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Curiosity, Forbidden Knowledge, and the Reformation of Natural Philosophy in Early Modern England

*By Peter Harrison**

ABSTRACT

From the patristic period to the beginning of the seventeenth century curiosity was regarded as an intellectual vice. Curious individuals were considered to be proud and "puffed up," and the objects of their investigations were deemed illicit, dispute engendering, unknowable, or useless. Seventeenth-century projects for the advancement of learning had to distance themselves from curiosity and its dubious fruits or, alternatively, enhance the moral status of the curious sensibility. Francis Bacon's proposals for the instauration of knowledge were an integral part of a process by which curiosity underwent a remarkable transformation from vice to virtue over the course of the seventeenth century. The changing fortunes of this human propensity highlight the morally charged nature of early modern debates over the status of natural philosophy and the particular virtues required of its practitioners. The rehabilitation of curiosity was a crucial element in the objectification of scientific knowledge and led to a gradual shift of focus away from the moral qualities of investigators and the propriety of particular objects of knowledge to specific procedures and methods.

> Why did my parents send me to the schooles
> That I with knowledge might enrich my mind?
> Since the *desire to know* first made men fooles,
> And did corrupt the roote of all mankind?. . . .
>
> But we their wretched Offspring, what do we?
> Do not wee still tast of the fruite forbid?

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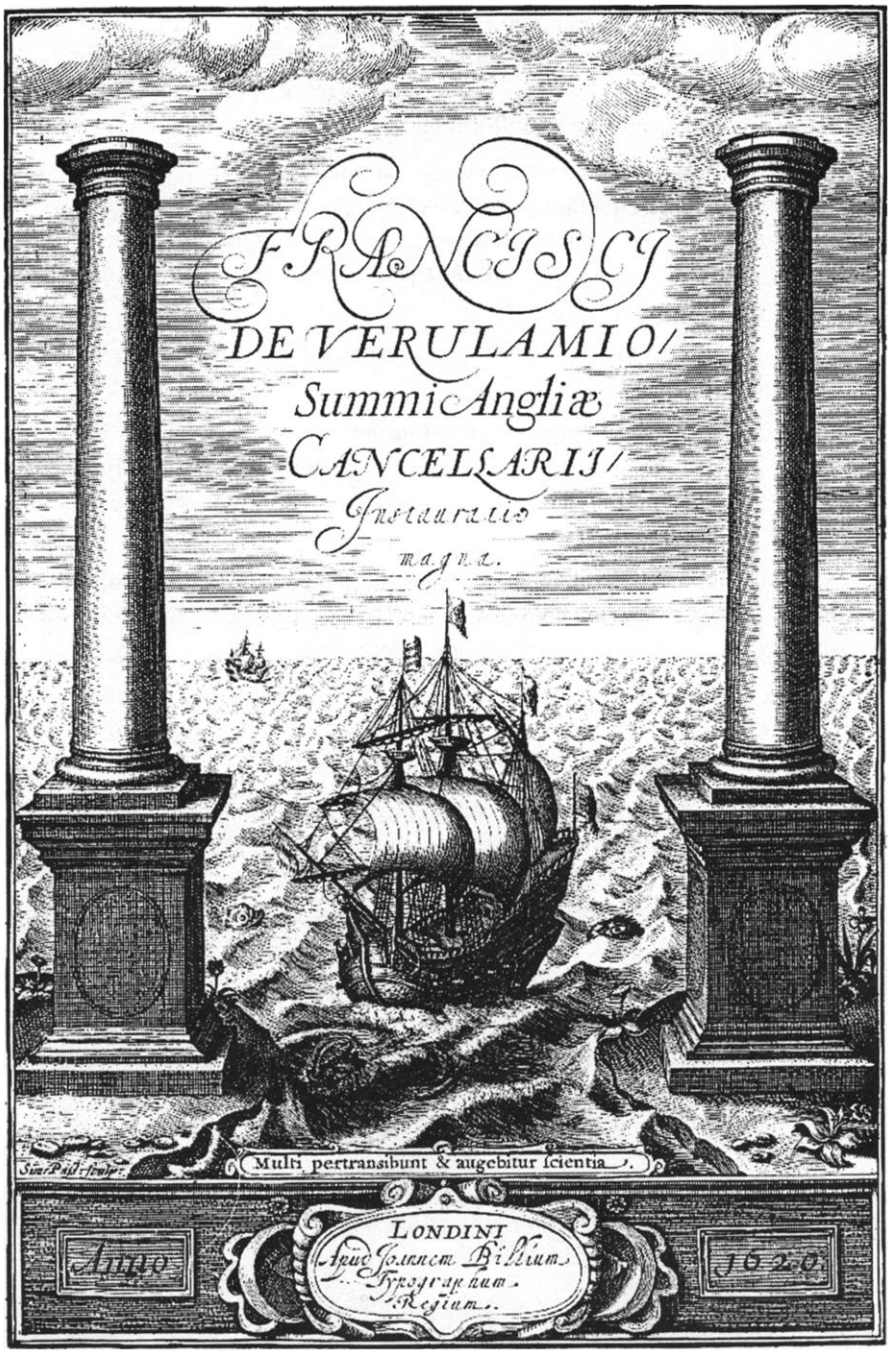

Francis Bacon, Instauratio magna *(London, 1620), frontispiece. The motto is from Daniel 12:4: "Multi pertransibunt & augebitur scientia"—"Many shall go to and fro, and knowledge shall be increased."*

Whiles with fond, fruitlesse curiositie,
In bookes prophane we seeke for knowledge hid?
—Sir John Davies, *Nosce teipsum* (1599)[1]

Curiosity is now widely regarded, with some justification, as a vital ingredient of the inquiring mind and, more particularly, as a crucial virtue for the practitioner of the pure sciences. We have become accustomed to associate curiosity with innocence and, in its more mature manifestations, with the pursuit of truth for its own sake. It was not always so. The sentiments expressed in Sir John Davies's poem, published on the eve of the seventeenth century, paint a somewhat different picture. To seek knowledge with no particular end in mind was to indulge in "fruitlesse curiositie," while the "desire to know" was associated with those catastrophic events that took place at the dawn of history in the Garden of Eden and with the ensuing curse that fell upon succeeding generations. Davies's poem neatly sets out two of the chief impediments to the advancement of learning in seventeenth-century England: the fact that the Genesis narrative attributes the Fall of the human race to the desire for knowledge, and the moral disapprobation associated with the vice of curiosity. In short, the traditional classification of curiosity amongst the vices and its complicity in the commission of the first sin represented a major obstacle to early modern projects to enlarge human learning.

This essay will explore the changing fortunes of curiosity, from its construction as an intellectual vice in the patristic era to its subsequent transformation, over the course of the seventeenth century, to a virtue. Particular attention will be paid to the way in which Francis Bacon dealt with prevailing conceptions of curiosity and forbidden knowledge and how he modified an existing view of the moral legitimacy of knowledge of nature in order to provide rhetorical justification for his proposed instauration of learning. This change in the status of knowledge of nature, initiated by Bacon and promoted by his successors, highlights the morally charged character of early modern debates over the status of natural philosophy and the particular virtues required of its practitioners. As we shall see, the rehabilitation of curiosity was a crucial element in the objectification of scientific knowledge and led to a shift of focus away from the moral qualities of investigators and the propriety of particular objects of knowledge to specific disciplines, procedures, and methods.

THE HISTORY OF AN INTELLECTUAL VICE

The Greeks had little to say directly on the issue of curiosity and forbidden knowledge, and while the general import of the myths of Pandora and Prometheus is clear enough, curiosity was not identified as a vice in the moral philosophy of the writers of classical antiquity. If anything, it was regarded as a natural human propensity. Aristotle, in the opening lines of the *Metaphysics,* declares that the desire for knowledge is the natural human condition. But he later qualifies this by stating that it is wonder (*thauma*), rather than curiosity (*periergia*), that is the beginning of knowledge. Amongst Roman authors, curiosity was the subject of mild rebuke. The specific moral category *curiositas* first appears in Cicero, where it has dual aspects: on the one hand, curiosity is a necessary mo-

[1] Sir John Davies, *Nosce teipsum* (Londson, 1599), pp. 1–2.

tivation for the pursuit of knowledge; on the other, it is an intemperate and excessive desire for unsuitable or inappropriate knowledge. If the natural state of the human being is to seek knowledge, its excess becomes the vice of curiosity. As Seneca expressed it: "The desire to know more than enough is a form of intemperance."[2]

In the writings of the church fathers, however, curiosity took on a somewhat more sinister aspect and was frequently singled out for specific censure. The chief canonical source for the early Christian view was the Genesis narrative of the Creation, in which Adam and Eve had been forbidden to eat from the tree of the knowledge of good and evil. Unfortunately for them and their issue, they succumbed. Curiosity, along with pride and disobedience, was thus implicated in the first sin and in the subsequent fall of the whole human race. Additional biblical sources reinforced the dangers of the quest for knowledge: "Seek not out things that are too hard for thee, neither search the things that are above thy strength. . . . Be not curious in unnecessary matters," counsels Ben Sirach. Cautions against overzealous inquiry are reprised in St. Paul's dismissal of "the wisdom of the world" and in his warnings against "philosophy and vain deceit."[3]

For the Fathers, human curiosity was distinguished both by its objects and by its underlying motivations. The curious mind aimed at that knowledge that surpassed human capacities or that was forbidden, "worldly," or useless. As to its motivations, curiosity was prompted by pride, vanity, or the desire to be like God. The fourth-century theologian Basil the Great had asserted that "the most penetrating mind cannot attain to the knowledge of the least of the phenomena of the world." Given this somewhat skeptical outlook, attempts to discern the operations of nature were regarded as not merely futile but morally culpable. "Put then a limit to your thought," Basil counseled, and avoid "curiosity in investigating the incomprehensible." St. Jerome, translator of the Vulgate, was no less dismissive of the curious investigator of nature: "Is it not evident that a man who day and night wrestles with the dialectic art, the student of natural science whose gaze pierces the heavens, walks in vanity of understanding and darkness of mind?" Peter Chrysologus, fifth-century bishop of Ravenna, similarly regarded human curiosity as the pursuit of "worldly wisdom."[4] It is difficult to escape the conclusion that this understanding of curiosity would devalue the pursuit of knowledge of nature. And if such knowledge were

[2] Aristotle, *Metaphysics,* 980a, 982b, trans. Hugh Tredennick (London: Heinemann, 1947), pp. 3, 13. For a comprehensive history of wonder see Lorraine Daston and Katharine Park, *Wonders and the Order of Nature* (New York: Zone, 1998); on the relation of wonder to curiosity see pp. 303–328. On *curiositas* see A. Labhardt, "Curiositas: Notes sur l'histoire d'un mot et d'une notion," *Museum Helveticum,* 1960, *17:*206–224; and Robért Joly, "Curiositas," *L'Antiquité Classique,* 1961, *30:*33–44. For Seneca's view see Seneca, *Letters to Lucilius,* 88.37, trans. E. Phillips Barker, 2 vols. (Oxford: Clarendon, 1932), Vol. 2, p. 70; similar sentiments are found in letters 48 and 117.

[3] Genesis 3:1–7; Ecclesiasticus 3:21–23; I Corinthians 1:19–27, 2:1 f.; Colossians 2:8; and I Timothy 6:20. See also Ecclesiastes 1:18, 12:12; Esdras 4:23, 13:52; I Corinthians 8:1; and II Timothy 3:13–16. For typical patristic and medieval commentary see Ambrose, *Hexameron,* 1.7, 1.9, 1.24; Gregory, *Moralia in Iob,* 27.1; Gregory [attr.], *Dialogorum Gregorii Papae Libri Quantuor,* 2, preface 1; Bernard of Clairvaux, *Epistola,* 190; Bernard, *In Die Pentecostes,* 3.5; and Bernard, *In Solemnitate Apostolorum Petri et Pauli,* 1.3. For a general indication of how these passages were read in early modern England, consult the relevant glosses in the Geneva Bible: *The Bible and Holy Scriptures Conteyned in the Olde and Newe Testament* (Geneva, 1560).

[4] Basil, *Hexaemeron,* 1.9, in *Nicene and Post-Nicene Fathers: Series II,* ed. Philip Schaff and Henry Wace, 14 vols. (Grand Rapids, Mich.: Eerdmans, 1952–1964), Vol. 8, p. 57a (cf. Job 38:6); Jerome, *Commentarius in Epistolam ad Ephesios,* 4.17, in *Patrologiae Cursus Completus,* Series Latina, ed. Jacques-Paul Migne, 217 vols. (Paris, 1844–1905) (hereafter cited as ***PL***), Vol. 26, p. 536 f.; and Peter Chrysologus, *Collectio sermonum,* 11, in *Corpus Christianorum,* Series Latina, Vol. 24, p. 174. On the motivations see, e.g., Origen, *Against Celsus,* 7.4; Tertullian, *De anima,* 2; Basil, *Hexaemeron,* 1.8–11; Peter Chrysologus, *Collectio sermonum,* 11; and John Cassian, *Colationes,* 14.16.

suspect, even more worthy of censure were the darker arts of magicians and sorcerers. Magic, enchantment, and divination came to be known as "the curious arts."[5]

The most comprehensive analysis of curiosity amongst the Fathers was provided by Augustine. In a lucid passage in *The Confessions,* he set out the phenomenology of this intellectual vice. Curiosity is at work "when people study the operations of nature which lie beyond our grasp, when there is no advantage in knowing, and the investigators simply desire knowledge for its own sake." This was the besetting sin of pagan priests, philosophers, and Manichaean heretics. In various ways they had all succumbed to a "form of temptation," a "lust for experimenting and knowing," a "diseased craving," a "vain inquisitiveness dignified with the title of knowledge and science."[6] Linking the objects of curiosity with its base motivations, Augustine wrote of those who, forsaking virtue, "imagine they are doing something great, if with surpassing curiosity and keenness they explore the whole mass of this body which we call the world." Oracles, necromancy, and pagan religion in general were all associated by Augustine with curiosity. Indeed, he scarcely recognized a distinction between legitimate and illegitimate means of acquiring knowledge of nature, accusing the philosophers of a "sinful curiosity in seeking knowledge from the demons." Augustine also provided curiosity with a genealogy, placing it amongst sins of the first rank and linking it back to the sin of Adam and Eve. Curiosity was nothing more than an original concupiscence refracted through the mind rather than the body (*"concupiscentia oculorum,"* in his vivid turn of phrase—the "lust of the eyes"). As it represented the corruption of something more noble than the body, this species of lust was particularly contemptible. Most damning of all, curiosity was associated with the first and greatest of all sins—pride.[7]

For medieval theologians curiosity, while not classified amongst the seven deadly sins, remained a significant vice. *Vana curiositas* was thus a common trope in the sermons of such reformers as Robert Pullen and Bernard of Clairvaux, who were active in the twelfth-century Ile-de-France. Bernard also addressed the topic in his more systematic theological writings, in which are developed the Augustinian view that curiosity is the beginning of pride.[8] Other preachers focused their disapproval on the dubious fruits of curiosity. As-

[5] Origen, *Against Celsus,* 7.4; and John Cassian, *Colationes,* 14.16. Cf. Rabanus Maurus, *Ennarationes in librum Numerorum* (*PL,* Vol. 108, p. 727).

[6] Augustine, *Confessions,* 10.35, trans. H. Chadwick (Oxford: Oxford Univ. Press, 1991), p. 211. For Augustine's treatment of curiosity see Hans Blumenberg, "*Curiositas* und *Veritas:* Zur Ideengeschichte von Augustin, Confessiones X 35," *Studia Patristica,* 1962, *81:*294–302; Blumenberg, "Augustin's Anteil an der Geschichte des Begriffs der theoretischen Neugierde," *Revue des Etudes Augustiniennes,* 1961, *7:*35–70; and Lorraine Daston, "Curiosity in Early Modern Science," *Word and Image,* 1995, *11:*391–404, esp. p. 393 f.

[7] Augustine, *City of God,* 7.34–35 ("surpassing curiosity"), in *Nicene and Post-Nicene Fathers: Series I,* ed. Philip Schaff, 10 vols. (Grand Rapids, Mich.: Eerdmans, 1956) (hereafter cited as ***Nicene and Post-Nicene Fathers, I***), Vol. 2, pp. 141b–142a; Augustine, *Homilies on the First Epistle of John,* 2.13 (association with oracles, etc.), *ibid.,* Vol. 7, p. 474a; Augustine, *De vera religione,* 4 ("sinful curiosity"), in *Opera omnia,* 11 vols. (Paris, 1836), I/2, 1211a (cf. Augustine, *Letters,* 118.33, in *Nicene and Post-Nicene Fathers, I,* Vol. 1, p. 450a); and Augustine, *Confessions,* 10.35 ("lust of the eyes"). For Augustine's views on the link with pride see *De moribus Ecclesiae Catholicae et de moribus Manichaeorum,* 21; *De agone Christiano,* 4.4; *De Trinitate,* 12.9; and *City of God,* 14.28. In *Supra Genesi contra Manichaeos,* 2.18.27, the curse placed on the serpent is also associated with curiosity—"to eat the earth is to look into things deep and dark": *Augustine on Genesis,* trans. Ronald Teske (Fathers of the Church, 84) (Washington, D.C.: Catholic Univ. America Press, 1991), p. 122.

[8] On Pullen and Bernard see Katherine Tachau, "God's Compass and 'Vana Curiositas': Scientific Study in the Old French 'Bible Moralisée,'" *Art Bulletin,* 1998, *80:*7–42; and Stephen Ferruolo, *The Origins of the Universities: The Schools of Paris and Their Critics, 1100–1215* (Stanford, Calif.: Stanford Univ. Press, 1985), pp. 231–234. For Bernard's views see Bernard of Clairvaux, "De curiositate," *De modo vivendi,* 54.130; and Bernard, "De vitanda curiositate," *De interiori domo,* 24.50. See also Richard Neuhauser, "The Sin of Curiosity

Figure 1. *Old French* Bible Moralisée, *Vienna ÖNB 2554, fol. 3v. Reproduced with the permission of the Bildarchiv of the Austrian National Library. The commentary on the biblical narrative reads: "That the pagans began the tower of Babel against God's commandment signifies the* astronomers *and* dialecticians *who make false proofs against the will of Jesus Christ, and He turns their work to nothing, and blinds them, and strikes them." Translation by Gerald Guest,* in Bible Moralisée: Codex Vindobonensis 2554, *facsimile ed. (London: Harvey Miller, 1955), p. 57.*

trology, which at this time was beginning to attract highly placed patrons, was a popular target. Early in the thirteenth century Helinand of Froidmont, for example, cautioned against the use of astrologers, observing that their activities epitomized vain and useless curiosity. The beautifully illustrated thirteenth-century French Bibles Moralisées—one of which is the source of the famous image of the Creator measuring the earth with a compass—convey a similar message. (See cover illustration.) In these works the Tower of Babel, for example, comes to signify the worthlessness of pagan astronomy and logic, and the glosses that accompany the text and its illustrations issue stern warnings about the dangers of curiosity. (See Figure 1.) "The entanglement of philosophy, as secular learning, and astrology is a leitmotiv running through the Old French Bibles Moralisees," writes Katherine Tachau.[9] These treatments canvass the familiar associations of curiosity with

and the Cistercians," in *Erudition at God's Service,* ed. John R. Sommerfeldt (Kalamazoo, Mich.: Cistercian Publications, 1987), pp. 71–95. Thomas Aquinas discusses Bernard's view in *Summa theologiae,* 2a2ae,162.4, 60 vols. (London: Blackfriars, 1964–1976) (subsequent references to this edition will be shown in parentheses by volume and page number), Vol. 44, pp. 200–209. On the medieval treatment of *curiositas* more generally see Neuhauser, "Towards a History of Human Curiosity: A Prolegomenon to Its Medieval Phase," *Deutsche Vierteljahrsschrift,* 1982, *56:*562–578; William Eamon, *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture* (Princeton, N.J.: Princeton Univ. Press, 1994), pp. 59–66; G. R. Evans, *Getting It Wrong: The Mediaeval Epistemology of Error* (Leiden: Brill, 1988), pp. 109–118; and Daston and Park, *Wonders and the Order of Nature* (cit. n. 2), Ch. 3.

[9] Tachau, "God's Compass," p. 15. See also Marie-Therese d'Alverny, "Astrologues et theologiens au XIIe siècle," in *La transmission des textes philosophiques et scientifiques au Moyen Age* (London: Variorum, 1994), p. 46.

pagan knowledge, astrology, and heresy but introduce some new themes as well: curiosity is linked with lust, with the desire for riches and renown, and (for reasons which are not altogether clear) with the sin of Onan.

The stridency of these sentiments was due in part to the reintroduction into the West of Greek philosophy, along with its Islamic and Jewish elaborations. Negative assessments of curiosity thus form part of the background of the thirteenth-century prohibitions against the teaching of Aristotle at the University of Paris. Yet even when concessions were made to the value of pagan learning, curiosity retained a degree of odium as an intellectual sin. Thus Thomas Aquinas, while not inveighing against the investigation of nature or the achievements of pagan natural philosophers, still assigned curiosity to the list of vices and devoted a complete question to it in the *Summa theologiae.* Subsequently, condemnations of vain curiosity were to become common within Franciscan nominalism.[10]

The Renaissance and Reformation witnessed a renewed interest in curiosity—and in its rhetorical deployment against certain modes of knowledge. A number of factors contributed to this phenomenon. The status of Aristotle and Aristotelianism had once again become controversial, and reformers both of religion and of learning revived the traditional use of this intellectual vice as a weapon against the corrupting influences of pagan philosophy. More generally, it was inevitable, given the history of curiosity, that it would play a significant role in those disputes about learning and the proper objects of knowledge characteristic of the period. In addition, Protestant reformers came to emphasize the literal text of Scripture in an unprecedented way. This scriptural focus meant in turn that the Genesis narratives of the Creation and the Fall, including the crucial episode of the tree of knowledge, came to occupy a central position in early modern intellectual life.[11] "Forbidden fruit" was commonly associated with "forbidden knowledge," and both entailed the vice of curiosity. The reformer John Calvin, for example, reasserted the Aristotelian view that the desire for knowledge is a natural human characteristic but argued that if it were not controlled curiosity would be the result. Commenting on the temptation in the Garden of Eden, he pointed out that "the desire of knowledge is naturally inherent in man and happiness is supposed to be placed in it." However, "Eve erred in not regulating the measure of her knowledge by the will of God," and her descendants rehearse her original fault: "we all daily suffer under the same disease, because we desire to know more than is right, and more than God allows." The corruption of reason and the desire to know that ensued upon the Fall thus issued in "vain curiosity" that torments the mind with "superfluous and useless discussions."[12]

[10] Aquinas, *Summa theologiae,* 2a2ae.167. Cf. Thomas Cajetan's sixteenth-century commentary, *Summula caietana Reverendissimi domini Thome de Vio caietani cardinalis S. Sixti* (Rome, 1525), s.v. "curiositas" (unpaginated); and Agostinus de Ancona, *Summa de potestate ecclesiastica* (Augsburg, 1473), fol. 1r. On condemnations of "vain curiosity" see Heiko Oberman, "The Shape of Late Medieval Thought," in *The Pursuit of Holiness in Late Medieval and Early Renaissance Religion,* ed. Charles Trinkaus and Oberman (Leiden: Brill, 1974), pp. 3–25.

[11] For typical Renaissance and Reformation treatments of curiosity see, e.g., Peter de La Primaudaye, *The French Academie* (London, 1594), Ch. 15: "Of Curiosity and Novelty"; Peter Martyr Vermigli, *The Common Places of the Most Famous and Renowned Diuine Doctor Peter Martyr* (London, 1583), "Of Curiosity"; and Thomas Wright, *Passions of the Minde* (London, 1604), Bk. 6, Ch. 8: "Curiosity in Knowing Things Not Necessary." On the scriptural focus see, e.g., Peter Harrison, *The Bible, Protestantism, and the Rise of Natural Science* (Cambridge: Cambridge Univ. Press, 1998), Ch. 6; Philip Almond, *Adam and Eve in Seventeenth-Century Thought* (Cambridge: Cambridge Univ. Press, 1999); and James Bono, *The Word of God and the Languages of Man: Interpreting Nature in Early Modern Science and Medicine,* Vol. 1 (Madison: Univ. Wisconsin Press, 1995).

[12] John Calvin, *Commentary on Genesis,* 3.5, trans. John King (Grand Rapids, Mich.: Baker, 1984), p. 151; and Calvin, *Institutes of the Christian Religion,* 2.2.12, ed. John McNeill, trans. Ford Lewis Battles, 2 vols. (Philadelphia: Westminster, 1960) (hereafter cited as **Calvin, *Institutes***), Vol. 1, p. 271.

With the rise of Puritanism in late sixteenth-century England, cautions against curiosity and overzealous scholarly endeavors appeared in a wide range of literature, representing a strong counterpoint to the Renaissance stress on the dignity of the human being and the value of learning. Sermons, emblem books, works of moral psychology, and pious meditations, along with commentaries on Scripture, the Decalogue, the Lord's Prayer, and the creeds, all warn against this pervasive and pernicious intellectual vice. Most writers traced its lineage to the Fall. A "general defect and imperfection proceeding from Nature corrupted, and tending to corruption, followeth all the Sonnes of Adam, and that is a certaine natural curiosity," wrote Thomas Wright in his *Passions of the Minde* (1604). The first temptation, explained the Puritan divine William Perkins, "enclosed within it many sins," not least of which was discontentment, for Adam and Eve became dissatisfied with their lot and sought to be as gods. In this intellectual restlessness lay also the seeds of curiosity: "The second degree of discontentment, is in the mind and inward man; and that is *curiositie,* when a man resteth not satisfied with the measure of inward gifts received, [but] aspires to search out such things as God would haue kept secret."[13] A fellow Puritan, the "silver tongued" Henry Smith, similarly admonished his congregation "not to bee curious in searching mysteries." It was permissible to "desire knowledge of God, as *Salomon* did, but not desire knowledge as *Eue* did."[14] For numerous other writers curiosity was similarly implicated in the commission of the first human sin.[15]

While Puritan writers might have taken the lead in the condemnation of curious learning, it would be a mistake to conclude that they alone adopted this position. As John Morgan has convincingly argued, Puritans, at least in their attitude toward knowledge, were typical both of Protestants in general and of the dominant elements of Continental thought. Discussions of curiosity were thus not restricted to moralists and divines, and allusions to this intellectual vice abound in the works of seventeenth-century poets, prose writers, and dramatists. Here again, curiosity is given a key role in the Fall of our first parents and is roundly condemned. As Aphra Behn succinctly expressed it: "Too much Curiosity lost paradice." On the Continent, too, similar sentiments were expressed. The French courtier Peter de La Primaudaye, whose influential digest of learning *The French Academie* appeared in English in 1594, provided a similar analysis of the way in which curiosity had

[13] Wright, *Passions of the Minde* (cit. n. 11), p. 312 (this author is not to be confused with the contemporary Catholic controversialist [d. 1624] of the same name); and William Perkins, *A Discourse of the Damned Art of Witchcraft* (Cambridge, 1608), p. 9. More broadly, see Eugene Rice, *The Renaissance Idea of Wisdom* (Cambridge, Mass.: Harvard Univ. Press, 1958). For a comprehensive account of the treatment of curiosity in this period see Howard Schutz, *Milton and Forbidden Knowledge* (New York: Modern Language Association, 1955), Ch. 1. Cf. Carlo Ginzberg, "High and Low: The Theme of Forbidden Knowledge in the Sixteenth and Seventeenth Centuries," *Past and Present,* 1976, *73:*28–41.

[14] Henry Smith, *The Sermons of M. Henry Smith* (London, 1592), pp. 996, 997, 998. It is interesting that while Smith particularly associates curiosity with Eve, amongst theological writers this vice is rarely gendered. Literary works of the seventeenth century, however, present a different perspective. In Walter Charleton's *The Ephesian and Cimmerian Matrons* (London, 1668), we encounter the sentiment that women "naturally are so much given to Curiosity, that some Divines have held, our Grandmother Eve had never longed for the forbidden fruit, had it not been forbidden" (p. 96). Aphra Behn writes that "naturally . . . Maids are curious and vain": *The History of the Nun* (London, 1689), p. 58. Curiosity was presented as being natural to women, their "favourite vice." For additional examples see Peter Motteux, *Love's a Jest* (London, 1696), act 3, scene 1; Charles Gildon, *The Post-boy Rob'd of His Mail* (London, 1692), p. 208; John Milton, *Samson Agonistes* (London, 1671), ll. 775–778; and John Crown, *Sir Courtly Nice* (London, 1685), act 5, scene 1.

[15] See, e.g., Walter Raleigh, *Historie of the World* (London, 1614), p. 142; Robert Burton, *The Anatomy of Melancholy,* 1.1.1.1, ed. Thomas Faulkner *et al.,* 3 vols. (Oxford: Clarendon, 1989), Vol. 1, p. 122; Andrew Willet, *Hexapla in Genesin* (Cambridge, 1605), p. 58; Henry Holland, *The Historie of Adam* (London, 1606), p. 10; and Edward Leigh, *A Systeme or Body of Divinitie* (London, 1654), p. 382. See also Almond, *Adam and Eve* (cit. n. 11), p. 194 f.

evolved from an originally pure appetite for what was good. Man, he wrote, had imprinted in his soul "an affected and earnest inclination to his soveraigne good" that "is drawn as it were by force to search it out in euery thing." However, "ignorance of things and the imperfection of reason, which abounde in him, bicause of his corruption, make him for the most part to labour and take delight in evil." Thus have men "abandoned the simplicitie and first modesty of their nature, to feed their minds with a vaine curiositie."[16]

Most commonly, the curious quest for knowledge, as in the Augustinian analysis, was associated with the greatest of the deadly sins—pride. The mortal sin of pride was a master vice that encompassed within its scope a range of lesser vices. John Downame described an endless cycle of pride and curiosity: "We must labour to mortifie our spirituall pride, which is the mother and nurse of this idle curiosity." Curiosity, for its part, prompted the accumulation of vain knowledge that made its possessor proud: "it puffeth them vp with pride, and maketh them in the overweening conceit of their owne excellencies to contemne all others."[17]

The expression "puffed up" was to become a commonplace in early modern discussions of proud knowledge. It is most familiar from Bacon's famous reference and has its origins in St. Paul's observation: "Scientia inflat caritas vero aedificat [Knowledge puffeth up, but charity edifieth]." John Calvin, endorsing Augustine's view that pride was the cause of the Fall, wrote that "Adam was denied the tree of the knowledge of good and evil . . . to prevent him from becoming puffed up with wicked lust." Another citizen of Geneva, the Calvinist writer Lambert Daneau, spoke in his popular *Wonderfvll Woorkmanship of the World* (1578) of "the swellying and puffed Artes of Naturall Philosophie," further suggesting that heathen natural philosophers had been motivated by "a moste stronge poison of humane ambition." The great preacher Thomas Adams, the prose Shakespeare of Puritan preachers, spoke of "*proud and puffed up*" ignorance, which arises when "a man should be persuaded that hee knowes that soundly whereof he is ignorant." All the learning of the philosophers, Adams claimed, served merely to puff them up with pride. Pierre Charron, the French skeptical writer whose *Of Wisdome* was a popular moral treatise in seventeenth-century England, also claimed that knowledge might serve merely to exacerbate our natural prejudices and stubbornness: learning "puffeth up" and "bringeth with it presumption and temeritie."[18] (See Figure 2.)

[16] John Morgan, *Godly Learning: Puritan Attitudes towards Reason, Learning, and Education, 1560–1640* (Cambridge: Cambridge Univ. Press, 1986), p. 43; Aphra Behn, *The Luckey Chance* (London, 1687), act 3, scene 1; and La Primaudaye, *French Academie* (cit. n. 11), pp. 159–161. For typical treatments in English literary works see Edmund Elviden, "Of Superfluous Curiosity," in *The Closet of Counsells* (London, 1569); William Averell, *A Dyall for Dainty Darlings* (London, 1584), p. 13; John Davies, "Sinfull Curiosity," in *The Muses Sacrifice* (London, 1612), p. 163; Thomas Heywood, *The Hierarchie of the Blessed Angells* (London, 1635), Bks. 6, 7; Robert Aylett, *Divine and Moral Speculations* (London, 1654), Bk. 3, Meditations 1 and 2; Nicholas Billingsley, "On Curiosity," in *A Treasury of Divine Raptures* (London, 1667); and John Collop, "A Defence of Curiosity," in *Poesis Rediviva* (London, 1656).

[17] John Downame, *Second Part of the Christian Warfare* (London, 1611), p. 99 f. By way of contrast, Bernard of Clairvaux had thought that Satan fell through curiosity, which was the first step toward pride: "Curiosity therefore rightly claims first place among the degrees of pride, and is thus revealed as the beginning of all sin." Bernard of Clairvaux, *De gradibus humilitatis,* 3.10, 10.28, *The Twelve Degrees of Humility and Pride,* trans. B. Mills (London: Macmillan, 1929), p. 70.

[18] I Corinthians 8.1 (Vulgate/Authorized Version); Calvin, *Institutes,* 2.1.4 (Vol. 1, p. 245) (cf. 2.7.6 [Vol. 1, p. 355], 2.8.1 [Vol. 1, p. 368], 3.2.22 [Vol. 1, p. 568], 4.10.12 [Vol. 2, p. 1190]); Lambert Daneau, *The Wonderfvll Woorkmanship of the World* (London, 1578), sig. 13v; Thomas Adams, *The Divells Banket Described in Sixe Sermons* (London, 1613), pp. 177–182; and Pierre Charron, *Of Wisdome* (London, 1604), preface. At least some of these categories were taught by the Schools. The scholastics, however, were less inclined to regard involuntary ignorance as culpable. Aquinas, for example, has quite a different conception of invincible ignorance (*ignorantia*

Figure 2. *Emblem from Geffrey Whitney,* A Choice of Emblemes *(Leiden, 1586), p. 78. The emblem depicts a fowler who, in concentrating his aim on the heavens, fails to see the poisonous serpent in the grass that brings about his downfall. The accompanying verse reads: "Let Mortall men, that are but earthe, and duste, Not look to highe, with puffe of worldly pride."*

The obvious consequence of these widespread condemnations of curiosity and pride was that the acquisition of knowledge was not, as we have become accustomed to imagine, a morally neutral activity. At the turn of the seventeenth century, assessments of the relative merits of methods of inquiry were expressed in terms of these ethical and theological considerations. The particular virtues required of the earnest natural philosopher were thus an important feature of evaluations of rival proposals for natural knowledge, and a variety of vices could be attributed to proponents of competing viewpoints: curious, proud and puffed up, vain, ambitious. For this reason, the *argumentum ad hominem* was considered a legitimate tool in early modern controversies about knowledge claims. Closely associated with this ethical dimension was an exegetical concern. To advance the cause of any branch of learning it became necessary to show how it was not merely a rehearsal of the first sin of Adam and Eve recorded in Genesis, how it escaped the condemnation of the wisdom literature according to which all human knowledge was mere "vanity," and why it was not

invincibilis): "This type of ignorance is called invincible because it cannot be overcome even with effort. Since such ignorance cannot be conquered by human means it is neither voluntary nor sinful." Aquinas, *Summa theologiae,* 1a2ae.76.3 (Vol. 25, p. 149). Aquinas also speaks of affected ignorance (*ignorantia affectata*), which he applies to the Jews who willfully refused to believe in the divinity of Christ. This ignorance "aggravates rather than excuses a fault." *Ibid.,* 3a.47.6 (Vol. 54, p. 71). Proud knowledge (*scientia inflat*) is also discussed by Aquinas, but he stresses that knowledge of a truth is "essentially good" and only incidentally bad. *Ibid.,* 2a2ae.167.1 (Vol. 44, p. 203). Cf. also Augustine: "For science, too, which has its good measure of that which puffs up, or is wont to puff up, is overcome by the love for eternal things which does not puff up but, as we know, edifies." *De Trinitate,* 12.14, trans. Stephen McKenna (Fathers of the Church, 45) (Washington, D.C.: Catholic Univ. America Press, 1963), p. 363.

to be equated with St. Paul's worldly *scientia.* Finally, the moral credentials of claimants to knowledge were judged in part by an examination of the fruits of their labors, along the lines of the phrase from Matthew 7:16 adapted by Bacon: "Ye shall know them by their fruits." The mark of the unworthy investigator was knowledge that was worldly, illicit, or useless.

WORLDLY WISDOM, FORBIDDEN SCIENCE, AND VAIN KNOWLEDGE

For the most part, early modern writers followed the lead of the church fathers when identifying the tainted fruits of curiosity. The curious inquirer aspired to those things that lay beyond the natural powers of the human intellect or to knowledge that was without profit, useless, or—in a word—"vain." Poet and peer Fulke Greville, in his influential *Treatie of Humane Learning,* referred to knowledge that "doth it self farre more extend/Than all the mind of Men can comprehend." He associated this knowledge with "the same forbidden tree,/Which man lusts after to be made his Maker." Thomas Wright wrote in his work on the passions that curiosity extended to "those secrets, oracles, and mysteries, which farre exceed mens capacities, or are so vnprofitable, that the commoditie of men reape by them, will not countervaile the labor and paine spent in procuring, effecting, or obtayning of them." The Italian reformer and sometime Regius Professor of Divinity at Oxford, Peter Martyr, described curiosity in his encyclopaedic *Common Places* as "too much indeuour to knowe things forbidden, and such things as are nothing to the purpose." The independent divine Thomas Goodwin, who had advanced the rather extreme thesis that all thoughts are sins, regarded lust for knowledge as particularly loathsome, condemning "that curious itch that is in men . . . which is much delighted with new things, though they concerne us not."[19]

The most general label for such knowledge was "worldly wisdom." St. Paul warned the Christians at Corinth that God had "made foolish the wisdom of this world." This text provided the basis for the common pairing of curiosity with "worldly wisdom." A typical instance is provided by La Primaudaye, who condemned that "Sophisticall curiositie and worldlie wisdome which are meere foolishnes before God." In its most innocuous form, worldly learning had the potential to seduce the curious mind away from the knowledge of God. "Curious speculation of creautures," thought Thomas Jackson, serves to "divert many minds from the invisible creator vnto whom the sight of these by nature not misleveled by inordinate or unvildy appetites would direct all." The end result of this tendency was that the learned might even be persuaded that God did not exist. This association of natural philosophy with atheism was as old as the ancient accusations leveled against Socrates. La Primaudaye spoke of those "curious Inquisitors of the causes of all natural things, that through frivolous and vnprofitable questions . . . haue fallen into that impietie, as to seeke for another beginning of all things, than God."[20] The naturalistic hypothesis for the world's origins was associated with Epicurus.

An attendant danger of worldly learning, potentially more deadly even than its incipient

[19] Fulke Greville, *A Treatie of Humane Learning,* in *Certaine Learned and Elegant Workes* (London, 1633) (hereafter cited in parentheses as ***Workes***), p. 23; Wright, *Passions of the Minde* (cit. n. 11), p. 314 (cf. Willet, *Hexapla in Genesin* [cit. n. 15], sig. A2r); Peter Martyr, *Common Places* (cit. n. 11), p. 332; and Thomas Goodwin, *The Vanity of Thovghts Discovered: Together with Their Danger and Cvre* (London, 1637), p. 67.

[20] I Corinthians 1:20; La Primaudaye, *French Academie* (cit. n. 11), pp. 170 ("Sophisticall curiositie"), 161 ("curious Inquisitors"); and Thomas Jackson, *A Treatise of Unbelief* (London, 1625), p. 45. For the accusations against Socrates see Plato, *Apology,* 26d.

atheism, lay in its potential to promote error and heresy. Early modern writers reiterated the view of the third-century church father Tertullian, who had asserted that "Restless curiosity" and "philosophy," in fatal combination, were the parents of heresy. John Calvin, for example, continually warned the curious against examining too closely his doctrine of election. To do so was to seek knowledge of the inscrutable divine will, with the attendant danger of developing false ideas of the Deity. The conservative controversialist Alexander Ross reiterated Calvin's stance, stating that the real danger of curiosity was that it would lead to prying "into the secrets of heaven." "Worldly learning," agreed the Puritan divine John Downame, "is the mother of all dangerous errours and damnable heresies."[21]

But where exactly were the boundaries of worldly learning supposed to lie? The illicit sciences of divination, magic, and witchcraft—"forbidden knowledge by forbidden means," to use John Milton's phrase—selected themselves. Lambert Daneau wrote in his *Dialogue of Witches* (1575) of those who, "borne away with fonde vanitie of a proude mynde, whyle they are not able to containe themselues within the compas of mans vnderstanding & capacitie, do yeelde themselves vassals to Satan, being desierous to know things to come & to foretell them to other [*sic*]." Curiosity beyond its proper bounds might thus lead one determined to arrive at that knowledge that could not be had by ordinary means to a Faustian compact with the devil. Once again, the paradigm was Eve, who had been persuaded by Satan to an attempted mastery of forbidden knowledge. In his *Daemonologie* (1597) James I described the process through which curiosity would eventually lead to the darker arts of magic. Certain learned men, he wrote, "mounting from degree to degree, vpon the slippery slope and vncertain scale of curiositie," are "at last entised, that where lawful artes or sciences fails, to satisifie their restlesse mindes, even to seeke to that black and vnlawful science of *Magick*." In this manner they re-enact that original sin of Adam, who by seeking to increase his knowledge extended what he knew only to what was evil: "and their knowledge, for all that they presume thereof, is nothing increased, except in knowing evil . . . as Adam's was by eating of the forbidden tree." Reginald Scot, in his classic work on the black arts, *The Discoverie of Witchcraft* (1584), condemned "the curiositie of figure casters, the vanitie of dreamers." The charge was repeated by William Perkins, who asserted that curiosity leads to "the cursed art of Magick and witchcraft, as a way to get further knowledge in matters secret and not reueiled." Curiosity, according to Anthony Burgesse, was the author of "those Magick Arts and Witchcraft, which have abounded in the world; as also in Judicial Astrology, and such deceitful impostures."[22]

[21] Tertullian, *De praescriptione haereticorum*, 7, 14, and Tertullian, *De anima*, 2, in *Anti-Nicene Fathers*, ed. Alexander Roberts and James Donaldson, 10 vols. (Grand Rapids, Mich.: Eerdmans, 1989), Vol. 3, pp. 246–247, 249–250, 182–183; Calvin, *Institutes*, 2.1.10 (Vol. 1, p. 254), 3.21.1 (Vol. 2, pp. 920, 920 F.) (cf. Daneau, *Wonderfvll Woorkmanship* [cit. n. 18], sig. Aiiir); Alexander Ross, *Mel Heliconium* (London, 1642), p. 2; and Downame, *Second Part of the Christian Warfare* (cit. n. 17), p. 100. For similar themes in contemporary poetry see Thomas Nash, *Summers Last Will and Testament* (London, 1600), ll. 1399–1410; Heywood, *Hierarchie of the Blessed Angells* (cit. n. 16), Bk. 6, ll. 6182–6199, Bk. 7, ll. 9300–9305 (pp. 333, 443); Charles Fitz-Geffry, *The Blessed Birth-Day* (London, 1636), ll. 945–954 (p. 37); Robert Aylett, "Of Truth," ll. 163–171, in *Divine and Moral Speculations* (cit. n. 16), Bk. 2, Meditation 2; Billingsley, "On Curiosity" (cit. n. 16), p. 225 f.; and Francis Quarles, "Iob Militant," in *Divine Poems* (London, 1632), ll. 103–140 (p. 238 f.). It is interesting that even Hobbes, who gives a comparatively positive account of curiosity, implicates it in the origins of heresy. See Thomas Hobbes, *An Historical Narration Concerning Heresy*, in *The English Works of Thomas Hobbes of Malmesbury*, ed. Sir William Molesworth, 7 vols. (London, 1839–1845) (hereafter cited in parentheses as ***Works***, with volume and page numbers), Vol. 4, p. 390; and Hobbes, *Leviathan*, 1.11 (*ibid.*, Vol. 3, p. 92 f.).

[22] John Milton, *Paradise Lost*, Bk. 12, l. 279; Lambert Daneau, *A Dialogue of Witches* (London, 1575), sigs. E2v–E3r; James I, *Daemonologie* (Edinburgh, 1597), pp. 10, 11; Reginald Scot, *The Discoverie of Witchcraft* (London, 1584), title page; Perkins, *Discourse of the Damned Art of Witchcraft* (cit. n. 13), p. 11; and Anthony Burgesse, *The Doctrine of Original Sin Asserted* (London, 1658), p. 213. For the connection between curiosity

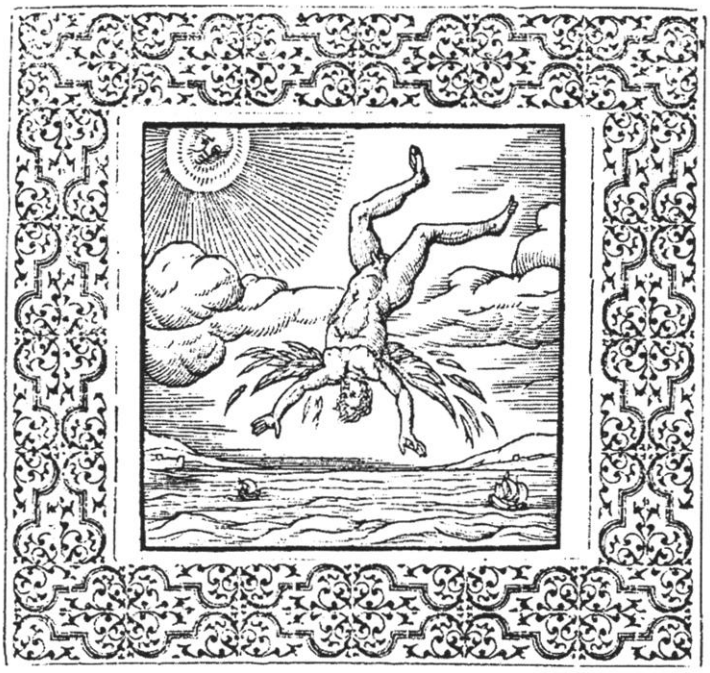

Figure 3. *"On Astrologers." Emblem of Icarus from Geffrey Whitney,* A Choice of Emblemes *(Leiden, 1586), p. 28. The accompanying verse reads: "Let suche beware, which paste theire reache doe mounte,/Whoe seeke the thinges, to mortall men deny'de,/And searche the Heauens, and all the starres accoumpte,/And tell therebie, what after shall betyde:/With blusshinge nowe, theire weaknesse righlie Weye/Least as they clime, they fall to theire decaye."*

To the catalogue of the curious arts might also be added judicial astrology and alchemy. In his *Admonicion against Astrology Ivdiciall and Other Curiosities,* translated into English in 1561, Calvin had preached that astrology and soothsaying are the fruit of "a curiositie not onelye superfluous and unprofitable, but also evill & wicked." Sixteenth-century emblem books, which set out images with an accompanying moral text, also warned against the dangers of astrology. The emblem of Icarus in Geffrey Whitney's *Choice of Emblemes* (1586) bears the title "On Astrologers" and sounds the warning: "Let suche beware, which paste their reache doe mounte,/Whoe seeke the thinges, to mortall men deny'de."[23] (See Figure 3.) This message was not lost on James I, who censured Cardanus, Cornelius Agrippa, and "diuerse others" for having "more curiously than profitably written at large." Astrology and alchemy were similarly held up by Thomas Wright

and the occult sciences in France see M. Verbeeck, "Magie et curiosité au XVIIe siècle," *Revue d'Histoire Ecclesiastique,* 1998, *83:*349–368; and Verbeeck, "Le péché de curiosité au XVIIe siècle" (mémoire de licence en histoire, Univ. Liège, 1984–1985).

[23] John Calvin, *An Admonicion against Astrology Ivdiciall and Other Curiosities,* trans. G. Gylby (London, 1561), unpaginated; and Geffrey Whitney, *A Choice of Emblemes* (Leiden, 1586), p. 28. See also George Wither, *A Collection of Emblemes, Ancient and Moderne* (London, 1635), p. 147; and John Hall, *Emblems with Elegant Figures* (London, 1658), p. 29. The emblems of Whitney and Wither are derivatives of the Latin emblems of Andreas Alciatus, *Andreae Alciati Emblematum Fontes Quatuor* (Augsburg, 1531), numerous editions of which appeared between 1531 and 1621. For the Latin original see *Andreas Alciatus,* ed. Peter M. Daly with Virginia Callahan, 2 vols. (Toronto: Univ. Toronto Press, 1985), Vol. 1, p. 104.

as examples of the dubious fruits of curiosity. Even such apparently harmless pursuits as mathematics and the mechanical arts were frequently associated throughout the Renaissance with the proscribed practices of witchcraft and magic. Again it was Calvin who complained that mathematics was often a refuge for astrologers seeking a cloak of respectability for their nefarious activities. Cornelius Agrippa readily conceded that mathematics is "necessary to" and has "an affinity with Magick."[24]

Not only the occult sciences were censured as "worldly," however. A more controversial inclusion was the natural philosophy of Aristotle and the learning of the schools. "Worldly learning," for a number of seventeenth-century thinkers, thus retained some of its original Pauline sense, being frequently identified with Greek natural philosophy. La Primaudaye accused Aristotle of having burned with an inappropriate "desire of curiosity in vnderstanding the causes of natural things." Pliny was condemned on the same grounds. The interest of the seventeenth century in Aristotle, it need hardly be said, was not purely antiquarian. Criticism of Aristotle was aimed at his medieval and early modern adherents. "The *Vanitie* of the mind," wrote Thomas Goodwin, "appears in *curiosity* a longing and itching to be fed with, and to know (and then delighting to think of) things that do not at all concern us." To follow this course is to glory in one's own imagination, "as many of the Schoole-men did in some of their speculations, spending their pretious wits in framing curious webs out of their owne bowels." The primary feature of such vain knowledge was, for Goodwin, its "unprofitableness."[25] Fulke Greville likewise described the "Vainenesse and Defect of Schooles." Such critical views persisted well into the seventeenth century. Vain curiosity, wrote Anthony Burgesse in his 1658 work on original sin, had "filled the Church once with so many Schoolmen and their Questions as Aegypt was once filled with Caterpillars." Robert Fludd, who had himself flirted with forbidden sciences, condemned "the Philosophy of the *Ethnicks*" as "false and erroneous," "vain," and "founded upon the wisdom of the world." It had its ultimate source in "the Prince of darknesse." True philosophy lies "buried in darkness, through the mysty and ambiguous clouds of that cavilling, brabling, heathenish Philosophy, which they [the scholastics] so adore and follow, with their Master *Aristotle,* as if he were another Jesus rained down from heaven, to open unto mankind the treasures of the true wisdome."[26]

To condemn curiosity and assert the vanity of worldly learning, however, was not necessarily to interdict all investigative endeavors. Admittedly, there were those, like Montaigne, who were content to rest in a skeptically motivated fideism. Yet many of those who mouthed the rhetoric of curiosity and asserted the vanity of worldly learning did not

[24] James I, *Daemonologie* (cit. n. 22), p. 11; Wright, *Passions of the Minde* (cit. n. 11), p. 315; Calvin, *Admonicion against Astrology;* and Henry Cornelius Agrippa, *Three Books of Occult Philosophy,* 2.1 (London, 1651), p. 167. On unsavory associations see, e.g., Katherine Neal, "The Rhetoric of Utility: Avoiding Occult Associations for Mathematics through Profitability and Pleasure," *History of Science,* 1999, *37:*151–178, esp. pp. 155–158; William Eamon, "Technology as Magic in the Late Middle Ages and Renaissance," *Janus,* 1983, *70:*171–212; and Peter Zetterberg, "The Mistaking of 'the Mathematics' for Magic in Tudor and Stuart England," *Sixteenth Century Journal,* 1980, *11:*83–97.

[25] La Primaudaye, *French Academie* (cit. n. 11), p. 162. Even Thomas Sprat, an enthusiastic apologist for natural philosophy, rebuked Pliny for his counterproductive curiosity: Sprat, *History of the Royal Society of London* (London, 1667), p. 90 f. Goodwin, *Vanity of Thovghts* (cit. n. 19), pp. 62, 64 f., 20. The image was not entirely original. See Francis Bacon, *The Advancement of Learning,* in *The Works of Francis Bacon,* ed. James Spedding, Robert Ellis, and Douglas Heath, 14 vols. (London: Longman, 1857–1874) (hereafter cited in parentheses as ***Works,*** with volume and page numbers), Vol. 3, p. 285 f. Cf. Brian Vickers, ed., *Francis Bacon* (Oxford: Oxford Univ. Press, 1996), pp. 140, 596n.

[26] Greville, *Treatie of Humane Learning* (cit. n. 19), par. 60 (*Workes,* p. 34); Burgesse, *Doctrine of Original Sin* (cit. n. 22), p. 213 (cf. Augustine, *Confessions,* 10.25); and Robert Fludd, *Mosaicall Philosophy Grounded upon the Essential Truth or Eternal Sapience* (London, 1659), pp. 9, 28.

do so indiscriminately but, rather, attempted to utilize this moral discourse to discredit rival claims to knowledge. Lambert Daneau, for example, wished to replace Aristotelian natural philosophy with a "Christian" natural philosophy. Fulke Greville's apparently skeptical *Treatie of Humane Learning* sought to condemn only proud and bookish learning. Genuine knowledge was to be drawn from nature, not from books, and true learning could take place only in the most humble of human hearts. Paracelsian and Helmontian attacks on the physick of the ancients were similarly mounted in order to propose what were thought to be efficacious alternatives. The acrimony of Fludd's invective against Aristotle and the Schoolmen was matched by an enthusiasm for his own blend of Renaissance hermeticism. Numerous authors also pointed out that if Scripture had condemned the curiosity of Eve, the foolishness of the Greeks, and the vanity of the worldly wise, it had equally praised the knowledge of Solomon and Job. Even Thomas Goodwin, who had condemned all human thoughts as vain, allowed that the study of the natural world could convey something of the divine nature.[27]

The strategic use of the moral argument against worldly learning, however, placed an onus on those who proposed something in its place to show how their suggested alternative was itself immune to the criticism leveled against opponents: not proud or puffed up, not extending to what was illicit or impossible to know, not scholastic, not diabolical or magical, not bookish, not pagan, and, crucially, not vain or useless. Attentive to the dual aspects of the vice of curiosity—the moral status of the inquirer and the nature of the proposed knowledge—proposals for the advancement of learning had to address themselves to two related issues, one pertaining to those seeking after knowledge, the other to the kind of knowledge sought. On the first count, as we have already noted, the pursuit of knowledge could not be isolated from a moral discourse in which specific intellectual vices were identified as having in the past presented insurmountable barriers to legitimate science. The natural philosopher, in short, was required to embody certain virtues, in particular humility and charity.

On the second count, the knowledge obtained had also to meet a number of criteria. Above all, it could not be vain or unprofitable. The familiar seventeenth-century rhetoric of the usefulness of natural philosophy was addressed to this concern. Neither could it be concerned with "forbidden" things. Hence the tendency to define the legitimacy of natural philosophy in terms of its distance from the illicit sciences, in particular magic and witchcraft, and to a lesser extent those other endeavors with occult associations—astrology, alchemy, Paracelsianism, hermeticism. Knowledge could not be sought that was beyond human capacities, whence new epistemological projects to establish the legitimate bounds of human knowledge. Finally, learning could not be dispute engendering. Again, this requirement called for epistemological endeavors, along with the establishment of specific practices and procedures designed to make explicit the criteria for making and contesting knowledge claims.[28] The most comprehensive seventeenth-century response to these concerns was provided by Francis Bacon's program for the instauration of natural philosophy.

[27] Daneau, *Wonderfvll Woorkmanship* (cit. n. 18), sig. 10r (cf. sig 3r and translator's introduction); Greville, *Treatie of Humane Learning*, pars. 62, 75, 150 (*Workes*, pp. 35, 37, 51); Smith, *Sermons* (cit. n. 14), p. 997; Bacon, *Advancement of Learning* (cit. n. 25) (*Works*, Vol. 3, p. 298 f.); and Goodwin, *Vanity of Thovghts* (cit. n. 19), p. 64.

[28] Steven Shapin's *Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago: Univ. Chicago Press, 1994), focuses on the role of trust in seventeenth-century English natural philosophy and thus addresses similar concerns from a different perspective. Shapin suggests that the natural philosopher had to exemplify certain virtues and that strategies for determining the veracity of knowledge claims were adjudicated by a gentlemanly community in such a way as to avoid fruitless disputation.

BACON'S INSTAURATION AND FORBIDDEN KNOWLEDGE

Any project that advocated the expansion of knowledge would need to address the moral and theological discourse that centered on the themes of curiosity, vain knowledge, and pride. It would need also to confront the Genesis account of the Creation and the temptation of Adam and Eve, which on a literal reading implied that the quest for certain kinds of knowledge had resulted in the Fall of the human race. Francis Bacon engaged in a masterful manipulation of contemporary moral and theological concerns about knowledge to put his case for the advancement of learning.

In two paragraphs in *Valerius Terminus* (ca. 1603), an unpublished precursor to *The Advancement of Learning,* Bacon addressed virtually all of the criticisms of learning embedded in the contemporary conception of curiosity:

> So as whatsoever is not God but parcel of the world, he hath fitted it for the comprehension of man's mind, if man will open and dilate the powers of understanding as he may. But yet evermore it must be remembered that the least part of the knowledge passed to man by this so large a charter from God must be subject to that use for which God hath granted it; which is the benefit and relief of the state and society of man; for other wise all manner of knowledge becometh malign and serpentine, and therefore as carrying the quality of the serpent's sting and malice it maketh the mind of man to swell; as the Scripture saith excellently, *knowledge bloweth up, but charity buildeth up.*

For Bacon, knowledge of the world is neither forbidden nor exceeds our capacities, for God has fitted the world to human capabilities. The legitimacy of such knowledge is evident from its usefulness—"the benefit and relief of the state and society of man." The quest for this beneficial knowledge, moreover, is nothing other than the practice of the greatest of the theological virtues, charity. There is, Bacon concedes, a forbidden, serpentine, knowledge, that to which our first parents aspired and that produces the greatest of the seven deadly sins—pride. But it is the usefulness of knowledge that is the chief sign of its charitable, rather than proud, nature. Bacon concludes this section by providing instances of the latter. Legitimate knowledge of nature is not the fruit of "the pleasure of curiosity": this dubious distinction is reserved for "all the vain and abusing promises of Alchemists and Magicians, and such like light, idle, ignorant, credulous, and fantastical wits and sects."[29]

These same themes were developed further in *The Advancement of Learning* (1605). Here Bacon reiterates his conviction that knowledge of the world is not beyond human capacities because "God hath framed the mind of man as a mirror or glass, capable of the image of the universal world." Bacon confronts the narrative of Genesis even more directly in this context, contesting the common reading of the account of the temptation according to which "the aspiring to overmuch knowledge was the original temptation and sin whereupon ensued the fall of man." He concedes the power of knowledge to corrupt the knower. If knowledge is sought "without the true corrective thereof, [it] hath in it some venom or malignity." Such knowledge is "proud knowledge" or knowledge that "hath in it something of the serpent."[30] Again, Bacon turns the biblical phrase "Scientia inflat caritas vero ae-

[29] Francis Bacon, *Valerius Terminus* (*Works,* Vol. 3, pp. 221, 222, 223). For an account of the religious elements in *Valerius Terminus* see Benjamin Milner, "Francis Bacon: The Theological Foundations of *Valerius Terminus,*" *Journal of the History of Ideas,* 1997, *58*:245–264.

[30] Bacon, *Advancement of Learning* (cit. n. 25) (*Works,* Vol. 3, pp. 265, 264); and Francis Bacon, *De augmentis,* 7.8 (*Works,* Vol. 5, p. 29). Compare the defense in Daneau, *Wonderfvll Woorkmanship* (cit. n. 18), sig. 3v.

dificat" to his own purposes. The necessary corrective to "proud knowledge," he asserts, is the moral virtue of Christian love (*caritas*): "This corrective spice, the mixture whereof maketh knowledge so sovereign, is charity." Charity thus contrasts with a range of improper motives for the acquisition of knowledge: "natural curiosity and appetite," "reputation," "victory of wit and contradiction," "lucre and profession." Charity aims instead at the sole legitimate end of learning: "the glory of the creator and the relief of man's estate." Finally, as pride subsumes all the vices, so does its contrary, charity, include within its scope all the virtues: Charity is "the bond of perfection, because it comprehendeth and fasteneth all the virtues together."[31]

In the preface to *The Great Instauration* (1620), the themes appear yet again. Knowledge must be "discharged of that venom which the serpent infused into it, and which makes the mind of man to swell." This will enable sober minds to "cultivate the truth in charity." In the concluding remarks of the preface Bacon asks of his readers "that they consider what are the true ends of knowledge, and that they seek it not either for pleasure of the mind, or for contention or for superiority to others, or for profit, or fame, or power, or any of these inferior things; but for the benefit and use of life; and that they perfect and govern it in charity." Again, in one of the best-known passages in all of his works, Bacon speaks of repairing the losses that ensued upon the Fall. Nature "is now by various labours (not certainly by disputations or idle magical ceremonies, but by various labours) at length and in some measure subdued to the supplying of man with bread; that is, to the uses of human life." Both in the negative parenthetical qualification—not through disputation, not through magic—and in the positive assertion of the usefulness of the endeavor, Bacon addresses the discourse of curiosity.[32]

While some have doubted the sincerity of Bacon's moral and theological rhetoric, it is clear that the virtue of charity so lauded in these passages was central to an underlying conviction that informs not merely Bacon's rhetoric about knowledge but the whole range of his activities. Thus, for example, in a letter explaining his reasons for seeking a position at court, Bacon insists that it is not "curiosity, or vain glory," but "*philanthropia*" that motivates him. The centrality of *philanthropia* and charity recurs as a theme in the 1612 volume of *Essays* in a piece entitled "Of Goodness and Goodness in Nature," and indeed "philanthopy" is a term that Bacon himself introduced into the English lexicon. Bacon designates *philanthropia* as the greatest "of all the virtues and dignities of the mind"; it is nothing less than "the character of the Deity." It is a form of goodness that is to be equated with "the theological virtue Charity." The motif of charity also dominates the early reli-

[31] Bacon, *Advancement of Learning* (*Works,* Vol. 3, pp. 294, 442). In standard scholastic accounts, charity is the crown of the three theological virtues—faith, hope, and love. See, e.g., Aquinas, *Summa theologiae,* 2a2ae.23, la2ae.23.8; for Aquinas, love was the form of all the virtues. As the chief of the theological virtues, charity was the counterpart of pride, the first of the seven deadly sins. In the original description of this supreme Christian virtue, St. Paul notes that charity "is not puffed up" (I Corinthians 13:4). Calvin also suggested a fundamental opposition between charity and pride: *Institutes,* Vol. 1, p. 695. The contrast Bacon draws between curiosity and charity as motives for knowledge appears in other contemporary writers. Thus the poet Robert Aylett: "Some only seek to know that they may know/And this is foolish curiosity,/And some of Learning make a goodly show,/And this is base and idle vanity;/Some Knowledge seek for their utility,/Or their preferment, which is filthy gain;/Some to teach others which is Charity." "The Brides Ornament," ll. 127–133, in *Divine and Moral Speculations* (cit. n. 16), p. 145. See also John Reynolds, *The Triumphs of God's Revenge* (London, 1635), p. 11 f.; and Collop, "Defence of Curiosity" (cit. n. 16), ll. 80–84.

[32] Francis Bacon, *The Great Instauration,* preface (*Works,* Vol. 4, p. 20 f.); and Bacon, *Novum Organum,* 2.52 (*Works,* Vol. 4, pp. 247–248). On Bacon's explicit distancing of his project from magic and hermeticism see Paolo Rossi, *Francis Bacon: From Magic to Science* (London: Routledge & Kegan Paul, 1968), esp. pp. 22–35.

gious work *Meditationes.* Here Bacon emphasizes the necessity for good works to accompany faith. Jesus is the best model, "for all his miracles were for the benefit of the human body, his doctrine for the benefit of the human soul." These two facets of usefulness—physical and spiritual—reappear during the Interregnum in justifications of medical reforms and are later repeated by Joseph Glanvill and Robert Boyle in their defenses of the usefulness of the experimental philosophy.[33]

Bacon's achievement in sanctifying the pursuit of natural philosophy was twofold. First, he countered the most common biblical objections to the promotion of learning by providing a rereading of the narrative of the temptation in the Garden. Applying the Protestant exegetical principle that Scripture must interpret Scripture, he brought the Pauline "Scientia inflat" to bear on the text of Genesis, yielding an interpretation that was to legitimate natural philosophy. Additional support for such a reading was supplied from the text of Daniel 12:4, "Many shall go to and fro, and knowledge shall be increased," which for Bacon implied that "in the last stages of the world" voyages of discovery and the advancement of the sciences were destined by providence to meet in the same age.[34] (See Frontispiece.) This added an eschatological element to the moral perspective. The significance of the liberating effect of these readings was not lost on subsequent thinkers. These two biblical justifications for natural philosophy gave a particular resilience to the Baconian program during a period when appeals to biblical authority were decisive. If the incipient millenarianism of his reading of the passage from Daniel and his rhetoric of restoring human dominion over the earth provided inspiration for the various chiliastic movements associated with new scientific and technological projects during the Interregnum, the more staid moral component, with its emphasis on the control exercised by charity, ensured its tenure through the Restoration, when more enthusiastic eschatological enterprises were viewed with some suspicion.

The second aspect of Bacon's achievement was his response to the related issue of the moral legitimacy of the quest for knowledge. The pursuit of knowledge need not be morally improper if it is carried out with the correct motivations and gives rise to knowledge that is useful. The vocation of natural philosophy, in short, demands certain moral qualifications. The mind must be purged of improper motives, and the tendency to excess, the rule of the passions, and the triumph of intellectual lust, all of which were both cause and consequence of the Fall, reined in. This insistence upon mental discipline is reminiscent of medieval meditative and ascetic traditions that require the mind to be purged and purified before it attains knowledge. Aquinas had explained how lust and gluttony give rise to "blindness of mind," whereas abstinence and chastity "dispose man very much to the perfection of intellectual operation." Later ascetic writers took a similar view. "Were you inwardly good and pure, you would see and understand all things clearly and without difficulty," wrote Thomas à Kempis. The extreme tendency of this view is present in the seventeenth century in the influential writings of Jacob Boehme, who claimed that human knowledge could be opened up not by "Academick, or University, or Scholastick learning:

[33] *The Letters and the Life of Francis Bacon,* ed. James Spedding, 7 vols. (London, 1861–1874), Vol. 1, p. 109; Francis Bacon, *Essays* (*Works,* Vol. 6, p. 403); and Bacon, *Meditationes sacrae* (*Works,* Vol. 7, p. 244). On Bacon's philanthropy see Brian Vickers, "Bacon's So-called 'Utilitarianism': Sources and Influences," in *Francis Bacon: Terminologia e fortuna nel XVII secolo,* ed. Marta Fattori (Rome: Ateneo, 1984), pp. 281–314; and Masao Watanabe, "Francis Bacon: Philanthropy and the Instauration of Learning," *Annals of Science,* 1992, *49:*163–173. For the Interregnum see, e.g., John Webster, *Academiarum examen* (London, 1654); and H. Pinnel, *Philosophy Reformed and Improved in Four Profound Tractates* (London, 1657). See also Charles Webster, *The Great Instauration: Science, Medicine, and Reform, 1626–1660* (London: Duckworth, 1975), pp. 282–288.

[34] Bacon, *Novum Organum* (*Works,* Vol. 4, p. 91).

but by earnest repentance, fasting, watching, praying, knocking, and seeking in the sufferings of Iesus Christ by the Holy Ghost." Bacon himself, while decrying such extremes, frequently observed that the mind in pursuit of knowledge needs to be "purifed and purged of fancies and vanity." Charity is the principle that must "govern" the quest for knowledge; it is a virtue of "which there can be no excess."[35] In short, it is charity that must motivate the knower, not curiosity.[36]

The Baconian defense of the moral appropriateness of seeking knowledge of nature provided legitimation for the scientific projects of the Commonwealth and, subsequently, those of the Royal Society. If the positive eschatological images provided by Bacon served to inspire the many and varied projects for the advancement of knowledge and relief of man's estate during the Commonwealth period as Charles Webster has suggested, we must add that in addition to providing positive incentives, Bacon had neutralized standard assumptions about curiosity and forbidden knowledge that might have impeded such projects. Neither were Restoration advocates of the new philosophy unaware of their enormous debt to Bacon's defense of natural philosophy. As the poet Abraham Cowley was to write in his dedicatory poem to the Royal Society: "The Orchard's open now, and free/Bacon has broke that Scar-crow Deity." Thus was Bacon credited with having provided a new, liberating reading of the narrative of the Fall and, consequently, exorcising the notion of a Deity who frowned upon projects for the advancement of the sciences.[37]

THE REHABILITATION OF CURIOSITY

Bacon's strategy for dealing with the difficulties caused his proposed instauration by the dubious status of curiosity consisted in insulating his natural philosophy from the criticisms associated with that particular intellectual vice. Bacon did not deny the dangers of curiosity and pride but showed how a legitimate natural philosophy might avoid the more obvious problems and how its practitioners might be immune to the moral pitfalls traditionally associated with the acquisition of knowledge. It was entirely appropriate that the Fellows of the Royal Society consider themselves in his debt. The interval between Bacon's justification of the sciences and the founding of the Royal Society, however, witnessed a parallel development that further smoothed the path for the new philosophies. From early in the seventeenth century lone voices had begun to question whether any moral odium

[35] Aquinas, *Summa theologiae,* 2a2ae.15.3 (Vol. 32, p. 143) (cf. Gregory: "dullness of sense arises from gluttony and blindness of mind from lust." *Moralia in Iob,* 31.45, in *Corpus Christianorum,* Series Latina, Vol. 143B, pp. 1610–1611); Thomas à Kempis, *The Imitation of Christ,* 2.4, trans. Leo Sherley-Price (Ringwood, Victoria: Penguin, 1952), p. 72; Jacob Boehme, *The Second Booke, Concerning the Three Principles of the Divine Essence* (London, 1648), preface; and Bacon, *Great Instauration* (cit. n. 32) (*Works,* Vol. 4, p. 20) (cf. Bacon, *Prayers,* 1 [*Works,* Vol. 7, p. 259]). On the connection between control of the passions and acquisition of knowledge see Peter Harrison, "Reading the Passions: The Fall, the Passions, and Dominion over Nature," in *The Soft Underbelly of Reason: The Passions in the Seventeenth Century,* ed. Stephen Gaukroger (London: Routledge, 1998), pp. 49–78.

[36] It is also suggestive that the patristic and medieval theological sources posit an opposition between curiosity and charity. "They were drawn by curiosity, not by charity," wrote Augustine of the Jews who came to see Lazarus raised from the dead. These curious spectators thus exemplified "the strange scheming of human vanity." Augustine, *Tractates on John,* 50.14, in *Nicene and Post-Nicene Fathers, I,* Vol. 7, p. 283b. "Charity is not vanity," Aquinas was later to write; "indeed it is opposed to vanity." Aquinas, *Summa theologiae,* 2a2ae.23.2 (Vol. 34, p. 15). Faith was also frequently opposed to curiosity. The latter attached to objects of the senses, and the eyes in particular, the former to higher unseen things. See Evans, *Getting It Wrong* (cit. n. 8), p. 114.

[37] Webster, *Great Instauration* (cit. n. 33); Cowley's poem appears in Sprat, *History of the Royal Society* (cit. n. 25), sig. Bv.

ought to be attached to curiosity, and by the end of the century they had become a chorus. Thus, over the course of the century a gradual rehabilitation of curiosity began, allowing for a more aggressive justification of the pursuit of natural philosophy than that which Bacon had found it necessary to articulate.

Thomas Hobbes, for example, turned his back completely on the long-standing moral tradition in his account of curiosity. He ignored the narrative of the Fall and avoided the familiar associations of pride, vanity, and forbidden knowledge. Instead, curiosity was the morally neutral "appetite of knowledge." Indeed, more than an innocuous appetite, curiosity was actually praised as the one characteristic that distinguished man from the beasts and as the beginning from which "is derived all philosophy." Hobbes regarded this latter relation as being to the credit of curiosity. In a letter to the marquis of Newcastle he went so far as to assert the value of pursuing knowledge for its own sake, even when no useful application is in sight.

> And therefore as in the cognitive faculties reason, so in the motive curiositie, are the markes that part ye bounds of man's nature from that of beastes. Which makes mee, when I heare a man, upon the discovery of any new and ingenious knowledge or invention, aske gravely, that is to say, scornefully, what 'tis good for, meaning what monie it will bring in, (when he knows as little, to one that hath sufficient what that overplus of monie is good for), to esteeme that man not sufficiently removed from brutalitie. Which I thought fit to say by way of anticipation to ye grave scorners of philosophie. . . .[38]

In their insightful analysis of the shifting sensibilities of this period, Lorraine Daston and Katharine Park identify in Hobbes the beginnings of a new twofold association of curiosity with greed, on the one hand, and with the more respectable wonder, on the other.[39] While a new alliance with greed may seem to add little to the fortunes of curiosity, it was at least a step away from lust and pride, which were far worse. In this new map of the relationships of the sensibilities, curiosity was distanced from the vices associated with the Fall and thus began its liberation from the burdens imposed upon it by sacred history. In addition, some of the stigma associated with it was subsequently transferred to wonder—which, having brought respectability to curiosity, was in the eighteenth century to suffer a rapid decline in its own reputation.

It is worth noting in passing that on the Continent Descartes, too, tended to disregard the traditional biblical associations of curiosity. For Descartes, as for Hobbes, it was curiosity, common to all men, that motivated the quest for knowledge.[40] Only when curiosity was undisciplined and unmethodical did it become "blind" and counterproductive. The Cartesian project thus sought not to eliminate curiosity but to discipline and direct it. In the *Regulae* Descartes explained how it was the purpose of his rules and his method to

[38] Thomas Hobbes, *Human Nature,* 1.9.18 (*Works,* Vol. 4, p. 50 f.); Hobbes, *Leviathan* (*Works,* Vol. 3, p. 44); Hobbes, *Decameron physiologicum,* Ch. 1 (*Works,* Vol. 7, p. 71); and Hobbes, "To the Marquis of Newcastle," in *Letters* (*Works,* Vol. 7, p. 467). Robert Hooke and, after him, Samuel Johnson also suggest that curiosity is a distinguishing feature of the human race. See Robert Hooke, *Micrographia* (London, 1665), preface; for Johnson's views see Robert J. Mayhew, "Nature and the Choice of Life in *Rasselas,*" *Studies in English Literature, 1500–1900,* 1999, *39*:539–552.

[39] Daston and Park, *Wonders and the Order of Nature* (cit. n. 2), pp. 305–328.

[40] René Descartes, *Passions of the Soul,* in *The Philosophical Writings of Descartes,* trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch, 2 vols. (Cambridge: Cambridge Univ. Press, 1984–1991) (hereafter cited in parentheses as ***Philosophical Writings,*** with volume and page numbers), Vol. 1, p. 359; and Descartes, *The Search for Truth,* sect. 499 (*ibid.,* Vol. 2, p. 402). Like Bacon, however, Descartes did have to address the issue of "puffed knowledge" and show why his own philosophical program was immune to the Pauline charge. See Descartes, *Reply to Objections,* 6 (*ibid.,* Vol. 2, p. 290).

control "blind curiosity" so that the mind might be directed toward knowledge. In his account of the passions, he similarly insisted that only the extremes of wonder and curiosity will lead to error. It is "*excessive* wonder" and "*blind* curiosity" that must be controlled if useful knowledge is to be attained.[41] This is not to say that Descartes's analysis of knowledge and the role of curiosity in erroneous judgments was completely novel. His psychological account of the origins of error owes much to an Augustinian view of the will. Curiosity results from the fact that the extent of the will is greater than that of the intellect. As Descartes explains, "It is of the nature of a created intellect to be finite; and it is of the nature of a finite intellect that its scope should not extend to everything." However, the will suffers from fewer limitations than the intellect. Hence in the freedom of the will lies the possibility for error: "The fact that we fall into error is a defect in the way we act, not a defect in our nature. The faults of subordinates may often be attributed to their masters, but never to God."[42] This, in essence is the same argument that we find in Augustine and, later, Calvin. According to Augustine's analysis, curiosity results from disordered relations amongst the faculties of the soul. As G. R. Evans describes it: "Will ought also to be subordinate to reason, but if will becomes dominant there is uncontrollable *curiositas*." The similarity of this view to that of Descartes is difficult to dismiss. Descartes, however, is less concerned with condemnation of this inherent tendency than with its rectification. He thus provides an Augustinian analysis of the will to highlight the inevitability of curiosity but at the same time supplies a prescription for reining it in—namely, the rules for the pursuit of natural philosophy.[43] Nicolas Malebranche followed Descartes, insisting that curiosity is "natural and necessary," although he too warned that failure to control it will inevitably lead to "many errors." These analyses thus dispensed with the connection between curiosity and original sin, resting instead on the common neo-Stoic ideal of temperance and rational control.[44]

Similar themes appear in seventeenth-century English literature. In Milton's great epic poem Adam's curiosity is presented as, in itself, quite harmless. Our first father was "led on, yet sinless, with the desire to know." *Unfettered* curiosity was the condition Raphael warned Adam against: "But knowledge is as food, and needs no less/Her Temperance over Appetite, to know/In measure what the mind may well contain,/Oppresses else with Surfet,

[41] René Descartes, *Rules for the Direction of the Mind,* rule 4, sect. 371 (*Philosophical Writings,* Vol. 1, p. 15); and Descartes, *Passions of the Soul,* sect. 386 (*ibid.,* p. 355) (emphasis added). Cf. Descartes, *Search for Truth,* sects. 499, 500 (*ibid.,* Vol. 2, p. 402).

[42] René Descartes, *Principles of Philosophy,* sects. 36, 38 (*Philosophical Writings,* Vol. 1, p. 205). Cf. Baruch Spinoza, *Descartes' Principles of Philosophy,* 1.174, in *The Collected Works of Spinoza,* Vol. 1, ed. and trans. Edwin Curley (Princeton, N.J.: Princeton Univ. Press, 1985), p. 257.

[43] Evans, *Getting It Wrong* (cit. n. 8), p. 60. For the general thesis that Augustine's thought directly influenced Descartes see Stephen Menn, *Descartes and Augustine* (Cambridge: Cambridge Univ. Press, 1998). For Descartes's view see Descartes, *Rules for the Direction of the Mind,* rule 4 (*Philosophical Writings,* Vol. 1, p. 15); and Descartes, *Passions of the Soul* (*ibid.,* p. 355). Cf. Descartes, *Search for Truth* (*ibid.,* Vol. 2, p. 402). Descartes thus ignores Augustine's understanding of curiosity based on the exegesis of Genesis and instead adopts Augustinian psychology in his account of curiosity.

[44] Nicolas Malebranche, *The Search after Truth,* 4.3, ed. and trans. Thomas M. Lennon and Paul J. Olscamp (Cambridge: Cambridge Univ. Press, 1997), p. 278 f. Cf. Francisco Sanches, "That Nothing Is Known," preface, in *Descartes'* Meditations: *Background Source Materials,* ed. Roger Ariew, John Cottingham, and Tom Sorell (Cambridge: Cambridge Univ. Press, 1998), p. 10. Pascal set out the opposing view—that it is better to be in error than to be curious: "For the chief malady of man is restless curiosity about things which he cannot understand; and it is not so bad for him to be in error as to be curious to no purpose." Blaise Pascal, *Pensées,* 744, trans. A. J. Krailsheimer (Ringwood, Victoria: Penguin, 1966), p. 256. The Stoic position was that the moral life is a means of guaranteeing freedom from intellectual error. See Gerard Verbeke, "Ethics and Logic in Stoicism," in *Atoms, Pneuma, and Tranquility: Epicurean and Stoic Themes in European Thought,* ed. Margaret Osler (Cambridge: Cambridge Univ. Press, 1991), pp. 11–24.

and soon turns/Wisdom to Folly, as Nourishment to Winde."[45] Once again it is the control of this natural and innocent inclination that leads to appropriate knowledge.

Such sentiments, not surprisingly, were also rehearsed in Restoration defenses of the mechanical philosophy. In *The Usefulnesse of Natural Philosophy* (1663) Boyle reminds his readers of Aristotle's assertion that the desire for knowledge is the natural human condition. Through the pursuit of natural philosophy, he continues, "man's curiosity for knowledge is much gratified." Such gratification, moreover, is not to be condemned as "trifling and unserviceable" but was practiced by those "of the severest virtue."[46] William Clark, commenting on the mysteries of divine providence as set out in the book of Job, reinforced the divine interdict on "such things/As far exceed all humane reasonings," while asserting at the same time that "the wit of man, may safely pry/in things on earth, and with security.... For our great God not only doth allow/Such curious searchings, but assists him too." Edward Tyson, the physician and anatomist, openly announced in his 1681 translation of one of Jan Swammerdam's works on insects that it was his design "to gratifie the Ingenious and Curious." Those who derided curiosity and devalued such works were simply "Ignorant."[47]

Tyson's sensitivity on this point illustrates the fact that the charge of curiosity was still by no means an empty one. Joseph Glanvill, a Fellow of the Royal Society and a leading apologist for the new natural philosophy, thus spoke with exasperation of those who "set up a *loud* cry against *Reason,*" misapplying the names of "*Vain Philosophy, Carnal Reasoning,* and the *Wisdom of this World.*" There was, acknowledged Glanvill, a "*blameable curiosity* in things not *worth* our *pains,* or *forbidden* our *scrutiny,*" but the quest for knowledge became a "*Duty,* and *laudable* endeavour in matters that are *weighty* and *permitted* to our *search.*" Investigating the subject matter of natural philosophy was one such laudable activity. John Norris, in his dedicatory poem to Robert Plot's *Natural History of Stafford-shire* (1686), argued that condemnations of curiosity were now simply an excuse for idleness:

> What strange Perversity is this of Man!
> When 'twas a Crime to taste th' inlightning Tree
> He could not then his hand refrain,
> None then so inquisitive, so Curious as He.
> But now he has Liberty to try and know
> God's whole Plantation below;
> Now the Angelic fruit may be
> Tasted by all whose Arms can reach the Tree:
> H' is now by Licence careless made,
> The Tree neglects to climb, and sleeps beneath the Shade.

[45] Milton, *Paradise Lost,* Bk. 7, ll. 61, 126–130. Cf. "Heav'n is for thee to high/To know what passes there; be lowlie wise": Bk. 8, l. 172 f. See also Patrick Brantlinger, "To See New Worlds: Curiosity in *Paradise Lost,*" *Modern Language Quarterly,* 1972, *33:*355–369.

[46] Robert Boyle, *Considerations Touching the Usefulnesse of Experimental Naturall Philosophy* (London, 1663), pp. 6, 7; for Aristotle's assertion see *Metaphysics,* 980a. Cf. Samuel Butler: "Man has a natural Desire to know,/but th' one Half, is for Interest, Th'other show." "Satyr on the Imperfection and Abuse of Human Learning," Pt. 1, ll. 123–126, in *Satires and Miscellaneous Poetry and Prose,* ed. René Lamar (Cambridge: Cambridge Univ. Press, 1928), p. 71.

[47] William Clark, *The Grand Tryal; or, Poetical Exercitations upon the Book of Job* (London, 1685), ll. 16, 19–20, 42–43; and Jan Swammerdam, *Ephemeri vita,* trans. Edward Tyson (London, 1681), "To the Reader." Cf. John Norris, who stated that "the Almighty gets no praise from this dull kind ... such ignorance can ne're devotion raise": "To Dr. Plot on His Natural History of Stafford-shire," ll. 27, 29, in *A Collection of Miscellanies* (London, 1692).

By the end of the century John Locke, likewise, was to turn accusations of curiosity and vanity back on the accusers. The claim that the sciences were "idle and empty amusements, comparatively of no use or importance," he pointed out, was itself "the effect of ignorance and not knowledge, the being vainly puffed up with a flatulency arising from a weak and narrow comprehension."[48] These responses suggest that while there were still those who regarded curiosity as a vice, the tide was turning against them.

When it served their purposes, however, advocates of the new philosophy were happy to wield this rhetorical weapon against others. John Wilkins warned against "the disease of curiosity," which he seems to have associated with the useless pedantry of the schools. "Pedantic learning," he cautioned, may infect a man with "pride, and affectation, as will render him unfit for any great employment." Anthony Burgesse, in a lengthy anti-Catholic polemic on original sin, allowed the universality of this particular disease of the soul but suggested that Scholastics were more prone to it than most. "Is this not a very natural sin in all, a curiosity in knowledge?" he inquired. "Do not all desire to eat of the tree of knowledge, but few of the tree of life, especially Scholars, and such who are buried in learning?"[49]

Neither could Boyle, for all his advocacy of the virtues of the inquiring mind, completely divest himself of the idea that curiosity had its darker side. He confided to Bishop Gilbert Burnet that on one occasion, having been invited to look into a magical glass, "he had the greatest Curiosity he ever felt in his life tempting him to look into it." Eventually, "he overcame himselfe which he accounted the greatest Victory he had ever over himself." For the scrupulous Boyle, the pursuit of natural philosophy called for a precarious balance between the extremes of skepticism and curiosity. He was acutely conscious that his special vocation could easily engender "anxious doubts," on the one hand, and "a disquieting curiosity," on the other.[50]

These developments suggest a new prescription for the control of intellectual desire and for the acquisition of knowledge. What is now required is the cardinal virtue of temperance rather than the theological virtue of charity. Curiosity tends to become the natural mean, rather than the extreme. The universality of curiosity, once considered evidence of its

[48] Joseph Glanvill, *ΛΟΓΟΓ ΘΡΗΣΚΕΙΑ; or, A Seasonable Recommendation and Defence of Reason* (London, 1670), p. 2 (cf. p. 17); Glanvill, *Philosophia Pia; or, A Discourse of the Religious Temper, and Tendencies of the Experimental Philosophy, Which Is Profest by the Royal Society* (London, 1671), p. 127; Norris, "To Dr. Plot," ll. 1–10; and John Locke, *Of the Conduct of the Understanding*, 22, 5th ed., ed. Thomas Fowler (Oxford: Oxford Univ. Press, 1901), p. 48. One of Glanvill's targets identified himself: Robert Ferguson, *The Interest of Reason in Religion* (London, 1675), p. 7. See Jan Wojcik, *Robert Boyle and the Limits of Reason* (Cambridge: Cambridge Univ. Press, 1997), pp. 65–72.

[49] John Wilkins, *Sermons Preached upon Several Occasions* (London, 1682), pp. 165–196, cit. in Adrian Johns, "Prudence and Pedantry in Early Modern Cosmology: The Trade of Al Ross," *Hist. Sci.*, 1997, *35*:23–59; and Burgesse, *Doctrine of Original Sin* (cit. n. 22), p. 184 (later Burgesse was to argue that curiosity was the effect rather than the cause of original sin [p. 212]). Johns's paper provides an interesting analysis of "pedantry," another intellectual vice the fortunes of which in some respects parallel those of "curiosity." See also Steven Shapin, "'A Scholar and a Gentleman': The Problematic Identity of the Scientific Practitioner in Early Modern England," *Hist. Sci.*, 1991, *29*:279–327. Bishop Stillingfleet, writing in 1661, claimed that curiosity was implicated in the chaos of the Interregnum: "*Curiosity*, that *Greensickness* of the soul, . . . hath been the *Epidemicall distemper* of the Age we live in." Edward Stillingfleet, *Irenicum* (London, 1661), sig. A3v.

[50] Michael Hunter, ed., *Robert Boyle by Himself and His Friends* (London: Pickering, 1994), p. 32 (magical glass); and Robert Boyle, *The Excellency of Theology*, in *The Works of the Honourable Robert Boyle*, ed. Thomas Birch, 6 vols. (London, 1772), Vol. 4, p. 36. See also Hunter, "Alchemy, Magic, and Moralism in the Thought of Robert Boyle," *British Journal for the History of Science*, 1990, *23*:387–410. Burnet himself adhered to the traditional view that curiosity was the parent of heresy—and, specifically, of trinitarian heresy: Gilbert Burnet, *A Vindication of the Authority, Constitution, and Laws of the Church and State of Scotland* (Glasgow, 1673), p. 82.

complicity in original sin, now becomes evidence instead of its naturalness. This change in the fortunes of curiosity thus reflects the beginning of a more general moral shift in which, from the end of the seventeenth century, the ethical function of biblical narratives is overshadowed by the search for moral imperatives in reason and nature. The "naturalness" of curiosity becomes reason to embrace it rather than to condemn it. It is also presumed that curiosity had some legitimate purpose or end, part of which was to seek out moral regularities in nature.

Much of this change has to do with the deployment of physico-theological arguments that asserted the religious "usefulness" of knowledge of nature. God is to be found in the book of his works, where his designs tell of his wisdom and power. Boyle thus spoke of "curious and useful creatures" and of a book of nature adorned with a "variety of curious pictures." "Curious" became a way of identifying divine ingenuity, the discovery of which required the cultivation of a corresponding virtue on the part of human investigators. "The Eye of a Flie," enthused John Edwards, is "a more curious piece of Workmanship than the Sun it self." "The most despicable and disregarded pieces of decayed nature are so curiously wrought and adorned with such eminent signatures of Divine Wisdome," marveled Joseph Glanvill. According to Edward Tyson, the ephemeron, "if curiously examined . . . would excite our greatest Admiration, and force us to adore the Infinite Wisdom of the Maker." Minute creatures, in particular, had been compensated for their modest proportions by being adorned with the most lavish ornamentation: "they have Crowns, Helmets and other Curiosities on their Heads which outdo the most luxuriant Fancies of Men."[51] And if the Deity had taken so much trouble to furnish his creation with curiosities, their study could hardly be a vice.

By the early decades of the eighteenth century praise of curiosity was to become common, and the ambivalence of the late seventeenth century begins to abate. In the 1711/12 Boyle Lectures, William Derham reminded his listeners that Scripture commended not only God's works but also those "curious and ingenious Enquirers that *Seek them out,* or *pry into them.*" The aim of the study of nature, according to Derham, was "to answer the Ends for which God bestowed so much Art, Wisdom and Power about them, as well as given us Senses to view and survey them, and an Understanding and Curiosity to search into them."[52] Curiosity was thus a gift that God had intended us to gratify. Just as the Deity had seen fit to adorn his irrational creatures with curiosities, so had he equipped rational creatures with the curious inclination to investigate and enjoy them.

By the middle of the century the rehabilitation of curiosity was all but complete, and there was general agreement that it was a virtue. David Hume, for example, who could hardly be said to share the priorities of the natural theologians, nonetheless defined curiosity as "love of truth" or "love of knowledge." All knowledge, he insisted, arose out of curiosity, and indeed the suppression of this natural inclination could only result in religious prejudice, "stupid ignorance," and "barbarism." As for curiosity and the Fall, Hume found implausible the notion that God would punish the human race for "slight curiosity and natural desire of life and knowledge." In short, if for Aristotle wonder was the beginning of knowledge, for Hume and his contemporaries that honor now fell to curiosity. This

[51] Boyle, *Usefulnesse of Experimental Naturall Philosophy* (cit. n. 46), p. 6; John Edwards, *A Demonstration of the Existence and Providence of God* (London, 1696), Pt. 1, p. 205 (Edwards is actually quoting Boyle); Joseph Glanvill, *Scepsis Scientifica* (London, 1665), p. 3; Edward Tyson, "To the Reader," in Swammerdam, *Ephemera vita,* trans. Tyson (cit. n. 47), sig. Av; and Malebranche, *Search after Truth,* cit. in Edwards, *Demonstration,* Pt. 1, p. 204 f.

[52] William Derham, *Physico-Theology* (London, 1713), p. 466.

was a remarkable reversal. As Daston and Park have observed in their history of wonder:

> The passions of wonder and curiosity had . . . been traditionally remote from one another in medieval natural and moral philosophy, and they were to separate once again by the mid-eighteenth century. Moreover, during the same period that wonder and curiosity first approached and then withdrew from one another, the trajectories of their valorization in natural philosophy also crossed, with curiosity ascending and wonder declining. On the one hand, the wonder that had once been hailed as the philosophical passion par excellence was by 1750 the hallmark of the ignorant and barbarous. On the other hand, curiosity, for centuries reviled as a form of lust or pride, became the badge of the distinterested and dedicated naturalist.

Such were the fortunes of this once-despised vice that in 1751 Samuel Johnson could articulate that view of curiosity now most familiar, confidently declaring it to be "one of the permanent and certain characteristics of a vigorous mind."[53]

CONCLUSION

The changing fortunes of curiosity in seventeenth-century England shed light on a number of important developments in early modern natural philosophy. First, the Genesis narratives of the Creation and the Fall are usually regarded as having had a significant positive impact on the development of natural philosophy during the seventeenth century. Adam's perfect knowledge of nature supposedly provided an eschatological vision that motivated scientific inquiry and inspired natural philosophers to re-establish our first father's dominion over the natural world.[54] However, the traditional view that curiosity and the quest for forbidden knowledge had been implicated in the catastrophic events that led to the Fall of Adam and his race meant that this Genesis text was at best a mixed blessing for the would-be investigator of nature. Bacon devoted considerable energy to providing alternative readings of this master narrative in order to neutralize its negative implications for the prosecution of knowledge of nature.

Second, this history of curiosity highlights an important shift in the relation of knower and knowledge, in which the significance of the moral character of the agent of investigation becomes increasingly irrelevant. One of the reasons curiosity ceases to play any significant part in the status of knowledge is that over the course of the seventeenth century the acquisition of knowledge is gradually dissociated from the personal morality of the investigator. The first stage in the process is the shift of focus away from traditional theological virtues to civic or social virtues. The significance of the latter for Restoration natural philosophy has been admirably demonstrated by Steven Shapin. At the same time, civic virtues come to be allied with disciplines or sets of practices. Hence the titles of Descartes's methodological works—*Rules for the Direction of the Mind* and *Discourse on the Method of Rightly Conducting One's Reason.* The legitimacy of a body of knowledge is now derived from the following of a strict set of procedures rather than from the

[53] David Hume, *Treatise on Human Nature,* 2.3.10, 2 vols. (London: Dent, 1911), Vol. 1, p. 448; Hume, *Essays Moral, Political, and Literary,* ed. Eugene Miller (Indianapolis: Liberty Classics, 1987), Pt. 1, essay 14, pp. 113, 118; Hume, *History of England* (London, 1778), Vol. 3, Ch. 37, p. 431; Hume, *The Natural History of Religion,* in *The Philosophical Works,* ed. Thomas Hill Green and Thomas Hodge Grose, 4 vols. (Aalen: Scientia, 1964), Vol. 4, p. 355 n 87; Daston and Park, *Wonders and the Order of Nature* (cit. n. 2), p. 304; and Samuel Johnson, *Rambler,* 12 Mar. 1751, no. 103. For a recent account of Johnson's view of curiosity see Mayhew, "Nature and the Choice of Life in *Rasselas*" (cit. n. 38).

[54] See, e.g., Webster, *Great Instauration* (cit. n. 33), pp. 6–12.

personal piety of the investigator. This development is also apparent in Bacon's writings, despite his lingering interest in the Christian virtues. John Leary has thus observed that Bacon's instauration called for "men of science to submit to the regimen embodied in [his] methodological and organisational prescriptions." Stephen Gaukroger has likewise suggested that Bacon's account of method can be seen "either as elaborating stringent procedures that individual scientists should follow, or as setting out the rules governing a new elite community subject to stringent measures designed to organise the investigation of nature at a social level."[55] For a time these methodological prescriptions coexisted with a set of moral requirements, and together they determined the legitimacy of knowledge claims. As the Christian and civic virtues gradually faded from view, however, appeals to prescribed methods came eventually to be regarded as the sole criteria for judging knowledge claims in the scientific realm. The importance of this development can hardly be overstated, for it is a precondition for the common claim that the distinguishing feature of scientific knowledge is its objectivity.

Third, the changing connotations of "curiosity" are linked to the fate of another term that was of central importance in seventeenth-century debates about the status of natural philosophy—"usefulness." Increasingly from the end of the seventeenth century we encounter justifications of knowledge in terms of its practical, as opposed to religious or moral, usefulness. This, too, is indicative of a severing of the connection between the moral qualities of the investigator and the legitimacy of the knowledge obtained. For as long as the usefulness of natural philosophy lay in its moral and religious applications, the personal virtues of the investigator could reasonably be considered evidence for the legitimacy of the knowledge. Once again, this reframing of the notion of usefulness is indicative of the tendency to exclude moral elements from the methods of natural philosophy.

There remains the question of the extent to which the debates that took place in early modern England might be said to be typical of Continental Europe as well. My original concern had been to understand the complex background of ideas on curiosity against which Bacon set forth his proposed instauration of knowledge and to see how curiosity subsequently fared in seventeenth-century England. But in carrying out this project I hope also to have shown that there are clear indications in the writings of Descartes, Malebranche, and other Continental thinkers that they grappled with similar concerns. Indeed, given the patristic and medieval treatments of curiosity, it could hardly have been otherwise. Specific treatments of curiosity in other traditions of natural philosophy, and considerations of how they compare to the English situation, however, await another study. Of more immediate importance, perhaps, is Lorraine Daston's suggestion, similarly prompted by a study of "the curious sensibility" in the early modern period, that "a history of sensibilities might deepen the history of science."[56] The gradual transformation of curiosity from vice to virtue is an integral part of a larger story in which moral sensibilities delimit the sphere of legitimate knowledge and determine which natural objects are worthy of serious attention. While it might be possible to discern in the activities of early modern

[55] John Leary, *Francis Bacon and the Politics of Science* (Ames: Iowa State Univ. Press, 1994), p. 218; and Gaukroger, ed., *Soft Underbelly of Reason* (cit. n. 35), p. 5 f.

[56] Daston, "Curiosity in Early Modern Science" (cit. n. 6), p. 403. The task of exploring treatments of curiosity in other traditions of natural philosophy has been commenced in Neil Kenny's *Curiosity in Early Modern Europe: Word Histories* (Wiesbaden: Harrassowitz, 1998), which considers the topic of curiosity in dissertations from German universities, and in Hans Blumenberg's *The Legitimacy of the Modern Age* (Cambridge, Mass.: MIT Press, 1983).

natural philosophers something that appears to answer to a "scientific method," it would be a mistake to conclude that the historical actors themselves regarded the legitimacy of their enterprise as dependent solely upon that method. It is for this reason, amongst others, that what they were engaged in was a morally informed "natural philosophy" and not a putatively objective "science."