']. And according to *Pliny*, *a Man that helps a Man becomes a God.*' Mather then quotes St. Paul and Philo to warn against admiring the creation more than the Creator (pp. 121-22). This material follows Barker's *Natural Theology*, pp. 62-63.²⁰ Barker attributes '*Quodcunque juvaret*' to 'the Poet,' who is Ovid (*The Heroides*, 4. 133), and the '*Nascuntur*' line to Juvenal. (The work is his satire on the Egyptians, *Satires*, 15. 10-11.) Alsted also quotes Juvenal on the gods of the Egyptians, p. 66. Barker (p. 63) quotes Philo as saying 'Κόσμον μάγγον ή κοσλλ'

²⁰ The Sabians were a religious sect mentioned in the Koran and by later Arabian writers, but Barker used the word erroneously to describe the heathens who worshipped the Sun, Moon, stars, and planets as deities.

ποιον θαυμήσαντες' ['more admiring the world than the maker of the world'], and he identifies the source of the quotation as *De mundi opificio*. Mather improves the Greek so as to make it read, 'Κοσμὸν μαλλὸν ἢ κοσμοποιὸν θαυμάσαντες.'

Mather turns next to natural history, assigning seven essays, about 60 percent of his treatise, to what is known today as the life sciences. He treats vegetables, insects, reptiles, fishes, birds, quadrupeds, and man. Classical references are frequent, but space compels generalization in treating this material.

According to the essay on vegetables, the 'Pagan *Pliny*' acknowledged the exceeding fertility of wheat as an instance of the divine bounty to man. One bushel in a fit soil, Pliny says, yields one hundred and fifty (p. 126). Here Mather follows Ray, p. 130, who relies upon Pliny, 18. 21. Mather cites Theophrastus on the uses of trees and on nature's ways for scattering and sowing seed. Some seeds are swallowed by birds, pass through their bodies, and are by them transferred to places where they fructify. Theophrastus affirms this of the mistletoe (pp. 129, 130-31). Both references are from Derham, p. 444, n. 1, and p. 454, n. 16. Mather also describes a plant that the ancients called '*Aeschynomene*' (p. 130). Mather borrows the point from Derham, p. 452, n. 13. All the plants in the vegetable kingdom are useful; Plutarch reports that the Babylonians obtained over three hundred kinds of commodities from the palm tree (p. 132). The source is Plutarch's *Moralia*, 724E.

Some ancient Romans confined their delight to a single vegetable; Cato doted on cabbage. In antiquity, several plants bore the name of Hercules, probably to denote their extraordinary force. To the Romans, cabbage was their 'grand *Physick*,' as well as food for six hundred years (pp. 134-35). As Mather probably knows, Marcus Porcius Cato spent several pages in *De agri cultura* explaining the medicinal values of cabbage (156-57). Pliny treats the plant called Hercules or

similar names (25. 12, 15, 37), as did Dioscorides, in *De materia medica*, 4. 66, and Theophrastus, in *Enquiry into Plants*, 9. 12, 3.

'Every body has heard,' Mather writes, '*cur moriatur homo cui Salvia crescit in hortis*' ['why should a man die who has sage growing in his garden'] (p. 135)? Sage was in high repute in antiquity and the Middle Ages, and this Latin apothegm was probably well known in the early modern period. It has a corresponding English proverb: 'He that would live for aye, / Must eat Sage in May.'²¹ To Mather, the works of the Creator in the whole vegetable kingdom call for continual admiration. 'It is a notable Stroke of Divinity methinks which *Pliny* falls upon, *Flores Odoresque indiem gignit Natura, magna (ut palam est) Admonitione hominum*' ['blossoms and their perfumes nature brings forth only for a day—an obvious warning to men'] (p. 139). Here the author follows Derham, p. 448, n. 7, who is quoting Pliny, 21. 1. This essay concludes with a baroque efflorescence of Latin quotations from Alsted and Arndt that includes 'a Saying of *Austin's*, *Deum Creaturas singulas guttula Divinae suae Bonitatis aspersione, ut per illas homini bene fit*' ['God has shed droplets of his divine goodness upon all the creatures, that they might contribute to the happiness of man'] (p. 140). Mather's source is Arndt's *True Christianity*, 2. 37, but I have been unable to locate the passage in St. Augustine.

Aristotle and Pliny are the leading ancient authorities in the essay on insects. Mather considers the 'Divine Workmanship' of these animals astonishing. As Pliny tells us, '*In his tam parvis atque nullis, quae Ratio, quanta Vis, quam inextricabilis perfectio*' ['in these minute nothings what method, what power, what labyrinthine perfection is displayed'] (pp. 141-42)! The ultimate sources are Aristotle's *Historia animalium*, 1. 1, 487a 32-33, and 4. 1, 523b 13-15, and Pliny, 11. 1, 2. But Mather takes the references to Aristotle and Pliny from Harris's *Lexi-*

²¹ M. Grieve, *A Modern Herbal*, 2 vols. (1931; reprint, New York, 1959), 2: 701.

con *Technicum* (2: s.v. 'insects') and the Pliny quotation from Ray, p. 196.

The capacity of spiders to move with speed and safety is admirable. They dart out and sail away by the help of their webs. Mather notes a hint of their darting in Aristotle and Pliny, stating, 'But the Antients knew nothing of their *sailing*' (p. 149). Here Mather follows Derham, pp. 403-4, n. 5; the original sources are Aristotle, *Historia animalium*, 9. 39, 623a, and Pliny, 11. 24.

The sagacity of insects in providing for their necessities is also admirable. One of these providers is the bee, on whom Mather cites Aristotle in Greek and Pliny in Latin. Becoming lyrical, he quotes several lines of Latin verse on the king bee—throughout antiquity, the queen bee was regarded as a king—without identifying the source as Vergil's *Georgics* (4. 212-13, 216-18), and he adds that 'these *aculeated Preachers*' furnish moral instruction to man. As Pliny notices, '*Nullus Apibus, si per Coelum licuit, Otio perit Dies*' ['not a single day is lost in idleness when the weather grants permission'] (pp. 152-55). This passage requires knowledge of Aristotle (*Historia animalium*, 1. 1, 488a 3, 10), Pliny (11. 16, 51), Vergil, and again Pliny (11. 4, 14), but Mather borrows it all from Moses Rusden's *A Further Discovery of Bees: Treating of the Nature, Government, Generation and Preservation of the Bee* (London, 1679), pp. 4-20 passim.

Some animals prefer to be housed in the bodies of other animals, Mather writes, and birds as well as some beasts have peculiar lice distinct from the two kinds with which men are infested. He writes, 'It has been pretended that the *Ass* is free, and an odd reason assigned for it; but it has been rather supposed from a Passage in *Aristotle*, the *Chronology* whereof won't well suit with the *odd Reason* I refer to.' This cryptic passage is made clear later. Some insects, Mather continues, work themselves into the very scales of the fishes: '*Lumbricus innascitur, qui debilitat*' ['a worm is produced which

makes them become weak"]; it was observed as long ago as the days of the *Stagyrite*' (p. 157). Here the source is Derham, pp. 417-18, nn. 8-9. Derham, however, explains that the 'odd reason' for the ass's freedom from lice is 'because our Saviour rode upon one, as some think.' Derham's authorities are Aristotle, from *Historia animalium*, 5. 31, 557a 13-14; 8. 20, 602b 28, and Pliny, 2. 33. But Aristotle had said that the ass has neither lice nor ticks.

Mather mentions Aristotle on the manner in which ichneumons carry spiders into their nests (he follows Derham, p. 228, n. 2, quoting *Historia animalium*, 5. 20, 552b26) and Pliny on the nidification of the gnat, the story of whose proceedings 'would give you a thousand Astonishments' (pp. 158-59)! Here, he takes from Ray, p. 196, whose source is Pliny, 17. 44. Mather also quotes Galen in Latin on the minute parts of the bodies of insects. The classical reference is *De usu partium*, 17. 1, but Mather draws it from Derham, p. 407, n. 11. Mather notes that Strabo offers an entertaining account of ant hills (p. 156), a reference that is perhaps ultimately dependent upon Strabo's *Geography*, 2. 1, 9. In a discussion of locust-eaters in the East Indies, Mather writes about 'the *Acridophagi*, mentioned by *Diodorus*, and by *Strabo*' (p. 162). These references are to *Diodorus Siculus*, 3. 29, and Strabo, 16. 4, 12.

In the chapter on reptiles, Mather describes Galen's account of mountebanks who stop the perforations of the teeth of poisonous vipers before they let spectators behold the vipers as they bite them (pp. 168-69). This is incorporated from Derham, p. [4]37, n. 8. A paragraph on the prodigious magnitude of some serpents includes many classical references: 'Yea, *Suetonius* affirms, that one was exposed by *Augustus*, which was no less than fifty Cubits long. *Dio* comes up with him, and affirms, that in *Hetruria* there was one that was fourscore and five Foot long, which, after he had made fearful Devastations, was kill'd with a Thunderbolt. *Strabo* out-does him, and affirms, that in Coelo-Syria there had been one which was an

hundred Foot long, and so thick, that a couple of Men on horseback, on each side of him, could not see one another. Yea, one that was an hundred and twenty Foot long, was kill'd near *Utica* by the Army of *Regulus*. Well might *Austin* say of these dreadful Animals, *Majora non sunt super Terram* ['greater there are not upon the earth'] (p. 168).

This marvelous tale demonstrates wide knowledge of classical antiquity. Suetonius Tranquillus (ca. A.D. 69—ca. 140), born half a century after the death of Emperor Augustus, wrote on the topic mentioned in *The Lives of the Caesars*, 2. 43. Dio Cassius Cocceianus (ca. A.D. 164—ca. 230) contains the account cited in his *Roman History*, 50. 8, 4. Etruria, an ancient country in central Italy, comprises modern Tuscany and part of Umbria. Strabo's story is in his *Geography*, 16. 2, 17, and Coele-Syria is the ancient name for the Bekaa Valley in Lebanon. Marcus Atilius Regulus was a Roman general in the First Punic War, and Utica was an ancient city on the coast of North Africa, northwest of ancient Carthage or modern Tunis. The St. Augustine quotation comes from his *Exposition of Psalm 148* (Migne, *PL*, 37: col. 1943). Mather, in all likelihood, knows the authors mentioned, but he draws his account from Samuel Bochart's *Hierozoicon: sive bipertitum opus de animalibus sacrae scripturae*, 2 vols. (London, 1663), 2:430—31.

As for the fishes, their variety is very considerable. Pliny 'reckons up' 176 kinds of them, and 'our Christian Pliny'—Ray—raises the number many times. Mather states, 'If you'll believe *Pliny* and Company, *Vera est vulgi Opinio, Quicquid nascitur in parte Naturae ulla, et in Mari esse, praeterque multa quae nusquam alibi*' ['the common opinion is true, that everything born in any department of nature exists also in the sea, as well as a number of things never found elsewhere']. Mather follows Francis Willughby, a seventeenth-century expert, in believing that Aristotle's division of the fishes into three kinds—cetaceous, cartilaginous, and spinous—is the best (p. 173). Here the material on Pliny (9. 1, 2) is from Derham, p. [4]40,

n. 3; the information on Aristotle is from Willughby's *De historia piscium libri quatuor* (Oxford, 1686), bk. 1. But Mather's knowledge of Willughby is from Harris's *Lexicon Technicum* (2: s.v. 'fishes').

Additional classical references enable Mather to relate tall tales even while refuting them. Pliny mentions the *balaenae* of the Indian Sea, which were 960 feet long, and whales that were 600 feet long and 360 feet broad, which came into a river of Arabia; Pliny also offers a reason why the largest animals are bred in the sea. But 'let what I gave you of the *nine hundred and sixty Foot* pass for a *Plinyism*,' Mather writes, 'and so what *Basil* in his *Hexaameron* reports of Whales equal in bigness to the greatest Mountains, let the Censure of *Brierwood* pass upon it, as an *intolerable Hyperbole*: We will write more sober things.' Mather passes by what Aelian affirms 'of the *Whale* being five times beyond the largest *Elephant*,' stating that '*Dion*, a grave as well as an old Writer,' reports 'a *Whale* coming to Land out of the *German Ocean* sixty Foot in length, twenty in breadth' (pp. 176-77). This Pliny material (9. 2, 4, 6-7; 9. 1, 2) is from Derham, pp. [4]40-41, n. 4. Basil the Great (330-79), who was abreast of the science of his time, wrote on whales in the eighth homily of the *Hexaameron*. Claudius Aelianus (2d century A.D.) wrote *De natura animalium*, a miscellany on the peculiarity of animals in seventeen books. He discusses the size of elephants in 13. 8 and of whales in 16. 18. Dio Cassius recounted the large whale in his *Roman History*, 54. 21, 2. Mather undoubtedly borrowed all this material not from Edward Brerewood's *Enquiries Touching the Diversity of Languages, and Religions through the Cheife Parts of the World* (London, 1614), which contains much of it, but from George Hakewill's *An Apologie of the Power and Providence of God in the Government of the World* (Oxford, 1627), pp. 126-27.

In the 'religious improvement' of the science in this essay, Mather writes, 'I remember a *Crassus*, of whom 'tis reported, that he so tamed a *Fish* in his Pond, as to make him come to him

at his calling him; verily, I shall have a Soul deserving *his Name*, and be more stupid than the *Fish*, if I do not hear the Calls which the *Fish* give to me to glorify the God that made them; and who has in their *Variety*, in their *Multitude*, in their *Structures*, their *Dispositions* and *Sagacities*, display'd his *Glories*' (p. 178). Marcus Licinius Crassus, a contemporary of Cicero who served in various public offices and in various ways attained influence, was best remembered for his wealth and greed; and maintenance of a *piscina* was a Roman status symbol. Aelian (*De natura animalium*, 8. 4) is the ultimate source; perhaps Mather knows the ironic story told there from the original.

Consideration of birds ought immediately to follow the fishes, says Mather, 'not only for the *Order* of their *Creation*, but also because, as *Basil* notes, there is a Συγγένεια τοῖς πετομένοις πρὸς τὰ νηκτα *Volantibus Affinitas cum Natantibus*' ['an affinity between the creatures that fly and those that swim'] (p. 180). Surely Mather takes this from Alsted, p. 493, but the ultimate source is Basil, Homily 8, 2. He explains that fin-toed birds are naturally directed to the water and fall to swimming there; thus ducklings, although hatched by a hen, go in water, even though they have never seen it before, while the hen is in an agony to keep them out, 'as *Pliny* expresses it, with *Lamenta circa Piscinae stagna, mergentibus se pullis, Natura duce*' ['lamentations round the margin of the pond when the chicks under the guidance of instinct take to the water'] (p. 184). This is from Ray, p. 147, and ultimately from Pliny, 10. 76.

'There is,' Mather writes, 'a considerable Observation of *Aristotle*, πτηνὸν μόνον οὐδέν' ['no animal is merely able to fly'] (p. 184). The reason why birds have feet as well as wings is that there is not always sufficient food for them in the air, and without feet they could not perch on the trees. The writer's source is Ray, p. 181.

Mather's account of birds leads him to relate a story familiar

to students of classical antiquity. 'We celebrate the *Dove of Archytas*, whereof *Gellius* tells us, *Simulacrum Columbae e ligno ab Archyta, ratione quadam, disciplinaque mechanica factam, volasse* [‘Archytas made a wooden model of a dove with such mechanical ingenuity and art that it flew’]; the same whom we find celebrated by *Horace* for a noble *Geometrician*. This *Dove* surely had more Geometry in it than the *πλαταγή*, or *Childrens Rattle*, for which *Aristotle* celebrates him, as the Inventor of it’ (p. 195). The classical sources are from *The Attic Nights* of Aulus Gellius (10. 12), Horace’s *Odes*, 1. 28, and Aristotle’s *Politics*, 8. 6, 1340b 26–28. Mather takes over the tale from Derham, p. 317, n. 25. Mather then praises God, who has with so much art contrived all the variety of birds and done so with such perfection. ‘*Austin* says well, *Deus non solum Angelum et Hominem, sed nec exigui et contemptibilis animantis viscera, nec Avis pennulam, nec Herbae flosculum, sine suarum partium convenientia dereliquit*’ [‘God has not left, not to speak of angels and men, but not even the entrails of the smallest and most contemptible animal, or the feather of the bird, or the little flower of a plant, without a mutual peace among all its parts’] (p. 195). This passage, from *De civitate Dei*, 5. 11, Mather takes out of Derham, p. 396, n.

In the rhapsody that concludes this essay, Mather writes, ‘It was a celebrated Speech of the Philosopher, *Si Luscinia essem, ut Luscinia canerem* [‘if I were a nightingale, I would sing as a nightingale’]; I can *fly* much *higher* than they, and if I praise their Glorious Creator, I shall *sing* much *better* than they; *Homo sum, atque ut Homo canam colamque*’ [‘I am a man, and as a man I will sing and worship’] (p. 197). The unidentified spokesman here is Epictetus, the Greek slave who obtained his freedom and taught Stoic philosophy in Rome. Mather probably took this information from Alsted, p. 472; the ultimate source is the *Discourses* of Epictetus, as reported by Arrian, 1. 16.

In the chapter on quadrupeds, Galen, Aristotle, and Pliny are invoked about equally. Galen, an authoritative witness to

design in nature, is cited on the strength of the lion, on the necks of animals being accommodated to their method of feeding, and on the kid of a goat (pp. 201, 205, 210). Galen reported that he took a live kid out of the belly of a dam and brought it up; the embryo presently walked, as if he had heard, said Galen, that legs were given him for that purpose; then he smelled things set before him and, refusing them all, supped only milk. But what Galen found most admirable was that the kid began to chew the cud, whereupon, said he, '*All that saw cried out with Admiration, being astonished at the natural Faculties of Animals.*' Mather takes the first two references from Derham, p. 357, n. 9, and p. 362; the last one from Ray, pp. 404-6.

Aristotle is mentioned on the location of the heart in man, on sea tortoises, and as the author of *De animalibus* (pp. 208, 213, 219). Mather takes the first reference from Derham, p. 365, n. 4, the second from Ray, p. 386. Pliny is mentioned on sea tortoises, on the legs of elephants being like pillars, and on the stomach of the camel (pp. 213, 201, 206). The first reference is from Ray, p. 386, and the others from Derham, p. 354, n. 1, and p. 363, n. 1. The necks of quadrupeds are commensurate to their legs, although this proportion is not kept in the elephant, who has a short neck. The excessive weight of his head and teeth would have been unsupportable. But his proboscis! Mather writes, '*Tully takes notice, Manus data Elephantis, quia propter Magnitudinem Corporis, difficiles aditus habebant ad Pastum*' ['the elephant is even provided with a hand, because his body is so large that it was difficult for him to reach his food'] (p. 205). This is from *De natura deorum*, 2. 47, 123, by way of Derham, p. 362, n. 1. In a discussion of cleverness in animals, Mather notes that many besides Plutarch have written *De sollertia animalium* (p. 213), and he recounts many interesting stories to illustrate his point. Plutarch's essay is in his *Moralia*; Mather apparently knows that Philo, Pliny, and Aelian also wrote on the subject.

Mather calls upon the Christian apologist Lactantius to censure men who do not learn from beasts about the being and glory of God, declaring, '*Illos qui nullum omnino Deum esse dixerunt, non modo non Philosophos, sed ne Homines quidem fuisse dixerim; qui mutis simillimi, ex solo Corpore constiterunt, nihil videntes animo*' ['for as to those who have altogether denied the existence of God, I should not only refuse to call them philosophers, but even deny them the name of men, who with a close resemblance to dumb animals, consisted of body only, discerning nothing with their mind'] (p. 210). He quotes the passage, from *The Divine Institutes*, 7. 9, from Derham, p. 371, n.

Mather's classical references on the horse, a 'notable, docible, tractable Animal,' are a bit recondite. He states, 'Read *Solinus*, and see what Approaches the *Horse* makes to *Reason!* One would question which had most, *Caligula* or *Incitatus*' (p. 214). Gaius Julius Solinus wrote, probably soon after A.D. 200, *Collectanea rerum memorabilium*, a geographical summary of parts of the known world that contained stories about the cleverness of the horse. Caligula, the Roman emperor from A.D. 37 to 41, built a marble stable for his horse Incitatus. 'There are antient Examples of other *Horses* besides *Bucephalus* and *Lethargus*,' Mather adds, 'that have been honour'd with stately *Funerals* and *Sepulchres* at their *Deaths*, as well as their *Masters*; yea, tho the Epitaph of *Adrian* be lost, his *Horse's* is preserved to this day' (p. 214). Bucephalus was the favorite horse of Alexander the Great. Lethargus has the distinction of gaining Mather's attention without leaving sufficient traces to be identified. The name, from the Greek word meaning 'morbid drowsiness,' does not seem to fit a horse that merits the honors described, certainly not a race horse. It is possible that Mather's memory played a trick on him. A sepulchral epigram by Pisander of Rhodes in the *Anthologia Palatina*, 7. 304, relates that a man named Hippaemon, a Thessalian from Crete who perished while fighting in the front ranks, had a horse

named Podargos and a dog named Lethargos.²² The Roman emperor Hadrian (A.D. 117–38) built a tomb with a stele and inscription for his favorite horse for the chase, Borysthenes. Dio's *Roman History* (69. 10) relates the story. Mather takes this information from a variety of sources, including Solinus and Dio Cassius as well as Grew's *Cosmologia Sacra*, p. 99, and Edward Topsell, *The Historie of Foure-footed Beasts* (London, 1607), pp. 220–339 passim. But not all of Mather's data is in these authors.

Several animals yield man useful instructions, and Mather remembers an observation of Seneca that exemplifies a moral remark on the properties of some quadrupeds: '*Omnia quae Natura fera ac rabida sunt, consternantur ad Vana. Idem inquietas et stolidis Ingeniis evenit, rerum suspicione feriuntur*' ['all creatures by nature wild and savage are alarmed by trifles. The same is true of men, whether they are by nature restless or inert. They are smitten with suspicion'] (pp. 216–17). The passage is from Seneca the Younger's *On Anger*, 3. 30, 1–2.

In the essay on man, by far the longest in the book, Cicero, Pliny, and Galen are the classical authorities most frequently cited, but some twenty-five additional ancients are named. 'Father Austin,' Mather writes, taxed the folly of those 'who admired the *Wonders* in the other Parts of the Creation abroad, *et relinquunt seipsos, nec mirantur*, but see nothing in *themselves* to be *wondred* at' (p. 221). This is from Augustine's *Confessions*, 10. 8. The body of man is none other than 'a Temple of GOD! A *Vitruvius* will teach us that the most exquisite and accurate Figure for a *Temple* will be found in a Conformity to an *Human Body*' (p. 222). The Roman architect Vitruvius Pollio (d. ca. 25 B.C.) compares the human body to the perfect plan for a temple in *On Architecture*, 3. 1.

According to Mather, 'the *erect Posture* of Man, the *Os sub-*

²² I thank Prof. George Pesely, now of Memphis State University, for help on this point.

lime' ['uplifted face'], is commodious for a 'rational Creature' who must have dominion over those which are not erect. 'Tully admires the *Providence of Nature*, as he calls it, adding the reason for it; *Sunt enim e Terra Homines, non ut Incolae atque Habitatores, sed quasi Spectatores superarum rerum, atque Coelestium, quarum Spectaculum ad nullum aliud Genus Animantium pertinet*' ['for men are sprung from the earth not as its inhabitants and denizens, but to be as it were the spectators of things supernal and heavenly, in the contemplation whereof no other species of animals participates']. By this posture, man has the use of his hands, 'which, as Galen observes, are *Organa sapienti Animali convenientia*' ['instruments most suitable for an intelligent animal'], and his eyes (p. 223). '*Os sublime*' is from Ovid's *Metamorphoses*, 1. 85, by way of Derham, p. 324, n. 4. Mather is quoting *De natura deorum*, 2. 16, 140, and *De usu partium*, 1. 3, but he takes this material from Derham, p. 323, n. 3.

'No sign of *Chance* in the whole Structure of our Body,' writes Mather, who proceeds to discuss the parts of the body and their location as evidences of design in nature. He quotes Cicero, cites Galen, and mentions Hippocrates in this capacity (pp. 225-27), taking all this from Derham, p. 336, n. 1, and p. 341, n. 5. A sympathy exists between the members of the body: 'as *Pliny* notes, the *Face* in *Man* alone is the *Index of all the Passions*.' Such is the variety in the faces of man that, as *Valerius Maximus* observes, no two are alike. Had nature been a blind architect, men's faces might have been as similar as a hen's eggs. He notes, 'It was one of *Pliny's Wonders*, *In Facie Vultuque nostro, cum sint decem aut paulo plura membra, nullas duas in tot millibus Hominum indiscretas Effigies existere*' ['though our physiognomy contains ten features or only a few more, to think that among all the thousands of human beings there exist no two countenances that are not distinct'] (pp. 227-29). Mather fabricates this from Derham, p. 346 (citing *Pliny*, 11. 51, 138), and p. 347 (citing the Roman historian *Valerius*

Maximus, 9. 14), and from Ray, pp. 283–84 (citing Pliny, 7. 1, 8).

For authors in the physico-theological literary tradition extending down to Darwin, the eye afforded special evidence of design in nature, and Mather is no exception. 'No rational Beholder can look upon the *Eye*,' he writes, 'without seeing Reason in the wondrous Workmanship thereof' (p. 235). He quotes Pliny (p. 235) and Cicero (p. 240) and cites Galen (pp. 235, 243) on the subject, taking this material from Derham and Ray. The ear is treated next. Pliny is cited on the virtue of earwax in curing the bites of men, scorpions, and serpents (p. 246), with Derham (p. 122, n. 13) as the source. The *membrana tympani* was noticed as long ago as Hippocrates's time, a detail available in Derham, p. 124, n. 17. As for sound, Alexander the Great reportedly had a 'tube' that might be heard at a distance of a hundred stadia (p. 249). The power of musical sounds over the spirits and bodies of man is very surprising, for Mather writes, 'What could the famous *Timothy* the Musician do upon Alexander' (p. 252)? The reference is probably from Derham, p. 135, n. 29. '*Ismenias* the *Theban*, by playing on the *Flute* or *Harp*, cured the *Sciatica*' (p. 252), Mather remarks. Where Mather obtained this recondite detail, I do not know.

In treating the nose, the tongue, and the sense of feeling, Mather quotes Cicero in Latin three times (all from *De natura deorum*, 2. 56, 141), and Pliny once (10. 90, 195), and mentions Theophrastus (pp. 253, 254, 255). The source is Derham, p. 138, n. 2, p. 142, n. 3, and p. 145, n. 3. Galen is cited on the teeth (p. 255), an observation taken from Ray, p. 309.

The grand glory of the tongue is that it is the main instrument of speaking. 'What the Emperor *Justinian* himself asserts in his Rescripts,' Mather writes, '[*Vidimus venerabiles Viros, qui abscissis radicitus Linguis;*] that he himself saw *venerable Men*, who when their *Tongues* were cut out, at the very Root, yet continued plainly speaking the Truth of Christianity against

the *Arians*; a Fact whereof many Witnesses are subpoena'd by *Cujacius*: it looks miraculous' (p. 259)! This wonderful tale is based on historical events. The Roman Empire included parts of Africa, but in 429 the Vandals under Gaiseric invaded and captured the fairest provinces, establishing their capital at Carthage. The Vandals treated the Libyans harshly during Gaiseric's reign of nearly forty years. The Arian Vandals persecuted orthodox Christians and imposed their faith on them, and this cruel policy continued during the reign of Honoric (477–84). Victor, bishop of Vita in Africa, left an eyewitness account of Vandal persecutions in these years. In Carthage, Victor reported, the Vandal king ordered the tongues and right hands of orthodox Christians 'cut off at the very roote and stumpe: yet through the assistance of the holy Ghost, they so spake and speake still, as they did neuer before. If any man be incredulous, let him goe now to *Constantinople*, and there shal he find *Reparatus* a Sub-deacon, one of that company, speaking (and that eloquently) without any impediment. For which cause he is greatly reuerenced in the palace of the Emperor *Zeno*.'²³

The Vandal kings assured the peace of the Christians beginning in 496, but the Emperor Justinian (527–65) valued religious uniformity and decided to recover Africa nevertheless. The army was sent in 533, and Procopius of Caesarea, the historian of the reign of Justinian, went along as secretary to the commanding general. Procopius reports that Honoric forced Christians in Libya to change over to the Arian faith or suffer death, 'and he also cut off the tongues of many from the very throat, who even up to my time were going about in Byzantium having their speech uninjured, and perceiving not the least effect from this punishment.' Justinian or his lawyers knew

²³ Victor, Bishop of Vita, *The Memorable and Tragical History of the Persecution in Africke*, in D. M. Rogers, ed., *English Recusant Literature, 1558–1640* (Menston, Yorkshire, England, 1969), p. 102.

these events well; Mather's Latin quotation is from the Code of Justinian, 1. 27, 1.²⁴

Mather cites Galen on the lungs, the arteries, and the muscles of the belly (pp. 263, 265, 273), drawing on Derham, p. 153, n. 8, Ray, p. 317, and Nehemiah Grew, *Cosmologia Sacra: Or a Discourse of the Universe as It Is the Creature and Kingdom of God* (London, 1701), p. 27, respectively. He calls upon Galen, Cicero, and Aristotle to celebrate the hand and its uses (pp. 277-78).

Mather next considers the astonishing physical strength of some persons since the days of Samson and of Milo the Ox-carrier in the sixth century B.C. (pp. 279-80). Valerius Maximus and others cite examples. Mather then tells about such ancients as the 'Tyrant *Maximus*' (actually Gaius Julius Verus Maximinus, who murdered and succeeded the Emperor Alexander Severus in A.D. 235), '*Marius*' (Gaius Marius, a cutler, who in the time of Galienus was chosen emperor by the soldiers), and '*Salvius*' (Fufius Salvius, described by Pliny). Mather's source is Nathaniel Wanley, *The Wonders of the Little World: Or, A General History of Man* (London, 1678), pp. 38-39.

The Christian Philosopher comes finally to the soul of man. In introducing the subject, Mather calls on four ancient worthies: the 'Pagan Orator'—i.e., Cicero—the poets Juvenal, Claudian, and Galen. The gist of their testimony, which is quoted in Latin, is that man's indwelling intelligence gives evidence of Divine Providence, and that man's spirit alone remains when his body perishes (pp. 281-82). All of this material, which is based on *De natura deorum*, 2. 58, 147, Juvenal's *Satires*, 15. 146-47, Claudian's *Panegyric on the Fourth Consulship of the*

²⁴ Procopius, *History of the Wars*, 3. 8, 4. The relevant portion of Justinian's Code merely says (in translation), 'We saw venerable men who with difficulty related their sufferings, whose tongues had been cut out by the roots.' See S. P. Scott, *The Civil Law: Including . . . the Enactments of Justinian*, 17 vols. (Cincinnati, 1932), 12: 130.

Emperor Honorius, 234–35, and *De usu partium*, 17. 1, is woven out of Derham, pp. 302–3, nn. 1–3.

The account continues by describing such ‘stupendous Faculties of the Soul’ as reason, prodigious learning, extraordinary memory, and certain practical inclinations. The Jews tell us of a professor in their ‘Academy of Sora, who was called *Sagi Nahor*, or *Joseph of great Light*; he was *blind*, but it seems he had a Soul full of Knowledge’ (pp. 282–85). The Academy of Sora in Babylon was founded in A.D. 219 and operated until the thirteenth century. ‘Sagi Nahor’ is a Jewish euphemism for blind; its literal meaning is ‘abundant in light.’ Seneca the Elder’s account of his own phenomenal memory and that of his companion Marcus Porcius Latro is mentioned, and Pliny’s examples of the memories of Cyrus, Mithridates, and Carneades are rehearsed—the latter based on Derham, p. 303, n. 4.

The various inclinations of the soul are a wise provision of God that the business of the world may all be transacted: ‘*Diversis gaudet Natura ministris*’ [‘nature delights in her various ministries’] (p. 287). This neo-Latin line is taken from Derham, p. 304, n. 5. The ultimate source is the eighth book, on Scorpio, of Marcello Palingenio’s *Zodiacus vitae: hoc est, de hominis vita, studio, ac moribus optime instituendis, libri XII* (Basel, 1600). Palingenio was the pseudonym of Pietro Angelo Manzolli, who flourished in 1528. His book was translated into English by Barnabe Googe as *The Zodiacke of Life* (London, 1576). ‘We find *Homer* sometimes admiring this Variety,’ Mather adds, ‘and *Horace* entertains us with a *Sunt quos Curriculo*, [‘some there are whose . . . upon the racing car’]—which might have been extended to a Volume; for as one says, “there may be found a *Sunt quos* for every thing under the Sun”’ (p. 287). On *Homer*, Mather follows Derham, p. 304, who quotes both the *Iliad*, 13. 730–33, and the *Odyssey*, 8. 167–68. *Horace* describes different walks of life, including his own

as a poet, and writes, 'Some there are whose one delight it is to gather Olympic dust upon the racing car' (*Odes*, 1. 1). Much study is a weariness to the flesh, but there have been hard students other than Cato, 'of whom *Tully* says, *Erat in eo inexhausta aviditas legendi, nec satiari poterat*' ['there was in him a voracious appetite for reading which could not be satisfied'] (p. 287). Cicero discussed Cato in *De finibus bonorum et malorum*, 3. 2, 7, but Mather follows Derham, p. 305, n. 6.

In treating man's inventions, Mather mentions Pliny's reference to the Romans having a sundial but refuses to regard Boethius as the inventor of clockwork (pp. 289-90). Here Mather follows Derham, *The Artificial Clock-Maker: A Treatise of Watch and Clock-Work* (London, 1700), p. 85, not realizing that Boethius did build a waterclock and a sundial.²⁵ The progress of invention leads Mather to optimism. If mathematics continues to improve in the future as in the past, 'who can tell what Mankind may come to! We may believe, without having *Seneca* our Author for it, *Multa venientis aevi populus ignota nobis sciet*' ['many things that are unknown to us the people of a coming age will know'] (p. 291). Here the author follows Ray, p. 201, quoting Seneca's *Natural Questions*, 7. 30, 5.

The union between soul and body, which for Mather consists in the conformity of our thoughts to our corporeal activity, is discussed in the last part of the treatise. Mather believes there is a scale of nature that passes 'regularly and proportionably from a *Stone* to a *Man*'; several orders of animated body lie below intellect, and several orders of embodied intellect lie below pure Mind. The transition from human to perfect Mind is made by a gradual ascent; there may be angels whose faculties may be as much superior to man's as man's may be to those of a snail or a worm. Mather writes, 'The highest Perfection that any *created Mind* can arise to, is that in the *Soul* of our admira-

²⁵ Edmund Reiss, *Boethius* (Boston, 1982), p. 25.

ble Saviour, which is indeed *embodied*; but it is the *Soul* of the *Man* who is personally united to the SON of GOD' (pp. 292–93).²⁶

'*Atheism*,' Mather concludes, 'is now for ever chased and hissed out of the World.' Having banished atheism, he proposes two 'general Strokes of *Piety*.' The first is that the works of God exhibited in nature demonstrate his power, wisdom, and goodness. The second is that the Christ of God must not be forgotten (pp. 294–97). After elaborating this theme, Mather writes, 'It was an high Flight of *Origen*, who urges, that our *High-Priest's* having *tasted of Death*, *ὄπερ παντος*, FOR ALL, is to be extended even to the very *Stars*, which would otherwise have been *impure* in the sight of God; and thus are ALL THINGS restored to the *Kingdom* of the Father.' The apostle Paul, in Col. 1:19–20, may seem to favor this flight. If this be so, Mather affirms, then '*total Nature*' may be 'sanctified to God that made it.' Mather endorses the proposition that God created all things in the foreknowledge that the Son of God became a man as well for this end as for ends more glorious, and without such an intuition he would not have made any thing that he has made (p. 300).

This part of Mather's treatise is very complicated, but a brief sketch will help clarify the views he set forth. Origen (ca. 185–ca. 254), the Greek theologian, was the principal apologist of the early church. A prolific writer, his biblical exegesis and theological speculation were inseparable. The masterpiece among his commentaries was the *Commentary on the Gospel of John*, and here, in an allusion to Hebrews 2:9, he refers to Jesus 'having tasted of death' (1. 40). Origen's most important theological work is *De principiis*, in which he advances the doctrine of the preexistence of souls, rebirth, and universal salva-

²⁶ Belief in a scale of nature arose in antiquity and was a basic intellectual assumption in the early eighteenth century. The standard treatment is Arthur O. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (Cambridge, Mass., 1936).

tion. His eschatology was based on belief in the justice and goodness of an omnipotent Creator and in the absolute free will of every rational being, including animated stars (*De principiis*, 1. 7). His doctrine concerning universal restoration was condemned as heretical by the Council of Alexandria in 400 and by the Fifth Oecumenical Council at Constantinople in 553. The Renaissance revived interest in Origen and stimulated fresh controversy over the doctrine of the ultimate salvation of everyone. George Rust, a member of the Cambridge Platonist school, defended Origen's opinions in *A Letter of Resolution Concerning Origen and the Chief of His Opinions* (London, 1661), and that book may have been known by Mather.²⁷

Scripture invites us to acknowledge that the Son of God is the upholder of all things in the world, Mather notes as he closes, although man's sin has so perverted and rendered the world full of loathsome and hateful regions and 'such *Scelerata Castra*' ['profane camps'] that the revenges of God would have long since rendered it a fiery oven if our blessed Jesus had not interceded for it (p. 301). Suetonius had used this Latin label, the final classical reference in Mather's book, to describe the name given to the summer camp in which Drusus died, in his *Life of the Deified Claudius*, 1. 3.

As we have seen, Mather makes abundant use of classical and Christian antiquity in his treatise on Newtonian science. His greatest intellectual debt is to the Platonist-Augustinian tradition. According to Plato, nature is only half-real, a system of symbols that reflect the nonsensible realities that lie beyond it. As Platonism spread, Plotinus in the early third century A.D. elaborated the philosophy of Plato as a basis for Hellenism in its struggle with Christianity. The Neoplatonists devised the concept of the scale of emanations, which connects the

²⁷ D. P. Walker, *The Decline of Hell: Seventeenth-Century Discussions of Eternal Torment* (Chicago, 1964), pp. 3-23 passim; *The Oxford Dictionary of the Christian Church*, 2d ed., s.v. 'Origen'; *New Catholic Encyclopedia*, s.v. 'Origen and Origenism.'

supreme Good with the whole hierarchy of its imperfect 'images.'²⁸

Meanwhile, the Christian church became the heir of Platonic philosophy, as Christian apologists appealed to Plato in their controversy with the gentiles. Origen extravagantly read the eschatology of Plato's myths into Christianity, while Augustine was instrumental in incorporating Platonism into the main current of Christian orthodoxy. The Augustinian doctrine that was derived from Plato and influenced by Neoplatonism held that God is the author of both nature and Scripture. God reveals himself through the symbolism of nature, which fallen man can never adequately decipher, and through Scripture, which is authoritative. The natural and the supernatural must be concordant. Through nature, the invisible things of God are made known by things that are visible.

In addition to Plato and Augustine, Mather is indebted to many other classical authors, especially Pliny, Galen, Cicero, and Aristotle. Pliny provided comprehensive if often indiscriminating treatment of a wide variety of scientific topics. Galen and Cicero in their different ways emphasized the design argument and could readily be adapted to Christian purposes. Aristotle had been rediscovered and elevated to a position of highest authority in all branches of natural knowledge in the thirteenth century, and despite a revulsion against Aristotelian dogma during the Renaissance, Mather summons the Stagyrite as an expert witness.

The classics are both essential and peripheral to *The Christian Philosopher*. They are essential in that Mather's argument is based on the Platonic-Augustinian concept that the whole world is the temple of God and that there is no real distinction between the two symbolisms, the natural and the supernatural. Hence, Mather can celebrate the exciting new discoveries in

²⁸ Alfred E. Taylor, *Platonism and Its Influence* (New York, 1963), pp. 3-56 passim, for this and the following paragraph. The strong influence of the Platonist-Augustinian tradition on American Puritanism is emphasized in Perry Miller, *The New England Mind*, 2 vols. (Cambridge, Mass., 1939-53).

science and hail Sir Isaac Newton as 'the *Perpetual Dictator* of the learned World' (p. 56) with no fear for the Christian faith. The classics are peripheral in that they are often a literary embellishment that does not affect the book's thesis. As embellishment, the classical references should be understood as part of the Renaissance tradition in which Mather had been educated and which was passing from the scene even as he wrote.

Mather borrows a large proportion of his classical references from intermediate sources, especially Derham, Ray, Harris, Cheyne, and Alsted. All authors borrow, but they acknowledge their debts in different ways. Although his introduction alerts the reader, Mather borrows heavily, and largely without attribution. This practice, however unacceptable by modern standards, was common at the time, but Mather departed from acceptable practice in taking much material from Harris without any acknowledgement of his debt. One must, nevertheless, know the classics to borrow from them confidently, and surely Mather knew the standard Latin authors, and many others besides. Like many other learned persons at the time, he kept a commonplace book in which he regularly entered quotations and paraphrases from his reading, and his *Quotidiana* served as a source for his subsequent writing. Yet, it seems clear that Mather found it easier to paraphrase and quote from contemporary authors—Derham's *Physico-Theology* was published only two years before Mather completed his manuscript—than from the classics themselves.

Wherever or however he obtained his information, Mather was certainly familiar with the scope of Greek and Latin literature. He exhibits wide-ranging knowledge with no evidence of taking it from a middleman in references to Fidentinus, Anaxagoras, Thales, Columella, salt, Cato, Crassus, clever animals, and Vitruvius. He draws on classical authors without naming them, as with Diogenes Laertius. And he is obviously well acquainted with the 'anecdotal tradition' that circulated in all kinds of books, ancient, medieval, and early modern, which

makes it almost impossible to discover the source of such tidbits as Ismenias's cure for sciatica.

In any event, Mather's content was more important than the sources he relied upon in writing his book. His purpose in *The Christian Philosopher* was to harmonize religion and the new science, and he skillfully used the literature of classical and Christian antiquity in producing one of the most important documents of early American intellectual history.

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