

ALIENS AND ATHEISTS: THE PLURALITY OF WORLDS AND NATURAL  
THEOLOGY IN SEVENTEENTH-CENTURY ENGLAND

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The plurality of worlds has had a long history in England, which has not gone unnoticed by scholars. Historians have tended to view this English pluralist tradition as similar to those found on the continent, and in doing so have failed to fully understand the religious significance that the plurality of worlds had on English thought and society. This religious significance is discovered through a thorough investigation of plurality as presented by English natural philosophers and theologians, and in so doing reveals much about England in the seventeenth century. As natural philosophers incorporated plurality within the larger framework of natural theology, it became a weapon of science and reason to be used against the unreasonable atheists of late seventeenth-century England.

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## CHAPTER I

### INTRODUCTION

The belief that the earth is not the sole oasis of life in a hostile, deserted universe does not solely belong to the modern era with its scientific and technological advances. This notion that our sun is like any other star and our planet like any other planet, all capable of harboring life, has a rich tradition in England. From its beginning as a few cautious statements about its possibility, this tradition blossomed into an accepted fact of the new science of the late seventeenth and early eighteenth centuries. Natural philosophers and theologians offered varying versions of this plurality of worlds, but they all stated that other solar systems did exist and contained their own creatures.

Such statements naturally raised religious and philosophical objections since it seemed to challenge the central place of humanity as God's favorite creation, not to mention the much more serious questions it implied about the nature of Christ. While these objections were commonplace in continental Europe, they by and large, with some notable exceptions, remained absent in England. Instead, natural theologians shaped the plurality of worlds so that it served their ends in reinforcing the Christian faith against immorality and atheism.

The plurality of worlds had profound impacts both on religious thought and how religion interacted with science throughout the seventeenth and early eighteenth centuries in England. It is this overall religious significance of plurality in England that this paper explores. Whereas previous research on the plurality of worlds has tended to view plurality in England in a similar fashion as on the Continent, the English tradition of the plurality of worlds is better explained by exploring its popularity in the Newtonian

age.<sup>1</sup> In this view the earlier works of John Wilkins, Henry More, Richard Baxter, and others laid the groundwork by separating plurality from Scripture and developing the methods of reasoning. Influenced by these earlier works and Isaac Newton's theories of mechanics, the Newtonian natural theologians turned plurality into a weapon against godlessness, which they viewed as the prime evil of their time.

The publication of Newton's *Principia* (1687) provided a catalyst in this popularity, as a plurality of worlds suddenly seemed a more logical scientific possibility. In the *Principia* Newton described a universe based upon mathematically demonstrable laws, which implied that, just as gravity kept the earth and other planets circling the sun, so the distant stars could serve as the centers of other systems. To Newton's more imaginative followers, the possibility, or rather, to put it more accurately, the probability, of other systems existing resulted in the seemingly natural conclusion that life flourish on these other "worlds." In fact, the teleological argument of final causes, so popular in natural philosophy at the time, demanded that these other worlds have their own inhabitants, for the alternative would suggest that God placed the innumerable stars at such immense distances solely for the sake of providing a minimal augmentation of light for humanity, reasoning which the Newtonian philosophers found blasphemous. While Newton, characteristically, did not lend his voice to such conjecture, "his British followers made belief in extraterrestrial life an orthodox component of Newtonianism."<sup>2</sup>

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<sup>1</sup> Karl Guthke, *The Last Frontier: Imagining Other Worlds from the Copernican Revolution to Modern Science Fiction*, trans. Helen Atkins (Ithaca, NY: Cornell UP, 1993); Steven J. Dick, *Plurality of Worlds: The Extraterrestrial Life Debate from Democritus to Kant* (New York: Cambridge UP, 1984)

<sup>2</sup> Patricia Fara, "Heavenly Bodies: Newtonianism, Natural Theology, and the Plurality of Worlds Debate in the Eighteenth Century," *Journal for the History of Astronomy* 35, no. 2 (May 2004): 143.

Indeed, Karl Guthke has described the plurality concept as the “new gospel” of Newtonian England.<sup>3</sup> Anglican divines and virtuosi faced little controversy in supporting the belief, unlike their brethren in Catholic and Lutheran areas on the Continent. While previous English commentators had earlier treated the subject with some hesitancy, or even apologetically, natural theologians in the Newtonian age confidently asserted that a belief in rational inhabitants on other worlds accorded perfectly with, and even enhanced, their version of Christianity. They were quick to point out that, despite what some detractors held, Scripture did not contradict plurality; only the narrowest literal interpretation supported such a view. Yet such reasoning was becoming less important to the overall argument. Religious, intellectual, and even political developments from the 1640s all the way through and beyond the Williamite settlement of 1688-89 helped to create a new climate in which religious doctrine could no longer be used to limit or deny the use of reason.<sup>4</sup> Instead, these natural theologians argued that reason necessarily augmented religion since it led to a fuller understanding of God’s natural works. This understanding would naturally express itself in increased veneration of both the Protestant God and the Anglican Church, as those atheists, deists, and other dangerous heretics were convinced of the errors of their beliefs. It was this emphasis on reason by natural theologians, whether inside or outside the Anglican Church, that helped precipitate the upsurge of pluralist belief.

Historians have shown that a simple reliance on reason, though, cannot explain why Newtonian natural theologians found a belief in other worlds so attractive. For

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<sup>3</sup> Karl Guthke, *The Last Frontier*, 132.

<sup>4</sup>One prime example of how political events impacted the natural theologians' discussion of the plurality of worlds was William's dependence upon latitudinarians and moderate low churchmen in the episcopacy. See Chapter 5.

instance, Steven J. Dick points claims that the existence of other solar systems was by no means a necessary result of the Newtonian system, as it was in that of Descartes.

To Newton, solar systems other than ours were certainly possible, but such possibilities fell far short of the standard of empirical proof laid down in the *Principia*. Meanwhile, Descartes held that

[Natural] laws led directly to the vortices that were the hallmark of Cartesian cosmology, and that resembled, in outline at least, the solar system that was the home of man. By contrast Newton's laws of universal gravitation left the question of other solar systems entirely open . . . the imputation of planets to other suns was only the grossest analogy.<sup>5</sup>

In Dick's view, Cartesian cosmology directly leads to pluralist speculation because the vortices responsible for each star's motion exist in a plenum of subtle matter. There is no vacuum, so each star is surrounded by matter—something that was only a possibility for each star in Newton's system. In this context it may seem somewhat surprising that plurality should garner so much support in Newtonian England when its link with plurality seems rationally weaker when compared with that of Cartesian mechanics. In fact, the plurality theory proved far more popular in Newton's England than in any area of Cartesian dominance.<sup>6</sup> In this period, described even contemporarily as that of the "new philosophy," virtuosi eschewed deductive principles in favor of inductive research and experimentation. Yet Newtonian natural theologians constantly asserted their belief in an idea that was empirically improvable. If this confidence in plurality is not exactly the most logical of conclusions, how then do we explain the "new gospel"?

Recent scholars have offered a variety of explanations to account for what attracted Newton's followers to the plurality of worlds. If a rational explication of

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<sup>5</sup> Steven J. Dick, *Plurality of Worlds*, 143.

<sup>6</sup> Fontenelle (*Entrentiens*) and Huygens (*Cosmotheoros*), however, both advocated a Cartesian view of the universe.



Newton's theories themselves are not completely responsible, then perhaps part of the answer lies somewhere outside the realm of natural philosophy altogether. Most often stressed are the publications of Bernard Le Bovier de Fontenelle's *Entretiens sur la pluralité des mondes* (1686) and Christian Huygens's *Cosmotheoros* (1698).<sup>7</sup> Both tracts proved popular, though Fontenelle's work "was far more widely-read than *Cosmotheoros*," and certainly appears to have been more influential, with two English translations of the *Entretiens* appearing in the year following its original French publication.<sup>8</sup> Guthke claims that these "two works [were the] most influential in spreading the idea of the plurality of worlds at the very beginning of the Enlightenment," and that Fontenelle's proved "the astronomical best seller" of the period.<sup>9</sup> The classicist and Anglican divine, Richard Bentley, in particular seems to have been influenced by Fontenelle: after reading the *Entretiens* in its original language, he subsequently aided Joseph Glanvil's translation.<sup>10</sup> Taking up his own version of inhabited worlds a few years later, Bentley incorporated the idea into his grand physico-theological series of sermons entitled *The Folly and Unreasonableness of Atheism* (1693), which he adapted from his Boyle Lectures of the previous year.

Historians have also shown how Bentley's use of the plurality of worlds represented a major shift in how philosophers conceived of and presented the idea. Bentley's influence was perhaps the most important because he simultaneously integrated plurality into the larger realm of natural theology and joined both with the

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<sup>7</sup> Dick, *Plurality of Worlds*, 155; Guthke, *The Last Frontier*, 199.

<sup>8</sup> Fara, "Heavenly Bodies," 146.

<sup>9</sup> Guthke, *The Last Frontier*, 227.

<sup>10</sup> Fara, "Heavenly Bodies," 146.; M. de Fontenelle, *A Plurality of Worlds. Written in French by the author of the Dialogues of the dead. Translated into English by Mr. Glanvill* (London: printed for R. Bentley and S. Magnes, 1688).

Newtonian universe. He showed Newtonian mechanics to be the laws with which God created the universe, and his belief in extraterrestrials made them a key part of this providential design as well. His sermons helped usher in a new age, in which time and time again authors would take up this Newtonian version of natural theology, with its awe-inspiring “appeal of a universe filled with inhabited worlds,” as a proof of God’s existence, distinct from that of divinely revealed religion.<sup>11</sup>

This desire on the part of natural theologians to “free themselves from the shackles of revealed theology represented by Scripture” left them unfettered by the dogmatic questions that had hounded previous commentators.<sup>12</sup> An examination into the book of Nature rather than Scripture renders “questions of theological dogma obsolete”—no longer must a natural theologian answer whether the rational inhabitants of other worlds are descendants of Adam, or whether they too felt the saving grace of Christ’s redemption (or indeed whether they would even *need* to).<sup>13</sup> Examining the design of the system told them more about God than dogmatic bickering.

In such a climate devoid of doctrinal debate, the outright belief in a plurality of worlds grew, seemingly at the expense of any personal relationship between Creator and created. Newtonian natural theology replaced traditional notions of providence on a human scale in favor of an “intelligent Agent” whose assistance was occasionally required for the maintenance of the universal system. Many critics found such a reduction in God’s role unpalatable, and scoffed at the notion that God would have

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<sup>11</sup> Dick, *Plurality of Worlds*, 156; Guthke, *The Last Frontier*, 246.

<sup>12</sup> Dick, *Plurality of Worlds*, 156.

<sup>13</sup> Guthke, *The Last Frontier*, 247.

insufficiently provided for the orderly working of the created universe.<sup>14</sup> Dick views these criticisms as providing the final explanation of why Newtonian natural theologians so readily embraced the thought of plurality. In response to the threat of an inactive, clumsy God, natural theologians “insist[ed] on the reality of inhabited solar systems . . . as a remedy for the failure to repel the attacks of those sympathetic to Leibniz, a failure that threatened the departure of God from the natural world.”<sup>15</sup>

Dick and Guthke thus represent Newton’s early followers, enticed by the romantic vision of Fontenelle and, to a lesser extent, Huygens, incorporating a belief in the plurality of worlds into their rational universe to strengthen God’s role: a role that had supposedly been diminished by those very same reasoned orderings of the universe. In this explanation, Newtonian natural theologians integrated plurality as an orthodox component of natural theology mainly to assuage their anxiety that a rational universe renders God needless. Yet such an interpretation does not adequately address the larger political context of religious belief in late seventeenth-century England. These natural theologians had other and far more important reasons to include plurality into their arguments. Specifically, after William and Mary’s ascension to the throne, the Latitudinarian movement, which contained a strong predisposition towards natural theologizing, gained a great deal of strength inside the Anglican Church thanks almost exclusively to royal patronage.<sup>16</sup> An initially small but increasingly

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<sup>14</sup> Leibniz’s criticisms are the most famous: “Sir Isaac Newton, and his followers also have a very odd Opinion concerning the Work of God. According to their Doctrine, God Almighty wants to wind up his Watch from Time to Time: otherwise it would cease to move. He had not, it seems, sufficient Foresight to make it a perpetual motion.” Gottfried Wilhelm Leibniz, quoted in Dick, *Plurality of Worlds*, 157.

<sup>15</sup> Ibid.

<sup>16</sup> The resentment felt by High Churchmen and the vast multitude of the lesser clergy on this point, as well as their questioning of the Latitudinarians’ religious sincerity, created a deep rift within Anglicanism which for a time lent credibility to the Tory campaign slogan of “Church in danger.”

numerous and powerful group of Christian virtuosi and their brethren within the Church found in the workings of the natural world a religious truth completely rational and separate from the revelation of Scripture. This “book of nature,” as it was termed, derisively by its detractors, was never intended by its proponents to supersede or replace the revealed word of God—only a deist would dare make that claim. The rational Anglican adherence to Scripture can be seen even in the Boyle Lectures, the supposed paramount of Newtonian natural theology, which devoted several series to its advocacy.<sup>17</sup>

This group certainly did spend much less time, at least publicly, engaging in the doctrinal hairsplitting that had so characterized the late Interregnum. The climate of radical Puritanism had taught them that quibbling on what they did not consider the “essentials of faith” would only create discord within the political, social, and religious structures. Hence the desire to move away from religious infighting and find those few fundamentals of the Christian faith that everyone, or at least every rational person, could agree upon. Historians have viewed this program to make Christianity as broad as possible as one of the hallmarks of the burgeoning Latitudinarian sect.<sup>18</sup> Though there is some disagreement about whether or not those categorized as Latitudinarians had any distinct agenda, especially in the Restoration era, a certain number of Anglican

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<sup>17</sup>The most famous is the first, that of Richard Bentley, whose *A Confutation of Atheism* (discussed below in Chapter 3), was considered a rousing success. Bentley not only used Newtonian mechanics and cosmology to prove the providential design of the universe, but even began a short correspondence with Newton. Many of Newton’s followers featured prominently in the Boyle Lectures, such as Samuel Clarke, William Whiston, and William Derham.

<sup>18</sup> For a list of characteristics, see p. 9 below.

clerics and laity opposed the penal laws leveled against Dissenters, instead favoring toleration or even comprehension.<sup>19</sup>

The status of Dissenters became one of the major points of contention facing the post-Restoration Anglican Church. Those in favor of toleration increasingly voiced their concerns about the justice and efficacy of the political and religious backlash unleashed on radical Puritans in the Restoration settlement, somewhat buoyed by the tensions that arose from the Exclusion Crisis and Rye House Plot.<sup>20</sup> Toleration was one of the most controversial issues facing early modern Christianity, and within the Anglican Church it exacerbated the wedge between the nascent Low and High Church factions. This statement is not meant to imply that either side had a rigid “party line” that they always defended; several examples of moderate Low Churchmen and those considered Latitudinarians alike exist who argued, at least in their printed material, *against* toleration.<sup>21</sup> The general consensus among the Low Church and the Latitudinarians, though, was that liberty of religious conscience should be extended to all of their Protestant brethren. Such a view was shared by William III, and throughout the 1690s he favored the Latitudinarians when filling major episcopal posts.

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<sup>19</sup> John Spurr concludes that in the Restoration period “Those tarred as ‘latitudinarians’ were sloughing off Calvinism, but they, like most Restoration Englishmen reacting against the experience of the 1640s and 1650s, preferred to see themselves as impartial, free, moderate, rational, moral and new. No specifically ‘latitudinarian’ party or outlook can be distinguished among the Restoration churchmen. ‘Latitudinarian’ was their opponents’ word. It was an attempt to brand the theological repudiation of Calvinism as a deficiency of character or a lack of principle.” John Spurr, “‘Latitudinarianism’ and the Restoration Church,” *The Historical Journal* 31, no. 1 (March 1988): 61-82.

<sup>20</sup> Toleration also had a measure of royal support, as Charles II issued his Declaration of Indulgence in 1672, and James II his own in 1687. These declarations were tainted, however, by the favorable treatment that they also afforded Catholics. Both acts ultimately failed, though they likely laid the groundwork for the Williamite Toleration of 1689.

<sup>21</sup> Spurr lists Simon Patrick, Edward Fowler, Joseph Glanvil, and Edward Stillingfleet as those who at least published tracts against toleration. Spurr, “‘Latitudinarianism’ and the Restoration Church,” 70-71, 74.

Oftentimes included or even confused with Low Churchmen, the Latitudinarians emerged as a separate entity late in the seventeenth century. This group of rational Anglicans always stayed somewhat amorphous, and as such historians have struggled to find a precise definition, both in the Restoration and beyond, as to what exactly the latitudinarians' beliefs were, or even *who* they were.<sup>22</sup> By the late 1680s, though, some discernable traits appear, not the least of which were the emphasis placed upon reason, and the faith that the discoveries of the new science would provide a better foundation for a unified Protestantism than discussing articles of faith. As Margaret Jacob has explained, "while no single definition can or should be given for latitudinarianism," they by and large believed that

rational argumentation and not faith is the final arbiter of Christian belief and dogma; scientific knowledge and natural philosophy are the most reliable means of explaining creation; and political and ecclesiastical moderation are the only realistic means by which the Reformation will be accomplished.<sup>23</sup>

Other accounts highlight the dissatisfaction with the importance that High Churchmen placed on ritual, a trait that the Latitudinarians shared with Low Church members. The struggle for control of Anglicanism between the High Church faction on one side and the Low Church and Latitudinarians on the other has only added to the confusion about each group; but John Miller points out that by the 1690s the Latitudinarians had virtually replaced all of the traditional, moderately Puritan leadership of the Low Church.<sup>24</sup>

These Newtonian Latitudinarians found their voice in that conjoining of rational theology and natural philosophy, known rather descriptively as natural theology.

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<sup>22</sup> See n. 20 above.

<sup>23</sup> Margaret Jacob, *The Newtonians and the English Revolution, 1689-1720* (Ithaca, NY: Cornell UP, 1976), 29, 34-35.

<sup>24</sup> "By the early eighteenth century the latter were far more influential than the former and were becoming known, confusingly, as Low Churchmen." John Miller, *The Glorious Revolution*, 2d ed. (New York: Addison Wesley Longman, Inc., 1997), 64.

As a genre, natural theology had existed from the early stages of Christianity, leaving the Newtonians a large tradition from which to draw. Scholars have shown how important the Interregnum and Restoration periods were to English natural theology, and have proposed several links between the new science and religion.<sup>25</sup> While the origins of modern science have been variously traced to Puritanism, Anglicanism, or a simple and rather generic Protestantism, the fact remains that several prominent natural philosophers incorporated their religious beliefs into their scientific explanations of the natural world. Anglican virtuosi such as Robert Boyle and divines like John Wilkins developed a Christian metaphysics that helped spur a growing interest in scientific research and found evidence of God's providence from the microscopic to the cosmological. Natural theology's importance to the new science can be seen in Boyle's works as well as all throughout English natural philosophy.<sup>26</sup> Henry Oldenburg, in the "Epistle Dedicatory" to the first issue of the Royal Society's *Philosophical Transactions*, wrote of his hopes that "The Great God prosper [the Royal Society] in the Noble Engagement of Dispersing the true Lustre of his Glorious Works," before later continuing that he also hoped for the practical explication of the "Happy Inventions of obliging Men all over the World, to the general Benefit of Mankind."<sup>27</sup>

Natural theology remained a powerful tool for Christian virtuosi well into the eighteenth century. One of the main benefits that proponents and practitioners derived from it was its potential for unifying a wide spectrum of Protestant Christianity. The

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<sup>25</sup> See Margaret Jacob, *Newtonians*; Lotte Mulligan, "Civil War Politics, Religion, and the Royal Society," *Past and Present* 59 (May 1973): 92-116.; Charles Webster, *The Great Instauration: Science, Medicine, and Reform, 1626-1660* (New York: Holmes and Meier Publishers, 1976).

<sup>26</sup> Boyle's more famous theological writings were his *Discourse of Things Above Reason* (1681), *Free Enquiry into the Vulgarly Receiv'd Notion of Nature* (1686), and *Disquisition about the Final Causes of Natural Things* (1688).

<sup>27</sup> Henry Oldenburg, "Epistle Dedicatory," *Philosophical Transactions* 1, no. 1 (1665-1666): 2 of 2 unnumbered "Epistle."

book of nature provided an independent, non-dogmatic, and verifiable proof of God's intelligent, providential design. Properly employed, scientific discoveries provided for Christians a vehicle towards unity of faith among each other, and as an attack against their *real* opponents: the dangerously rationalist sects of the atheists and deists, which were seemingly multiplying in droves in the late seventeenth century. To the Latitudinarians and other like-minded Anglicans, these groups constituted the most extreme danger to the Church, something far worse than antinomian Puritanism.

Waging the war against such "notorious Infidels" required a two-part strategy. The first, already mentioned, required as broad a Christianity as could be considered politically and socially possible (meaning no Catholics or anti-Trinitarians) to ensure a unified front against irreligion. Hence an emphasis on the essentials of faith rather than obscure doctrine, a call for an end to the penal laws and toleration, and the employment of natural theology to explain God's works of nature. Yet the Latitudinarians also deployed natural theology as a direct assault against the unfaithful. If the reasoning of Epicurean atomism or Hobbesian materialism had tempted them into unbelief then perhaps a different reasoning could bring them back into God's flock. Incorporating scientific discoveries into a religious context allowed latitudinarian Anglicans to show how rational Christianity actually is, and by doing so bring the battle to the atheists on their own ground.

Specifically, speculating on the plurality of worlds was an important tactic in the larger strategy of countering atheists with reason.<sup>28</sup> Plurality provided natural

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<sup>28</sup> In the 1670s, just as the Latitudinarians were beginning this campaign against irreligion, many "infidels abandoned what was now the tool of the church [reason]." Sarah Ellenzweig, "The Faith of Unbelief: Rochester's 'Satyre,' Deism, and Religious Freethinking in Seventeenth-Century England," *Journal of British Studies* 44 (January 2005): 31.



theologians a weapon from the physical universe that had usually been associated with Epicurean atomism. Adapted to their religious views, belief in a plurality of worlds placed rational inhabitants elsewhere in the solar system and beyond as a way to enhance the glory and magnificence of God. The fact that these inhabitants would praise their Creator is presented as completely natural; that is, natural to all those who, no matter where they are in the universe, neither deny reason nor let it lead them astray to mechanistic materialism. Such an argument had profound contemporary importance because English natural theologians had a multitude of both real and imagined enemies. Along with the earlier legacies of Hobbes and the Restoration libertines that still had to be dealt with, the late seventeenth century saw the development of English deism, an increased wariness (if not numbers) of scoffing atheists, and the flood of heretical tracts that followed the Revolution of 1688 and the lapse of the Licensing Act in 1695.<sup>29</sup> The cry of “the Church in Danger” may have been a High Church and Tory aphorism, but fears over atheism and other heresies certainly occupied much of the Latitudinarians’ time in the 1680 and 1690s. In natural theology in general, and the plurality of worlds specifically, they found a weapon to attack the unbelievers while at the same time defending and unifying their faith.

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<sup>29</sup> Miller, *The Glorious Revolution*, 61.

## CHAPTER II

### PLURALITY OF WORLDS IN ENGLAND, pre-c.1680

The Newtonians' belief in the plurality of worlds was by no means the first such expression in seventeenth-century England. In fact, an English tradition can be identified that stretches further back, even beyond the Henrician Reformation into the medieval period. These versions of plurality, largely derived from those of the ancient Greek philosophers, were rarely presented in the most remotely natural theological terms, and even on those rare occasions in which they were, such as in John Wilkins's *The Discovery of a World in the Moone* (1638), the concept did not carry the force of empirically provable mechanical laws that the Newtonians would be able to employ. Before the union of the Copernican heliocentric universe with Newtonian, or for that matter even Cartestian, cosmology, proponents of pluralism relied primarily upon metaphysical and religious reasoning for the foundations of their support, with the specter of Scriptural rigidity looming over any who dared propose belief in what orthodox Christianity widely viewed as an ancient heresy.

Yet condemnation of the plurality of worlds was neither universal nor established, either by the Catholic Church before or after the Reformation, or by the various Protestant churches that developed throughout the sixteenth and seventeenth centuries. Some of the Church Fathers and medieval scholars either regarded plurality as a heresy or expressed their strong opposition (not unlike how they viewed belief in Antipodeans), yet an open avowal in pluralism did not prevent Nicholas of Cusa from being named a cardinal in the fifteenth century.

Protestant opposition originated chiefly on the continent, specifically from Lutheran circles, and while England had a few detractors, the pro-plurality tradition was just as strong. In fact, what appears so shocking at this early stage is the form of expression that pluralists employed. In this period before purely scientific or philosophic reasoning could be used, authors discussed the plurality of worlds in far more lyrical terms, within larger works on poetry, literature, or metaphysics. This wide variety of bases for and expressions of pluralist belief can be seen in the examples of Giordano Bruno, Edmund Spenser, and John Donne, among others.

Giordano Bruno has long been seen as a martyr to science and progress, supposedly suffering execution by the Catholic Church for his assertion of an infinity of inhabited worlds throughout the universe. The Inquisition certainly had cause to be wary of Bruno's other and more dangerous beliefs, not the least of which were his Hermetic, neo-Platonic metaphysics and heretical opinions on the divinity of Jesus Christ.<sup>1</sup> This metaphysical foundation is evident in his infinitely inhabited universe, in which a subtle, universal spirit emanates throughout the cosmos. Bruno composed his two most important works on plurality while at Oxford in the 1580s, and the historian Daniel Massa has noted his influence upon Sir Walter Raleigh's "School of Night," especially in promoting atomism.<sup>2</sup>

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<sup>1</sup> "It is true that he was burned at the stake in Rome in 1600, but the church authorities were almost certainly more distressed at his denial of Christ's divinity and alleged diabolism than at his cosmological doctrines." Steven J. Dick, *Plurality of Worlds: The Extraterrestrial Life Debate from Democritus to Kant* (New York: Cambridge UP, 1984), 10. Guthke disagrees, claiming that it was Bruno's "flights of speculation" on plurality, which "led to [his] death at the stake as a heretic." Karl Guthke, *The Last Frontier: Imagining Other Worlds, from the Copernican Revolution to Modern Science Fiction*, trans. Helen Atkins (Ithaca, NY: Cornell UP, 1993), 135.

<sup>2</sup> Daniel Massa, "Giordano Bruno's Ideas in Seventeenth-Century England," *Journal of the History of Ideas* 38, no. 2 (April-June 1977): 228. Much controversy exists over whether the group actually knew one another, and if so, how much they actually associated. Marlowe was arrested and charged with

Alternatively and contemptuously known as the “School of Atheisme,” this group included such literary and philosophical figures as Christopher Marlowe, Nicholas Hill, George Chapman, and Thomas Hariot, arguably representing the height of pre-Baconian English natural philosophy. While Bruno resided just a relatively short time in England and wrote his treatises only in Italian, his metaphysics and cosmology made a profound impact in English intellectual circles, and raised interest in the plurality of worlds—even if not his own infinite, neo-Platonic version.

English literature of the late sixteenth and early seventeenth centuries contains several passing references to the plurality of worlds, which demonstrates the impact of Bruno’s thought. Comparing the discoveries of the new astronomy to those of Columbus and other explorers, Edmund Spenser noted that just because Europeans were ignorant of something, whether upon the Earth or beyond, did not make it untrue. In his magnus opus *The Faerie Queene* (1590), Spenser wrote

But let that man with better sence advize,  
That of the world least part to us is red:  
And dayly how through hardy enterprize,  
Many great Regions are discovered,  
Which to late age were never mentioned.  
Who ever heard of th'Indian Peru?  
Or who in venturous vessell measured  
The Amazon huge river now found trew?  
Or fruitfullest Virginia who did ever vew?

Yet all these were, when no man did them know;  
Yet have from wisest ages hidden beene:  
And later times things more unknowne shall show.  
Why then should witlesse man so much misweene  
That nothing is, but that which he hath seene?  
What if within the Moones faire shining spheare?  
What if in every other starre unseene

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atheism in 1593), and Thomas Hariot, the preeminent mathematician of the Elizabethan age, was also suspected of heresy.

Of other worldes he happily should heare?  
He wonder would much more: yet such to some appeare.<sup>3</sup>

Here Spenser offered no detailed account of this system of “other worldes;” his final statement even fell well short of an open avowal of plurality. Yet numerous worlds did not appear a ridiculous notion to Spenser, and his choice to compare astronomers with the explorers of the new world lent a certain air of legitimacy to pluralist conjecture. If other new worlds should be discovered, these philosophical explorers would find them outside of the earth.

For many others, though, the plurality of worlds was yet another new and disturbing idea. Copernicus’s heliocentric “innovation” and the renaissance revival of atomism were just part of the assault leveled at Aristotelianism by the “new philosophy,” which threatened to confuse the universe and humanity’s place in it. Though far from claiming general acceptance early in the seventeenth century, the mere suggestion that the earth be removed from the center of the universe in favor of the sun created an intense feeling of dislocation that some scholars have termed “the crisis of the European conscience.”<sup>4</sup> While such a crisis may not have been primarily anthropocentric, the confusion about the universe and human knowledge of it appears very real. John Donne, in his *An Anatomy of the World* (1612), delivered a famous expression of how science had contributed to this disorientation:

And new philosophy calls all in doubt,  
The Element of fire is quite put out;  
The Sunne is lost, and th’earth, and no mans wit  
Can wel direct him where to looke for it.  
And freely men confesse that this world’s spent,

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<sup>3</sup> Edmund Spenser, *The Faerie Queene* (London, 1596), Proem to bk. 2, st. 2-3.

<sup>4</sup> See Paul Hazard, *The European Mind, 1680-1715: The Critical Years*, trans. J. Lewis May (Cleveland: World Publishing Co., 1964).

When in the Planets, and the Firmament  
They seeke so many new; they see that this  
Is crumbled out againe to his Atomis.  
'Tis all in pieces, all coherence gone;  
All just supply, and all Relation:  
Prince, Subject, Father, Sonne, are things forgot,  
For every man alone thinks he hath got  
To be a Phoenix, and that then can bee  
None of that kinde, of which he is, but hee.<sup>5</sup>

For Donne such an intense incoherence of the world had a seditious tinge that endangered the very basis of human civilization: as the relationships among the microcosmic family unit break down, so do they also in the macrocosmic state. In the medieval worldview, the earth's centrality and immobility had been key tenets not just philosophically or scientifically, but religiously as well. If this "new philosophy" was to break down the prevailing assumption of how the physico-theological universe was constructed, who could say what system would take its place? To those as confused as Donne, the oft-repeated metaphor of "the world turned upside-down" seemed dangerously close to coming true.

Others found the advances in astronomy so confusing that historians have found it difficult to pinpoint exactly what they believed. Robert Burton, in his widely popular and frequently revised *The Anatomy of Melancholy* (1621), offered a rather lengthy diversion summarizing various virtuosi's heavenly discoveries and how they viewed the universe. Burton touched upon "that main paradox, of the earth's motion, now so much in question," and posited that if Copernicus's "supposition" was indeed true, "Then (I say) the earth and [Jupiter, Saturn, etc.] be planets alike, moved about the sun, the common centre of the world alike." Likewise, "if the firmament be of such an incomparable bigness, as these Copernical giants will have it, so vast and full of

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<sup>5</sup> John Donne, *An Anatomie of the World. The First Anniversarie* (London, 1612), 20-21, ln. 205-218.

innumerable stars . . . [and] if our world be small in respect, why may we not suppose a plurality of worlds?"<sup>6</sup>

Ultimately for Burton, though, a plurality of inhabited worlds remained a possibility contingent upon other possibilities and assumptions. Astronomers both ancient and modern put forth a whole host of varying cosmologies for those interested to choose from, from the Aristotelian or the Ptolemaic, to the Copernican or that of Tycho Brahe, who favored a geocentric universe with the planets orbiting the sun, which in turn orbited the stable earth. If astronomers themselves could not come close to agreement on the physical structure of the universe, how was the average educated Englishman supposed to know who to trust? Burton showed a great deal of such frustration when he concluded:

Thus [astronomers] disagree amongst themselves, old and new, irreconcilable in their opinions . . . [A]nd so whilst these men contend about the sun and moon, like the philosophers in Lucian, it is to be feared, the sun and moon will hide themselves, and be as much as offended as she was with those, and send another messenger to Jupiter, by some new-fangled Icaromenippus, to make an end of all those curious controversies, and scatter them abroad.<sup>7</sup>

Burton's frustration is of a scale and type rather different than Donne's concern, but they were both born from the confusion created by the new philosophy and its discoveries. Burton, however, did not appear unnerved by the particular possibility of other inhabited planets—even an infinite number of inhabited worlds in an infinite universe did not bring his censure.

Of these authors, only Burton—and not Donne, whose "new philosophers" seek so many new worlds in the planets—raised the question of religion when dealing with

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<sup>6</sup> Robert Burton, *The Anatomy of Melancholy* (London, 1652), 254. Burton published the *Anatomy* under the name of Democritus Junior, explicitly calling to mind the name most closely associated with classical atomic theory.

<sup>7</sup> *Ibid.*, 257.

the plurality of worlds. As with the other astronomical discoveries and conjectures, Burton here was merely concerned with summarizing the debate, in this case listing pluralist answers to theological objections.<sup>8</sup> In these early forays into pluralist conjecture, religion has neither provided an important reason for rejecting the theory nor been seen as an issue that must be addressed before affirming belief. The context within which these authors experienced the plurality of worlds, though, accounts for much of this. With new astronomical and cosmological theories seemingly appearing everyday, plurality appeared as just another part of the age of discovery. Spenser compared plurality with terrestrial exploration; Donne and Burton linked it within the larger realm of the new natural philosophy. In each case, plurality was barely considered as its own topic: it was not a cosmological prospect that either writer appeared enthusiastic to either incorporate into or deny from their personal worldviews. Thus, plurality's religious implications were not fully considered or explored.

For those early seventeenth-century English natural philosophers who did take the plurality of worlds this seriously, the specter of religion was something that needed to be addressed. The possibility of inhabitants on worlds other than the earth, whether rational or not, raised several serious questions related to accepted Christian doctrine. The most serious objections were generally Christological in nature; for instance, if these inhabitants are rational, are they free from the stain of original sin, or do they even have souls in need of saving? If they must be saved, did they experience Jesus Christ's

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<sup>8</sup> Burton wrote that natural philosophers "freely speak, mutter, and would persuade the world (as Marinus Marcenus complains) that our modern divines are too severe and rigid against mathematicians; ignorant and peevish, in not admitting their true demonstrations and certain observations, that they tyrannise over art, science, and all philosophy, in suppressing their labours (saith Pomponatius), forbidding them to write, to speak a truth, all to maintain their superstition, and for their profit's sake. As for those places of Scripture which oppugn it, they will have spoken ad captum vulgi, and if rightly understood, and favourably interpreted, not at all against it." *Ibid.*, 255.



redeeming death on the cross here on earth, or must Christ visit each inhabited world and die for them in turn?

Others used Scripture itself to attack the plurality of worlds. The account of creation in Genesis mentions nothing about the presence of other worlds, let alone God populating them with any sort of intelligent inhabitants. The thought that extraterrestrials need not be rational at all still created conflicts, since Genesis describes God creating the universe solely for the benefit of humanity, giving mankind dominion over His lesser creatures. For what possible human purpose could God have created other worldly non-rational inhabitants?

It is perhaps not surprising then that two Anglican clergymen provided some of the first English answers to this line of religious argumentation. In 1638, John Wilkins, the future Bishop of Chester, and Francis Godwin, Bishop of Hereford, anonymously published (posthumously as well, in Godwin's case) tracts that argued, more or less, for an open avowal of belief in plurality.<sup>9</sup> Wilkins and Godwin chose rather strikingly different strategies, with Wilkins writing an introductory astronomical textbook of sorts designed to explicitly prove the plurality of worlds, while Godwin produced what some consider as one of the first English language science fiction works.<sup>10</sup> As divines within the Anglican Church, they knew full well how important it was to answer these religious objections, and were probably more equipped to do so than would lay virtuosi. Each

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<sup>9</sup> John Wilkins, *A Discovery of a New World, or a Discourse Tending to Prove, that 'tis Probable there may be another Habitable World in the Moon*, 4th ed. (London, 1684); Francis Godwin, *The Man in the Moone: or a Discourse of a Voyage Thither* (London, 1638).

<sup>10</sup> Wilkins's *Discovery* contained support for many of the leading natural philosophical developments of the early seventeenth century: Copernican heliocentrism, anti-Aristotelianism, and the observations of Brahe, Galileo, and Johannes Kepler. Guthke repeatedly refers to *The Man in the Moone* as a work primarily of science fiction, and while it does have some aspects similar to modern science fiction, Godwin's work seems to share more in common with popular late seventeenth-century exotic travel literature. Guthke, *The Last Frontier*, 155, 157, 158.

work would have a profound impact on the plurality debate for later generations; most notably, historians have traced several important and direct influences from Wilkins in Fontenelle's *Entretiens sur la Pluralité des Mondes* (1686).

Wilkins explicitly informed his audience of the tract's primary objective within the title: to prove that the moon, far from being simply a terrestrial ornament, is a planetary body just like the earth, and also, like the earth, capable of harboring life. These implications are staggering, for it not only casts more than slight doubt upon the religious idea of humanity's uniqueness within the universe, but it also provided an underlying belief in the Copernican theory (i.e. the moon as a world) at a time when there was much debate over the theory's usefulness and veracity.

The future bishop understood how unsettling his critics and others would undoubtedly find his comparison between the earth and moon as habitable bodies. He advised his readers to approach the work "with an equal Mind, not swayed by Prejudice; but indifferently resolved, to Assent unto that Truth which upon Deliberation shall seem most probable unto thy Reason."<sup>11</sup> That truth, of course, was that the moon is an abode fit for habitation. Yet, even though Wilkins could (and did) make use of the arguments and observations of the leading natural philosophers of his day, notably, Johannes Kepler and Galileo, he was all too aware that his "truth" must largely remain unprovable. In the *Discovery* Wilkins admitted this fact, and took dutiful precautions to note that even though he could not necessarily *prove* all of what he claimed, the arguments that he raised, based as they are mostly upon probabilities, should convince those unbiased readers to a "more Active Spirit to a Search after other hidden and

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<sup>11</sup> Wilkins, *Discovery*, 1-2 of 6 unnumbered "Epistle to the Reader."

unknown Truths.”<sup>12</sup> In keeping with this, Wilkins decided to employ both analogical and teleological reasoning, a strategy that would become increasingly popular later in the century, a testimony to the great amount of influence that Wilkins would come to exert.

Perhaps more important for the future debate, though, was what the cleric had to say about the role that Scripture should play within the plurality of worlds—namely that it had none. Emboldened by a wide range of influences, Wilkins brought a critical approach to what Scripture had to say not only about plurality, but natural philosophy as a whole, deciding that God never intended to reveal the innermost secrets of the natural world in the Bible.<sup>13</sup> In fact, when speaking of the Byzantine scholar Procopius's belief, derived from *Psalms 24:2*, that the earth rests on a watery foundation, the divine stated that this and “like Absurdities have followed, when Men look for Grounds of Philosophy in the Words of Scripture.”<sup>14</sup> He likewise attacked those who placed just as much faith in Aristotelian philosophy, noting not only how false new observations were showing his physics to be, but how many of Aristotle's philosophical tenets prove much more dangerous to Christianity than the plurality of worlds.<sup>15</sup> Such anti-Aristotelianism was a hallmark of the new scientific climate, and Wilkins appeared a ready candidate in the Baconian empirical challenge.

In reaching this decision, Wilkins identified and answered what he saw as the four main arguments commonly employed by the religious opposition to show how pluralism was “directly against Scripture.” The first two proved the most problematic as

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<sup>12</sup> Ibid., 5 of 6 unnumbered “Epistle.”

<sup>13</sup> Wilkins quotes such critics on literal interpretations of Scripture as John Calvin, St. Jerome, Isaac Pererius, and the mathematician Edward Wright

<sup>14</sup> Wilkins, *Discovery*, 28.

<sup>15</sup> Among such “Blasphemies, which strike directly at the Fundamentals of our Religion,” Wilkins ascribes to Aristotle “that the World is Eternal; That God cannot have while to look after these Inferiour things; [and] That after Death there is no Reward or Punishment.” Ibid., 21.

they dealt directly with the Scriptural record: the Mosaic account of Creation, which mentions nothing of “other worlds,” and the testimony of St. John, who, “when speaking of Gods works, says, he made the World in the singular Number.”<sup>16</sup> Acutely aware of the dangers that contradicting the Bible would pose to the entirety of the *Discovery*, the cleric tackled these problems head on, devoting significantly more time to them than the other two.

Wilkins started with his conclusion first, one that would have a profound impact for natural theology as a whole in the 1680s and 1690s, “that the Negative Authority of Scripture, is not prevalent in those things which are not the Fundamentals of Religion.”<sup>17</sup> This statement bears more than a slight similarity to Galileo's famous declaration, cited from Baronius, that the “Bible was written to show us how to go to Heaven, not how the heavens go.”<sup>18</sup> Both subscribed to the view that God had created the Book of Nature as distinct, yet equal, to the Book of Scripture, and that the natural world should only be described in purely scientific terms.<sup>19</sup> As the Bible had to be written in terms even the simplest Christian could understand, it would be a mistake to assume that its accounts of Creation contain the entire contents and workings of the natural world. To hammer his point home, Wilkins noted that “if the Holy Ghost had intended to reveal unto us any Natural Secrets, certainly he would never have omitted the Mention of the Planets.”<sup>20</sup>

The third and fourth included the opinions of the early Catholic Church and Thomas Aquinas, respectively; arguments that carried very little weight with Wilkins.

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<sup>16</sup> Ibid., 22.

<sup>17</sup> Ibid., 23.

<sup>18</sup> Caesar Baronius was a sixteenth-century cardinal, historian, and served as the Vatican's librarian from 1596 until his death in 1607.

<sup>19</sup> Galileo also stated that “The Book of Nature is written in (clearly understood) mathematics.” Charles van Doren, *A History of Knowledge* (New York: Ballantine Books, 1991): 200.

<sup>20</sup> Wilkins, *Discovery*, 24.

That early Church leaders condemned the prospect of more than one world should hold no influence over the current debate. Quite the contrary, in fact, for “this very Example is quoted by others, to shew the Ignorance of those Primitive Times, who did sometimes condemn what they did not understand.” In any event, Wilkins quickly pointed out that these early religious objectors understood the plurality of worlds in a much different sense than in the seventeenth century. For “the Term (*World*) may be taken in a double Sense, more Generally, for the whole Universe, as it Implies in it the Elementary and Aethereal Bodies, the Stars and the Earth.”<sup>21</sup> This definition is the plurality of worlds in the classical sense; that is, a plurality of “separate systems unseen by humans, each with its own earth, sun, planets, and stars.”<sup>22</sup> The classical definition mattered less and less to post-Copernican natural philosophy, which came to favor observational data (such as from the newly invented telescope) in favor of metaphysical twists of logic.

Aquinas’s platonic ideas held that if more than one world were to exist, they must either be identical, a needless and wasteful example of God’s power, or of different natures, which, even worse, invalidated the idea of universal perfection.<sup>23</sup> Wilkins held very little regard for Aquinas’s line of reasoning, dismissing them out of hand in stating that this supposed “Dilemma is so blunt that it cannot cut either side, and the Consequences so weak, that I dare trust them without an Answer.” He goes on to add that the proponents of these arguments invalidate themselves by focusing their attacks

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<sup>21</sup> Ibid., 28.

<sup>22</sup> Michael Crowe, *The Extraterrestrial Life Debate, 1750-1900: the Idea of a Plurality of Worlds from Kant to Lowell* (New York: Cambridge UP, 1986), 4.

<sup>23</sup> Of Aquinas’s early seventeenth-century followers on the idea of plurality, Wilkins singles out Julius Caesar la Galla, professor of philosophy at the Collegio Romana and one of Galileo’s (and the heliocentric theory’s) main opponents. Unlike other detractors of Galileo’s research, la Galla did not doubt the efficacy of the telescope; rather, he claimed that Galileo should not present three-dimensional representations based on two-dimensional observations. One of the *Discovery*’s main influences, Tommaso Campanella’s *Apologia pro Galileo* (1616) also takes on la Galla as a principal target.

upon Democritus and classical atomism, instead of considering the recent astronomical observations and discoveries.<sup>24</sup>

The vast majority of the *Discovery's* remainder reasons through analogy that the moon, when compared with the earth, is extremely similar physically, and thus very likely a body capable of habitation. Like the earth, the moon has bodies of water, including rivers and vast oceans, large-scale geological features, such as high mountains and deep valleys, an atmosphere with meteorological activity, and even its very own moon (that is, the earth).<sup>25</sup> While Wilkins occasionally strayed into listing the differing beliefs of ancient philosophers (primarily to counter Aristotelian ideas) or involved himself in the growing debate over ancient versus modern learning, he largely remained loyal to his proof of the lunar world.

Newtonian natural theologians found two strategies in the *Discovery* from which they would receive much benefit. Inherent in the employment of these analogies is a kind of teleological reasoning, that of final causes, with which Wilkins argued that since the moon contains the same features as the earth, it therefore must be inhabitable. Some natural theologians had previously accounted for the existence of the moon by explaining that the light it provides during the night served a great benefit to humanity.<sup>26</sup> As the seventeenth century came to a close, though, natural theologians in support of plurality increasingly attacked the idea that the entire contents of the universe existed

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<sup>24</sup> Wilkins, *Discovery*, 23.

<sup>25</sup> Propositions VII-XII, respectively. That the moon's surface did not have an equal luster was observable before the aid of the telescope, but observations with the device did much to enhance the debate over the causes between the brighter and darker areas. One common solution proposed that the difference was due to corresponding areas of land and sea. Wilkins agrees with this idea, holding that the brighter spots are land, since "Water is the Thinner part, and therefore must give less Light." *Ibid.*, 83.

<sup>26</sup> This proposition was usually likewise extended to the planets and the distant sphere of fixed stars.

solely to benefit humanity.<sup>27</sup> As God does not create things without cause, the existence of lunar weather, seas, and mountains pointed to the fact that it harbors its own rational creatures.<sup>28</sup> To ignore the very obvious logic implied by final causes was, for Wilkins and like-minded pluralists, tantamount to blasphemy. Pluralists in the Newtonian age found in the argument from final causes one of their most effective weapons; readers can find liberal use in the works of Richard Bentley, William Whiston, and William Derham, just to name a few Boyle lecturers as examples.

Wilkins's other strategy was to show how the plurality of worlds enhanced the greatness and splendor of God's creation. Unlike Aquinas and his followers, whose metaphysical beliefs led them to believe that plurality diminished God and the perfect universality, Wilkins was awestruck that "parts of the Universe, may serve as well for the Conservation of that which is in it, as the Help of others without it."<sup>29</sup> The plurality of worlds can here be seen as part of a great Providential design, whose mysteries glorify the Creator; later in the century, natural theologians expressed similar sentiments in discovering God's design in such diverse fields as geology, anatomy, physics, and zoology.

In concluding, Wilkins saved his juiciest (and least scientific) conjectures for the supposed lunar inhabitants themselves. Without the benefit observational data the cleric was forced to admit that is impossible to know anything about them, but again choosing to propose only probabilities. "As I think this Opinion doth not anywhere

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<sup>27</sup> The telescopic discoveries of previously unseen objects, such as the satellites of Jupiter and Saturn, along with estimates that placed the fixed stars at staggering distances, did much damage to the notion. Richard Bentley particularly attacked the idea that the stars were created for human purposes; he considered it much more logical to assume God had created the stars for each system's inhabitants.

<sup>28</sup> Or, as Wilkins puts it, "We may Guess in the General that there are some inhabitants in that Plannet: for why else did Providence Furnish that place with all such Conveaniences of Habitation as have been Declared?" Wilkins, *Discovery*, 144.

<sup>29</sup> *Ibid.*, 29.

Contradict Scripture: so I think likewise, that it cannot be Proved from it;” thus, Campanella's attempts to salve the Christological concerns about the lunar beings was not only pointless, but close to blasphemy.<sup>30</sup> In fact, such posturing could be moot as the creatures may not even resemble humans. “There is a great Chasme betwixt the Nature of Men and Angels,” Wilkins noted, and there could exist countless other beings that God might create to “more completely Glorifie himself in the Works of his Power and Wisdom.”<sup>31</sup> Other possibilities postulated that the inhabitants of the moon (or any other body, for that matter) take the characteristics of the body on which they live, or that departed souls find their lasting repose on the lunar world.<sup>32</sup> Yet even though Wilkins must conclude that nothing about the nature of his “Selenites” can be affirmed, the possibilities he explored excited the imaginations of future generations.

One must turn to Francis Godwin's *The Man in the Moone* for an actual description of what these beings might look and act like. Unlike Wilkins's *Discovery*, Godwin never intended to convince anyone of the truth of the plurality of worlds through a rational explication, for after all, it was a work of fiction. The “Epistle,” however, urged readers (just like Wilkins did in the *Discovery*) not to reject plurality out of hand, comparing the possibility of an inhabited moon to Columbus's discovery of the new world and the existence of antipodeans.<sup>33</sup> In this view, there was no better time than the present to explore plurality than in “this our discovering age: in which our

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<sup>30</sup> Wilkins “Dare[s] not jest with Divine Truths, or apply these [Scriptural interpretations] according as fancy Directs.” *Ibid.*, 145.

<sup>31</sup> *Ibid.*, 146.

<sup>32</sup> *Ibid.*, 146-150. The first view was Nicholas of Cusa's, who stated that the lunar inhabitants are lower than solar ones, but not quite as low as terrestrial ones. Wilkins felt this opinion “hath not any great probability for it, nor certainty against it.” Wilkins ascribed the idea that the moon served as a heaven or a stop in the transmigration of souls to both ancients (Socrates and Plato) and moderns (Plutarch).

<sup>33</sup> Godwin, *The Man in the Moone*, 2-3 of 4 unnumbered “Epistle to the Reader.”



Galilaeusses, can by advantage of their spectacles gaze the Sunne into spots, and decry mountains in the Moone.”<sup>34</sup>

Godwin was well aware that he lived in an age of discovery, and made sure that his readers knew this fact as well. The narrator, Domingo Gonsales, an impoverished Spanish nobleman, undergoes a series of adventures (mostly bad) before finally ending up on an isolated Carribean island, where he stumbles upon a species of wild swan (which he refers to as *gansas*). With the help of Diego (“my Moore”), Gonsales quickly builds a contraption using cork, string, and stone blocks, with which he links the *gansas* together, thus creating a crude flying device, even though he has little control over where it goes.<sup>35</sup> This rather serious implication rears its head when the narrator is forced to use his *gansas* to flee from attacking natives, and after a brief respite at El Pico (“a place where they say never man came before, being in all estimation at least 15 leagues in height perpendicularly upward”),<sup>36</sup> the *gansas* again take flight, lifting Gonsales higher and higher into the atmosphere.

As Gonsales gets closer to the moon, so Godwin's opinions become more assertive. During the ascension he discovers “by this Experience that which no Philosopher ever dreamed of, to wit, that those things wee call heavie, do not sinke towards the Center of the Earth, as their naturall place.” This was a clear attack by Godwin on Aristotelian physics, which held that each of the four elements (five including the heavenly aether) had its natural place; in this case, earth (or heavy bodies) naturally

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<sup>34</sup> Ibid., 3-4 of 4 unnumbered “Epistle.”

<sup>35</sup> The relationship between Gonsales and Diego calls to mind that between Robinson Crusoe and Friday. They immediately assume a relationship of master and servant, in which Diego “who though he were a fellow of good parts, was ever content to be ruled by me.” Ibid., 20.

<sup>36</sup> Ibid., 43.

collected at the center of the universe (the Earth).<sup>37</sup> Since all of the heavy material had accumulated on earth, the plurality of worlds as Wilkins and Godwin envisioned it could not exist in the Aristotelian world because the moon and planets were made of entirely different material.<sup>38</sup> Copernicus, Galileo, Kepler, and others had begun the repudiation of Aristotelian natural philosophy, yet it still had its die-hard supporters well into the seventeenth century, not the least of which was Julius Caesar la Galla, Wilkins's nemesis. Thus, proponents of the plurality of worlds found it necessary to join in on the assault. In Godwin's mind, objects fell to the earth not as a result of natural place, but because they were "drawen by a secret property of the Globe of the Earth, or rather some thing within the same, in like sort as the Loadstone draweth Iron, being within the compasse of the beames attractive."<sup>39</sup>

Finally above the clouds, the traveler observes the earth as it really is, in motion, and urges those "*Philosophers and Mathematicians* [to] now confesse the wilfulnesse of their owne blindness."<sup>40</sup> In ascribing motion to the earth and a similar physical structure between the two, Godwin fulfilled the two most important prerequisites for comparing the moon to the earth, and did indeed refer to the moon as "another Earth."<sup>41</sup> Like Wilkins, Godwin imagined a lunar world with vast oceans, but in this fictionalized setting he allowed himself to go further in populating it with plants and animals,

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<sup>37</sup> Aristotelian physics was broken into two different branches, sublunary and supralunary. The cosmos outside of (and including) the moon was perfect and uncorruptible; inside the lunar orb (including the earth) was the opposite.

<sup>38</sup> The classical version of plurality did not violate Aristotelian physics since it called for a plurality of universes, each with their own sub- and supralunary physics.

<sup>39</sup> Godwin, *The Man in the Moone*, 46-7.

<sup>40</sup> Ibid., 58. Godwin, however, could not "go so farre as *Copernicus*, that maketh the Sunne the Center of the Earth, and unmoveable," rather, he refused "to define any thing one way or another." Ibid., 60.

<sup>41</sup> "After eleven daies passage in this violent flight, I perceived that we began to approach neare unto another Earth, if I may so call it, being the Globe or very body of that starre which we call the Moone." Ibid., 63.

including a few similar bird species and giant trees, three times as large and five times as thick as those on earth.<sup>42</sup>

Such a glorious and providential creation would be a complete waste without its own rational inhabitants to enjoy it. If Wilkins's *Discovery* laid the groundwork in England for the belief that such beings could exist, then Godwin introduced it to what they might conceivably look and act like. As with everything else on the moon, the strange "kind of people" that Gonsales encounters are large: roughly twice the size of humans (though the "true Lunars" can be as much as 30 times as big). As Guthke points out, his stay with the lunar people bears more than a little similarity with how Swift would depict Gulliver's journey into Brobdingnag in the next century: the civilization is idyllic, far greater than any one existing on earth, and a perfect hierarchy.<sup>43</sup> Gonsales finds himself "in a very *Paradise*" with creatures that, as Wilkins speculated, God seems to have created above humans. Just like humans, though, the Lunars praise the Creator; when Gonsales utters the name of Jesus at a royal banquet, the assembled guests upon "hearing the holy name of our *Saviour*, they all, I say, *King, Queene*, and all the rest fell down upon their knees, pronouncing a word or two I understood not."<sup>44</sup> Even more, Gonsales discovers that the lunar name for God is Martin, perhaps a jest by the Anglican Godwin that these superior beings would be Protestant just like him (though unlike his Spanish Catholic traveler). By the late seventeenth century, pluralists were imagining a universe densely populated with rational extraterrestrials praising the providential workings of the Creator.

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<sup>42</sup> Though he disagreed with his fellow divine on on the brightness of the seas, claiming "that part which shineth so clearly; it is even another ocean." *Ibid.*, 64.

<sup>43</sup> Guthke, *The Last Frontier*, 156.

<sup>44</sup> Godwin, *The Man in the Moone*, 82.

The fact that Godwin chose to make his Lunars Christian, or even raised the issue of extraterrestrial religion at all, is an important point, as it showed that he saw no qualms in placing Christianity outside of the human domain. Godwin knew from previous objections to plurality that critics would question whether his Lunars were descendants of Adam, along with the other familiar Christological concerns. Guthke challenges that “these brief allusions to religion are hardly more than a gesture of appeasement on the part of Domingo-Godwin, a gesture, however, that raises more questions than it answers. For instance, it is not at all apparent why the Lunars, who unlike us are evidently free from sin should know a Redeemer.”<sup>45</sup> As Guthke claims, simply making the inhabitants Christians obviously does not satisfy the theological questions; yet we have no reason to believe that Godwin ever intended to explore the religious subtleties of his fictional Lunars. Nor is there any reason to think that these lunar beings are perfect. Upon asking his learned hosts if they knew of any way to achieve invisibility, Gonsales receives the unsatisfactory answer that even “if it were a thing faisible, yet they assured themselves that God would not suffer it to be revealed to us creatures subject to so many imperfections, being a thing so apt to be abused to ill purposes.”<sup>46</sup> This statement appears to apply to the Lunars themselves, and Gonsales earlier noted how there exist varying degrees of the beings, with the “basest” not much different than humans.<sup>47</sup> Guthke further states that “Godwin cannot face even the thought of [other religions in outer space],” yet it seems more likely that Godwin made

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<sup>45</sup> Earlier he states that “All [Godwin] does in regard [to the theological concerns], however, is to make a few passing references to the religion of the lunar people—in other words, Bishop Godwin thinks that these few references adequately fulfill his obligations to his church.” Guthke, *The Last Frontier*, 156-7.

<sup>46</sup> Godwin, *The Man in the Moone*, 101.

<sup>47</sup> These “basest of creatures” are sent by the Lunars to North America, where they “change them for other children before they shall have either abilitie or opportunitie to do amisse among them.” *Ibid.*, 104.

the Lunars Christian not just because he was a bishop blinded by doctrinal obligation, but as a natural result of teleological reasoning and as a further way to celebrate God's glory.<sup>48</sup>

Godwin wrote *The Man in the Moone* as a fictional work to show how limitless the age of discovery's potential could be, not as an Anglican bishop producing a pro-pluralist apology for his fellow churchmen's consumption. As a work of fiction, it is difficult to know whether or how much he actually believed his lunar characters resembled reality. Yet his references to the moon as “another Earth” and a “new world,” along with pro-Copernican and anti-Aristotelian statements, show that his faith in the plurality of worlds was very real. Like Wilkins's *Discovery*, Godwin's *The Man in the Moone* directly influenced the Newtonian Age's understanding of plurality, specifically the notion that God's creations on other worlds venerate the Creator just as humans do.

Wilkins's and Godwin's comments about the plurality of worlds had a profound impact for later generations, most notably in the wake of the Newtonian synthesis. They also produced more immediate and subtle effects, not the least of which was the encouragement it provided to other authors to discuss the topic within a religious context. Less than a decade after the *Discovery* and *The Man in the Moone* appeared in 1638, the Cambridge Platonist Henry More published his *Democritus Platonissans* (1646).<sup>49</sup> In this philosophical poem More argued for the existence of an “infinite of worlds” based on a grand synthesis of Christian Neoplatonism, classical atomism, Descartes's idea of the extension of matter, and teleology.

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<sup>48</sup> Guthke, *The Last Frontier*, 156.

<sup>49</sup> Based at Cambridge in the mid-seventeenth century, the Platonists included, along with More, such figures as Ralph Cudworth, Nathaniel Culverwel, and Benjamin Whichcote. Henry More, *Democritus Platonissans, or, an Essay upon the Infinity of Worlds out of Platonick Principles* (Cambridge, 1646).

More, like Wilkins and Godwin before him, was aware of the “novelty” of his opinion, and so went on the attack, comparing philosophers “rashly settled in the truth” to “Pollitical Judges” and urging those with “more acute judgments” not to cast a “hastie prejudicative sentence” on it.<sup>50</sup> More provided himself as an example of an honest disciple of truth, stating that “Though I detest the sect/Of Epicurus for their manners vile,/Yet what is true I may not well reject.”<sup>51</sup> More's universe relied heavily on Epicurean atomism, for he agreed that the atoms comprised the building blocks of matter, though he modified it heavily in the Neoplatonic style by imbuing each atom with a divine presence wherein “infinite powers do ever abide.”<sup>52</sup> Each atom played an important role in God's master plan, which to More resulted in a universe of infinite solar systems: each countless star surrounded by an even greater number of planets (“dull orbs”).

More's universe was one that relied heavily on teleology, with evidence of God's grand design seen in everything. Since God was a part of every atom, and the extension of matter permeated the entire universe, then “This omnipotent God be every where,/ Where e're he is then can he eas'ly vent/His mighty virtue thoroughall extent.”<sup>53</sup> Echoing Genesis, More claimed that “judicious Nature and carefull Providence her dear” placed the stars at such immense distances so “That the dull Planets with collated light/By neighbour suns might cheared be in dampish night.”<sup>54</sup> As Wilkins was awestruck at how God could create an astronomical body to be both a place of

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<sup>50</sup> Ibid., 1 of unnumbered 6 “To the Reader.” This page also contains the oft-quoted line “INFINITIE OF WOLRDS! A thing monstrous if assented to, and to be startled at.”

<sup>51</sup> Ibid., st. 20.

<sup>52</sup> Ibid., st. 69.

<sup>53</sup> Ibid., st. 48.

<sup>54</sup> Though of course More argued that the stars were not created solely for man's benefit, as they were each suns in their own right. Ibid., st. 23.

habitation and a moon to another inhabited body, so More expressed a similar attitude when noting how “Our worlds sunne/Becomes a starre elsewhere.”<sup>55</sup> To those who would reject his claims and continue to argue that God created the stars solely for human benefit, More again relied on argument for design, by noting the “careless scatter[ing]” of the nighttime stars and countering that “If onely for this world they were intended,/Nature would have adorn'd this azure round/With better art, and easily have mended/This harsh disord'ed order, and more beauty lended.”<sup>56</sup>

Yet following this line of teleological reasoning raises an important question; namely, why should our sun serve as a star to another planetary system unless its (and those of countless other suns/stars) was to be enjoyed by its own creatures? More was convinced that extraterrestrials existed, describing early on how each star's primary duty was to bestow their “seminall virtue” on their own planets to “raise long hidden shapes and life, to their great Makers praise.”<sup>57</sup> Not only did More believe that other solar systems and their inhabitants enhanced the beauty of creation and the glory of the Creator, but he also raised the possibility in the reader's mind that these “shapes and life” praise their Maker, just as Godwin's Lunarians did.

Indeed in his later *Divine Dialogues* (1668), More positively asserted that if there are beings residing on other planets, they have been saved by the Christian faith.<sup>58</sup> In the *Dialogues*, More speculated on the “attributes and providence of God,” including such topics as the habitability of other planets, the rationality of the inhabitants, and whether or not they would be members of the “true religion.” For if the only thing all

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<sup>55</sup> Ibid., st. 24.

<sup>56</sup> Ibid., st. 54.

<sup>57</sup> Ibid., st. 25.

<sup>58</sup> Henry More, *Divine Dialogues, Containing Sundry Disquisitions and Instructions Concerning the Attributes and Providence of God* (London, 1668).

these “men” have in common with humans is “mere natural Reason, so they may all disagree with us in this essential Property of being capable of true Religion.”<sup>59</sup> More answered, in another comparison of plurality with the New World discovery, that as Americans received the Christian Gospel, so “the Spirit of the Lord passes through the whole universe, and communicates this Mystery to all Souls, where-ever they are, that are fitted to receive it, in a more hidden and miraculous way, such as himself and at what time himself shall please to make use of.”<sup>60</sup> Pluralists in the first half of the seventeenth century had already begun to populate the universe with Christian beings, even if they struggled with how to present them.<sup>61</sup>

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<sup>59</sup> Ibid., 530.

<sup>60</sup> Ibid., 536.

<sup>61</sup> Along with an infinity of worlds, More also believed in a succession of times of sorts, in which “all the darksome Planets wide and farre” were engulfed in fire, only to be reborn in a pristine condition.



## CHAPTER III

### 1680 AND BEYOND: THE PLURALITY OF WORLDS AND NATURAL THEOLOGY

After Wilkins's *Discovery* appeared, writers increasingly attempted to show that the plurality of worlds did not contradict the revelation of Scripture. Without the negative authority of Scripture looming over them, Christian pluralists found themselves somewhat freer to speculate on theological issues. As with Francis Godwin and Henry More, numerous examples of a Christianized universe exist from the second half of the seventeenth century; all too sensitive of the charge of irreligion, though, pluralists continually argued that Scripture could not be used to deny the truth of plurality, especially in light of recent scientific discoveries and observations. Some, such as the leading Puritan Richard Baxter, argued that just as the Bible could not be used to deny, neither could it affirm a plurality of worlds; many authors, however, chose to interpret Scriptural passages they saw as favorable to their case.

In 1658, one year after its initial publication, an anonymous English translation of Pierre Borel's *A New Treatise, Proving the Multiplicity of Worlds* appeared.<sup>1</sup> Borel listed objections both ancient and modern to the belief in a plurality of inhabited worlds, chief among them the belief that it presented a disagreement with revelation. Yet “holy Scripture itself is not repugnant and contradictory to it,” Borel wrote, “but rather leans much towards my opinion [of inhabited worlds].”<sup>2</sup> Heavily influenced by Cartesianism and classical atomism, as well as relying heavily upon final causes, Borel's universe was heliocentric, with the sun providing heat and light to the rest of the universe,

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<sup>1</sup> Pierre Borel, *A New Treatise, Proving the Multiplicity of Worlds. That the Planets are Regions Inhabited, and the Earth a Star, and that it is out of the Center of the World in the third Heaven, and turns round before the Sun which is fixed. And other most Rare and Curious Things.* (London, 1658).

<sup>2</sup> *Ibid.*, 12.

including the earth-like stars. This vision resulted in an “infinite number of great globes of divers natures, or inhabited by several living creatures.”<sup>3</sup> Naturally, these worlds and rational creatures were “created for the praise and everlasting glory of their Maker;” Borel's infinite universe was undoubtedly Christian.<sup>4</sup>

Borel spoke of “men” of “other natures,” and he remained confident that “those men in the Starres have need of salvation.” Instead of speculating on the form of that salvation, Borel, much like More would do ten years later in the *Divine Dialogues*, wrote that “God hath so many means and wayes, to us unknown, for to save them,” that one should only trust in the Creator's infinite goodness.<sup>5</sup> The works and providence of God are so far beyond human comprehension that there was no need to assume that Christ must die on each world. Scripture provided no help on the nature of these “men” or even on the existence of the other worlds, since it only related the creation of *this* world, the Earth, and its inhabitants.

Borel echoed Wilkins in claiming that God intended Scripture for common consumption, and thus it should not be used as a natural philosophy textbook.<sup>6</sup> Against Wilkins's advice, though, Borel held that “in severall places [Scripture] agreeth in the plurality of worlds,” and so sought out several passages that he thought lent credence towards his pluralist universe.<sup>7</sup> Using this method, he derived the existence of water on the stars (*Genesis*, ch. 1 and *Esdras*, ch. 6), that “those Men in the Stars” could be free

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<sup>3</sup> Ibid., 30.

<sup>4</sup> Ibid., 37.

<sup>5</sup> Ibid., 140.

<sup>6</sup> Borel also used one of Wilkins's examples from Scripture concerning the moon. “The Holy Ghost uses such Vulgar Expressions as when he calls the Moon *one of the greater Lights*, whereas 'tis the least that we can see in the whole Heavens.” John Wilkins, *The Discovery of a New Planet*, 4th ed. (London, 1684), 27. “God speaks according to mens belief as when he calls the Moon the *great light*, though an infinite number of others are greater.” Borel, *A New Treatise*, 48, also 126-27.

<sup>7</sup> Borel, *A New Treatise*, 126.

from sin and the temptations of Satan (*Book of John*, ch. 12), “that the Stars are not clean before God, that they sing his praises, and are his armies” (*Book of Job*, ch. 12), and that by “the stars” was meant their inhabitants who were in need of redemption (*Colossians*, ch. 1).<sup>8</sup>

Borel continued this line of Scriptural interpretation, claiming that the inhabitants of some other worlds have already been judged as humans on the earth will be (2 *Esdras*, ch. 7 and *Proverbs*, ch. 8).<sup>9</sup> Other writers were more conservative in their theories. Richard Baxter's *The Reasons of the Christian Religion* (1667), written as a massive proof of the existence of God and intended for atheists just as much as Christians, contained many of the dissenting minister's thoughts on other inhabited worlds.<sup>10</sup> Baxter, like Wilkins, shunned the use of Scripture, claiming that “Religion doth not only say nothing of former worlds, but that it also forbiddeth us to say, Yea or Nay, to such questions, and to corrupt our minds with such presumptuous searches of unrevealed things.”<sup>11</sup> Furthermore, the Puritan wanted his “unbelieving Reader to observe” that he personally speculated in natural philosophy not expressly asserted by Christianity; and as for those who used religion to oppose such conjectures, Baxter thought “them betrayers of the Christian cause . . . [who] corrupt it by pretending that it condemneth all the opinions in Philosophy which themselves are against.”<sup>12</sup>

With *The Reasons of the Christian Religion*, Baxter produced a work designed to convince atheists and infidels of the errors of their ways by reasoning with them. One

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<sup>8</sup> Ibid., 84-5, 139, 167-68, 170.

<sup>9</sup> “Those great Comets that remain so long above the Region of the meteor, are the burnings of some Stars that are ending, and which we had not perceived by reason of their far distance.” Ibid., 173-74.

<sup>10</sup> Richard Baxter, *The Reasons of the Christian Religion* (London, 1667).

<sup>11</sup> Ibid., 587.

<sup>12</sup> Ibid., 588.

such form of reasoning was to expound upon the beauty and order of creation, which Christian pluralists before and (especially) after Baxter saw exemplified by the notion of an inhabited plurality of worlds. In contemplating the wisdom of God, he wrote:

Yea, if we had a sight of all the Orbs, both fixed Starrs and Planets, and of their matter, and form, and order, and relation to each other, and the cause of all wonderous motions: If we saw not only the nature of Elements, especially the active Element, Fire; but also the constitution, magnitude, and use, of all those thousand Suns, and lesser Worlds, which constitute the universal World: And, if they be inhabited, if we knew the Inhabitants of each: Did we know all the Intelligences, blessed Angels, and holy Spirits, which possess the nobler parts of Nature; and the unhappy degenerate Spirits, that have departed from light and joy, into darkness and horror, by departing from God; yea, if we could see all these comprehensively, at one view; what thoughts should we have of the *wisdom* of the Creator? And what should we think of the Atheist that denyeth it? We should think *Bedlam* too honourable a place for that man . . .<sup>13</sup>

Baxter, the Puritan, here briefly engaged himself in the use of natural theology to show the ridiculousness of the other side: how could anyone in their right mind believe in the chance formation of atoms, when so much order exists in the universe?

Natural theology, synonymous with the Book of Nature, existed apart from revealed religion, and so represented an important argumentative tool against those atheists and deists who refused the authority of Scripture. Known as scoffers, these lapsed souls were viewed as trusting solely in what their own reason could prove. As concerned English churchmen and citizens became more and more disheartened with what they saw as their nation's moral decline in the late seventeenth century, many hoped natural theology would reform their enemies' souls. The lax social standards and the growth of atheism associated with Charles II's court and the Earl of Rochester's circle helped fuel natural theology's campaign. While extremely popular among the Newtonians, previous authors, as Wilkins and Baxter before them did, espoused natural

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<sup>13</sup> Ibid., 23.

theology through the plurality of worlds with numerous works seeing publication in the 1680s—just a few years before Newton's *Principia* appeared. One such example was produced by Robert Wittie, a physician and contributor to the Royal Society's *Philosophical Transactions*.<sup>14</sup>

Wittie's *Ouranoskopia, or, A Survey of the Heavens* (1681) contains many arguments for the plurality of worlds by now familiar, though with the aid of newer telescopic observations, and the groundwork laid by Wilkins and others, he presented them in a much more confident manner.<sup>15</sup> Wittie explained the day's leading astronomical theories, and through them hoped to show how the “new philosophy,” including plurality, satisfied both reason and religion.

From Wilkins's *Discovery*, one of his prime sources, Wittie extended the analogy of the moon as another world to the rest of the planets. Like the earth, and moon, the other planets are dark bodies having no light of their own, rotate on their own axes, and are surrounded by moons.<sup>16</sup> In addition to analogous reasoning, Wittie employed the doctrine of final causes, arguing that these planets would be wasted “if there be no Inhabitants, or rational beings in them.”<sup>17</sup> He also mirrored Borel's *New Treatise* in claiming that, far from condemning the plurality of worlds, Scripture could in fact be shown to prove the existence of other inhabitants. Obviously, these beings would be Christian and would “exalt the great Name of their and our Creator.”<sup>18</sup> Wittie admitted

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<sup>14</sup> Wittie dedicated the *Ouranoskopia* to the Royal Society, and made use of Robert Hooke and Giovanni Domenico Cassini's telescopic observations reported in the *Philosophical Transactions*. Robert Wittie, *Ouranoskopia, or, A Survey of the Heavens. Being a Plain Description of the Admirable Frabrick and Motions of the Heavenly Bodies* (London, 1681).

<sup>15</sup> Wittie, however, still felt the need to defend himself against the apparent “Novelty of these Notions,” despite the already rich history of plurality in England. *Ibid.*, 34.

<sup>16</sup> *Ibid.*, 25, 29.

<sup>17</sup> *Ibid.*, 29.

<sup>18</sup> *Ibid.*, 26.

that neither he nor any other astronomers could produce any observational proof of these inhabitants, yet he held out hope that some future generations may carry “commerce” with them, just as God provided the seventeenth century with a better sense of astronomy than the ancients, via the telescope.

What the telescope and the new astronomy provided, according to Wittie, was a further proof of the Christian system, along with increased reverence for its Creator. Wittie found the idea of a universe full of Christian inhabitants too appealing to pass over, and scoffed at those unbelievers. He challenged them to deny the proofs he laid out, claiming that the universe as it existed held no room “for *Atheism*, unless men will shut their eyes, and wilfully divert themselves of that Reason which is implanted in their Nature.”<sup>19</sup> Thus, Wittie not only attacked the atheists on their own ground, through the use of reason, but accused those who failed to convert of actually ignoring their (God-given, of course) rational sense.

What Baxter had touched upon, Wittie hammered home: the plurality of worlds, with its myriad systems full of God-fearing rational creatures, reinforced revealed religion instead of countering it. The main concern of Wilkins and others had earlier been showing how a pluralist universe did not contradict Scripture, and while this would remain an issue for English pluralists, by the late seventeenth century they had largely moved on to a full-scale incorporation of plurality into the larger realm of natural theology. Along with Wittie's *Ouranoskopia*, another pivotal event towards this incorporation occurred in the 1680s with the publication of Bernard le Bovier de Fontenelle's *Entretiens sur la Pluralité des Mondes* (1686).

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<sup>19</sup> Ibid., 41.

Immensely popular in England even before being translated, two separate English editions were produced in 1688 by Joseph Glanvill, an Anglican clergyman and Royal Society fellow, and by Aphra Behn.<sup>20</sup> Fontenelle's main impact in England resulted mostly from his wit and writing style, which described the Copernican theory and the plurality of worlds in a language that non-virtuosi could grasp. Using Cartesian cosmology as his basis, as More, Borel, and Wittie all had done, Fontenelle argued that analogy and final causes led to a rational belief in plurality. In her preface, though, Behn explained how she felt Fontenelle pushed "his wild Notion of the Plurality of Worlds to that height of extravagancy," describing it as a "wild Fancy" that she would "not presume to defend."<sup>21</sup> A year earlier, she produced the farce *The Emperor of the Moon* (1687), in which she greatly satirized the idea of an inhabited moon, specifically mentioning Wilkins's *Discovery* and Godwin's *Man in the Moone* among "a thousand other ridiculous Volumes too hard to name."<sup>22</sup>

In addition, Behn objected to the Frenchman's depiction of the overall universe, as it "ascribes all to Nature, and says not a Word of God Almighty, from the Beginning to the End; so that one would almost take him to be a Pagan."<sup>23</sup> While not a denial of God's existence, the *Entretiens'* failure to mention an intelligent Creator was deeply troubling, and Behn's use of the word "pagan" was no accident. As she noted on the next page, devout Christians from all circles and countries initially had deemed the theory of a heliocentric universe heretical; only after more than a century of studying the mathematical and observational evidence did most natural philosophers come to agree

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<sup>20</sup> Bernard le Bovier de Fontenelle, *A Discovery of New Worlds*, trans. Aphra Behn (London, 1688); de Fontenelle, *A Plurality of Worlds*, trans. Joseph Glanvill (London, 1688).

<sup>21</sup> Behn, *Discovery of New Worlds*, 9, 10 of 28 unnumbered of "The Translator's Preface."

<sup>22</sup> Aphra Behn, *The Emperor of the Moon* (London, 1687), 4.

<sup>23</sup> Behn, *A Discovery of New Worlds*, 26 of "Preface."

with Copernicus. Even by the late seventeenth century the battle was not completely won, as Behn fell into a defensive posture when expressing her belief in heliocentrism—which surely seemed relatively benign when compared with plurality—employing the oft-used argument that God only intended Scripture to “instruct Mankind . . . in the Law of God, to lead us to Eternal Life.”<sup>24</sup>

While Behn may have found Fontenelle's insistence on numerous inhabited worlds extravagant and outlandish, she realized how popular an English translation could be, and listed “the General Applause this little Book has met with, both in France and England in the original” as her main reason for producing it.<sup>25</sup> One of those on the English side who applauded the *Entretiens* was the cleric Richard Bentley, a member of the burgeoning latitudinarian sect, who would later include a discussion of plurality in delivering first series of the Boyle Lectures (*A Confutation of Atheism*, 1692).<sup>26</sup> At the time of his exposure to the *Entretiens* he was serving in the household of fellow latitudinarian Edward Stillingfleet, Bishop of Worcester, and beginning his classical studies, for which he would later become primarily known.<sup>27</sup> Bentley is, obviously, very

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<sup>24</sup> Ibid., 28 of “Preface.”

<sup>25</sup> Ibid., 1 of “Preface.”

<sup>26</sup> The series consisted of eight parts, and Bentley revised and published them a year later. Richard Bentley, *The Folly and Unreasonableness of Atheism Demonstrated from the Advantage of a Religious Life, the Faculties of Human Souls, the Structure of Animate Bodies, and the Origin and Frame of the World* (London, 1693).

<sup>27</sup> Bentley would also later gain fame for his zealous attitude towards study and inquiry, an obstinate, almost ruthless view of opinions differing from his, and an unflappable belief in his own abilities and intelligence. Jonathan Swift took Bentley's arrogance to monstrous proportions in the *Battel of the Books*, Swift's defense of classical art and learning against those “Moderns” like Bentley and William Wotton. In his personification of the Moderns' army, Swift describes Bentley as “the most deformed of all the *Moderns*; Tall, but without Shape or Comeliness; Large, but without Strength or Proportion.” Swift further vilifies Bentley by having the narrator note how he “is famous for letting fly at every Body without Distinction, and using mean and foul Scurrilities.” Jonathan Swift, “The Battel of the Books,” *The Writings of Jonathan Swift*, ed. Robert A. Greenberg and William B. Piper (New York: W. W. Norton & Company, 1973), 391-92.



likely the publisher listed as “R. Bentley” on the title page of Glanvill’s translation of the *Entretiens*.

In any event, Bentley had already taken an interest in the possibility of a plurality of worlds at almost the exact same time that Isaac Newton’s *Principia* (1687) appeared. The *Principia* showed mathematically that the physical world operated according to certain fundamental mechanical laws, which produced the same effects whether on earth or in the void of space. In his Boyle series, Bentley produced “the first popular attempt to lay open the ‘sublime discoveries’ of Newton.”<sup>28</sup> His purpose, though, was not simply to popularize Newtonian physics, but to exploit it to prove the providential nature of the entire universe. In form, his efforts were no different than previous efforts already examined; the difference lay in the substance of the argument, specifically its use of Newtonian mechanics.

Bentley’s lectures were hailed as a wide success in Latitudinarian circles, and set the tone for future lecturers.<sup>29</sup> Only the last part of the series (“The Origin and Frame of the World”) dealt specifically with Newton and his mechanics; the previous parts considered the nature and “faculties of human souls” and the structure and design of human and animal bodies. With encouragement from Newton himself, with whom he began a correspondence sometime in May or June 1691, he produced a decidedly Newtonian natural theology, which placed a great deal of emphasis on the motion of bodies. The simplicity of Newtonian mechanics—perhaps more so than the mathematics—lent itself perfectly for Bentley’s design. Even Newton himself supported

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<sup>28</sup> Perry Miller, “Bentley and Newton,” *Isaac Newton’s Papers and Letters on Natural Philosophy*, ed. I. Bernard Cohen (Cambridge, Massachusetts: Harvard UP, 1978), 273.

<sup>29</sup> With the aid of the Latitudinarians, Newton’s followers dominated the Boyle Lectures. Among the other lecturers were Samuel Clarke, William Whiston, and William Derham.

this attempt, writing enthusiastically to Bentley that “When I wrote my Treatise about our System, I had an Eye upon such Principles as might work with considering Men, for the Belief of a Deity, and nothing can rejoice me more than to find it useful for that purpose.”<sup>30</sup> His support of Bentley's design likely did not extend to the latter's belief in other worldly inhabitants; Newton made few statements, public or private, commenting on the possibility of an inhabited universe.

Other Anglican virtuosi, most noticeably Robert Boyle, had previously discussed the importance of motion in defeating classical atomism, but the accuracy of Newton's mathematics made its creation and maintenance seem to them to be impossible in a godless world. As it was understood at the time, motion must come from one of two ways: either by a common motion not related to attraction (that is, gravity), or through a mutual gravitation inherent to matter. Bentley's view of Newtonian physics, and Newton here does not contradict Bentley, simply did not allow for both sets of motion to coexist. In the case of an attraction-less common motion, even if enough particles managed to collide in the vast spaces of the “Void,” there is no way left to account for the planets' orbits around the Sun. Bentley explained that the Earth's orbit

Must proceed (in this Hypothesis) *either* from the Summ and Result of the several motions of all the Particles that formed the Earth, *or* from a new Impulse from some external matter, after it was formed. The *former* is apparently absurd, because the Particles that form'd the round Earth...would generally tend towards its Center; which would make the whole Compound to rest in a Poise. And *secondly*, 'tis impossible, that any external Matter should impel that compound Mass, after it was formed.<sup>31</sup>

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<sup>30</sup> Isaac Newton, “Newton to Bentley, Letter I,” *Newton's Papers and Letters*, 280.

<sup>31</sup> Bentley, “Seventh Lecture,” *The Folly and Unreasonableness of Atheism*, 24.

He concluded in the seventh sermon that the mutual gravitation of the universe is not an innate characteristic of matter, and therefore some secondary source must have introduced it—continuing an active presence in the universe through its preservation.<sup>32</sup>

Bentley and other Newtonian natural theologians termed this preservation as providence, though of a different sort than the divine interference seen at the personal level or in earthly affairs.<sup>33</sup> This providential governance of universal motion resulted from “an eternal Wisdom and Understanding,” that made an Epicurean origin of the universe just as likely as if one could imagine an eternal poem, “transcribed from Copy to Copy without any first author and Original.”<sup>34</sup> Confident that he had proven God’s active role in the universe, and thus a victory over the atheists, Bentley proceeded to a more speculative approach in the eighth and final part, arguing that the specific structure of our solar system could only result from the choices of an “intelligent Agent.”

Before limiting himself to the sun and planets within the solar system that humans were already well aware of, Bentley hypothesized on those “great multitudes of lucid Stars even beyond the reach of the best Telescopes.”<sup>35</sup> If the current structure of the universe resulted from the choice and design of a divine being, then the intelligence and goodness of that being should be reflected by the utility of the present system for “Rational Minds.” That includes all rational minds, whether they may be humans on the earth, or other inhabitants throughout the stars.

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<sup>32</sup> This need for preservation highlighted the fact that Newtonian mechanics was not a perfect system, even after allowing for a divine “First Cause.” Leibniz, among others, quickly pounced on this fact, pointing out that Newton’s God apparently did not have the proper abilities to create a self-sufficient system. See Chapter 1, n. 15.

<sup>33</sup> One popular contemporary example was the “Protestant Wind” that allowed William’s army to cross the Channel on November 5 (William’s birthday as well as Guy Fawkes’ Day), 1688, leading to the expulsion of James II.

<sup>34</sup> Bentley, “Eighth Lecture,” *The Folly and Unreasonableness of Atheism*, 42.

<sup>35</sup> *Ibid.*, 6.

Once again, the style of Bentley's arguments was similar to what pluralists used before, with his favorite being final causes, but he delivered them with a confidence that Wilkins could have only dreamt. Whereas even Wittie had felt it necessary to defend himself against promoting new ideas just some ten years before, Bentley included no such caveat, and launched into his discussion of plurality noting that "we need not nor do not confine and determin the purposes of God in creating all the Mundane Bodies, merely to Human Ends and Uses."<sup>36</sup> While it is equally no "absurdity, that such a vast and immense Universe should be made for the sole use of such mean and unworthy Creatures as the Children of Men," Bentley, like Wilkins before him, dealt largely with probabilities.<sup>37</sup> While he agreed that God created "the innumerable Starrs" to "beget in us a great Idea and Veneration of the mighty Author and Governer of such stupendous bodies," for Bentley this could not have been the sole reason for their existence—especially not for those stars beyond the most powerful telescopes.<sup>38</sup>

Instead, he argued, the "boundless Beneficence of God" had intended "different ends and nobler purposes" for the infinity of stars and their presumed planets than merely to be "peept at through an Optick Glass."<sup>39</sup> Bentley wasted no time in taking the next step, writing "Now if they were not created for Our sakes; it is certain that they were not made for their own. For matter hath no life nor perception, is not conscious of its own existence, nor capable of happiness, nor gives the Sacrifice of Praise and Worship to the Author of its Being. It remains therefore, that all Bodies were formed for the sake

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<sup>36</sup> For Wittie, see n. 15 above. Bentley, "Eighth Lecture," *The Folly and Unreasonableness of Atheism*, 4.

<sup>37</sup> *Ibid.*

<sup>38</sup> *Ibid.*, 5.

<sup>39</sup> *Ibid.*, 6.

of Intelligent Minds.”<sup>40</sup> These minds, full of praise and worship for their creator, should inspire in humans an even greater adoration for God as they ponder a universe populated with a whole range of rational creatures.

Bentley also treated the religious questions which had plagued plurality with a confidence not previously seen. While Wilkins and his followers vigorously asserted that God did not intend Scripture to be used as an astronomical textbook, providing numerous examples, Bentley spent just under a half a page on the subject. He repeated the thought that revealed religion provided no quarrel “in this Speculation [i.e. other inhabited worlds]” because “Moses’s Narrative . . . doth only treat of the Origin of Terrestrial Animals.”<sup>41</sup> Whereas Wilkins commented that Scripture made no mention of the creation of the planets, Bentley, primarily concerned here with the creation of beings, similarly pointed out that there was neither an account of the origin of angels—yet no Christian would deny that they exist.

Bentley dealt somewhat more carefully with the Christological questions, no doubt aware of how quickly accusations of blasphemy could result, but he still dismissed them as “frivolous disputes.” Offering a novel definition of what precisely constituted “human,” Bentley argued that God made humanity the sum of both their rational souls and physical bodies, and any derivation from either facet would result in a non-human being.<sup>42</sup> If, then, these “Rational Inhabitants” were non-human, “we ought not upon any account to conclude . . . they must therefore have Human Nature, or be

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<sup>40</sup> Ibid.

<sup>41</sup> Ibid.

<sup>42</sup> “For what is Man . . . but a Rational Mind of such particular Faculties, united to an Organical Body of such a certain Structure and Form, in such peculiar Laws of Connexion between the Operations and Affectations of the Mind and Motions of the Body.” Ibid., 7.

involved in the Circumstances of Our World.”<sup>43</sup> As such, “the miseries of Adam’s Fall, or in the benefits of Christ’s Incarnation,” were unique to humanity, and thus unshared by the “innumerable Orders and Classes of Rational Minds” created by God.<sup>44</sup> Bentley felt that any speculation about these rational beings, other than that they existed and were not human, was baseless.

Bentley’s sermons were hailed as a wide success, and it is not difficult to see why they attracted such a following.<sup>45</sup> More specifically, the eighth part of Bentley’s series proved a critical building block for the rampant popularity of pluralist thought among natural theologians in early eighteenth-century England for a number of reasons, the most important being its link with Newton’s mechanics and its confident presentation. Some authors continued to include statements urging their readers not to dismiss it based on the supposed novelty of the idea, but one gets the sense that these were largely ceremonial gestures designed to preclude charges of heresy. Certainly by the late seventeenth century the plurality of worlds could no longer be considered a “new” idea, even among a general audience; William Temple, that staunch defender of ancient learning, made sure to point out as such when praising Fontenelle’s *Entretiens* “for the fashion of it rather than the matter, which is old and beaten.”<sup>46</sup>

Temple may have become bored with the topic, but Bentley’s followers each added their own individual spin to a pluralist universe, just as they did to Newton’s

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<sup>43</sup> Ibid., 8.

<sup>44</sup> Ibid., 7.

<sup>45</sup> “His success was immense, and in the opinion of many (including Bentley himself), *A Confutation of Atheism* so routed the atheists that they did not dare any longer show their faces openly, and so took refuge in the pretense of ‘deism.’” Miller, “Bentley and Newton,” *Newton’s Papers and Letters*, 273.

<sup>46</sup> William Temple, “An Essay upon the Ancient and Modern Learning,” *Five Miscellaneous Essays by Sir William Temple*, ed. Samuel Holt Monk (Ann Arbor, Michigan: University of Michigan Press, 1963), 37.

theories.<sup>47</sup> Nehemiah Grew, primarily known for his pioneering work in botany and, like Bentley, a fellow of the Royal Society, argued that the totality of God's power almost assured that a plurality of worlds with rational inhabitants existed.<sup>48</sup> Grew viewed the moon as "another Terraqueous Orb" complete with animals, plants, and minerals, and felt that "we have as good reason to believe the same of all the other Planets; their greater and lesser Distance from the Sun being matched with a suitable Atmosphere."<sup>49</sup> Since he equated the fixed stars with suns, this system was repeated throughout in an indefinite, though not infinite (only God could be infinite) universe.<sup>50</sup>

William Derham largely agreed with Grew in describing the "New System" of the structure of the universe as an extension of the Copernican, with each fixed star home to a realm of planets and their satellites. His immensely popular *Astro-Theology* relied heavily on teleological and analogous reasoning, arguing that God, as an "infinitely wise Architect," must have made the myriad stars for their own use, that is, to warm the planets they surely have.<sup>51</sup> In continuing this line of thought, such planets would resemble the earth in figure, composition, and motion, as well as have their own seasons and earth-like geological features.<sup>52</sup> It should go without saying that these

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<sup>47</sup> Patricia Fara, "Heavenly Bodies: Newtonianism, Natural Theology, and the Plurality of Worlds Debate in the Eighteenth Century," *Journal of the History of Astronomy* 35 (2004): 143.

<sup>48</sup> "The existence of other Beings, superior unto Human Mind, is further evident, from the Plenitude of Things, so far as we are able to go, throughout the Visible World." Nehemiah Grew, *Cosmologica Sacra: or a Discourse of the Universe as it is the Creature and Kingdom of God* (London, 1701), 10.

<sup>49</sup> *Ibid.*, 10.

<sup>50</sup> *Ibid.*, 6.

<sup>51</sup> "By 1777, [Derham's] *Astro-Theology* had attained fourteen English and six German editions," and according to Derham, his earlier *Physico-Theology* had gone through three printings in its first year of publication. Michael J. Crowe, *The Extraterrestrial Life Debate, 1750-1900: the Idea of a Plurality of Worlds from Kant to Lowell* (New York: Cambridge UP, 1986), 25.

<sup>52</sup> William Derham, *Astro-Theology: or a Demonstration of the Beings and Attributes of God, from a survey of the Heavens* (London, 1715), 132.

planets would, “with great reason . . . be habitable Worlds, so stocked with proper Inhabitants.”<sup>53</sup>

What Wilkins had applied to the moon, Derham extended to the rest of the solar system and beyond, though he was not merely content to leave his proof at the level of analogies or the magnificence of God. He cited observations from Cassini that Jupiter (as well as Mars and Venus) contained water, and claimed that he had even seen evidence of planets outside of the solar system.<sup>54</sup> Derham felt that the brightness of the Milky Way was “not caused by the bare Light of the great number Fixt Stars in that place, as hath commonly been thought, but partly by their Light, and partly (if not chiefly) by the Reflections of their Planets.”<sup>55</sup> In addition, the disappearance and subsequent reappearance of some “New Stars” could best be explained as planets, whose orbits carried them within visible range, and then out again. While these explanations constituted “an interesting early attempt to verify empirically the existence” of extrasolar planets, it was Derham’s reliance on analogy, final causes, and the power and wisdom of God that drove his plurality.<sup>56</sup>

Nowhere was the use of final causes more prevalent than in William Whiston’s *A New Theory of the Earth* (1696). Whiston railed at the thought that God had created the planets and fixed stars for the sole benefit of humanity, sternly rebuking it as an “*unreasonable Opinion*.”<sup>57</sup> Clearly it should seem an injudicious waste of God’s supreme power “To make a vast Number of Planets, (every way as capable of

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<sup>53</sup> Ibid., lvi.

<sup>54</sup> Ibid., 123-24.

<sup>55</sup> Ibid., xlvi.

<sup>56</sup> Steven J. Dick, *Plurality of Worlds: The Extraterrestrial Life Debate from Democritus to Kant* (New York: Cambridge UP, 1984), 154.

<sup>57</sup> William Whiston, *A New Theory of the Earth, From its Original, to the Consummation of All Things* (London, 1696), 73.



Creatures of their own) only for the sake of us on Earth; that we might in the nighttime view and calculate their Positions and Motions!”<sup>58</sup> Rather, Whiston argued, it would be much more reasonable to “suppose that as this Earth was form’d in six Days for the Sake of Man, so were the rest of the Heavenly Bodies, form’d at proper Times, for the Sake of other of God’s Creatures; for whom Providence ought to be allow’d to have taken a proportionable Care, and made a suitable Provision, as we our selves find has been done with regard to us and our Affairs.”<sup>59</sup> Such a line of teleological reasoning was necessarily anti-anthropocentric, and Whiston further urged his readers to “learn humble and modest sentiments of our selves” in contemplating their place in God’s vast majestic universe.<sup>60</sup>

One key problem of pluralist conjecture discernable from Bentley on was exactly where to place humanity on the chain of being. The existence of rational inhabitants other than humans implied difference, and authors debated this difference on a scale of superiority. Grew “look[ed] upon Man as the Equator of the Universe,” believing that as many creatures as there were on earth below humanity, there were just as many “divers other Created Beings Superior” to humanity on other worlds. What those creatures looked like, Grew would not speculate, other than that they comprised “several Orders of Imbody’d Intellect” on a gradual ascent to the “Perfect Mind,” God.<sup>61</sup> Expanding upon the imagery of humanity as an “Equator,” he claimed that “as the sense of a Worm is beneath Human Sense: So far may Humane Intellection, be beneath the Comprehensive, in the Supream Order of Celestial Mind.”

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<sup>58</sup> Ibid., 72.

<sup>59</sup> Ibid., 94.

<sup>60</sup> Ibid.

<sup>61</sup> Grew, *Cosmologica Sacra*, 80.

Likewise, Whiston also postulated that “there may be Millions of nobler Intellectual Beings interposed between Man and God.”<sup>62</sup> He later provided a glimpse of what these creatures might resemble, writing in the *Astronomical Principles of Religion* (1725) that planetary atmospheres “appear to be the proper Places for the Habitation of not wholly Incorporeal, but Invisible Beings.”<sup>63</sup> Planetary cores—even that of the sun—could also be inhabited, but Whiston cautioned that these were conjectures, not assertions. Still, he concluded that “Nature, as we still find, abounds in all proper Places with Living Creatures . . . all made to enjoy their Creator’s Bounty, and to be serviceable to other Beings Superior to themselves.”<sup>64</sup> Derham, however, remained silent on the matter, as he preferred not to comment on the possible natures of otherworldly beings, calling it a “meerly conjectural” exercise and instead referring his readers so interested to Christian Huygens’s *Cosmothereos*.

If these inhabitants were superior to humans were they then free of original sin, or did they require the redemption of Christ or a different sort of revelation? Like humans, Grew thought that these superior beings were capable of moral evil—an even greater moral evil than humans. Along with their higher intellects or spirits, came a greater “Phancy,” resulting in their souls not being “a true Light, but a Mixture of Darkness.”<sup>65</sup> Whether or not these creatures required redemption for their acts of moral evil, and what form it might take, Grew declined to comment. Whiston held that “though the Advantages of our Saviour’s Incarnation and Meditation should be wholly confin’d” to humanity, “that does not shew that the other Parts of God’s Creation are not equally

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<sup>62</sup> Whiston, *A New Theory*, 92.

<sup>63</sup> William Whiston, *Astronomical Principles of Religion, Natural and Revealed. In Nine Parts* (London, 1725), 92.

<sup>64</sup> *Ibid.*, 150.

<sup>65</sup> Grew, *Cosmologica Sacra*, 82.

regarded by him.”<sup>66</sup> He later referred to humanity as “that fallen Race of Creatures which belong to this Earth,” perhaps implying other races fell from grace just as mankind did, and that God would provide for them in a way that their unique circumstance calls.

Daniel Sturmy provided a novel way of viewing man in a pluralist universe. Sturmy populated his worlds with “*Good Angels, Fal’n Angels, and the Souls of Men* ordain’d for three different States, and Transplantings from one Orb to another in Succession.”<sup>67</sup> While angels constituted a separate creation and had their own worlds, human souls, after initial death on earth, would relocate to nobler worlds based on their religiosity. In this universe the planets would be divided into “Orbs of Tryal” and “Orbs of Reward;” fittingly, “Martyrs and Confessors” would claim the best worlds.<sup>68</sup>

Following Bentley’s lead, Grew, Derham, and Whiston continued to make a belief in a plurality of worlds an orthodox component of natural theology. While each had, and each inspired, different versions of what such a universe looked like, and what inhabitants it held, the lines of reasoning for their beliefs were largely the same as had been developed throughout the seventeenth century. These arguments, that of analogy, final causes, and the power and wisdom of God, formed a powerful tool against the threat of heterodoxy that they viewed as all too real. Sturmy expounded the aid for a religious life that plurality afforded, while condemning contemporary society as one of sin and debauchery.<sup>69</sup>

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<sup>66</sup> Whiston, *A New Theory*, 59.

<sup>67</sup> Daniel Sturmy, *A Theological Theory of a Plurality of Worlds* (London, 1711), 21.

<sup>68</sup> *Ibid.*, 22.

<sup>69</sup> *Ibid.*, 145.

The idea that a lowly human, when contemplating the works of the universe, could deny the existence of a creator was an unpalatable one that refuted the use of reason—that very faculty that atheists and deists claimed to love and follow only. Derham lamented that there were “Rational Beings so stupid, so vile, so infatuated with their Vices, as to deny these *Works* to GOD, and ascribe them to a *Necessity* of Nature, or indeed a meer *Nothing*, namely *Chance!* But such there are to be met with among our selves.”<sup>70</sup> These persons had “so debauched themselves” that they could no longer see God’s wisdom inherent throughout the created universe. Grew cited the explosion of heretical tracts that appeared in the 1690s as his main reason for writing the *Cosmologica Sacra*. The “many Leud Opinions, especially those of the anti-scripturists, which have been published of late years”—the *Cosmologica Sacra* appeared in 1696—spurred Grew and his followers to action. They believed that the very framework of their society was in jeopardy, and Grew felt it might already have been too late, since he thought “the Citizens themselves, grown of late more Bookish, are very dangerously infected.”<sup>71</sup> Who then, were these “anti-scripturists,” and just how real was the perceived threat to “Anglican hegemony?”

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<sup>70</sup> Derham, *Astro-Theology*, 196-97.

<sup>71</sup> Grew, *Cosmologica Sacra*, 1 of “Preface.”

## CHAPTER IV

### PLURALITY AGAINST HETERODOXY: ATHEISTS AND DEISTS

As employed by the Newtonians, the religious impact of a plurality of worlds served two essential functions. The first, mentioned most often by Daniel Sturmy, was its ability to strengthen the beliefs of Christians. By surveying the heavens, one witnesses the beauty and care that God bestowed on the universe and all its creatures, which would undoubtedly enhance one's personal relationship with the Creator. More importantly, though, this contemplation was used to show atheists the errors of their ways. Natural theologians hoped that the religious significance of a universe of multiple (though similar) world systems would prove too obvious for even the most obstinate atheist to ignore. The increased popularity of the plurality of worlds in the Newtonian age is best understood with this purpose in mind.<sup>1</sup> By examining how the Newtonians and other English Christians viewed the atheists and deists of their age, a clearer picture emerges of why plurality took on the forms it did in the Newtonian age. Through their engagement with these heretics, the Newtonians adapted plurality to an ever expanding Christian universe, with God responsible for the care of an infinity of creatures with one thing in common: a reverence for the Creator.

For the Newtonians, the beauty of a plurality of worlds lay in its simplicity, and this point becomes even more relevant since—as is illustrated below—English Christians viewed atheists as notoriously immune to reason. The polemicists of the age

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<sup>1</sup> Steven J. Dick, though, has argued that plurality became so popular among Newton's followers because Newton's very own system seemed to diminish the need for a deity. Quoting Leibniz's famous criticisms on God's role in their system, Dick writes that the "Newtonian arguments for God's intermittent interplanetary plumbing proved strained, redundant, and inimical to the standard Christian concept of Divine Providence." The creation of other planetary systems stocked with rational beings thus restored God to an active role that would be palatable enough to their fellow Anglicans. Steven J. Dick, *Plurality of Worlds: The Extraterrestrial Life Debate from Democritus to Kant* (New York: Cambridge UP, 1984), 157.

found that this difficulty resulted from the fact that, though atheists typically claimed to answer to reason alone, they actually denied this most human of God's gifts. How else to explain their resistance to God?

Newtonian natural theologians certainly had a battle on their hands. No one seemed to doubt that the late seventeenth century—and the 1690s in particular—was an age of godlessness and sin unlike any that had been seen before. As early as the late 1660s, the royalist churchman Richard Allestree found “vice daily gaining not only strength, but impudence: nay we are not only become witnesses against our selves by declaring our Sin as Sodom, but we have forced God also to attest against us by punishing us in a manner no less conspicuous and manifest”—words surely intended to recall the twin disasters of the Plague Year of 1665 and the Great Fire (1666).<sup>2</sup> Some English Christians even believed that an immoral, atheistic program, perhaps linked with or even propagated by France or Rome or both, had begun to infiltrate England with the Restoration. Since Charles had taken up court in Paris for a time it at least seemed possible that he could have gained sympathies for the Catholic faith.

While the fear of Charles being a crypto-Catholic had to wait until the 1670s to find any credence, the King's Restoration Court wasted no time in introducing a risqué atmosphere to London. Whatever the Protectorate had accomplished through its policing of morality was nullified (and then some) by Charles's return from exile. Almost immediately upon taking the throne, Charles lifted the ban on theater and encouraged continental-style farces that became infamous for their debauchery within its own time

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<sup>2</sup> Richard Allestree, *The Causes of the Decay of the Christian Piety, or an Impartial Survey of the Ruines of the Christian Religion, Undermin'd by Unchristian Practice* (London, 1667), 3 of 11 unnumbered “Preface.”

and in later decades.<sup>3</sup> Even more, Charles seemed to embrace the sort of lifestyle idolized in the comedies: the King, while not leaving a rightful heir, fathered a number of illegitimate children.<sup>4</sup> Certain members of the Court followed Charles in such depravity, most famously the libertine John Wilmot, Earl of Rochester.<sup>5</sup> For many English Christians, such immorality was symptomatic of a much larger problem of irreligion that could only be rectified with a more powerful Anglican Church. Numerous pamphlets and tracts spoke of the “*growing Disease of domineering Atheism, and both Actual and Doctrinal Blasphemy.*”<sup>6</sup> During the Exclusion Crisis of the 1670s, polemicists often linked atheism—and even some dissenting sects—with Catholicism in an attempt to discredit not only the Duke York, but continental influences as well.<sup>7</sup>

These influences not only included religion (Catholicism) and art (theater), but extended to natural philosophy. As examined in the previous chapter, the revival of classical atomism brought with it the atheistic philosophies of Lucretius and Epicurus, and English natural theologians searched for ways to embrace the atomic mechanism while avoiding the underlying dismissal of a deity. Henry More and Robert Wittie found solace in Rene Descartes’s world of atoms swirling through an infinite plenum, and used

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<sup>3</sup> The most oft-cited example comes from the close of the seventeenth century, when the non-juror Anglican Jeremy Collier wrote a vitriolic attack on Restoration (and contemporary) comedy. See Jeremy Collier, *A Short View of the Immorality and Prophaneness of the English Stage* (London, 1698).

<sup>4</sup> Paul Seaward, “Charles II (1630-1685), king of England, Scotland, and Ireland,” *Oxford Dictionary of National Biography* (Oxford UP, May 2006, online edition) <http://www.oxforddnb.com/view/article/5144>.

<sup>5</sup> In addition to having numerous mistresses (an obvious prerequisite) and being bisexual, Rochester wrote satirical and bawdry poetry, including *A Satyr on Charles II*, which portrayed the King as sex-crazed. He had ties to the theater (including the actress Elizabeth Barry, one of his mistresses), and was a known member of the “Merry Gang.” See Rachel Weil, “Sometimes a Scepter Is Only a Scepter: Pornography and Politics in Restoration England” in *The Invention of Pornography: Obscenity and the Origins of Modernity, 1500-1800*, ed. Lynn Hunt (New York: Zone Books, 1993): 124-156.

<sup>6</sup> Anonymous, *The Voice of the Nation, or, An humble Address to the High and Honourable Court of Parliament, for their just Severity to repress the growing Boldness of Atheism and Prophaneness in the Land* (London, 1675).

<sup>7</sup> For example, Edward Borne felt compelled to retaliate against the accusation “that to become a Quaker is the ready way to become a Papist.” Edward Borne, *An Answer to Dr. Good (so called), his Dialogue against those call’d Quakers* (London: 1675), 3.

Cartesian cosmology as the basis for their theories of plurality.<sup>8</sup> Descartes believed God to be the creator of atoms as well as being responsible for regulating their motion, yet even these beliefs were not enough to halt suspicions of atheism.<sup>9</sup>

While Descartes could count many English natural philosophers as followers in the seventeenth century, his impact was more limited on the British Isles than on the continent. The Christianized version of atomism that the Newtonians ultimately based their natural theology on was devised by Pierre Gassendi and popularized in England by Walter Charleton in the mid-seventeenth century.<sup>10</sup> English natural philosophers and theologians from Robert Boyle's circle up to Newton's followers and onward all used one form or another of this "corpuscular philosophy."<sup>11</sup> This corpuscular atomism provided the foundation for the rest of the natural philosophy, which necessarily required the active influence of an "Intelligent Agent" to account for all the motion, structure, and form of matter observed in the universe. English science thus avoided the potential pitfall of materialism threatened by Cartesianism, and placed itself in stark contrast to the classical style with all its chance formations and directionless motion.<sup>12</sup>

By mid-century, English Christians feared that continental philosophical influences were leading to a materialistic or atheistic society in England. Thomas

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<sup>8</sup> More broke away from Cartesian cosmology in the *Divine Dialogues* (1668).

<sup>9</sup> Descartes seemed to be hurt equally on this point from both his other philosophical writings as well as the enthusiastic support he received from Thomas Hobbes. Ralph Cudworth, for example, "desire[d] to combat the *Leviathan* doctrine to which he considered Descartes had given an opening for a denial of the existence and preexistence of man's soul through the view that men do not differ from the brutes except only in their 'Organization, and the Use of Speech or Words.'" J.E. Saveson, "Differing Reactions to Descartes Among the Cambridge Platonists," *Journal of the History of Ideas* 21, no. 4 (October 1960): 561.

<sup>10</sup> Walter Charleton, *Physiologia Epicuro-Gassendo-Chareltonia: or, a fabrick of science natural, upon the hypothesis of atoms* (London, 1654).

<sup>11</sup> Margaret Jacob, *The Newtonians and the English Revolution: 1689-1720* (Ithaca, NY: Cambridge UP, 1976), 23.

<sup>12</sup> *Ibid.*, 28.



Hobbes embraced many parts of Descartes's philosophy, especially his physics, taking it to the point to where it shared many aspects with a purely mechanistic materialism, resulting in his contemporaries widely denouncing him as an atheist. Hobbes made enemies far and wide throughout the English political, religious, and scientific communities, who viewed his writings, especially, but not solely the *Leviathan*, as a direct threat against established authority. His textbooks were reviewed with considerable scorn and vitriol in the Royal Society's *Philosophical Transactions*, and Christian apologists set out to refute his religious ideas well into the eighteenth century. Natural theologians feeling the need to counteract Hobbes's and his followers' views looked for new angles to strengthen their arguments, and they found one in the plurality of worlds.<sup>13</sup>

While the process had begun before the 1690s (see Richard Baxter's *Reasons of the Christian Religion*, for example), after Richard Bentley delivered his *A Confutation of Atheism* as the first Boyle lecturer Newtonian natural theologians found the plurality of worlds a much more accessible vehicle against heresy. Visible as early as in John Wilkins's *The Discovery of a World in the Moone*, the existence of other worlds, inhabited and similar to the earth, was a possibility (or rather, a probability), too awe-inspiring to pass over. The Newtonians found in plurality the ultimate expression of God's power and wisdom, with these attributes being so great that they could create a multitude of world systems all dependent on physical laws that even humans could understand. Plurality seemed to complete natural theology, taking it to the ultimate,

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<sup>13</sup> For instance, the reviewer of Hobbes's *Decameron Physiologicum* stated "I am not more certain of the Authors being a learned Man, than I am of his mistakes in several Particulars of this Book." Anonymous, "An Account of Three Books," *Philosophical Transactions* 12, no. 138 (1678): 965.

universal level—no wonder that the Newtonians viewed such a formulation as providential.

The attractiveness of natural theology as employed against atheists was that it avoided the corruption of human involvement. Atheists and deists were alternatively labeled “scoffers” at the time for their open derision and ridicule of the veracity and usefulness of the Bible (as well as religion in general), and seemingly all human institutions. Such an attitude towards authority was considered extremely dangerous, both socially and politically, and was well represented in the Tories’ cry of the “Church in Danger” in the late seventeenth and early eighteenth centuries. England in the 1690s was awash in heterodox opinions, from atheism and deism to the Arian and Socinian opinions that Newton and his followers privately (and sometimes publicly) flirted with. One explanation of this surge in radical religious thought centers on William’s appeals for toleration beginning upon his ascension to the throne, and the lapsing of the Licensing Act in 1695.<sup>14</sup>

In supplying a “proof” (no matter how unrealized) of God’s existence separate from theology, a pluralist universe gave natural theologians an argument that these atheists and scoffers could not automatically dismiss as an idea that relied on Scriptural evidence. In fact, as with Charles Blount, one of the first deists in England, many of those commonly referred to as atheists publicly professed their belief in plurality.<sup>15</sup> Newtonian natural theologians from Bentley to William Whiston and many others later in

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<sup>14</sup> See Johnathan I. Israel, “William III and Toleration” in *From Persecution to Toleration*, ed. Ole Peter Grell, Jonathan I. Israel and Nicholas Tyacke (Oxford: Clarendon Press, 1991): 129-170

<sup>15</sup> The reference comes from Blount’s *The Oracles of Reason*, and, while written by his collaborator Charles Gildon, likely echoes his own opinion.

the eighteenth century jumped at the chance to take one of their enemies' beliefs and turn it into a tool of conversion (or at least a defense of religion).

Rather than a defensive response aimed at increasing God's role in their system, Newtonian natural theologians so readily embraced a pluralist, inhabited universe primarily because it enabled them to attack the heretics eager to destroy English institutions. A plurality of worlds was a subject that allowed natural theologians to appeal to their opponents' reason and confront them on their own ground, away from Scripture (though many, if not most, still cited biblical passages). Surely, they felt, even the most steadfast atheist would never be able to look upon the multitude of stars with their planets, and those planets with their rational beings and not be swayed to marvel at the magnificence of the Creator.

To those defenders of Christianity of the late seventeenth century, atheism was an ever-increasing problem. The notorious libertinism and immorality of the Restoration Court and the Earl of Rochester's circle seemed symptomatic. With this in mind, historians have debated for some time the sincerity of those who attacked atheists, arguing either that true atheism did not really exist or that it was just a minor cog in a much larger machine of heterodoxy, and that these attacks were merely ploys designed to protect Anglican hegemony. In this view, the specter of atheism was raised either to "distort reality for purposes which were both polemical and reassuring," to smear an individual opponent, or both.<sup>16</sup> Yet Michael Hunter notes that simply because no clear definition of what constituted atheism existed at the time did not make fears of it and its

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<sup>16</sup> Patrick Collinson, "The Cohabitation of the Faithful with the Unfaithful" in *From Persecution to Tolerance*, 55; James R. Jacob and Margaret C. Jacob, "The Anglican Origins of Modern Science: The Metaphysical Foundations of the Whig Constitution," *Isis*, vol. 71 (1980): 251-67.

influence any less genuine.<sup>17</sup> While a clear “degree of rhetorical exaggeration” also existed as to the number of atheists in London, Atheism was a “phenomena” that captivated and haunted the minds of the best natural philosophers and theologians of the age, from Boyle and Charleton to Newton, Bentley, Whiston, and others.<sup>18</sup>

Hunter goes on to provide a list of attributes most commonly applied to atheists of the time. Foremost among them was their denial of the existence of God, though close behind (and somewhat related) was that atheists ascribed to materialist or naturalist views of the origin of the universe, denying the need for a deity or severely limiting its presence. Others may have admitted to the belief in a god, yet denied the immortality of the soul or the existence of an absolute morality, to which God subjected all humanity. Still another group professed a truly natural religion, treating the Bible with skepticism or claiming that governments introduced organized religion for sociopolitical concerns.<sup>19</sup>

The anti-atheist tracts so prevalent during of the later decades of the seventeenth century reveal these characteristics. In 1691, William Assheton, chaplain to the first duke of Ormond and virulent opponent of toleration, “rejected with the highest Indignation” his anonymous adversary’s “Atheistical Harangues against the *Majesty of God and his Providence; the Immortality of the Soul, Rewards and Punishments in another World; particularly, against the Certainty and Eternity of Hell Torments.*”<sup>20</sup>

Three years later, William Dawes criticized classical atomism, lamenting that there still

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<sup>17</sup> Michael Hunter, “Science and Heterodoxy: An Early Modern Problem Reconsidered,” *Reappraisals of the Scientific Revolution*, ed. David C. Lindberg and Robert S. Westman (New York: Cambridge UP, 1990), 441.

<sup>18</sup> *Ibid.*, 443.

<sup>19</sup> *Ibid.*, 441

<sup>20</sup> William Assheton, *A Discourse Against Blasphemy. Being a Conference with M.S. Published Pursuant to their Majesties’ Injunctions to Suppress Atheism and Irreligion* (London, 1694), 1.

existed some of “that misguided Tribe/Which to blind chance does all these works ascribe.”<sup>21</sup> By doing so, these atheists rejected the Mosaic account of creation, and called the Bible’s “traditional Authority” into doubt. To Dawes, such skepticism was absurd:

[The Bible] does nothing but the Truth contain,  
Wrote by a Man, whose just Integrity  
Forbids us to suspect he’d write a lye,  
Or tell those things, with Confidence, as true  
Which he perhaps might fancy, never knew,  
Yet against *Moses* he will still exclaim  
And call his Story a Phantastick Dream.”<sup>22</sup>

An anonymous “person of honour” made a similar statement almost a decade earlier, writing that the “Atheist . . . denies the Scriptures to be of God, but to be only humane inventions to cozen the People, so that it would be to cast Pearls before Swine, to trample them under their feet.”<sup>23</sup>

This denial that scripture was divinely inspired, or, even worse, that it was a human invention designed for social control, hinted at the underlying cause of what so bothered English Christians in regards to atheists. Aside from their beliefs, the most dangerous aspect to English Christian society was their personalities. Christian polemicists feared atheists for their supposed ridicule and disrespect shown towards all forms of polite society and established authority, not just religion and its devices. Scoffing was treated with great abuse by these writers, and Hunter states that “atheism

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<sup>21</sup> William Dawes, *An Anatomie of Atheisme* (London, 1694), 4.

<sup>22</sup> *Ibid.*, 9.

<sup>23</sup> Anonymous, *The Atheist Unmasked, or A Confutation of such as deny the Being of a Supream Deity, that governs the Heavens and Earth* (London, 1685).

was often associated more with attitude and demeanor, with a proclivity to question orthodoxy, than with the degree of unorthodoxy.”<sup>24</sup> Assheton, before tackling and refuting his opponent’s ideas, first addressed his “rudeness,” advising him to “polish your Conversation; and to behave yourself, at least as a *Gentleman*, if not as a *Christian*.”<sup>25</sup> Dawes wrote of their “rashness, impudence, and Pride,”<sup>26</sup> while John Harris, in delivering the Boyle Lectures of 1698, spoke of the “Mirth and Humour, and that Surprising and Extravagant Vein of talking which always abound in the Company of such Men.”<sup>27</sup> In his *A Journal of the Plague Year*, first published in 1722 but written about the Great Plague of 1665, Daniel Defoe’s journalist ran afoul of a “dreadful set of fellows” at a local tavern, who “were not afraid to blaspheme God and talk atheistically.” Upon his reproaching their “devilish language,” these atheists responded with the “utmost contempt, and made the greatest mockery that was possible for them to do at me, giving me all the opprobrious, insolent scoffs that they could think of for preaching to them.”<sup>28</sup>

Hunter notes that contemporaries viewed a reciprocal relationship between atheism and immorality, with one inevitably leading towards the other.<sup>29</sup> Harris preached that “*Wickedness* in general, and *Pride* in particular do so naturally lead to *Infidelity* and *Atheism*; that ‘tis hardly possible to imagine a Man can entertain such an Opinion without them.”<sup>30</sup> The author of *The Mystery of Atheism* agreed, saying that “‘Tis

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<sup>24</sup> Hunter, “Science and Heterodoxy,” 445.

<sup>25</sup> Assheton, *Discourse Against Blasphemy*, 2.

<sup>26</sup> Dawes, *Anatomie of Atheisme*, 32.

<sup>27</sup> John Harris, “Immortality and Pride, the Great Causes of Atheism,” *The Atheistical Objections, against the Being of a God, and his Attributes, Fairly Considered, and Fully Confuted* (London, 1698), 6.

<sup>28</sup> Daniel Defoe, *A Journal of the Plague Year*, Anthony Burgess and Anthony Bristow (New York: Penguin Books, 1966), 81-85.

<sup>29</sup> Hunter, “Science and Heterodoxy,” 442.

<sup>30</sup> Harris, “Immortality and Pride,” *The Atheistical Objections*, 22.

most certain, that the Looseness and Debauchery of mens lives is the prime fundamental cause of all Atheism.”<sup>31</sup> In addition to being prideful or extravagant, or rather perhaps because of this, atheists were seen as corrupt individuals who had fallen so far into vice that they threatened to infect the rest of society. Dawes dedicated *The Anatomy of Atheisme* to a young George Darcy, hoping it would help him “avoid those Follies which too commonly attend the young Gentlemen of this Age.”<sup>32</sup> What exactly these follies were, Dawes did not say, but they presumably would all lead his patron down the pathway to atheism.

What waited for one at the end of this pathway was a dreary, almost monstrous existence full of lust and debauchery. Far from being freed from the shackles of religion, the atheist had merely exchanged God for “the most base and unworthy of [masters],” becoming “a Slave to his Lusts, as every luxurious and debauched Person is.”<sup>33</sup> Harris felt that the atheist’s mind was guilt ridden and “must be filled with Dismal and ill-boding Thoughts.”<sup>34</sup> The anonymous author of “A Satyr Against Atheism” some two decades earlier gave a more detailed account of what an atheist could expect from his life, claiming that

He does both Clergy and Religion curse,  
As froward Children scratch indulgent Nurse.  
His strength’s made weakness, and his health disease,  
And that he makes his plague, which ought to please.  
Madness his mirth’s become, poyson his meat,  
Surfeit’s his meal, he gluts, but cannot eat.  
Abroad he drinks and revels all the night,  
At home poor *Hector* with himself does fight.

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<sup>31</sup> A.B., *The Mystery of Atheism, or the Devices Made use of to Countenance and Propagate it* (London, 1699), 2.

<sup>32</sup> Dawes, *Anatomie of Atheisme*, 3 of 6 unnumbered “Epistle.”

<sup>33</sup> Anon., *The Atheist Unmasked*, 15.

<sup>34</sup> Harris, “Immortality and Pride,” *The Atheistical Objections*, 3.

When morning glimpse steals softly through the chink,  
And without noise does seek the man in drink,  
The guilty prisoner then is homeward brought,  
Reeling in fetters, which he himself had wrought . . .  
Then as if dead, the ghastly Atheist lyes,  
With mouth half shut, with white and glaring eyes;  
The lines which laughter in his face had drawn,  
Are wrinkles now, and help to make him frown:  
His pale and meager cheeks, and purging head,  
Wou'd almost make one think the Wretch were dead.<sup>35</sup>

This last line, associating atheism with death both in mind and body, recalls the examples of Rochester and Charles Blount. Rochester, the famous libertine, suffered a gruesomely painful death at a youthful age (likely mainly due to syphilis), which contemporaries traced directly to his immoral lifestyle. Blount's infamous suicide in 1693 reinforced the notion that the atheist's mind was naturally diseased, and that it was both a contributor to and result of the degeneration of English society.

Blount is most often known today as one of the fathers of deism in England, another form of the "radical thought [that] thrived in the 1690s."<sup>36</sup> While they professed belief in some sort of creator, deists shared many of those other beliefs characteristic of atheists, most commonly a faith in natural religion and scorn shown for organized religion. Indeed by the 1690s, Christian apologists used the two labels almost interchangeably, especially seen in references to Blount and Baruch de Spinoza. William Assheton wrote of "M.S.," with whom he apparently debated in a coffeehouse, that if "the Person concerned in these Papers had not confessed, upon Demand, that there is a God; I should then have judged by the rest of his Discourse that he was a

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<sup>35</sup> Anonymous, "A Satyr Against Atheism," *Philo-Carolus: Consisting of Three Poems* (London, 1680), 8-9.

<sup>36</sup> Ole Peter Grell, Jonathan I. Israel and Nicholas Tyacke, "Introduction" in *From Persecution to Toleration*, 8.



down-right Atheist. And ought have treated him as such, and not the milder name of Deist.”<sup>37</sup>

As they did with atheists, Christian authors produced numerous pamphlets and tracts designed to expose the true character and depravity of deists. The lapsing of the Licensing Act in 1695 allowed a flood of heterodox polemics to hit the printing presses, much to the horror of a Church left relatively powerless to stop it by the 1689 Act of Toleration.<sup>38</sup> Parliament attempted to remedy the situation through the enactment of a Blasphemy Act, but in the words of historian John Miller, “it proved too difficult to convict the authors of ‘blasphemous’ works.”<sup>39</sup> Oftentimes, these Christian polemics provided the only remedy against the heretical attacks, and that Anglicans viewed it as a unified, godless movement is evident in that they left little distinction between atheists and deists. Deists were known to deny scriptural revelation just as atheists did, and in everyday conversation they too “rel[ie]d upon the great share of Wit,” while “they pretend to [be?] above others.”<sup>40</sup> This emphasis on wit was a key characteristic of the deist for James Buerdsell, who continued his assault by claiming that deists “have an ill Opinion of all religion, because many who are zealous for its *Truths*, are yet negligent of the *Morals* of it, and live after such a manner, as would make a sober Heathen blush.”<sup>41</sup>

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<sup>37</sup> Assheton, *Discourse Against Blasphemy*, 1 of unnumbered “Dedication.”

<sup>38</sup> Johnathan I. Israel points out that the Toleration Act effectively ended the Church’s role at enforcing Sunday attendance. While noting the impact that the lapsing had, he views William’s overall campaign at securing Protestant toleration as a more important reason for the influx of, in particular, pro-Socinian tracts. Johnathan Israel, “William III and Toleration” in *From Persecution to Toleration*, 161.

<sup>39</sup> John Miller, *The Glorious Revolution*, 2d ed. (New York: Addison Wesley Longman Inc., 1997), 61.

<sup>40</sup> Anonymous, *The Scandal and Folly of the Cross Removed: or, the Wisdom of God’s Method of the Gospel, in the Death of Jesus Christ, Manifested, and Justified, Against the Deists* (London, 1699), 1.

<sup>41</sup> James Buerdsell, *Discourses and Essays on Several Subjects, Relating chiefly to the Controversies of these Times: Especially with the Socinians, Deists, Enthusiasts, and Scepticks* (Oxford, 1699), 206.

Some writers looked back upon the reigns of Charles II and his brother James as key moments in the introduction of godlessness into England. In 1696 Richard Willis observed that “the great and chief Cause of Deism at present, was the general Corruption of Manners brought in the late Reign, and encouraged during that time both in Clergy and People . . . perhaps to prepare the way for Popery.”<sup>42</sup> Willis hinted that such libertinism might have been part of a larger plot to reintroduce England with Rome, but regardless of whatever the intentions of the Stuart brothers were, the depravity of their Courts were seen as a plague that had as of yet proved incurable. Earlier that same year, William Stephens repeated the accepted natural progression from immorality to non-belief, writing that many that called themselves deists led “loose and sensual Lives,” and “[were] meer *Sceptics*, and practical *Atheists*, rather than real *Deists*.”<sup>43</sup>

The natural theologians’ use of the plurality of worlds to form a reasoned debate proved just one aspect of a larger campaign against irreligion. Another, more proactive attempt found concerned English Protestants countering their societal degeneration, whether real or imagined, through the establishments of the Society for the Reformation of Manners in 1691 and, later in the decade, the Society for Promoting Christian Knowledge (1699). Enthusiastically supported by the queen, by the middle of the decade there were a handful of subordinate reformation societies in London designed to combat the growth of prostitution, blasphemy, and sodomy.<sup>44</sup> Londoners looked on in

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<sup>42</sup> Richard Willis, *Reflexions upon a Pamphlet, intituled, An Account of the Growth of Deism in England* (London, 1696), 6.

<sup>43</sup> Willis was in fact responding to what he viewed as Stephens’s attempts to popularize the deist cause in England. William Stephens, *An Account of the Growth of Deism in England* (London, 1696), 5.

<sup>44</sup> Craig Rose, *England in the 1690s: Revolution, Religion, and War* (Malden, Massachusetts: Blackwell Publishers, Inc., 1999), 206.

horror as these “fashionable vices” seemed to represent the practical effects of atheism<sup>45</sup>—no doubt the “follies” that Dawes warned about.<sup>46</sup> One of the most important facets of the societies, and a fact that historian Craig Rose stresses, was their ecumenical nature, as they “counted among their members both Churchmen and moderate Dissenters.”<sup>47</sup> The battle against immorality proved to be pan-Christian (excluding Catholics and anti-trinitarians, of course) affair, much like the natural theologians had argued for in their own way.

Newtonian natural theologians, though, never acquired a monopoly on pluralist thought in the 1690s and beyond. Deists were particularly attracted to the idea of an inhabited universe in their efforts to search for a universal, natural religion—the uncorrupted (by human minds) “Urreligion.”<sup>48</sup> The best example of this reasoning comes from Blount’s *Oracles of Reason* in a brief passage written by Charles Gildon, most famous as a frequent literary target of Alexander Pope and Jonathon Swift.<sup>49</sup> Gildon’s arguments should all appear familiar, as they are virtually the same as those put forward by Christian pluralists. In particular, he stressed the point that humanity is too far below God to warrant special attention or preclude other creatures from existing. If nothing else, a belief in “Plurality of Worlds does at least give us a more August Idea of the Wisdom and Power of God, and of his infinite Perfections, than to imagine all that

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<sup>45</sup> Hunter, “Science and Heterodoxy,” 447.

<sup>46</sup> According to Dawes, immorality did not necessarily lead to a denial of the existence of God, but its practical effects were the same. In the *Anatomy of Atheisme*, he counted three different groups of atheists, with the third being those who regularly attended church, but lived sinful lives and engaged in “prophane Hypocrisie.” Dawes, *Anatomie of Atheisme*, 32.

<sup>47</sup> Rose, *England in the 1690s*, 206.

<sup>48</sup> Such efforts followed that of Herbert of Cherbury, who identified “five Common Notions of Natural Reason” found in polytheistic and monotheistic religions. Richard Popkin, “The Deist Challenge,” *From Persecution to Toleration*, 203.

<sup>49</sup> James Sambrook, “Charles Gildon,” *Oxford Dictionary of National Biography*, <http://www.oxforddnb.com/view/article/10720>.

Infinite Extension should be like barren Heath, without any Productions of the Infinite Being, and not fill'd with Infinite and Endless Worlds.”<sup>50</sup>

Since deists only subscribed to one “Book”—that of nature—the link between deism and plurality seems much more natural than with Christianity, and Michael Crowe has noted how plurality’s popularity in the eighteenth century was “not unrelated to the spread of deism.”<sup>51</sup> The same aspect of plurality, and natural theology as a whole, that made it so important to the pan-Protestant fight against irreligion, its exclusion of dogma, became a real point of contention with High Churchmen and more conservative Anglicans.<sup>52</sup> Newtonian natural theologians could not hide the fact that their proofs of a deity did not necessarily result in the belief in a *Christian* deity. Some, like Robert Wittie or Daniel Sturmy, turned to Scripture to reinforce their notions of a Christianized pluralist universe. Most, though, followed John Wilkins in believing that just as biblical revelation could not be used to deny a plurality of worlds, it could neither confirm it as well.

What Wilkins and his followers assumed, though, was that upon seeing the majesty of God in nature, the atheists and deists of the world would naturally accept scriptural revelation. As illustrated above, English Christians viewed deists as little more than “practical atheists,” who confessed to a belief in God only for appearances’ sake. Yet the deist challenge of the 1690s had much more in common with Christian beliefs than the polemicists were willing to acknowledge. While Richard Bentley and his fellow latitudinarians were still celebrating his complete destruction of atheism, Gildon

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<sup>50</sup> Charles Gildon, “To Mr. B *Fellow of ---Colledge*” in Charles Blount, *The Oracles of Reason* (London, 1693), 195-96.

<sup>51</sup> Michael Crowe, *The Extraterrestrial Life Debate, 1750-1900: The Idea of a Plurality of Worlds from Kant to Lowell* (Cambridge, Massachusetts: Cambridge UP, 1986), 84.

<sup>52</sup> See Chapter 5 below.

wrote to him in the *Oracles of Reason* that he “undertook a needless trouble, since I’m confident there’s no man of sense that doubts whether there be a God or no.”<sup>53</sup> Gildon went even further, adding, “if there be a God, the necessary Qualities that must be granted him, will not permit a man that Reasons right of things to question his Care and Providence over humane Affairs.” Gildon did not elaborate on what exactly he meant by “Care and Providence,” but it does at least imply that some deists in the late seventeenth century thought of God as an active presence in the universe.

The Newtonians viewed the threat posed by the atheists and their heterodox brethren as a very real one. Since religion was so inextricably linked with politics and the greater society, an upheaval in the Church could turn the whole world upside down. No wonder then that numerous commentators decried the sinful state of England in the late seventeenth and early eighteenth centuries. With the aid of the plurality of worlds, the Newtonians were able to both argue for the existence of a deity, while also fingering their opponents as moral degenerates who willingly chose to ignore that greatest gift God had given to humanity—its reason.

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<sup>53</sup> Gildon, “To Dr. R.B.—of God” in *The Oracles of Reason*, 181.

## CHAPTER V

### CONCLUSION

Richard Bentley's hounding of godlessness with his *Confutation of Atheism* (1693) was significant primarily in that it solidified the plurality of worlds' place in the arsenal against irreligion, and provided a benchmark for other Newtonians in the following decades. What it also did, though, was to hint at the dominant position that the latitudinarian creed was currently taking within the episcopacy of the Church of England.

The Latitudinarians had the great fortune to share many of the new monarch's opinions on toleration, as King William made it be known that he supported the Nonconformists' calls for a bill of comprehension, and that he felt the state had no business "to compel the conscience of the individual."<sup>1</sup> Furthermore, the Latitudinarians desire to move away from doctrinal hairsplitting also accorded with the King, of whom Gilbert Burnet reported that "even before the revolution, believed that the Church of England should be 'softned a little, both with relation to the Nonconformists at home and to the forrigne Churches beyond Sea.'"<sup>2</sup> While the king was leery to give too much power to one church faction over another, by the mid-1690s the Latitudinarians held the Archbishoprics of Canterbury (John Tillotson and Thomas Tenison) and York (John Sharp), along with several other bishoprics.<sup>3</sup>

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<sup>1</sup> Ole Peter Grell, Johnathan I. Israel and Nicholas Tyacke, "Introduction," *From Persecution to Toleration* (Oxford: Clarendon Press, 1991), 15.

<sup>2</sup> Gilbert Burnet, quoted in Craig Rose, *England in the 1690s: Revolution, Religion and War* (Malden, Massachusetts: Blackwell Publishers Inc., 1999), 110.

<sup>3</sup> William and Mary named bishops who are traditionally considered Latitudinarians: Simon Patrick (Ely), Edward Stillingfleet (Worcester), and Edward Fowler (Gloucester). Craig Rose, *England in the 1690s*, 182.

In many ways, the rampant popularity that the plurality of worlds achieved in the 1690s and into the early eighteenth century directly resulted from both latitudinarian support and its specific mindset. The Latitudinarians have been described as “the products of a newer intellectual climate” whose “outlook reflected both increased confidence in human potential and weariness with wrangling about biblical texts.”<sup>4</sup> Margaret Jacob has shown that one of the main characteristics of the Latitudinarians of the 1690s, chiefly represented by Bentley and Samuel Clarke, was their belief in progress and natural religion to help maintain the Church’s power and social order.<sup>5</sup> Such characteristics can clearly be seen with regard to the Newtonians’ use of the plurality of worlds. Whether or not Nehemiah Grew really believed that there were so many otherworldly beings between humans and God (and we have no reason to believe he did not), describing the world as such would certainly serve as a reminder to the faithful not to think too highly of one’s self.

Latitudinarian success enabled the plurality of worlds to become more popular than it had even been before in England. With William’s backing the Church’s leaders now stressed for Protestant unity, and plurality, as a part of natural theology, fit perfectly into this scheme as it largely ignored biblical revelation. While this movement found ample support from the king and queen, it was largely met with resistance by the lower orders of the Church. Instead of viewing this unity as a way to bring more members into the Church and thus strengthen its authority, High Churchmen, already stung by the

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<sup>4</sup> John Miller, *The Glorious Revolution*, 2d ed. (New York: Addison, Wesley, Longman, Inc., 1997), 63.

<sup>5</sup> Margaret Jacob, *The Newtonians and the English Revolution: 1689-1720* (Ithaca, NY: Cornell UP, 1976), 142.

exclusion of the non-jurors, envisioned a direct opposite result, with “comprehension” merely being “a cant word for the destruction of the Church.”<sup>6</sup>

All associated policies were treated with similar disdain, and for some time before the 1690s the natural theological campaign had been under attack from more conservative churchmen as tending towards heresy or even outright atheism. For these divines there was no separate Book of Nature, and to ignore Scripture was irreligious and, once again, threatened the Church. As early as 1640, the Scottish vicar Alexander Ross published a scathing rebuke of John Wilkins’s *A Discovery of a New World* entitled *The New Planet no Planet*. For Ross, there was no controversy or question about whether or not the earth moves or if it is a planet, since

The Scripture tells us in plaine tearmes, the Earth is immoveable: our senses do assure us, and many reasons which I have heretofore alledged, induce us to beleve the truth of this assertion: and yet you [Wilkins] spurning at Scripture, sense, and reason, as if your phansie were *instar omnium*, would have our judgements, senses, Scripture, Church, and all regulated by your absurd dictates; therefore it is an unreasonable thing in you, to desire that the holy Ghost should not be judge of his owne assertions in naturall truths; and that there should be more credit given to your conceits, (which you call industry and experience) then to Gods own words.<sup>7</sup>

No wonder that writers advocating a plurality of worlds approached their topic carefully and apologetically.

Instead of reveling in the intelligence of the Creator shown in the discovery of each and every natural law, the critics of natural theology saw it as a dangerous field which seemed to lessen the need for God and God’s presence in the world. The Royal Society, that bastion of “new” knowledge and home to many Latitudinarians, was a frequent target for those afraid that philosophical speculation would lead to religious

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<sup>6</sup> Rose, *England in the 1690s*, 184.

<sup>7</sup> Alexander Ross, *The New Planet no Planet: or, The Earth no wandring Star Except in the wandring heads of Galileans* (London, 1640), 13.



skepticism. That science inevitably leads to materialism was a charge the Royal Society took great pains to refute; in his *History of the Royal Society*, Thomas Sprat called his defense of the Society against irreligion “the weightiest, and most solemn part of my whole Undertaking.”<sup>8</sup> The chief objections he had to defend against were “that man might come to look on matter as the final end of his contemplation, might consider his reason the measure of the universe, [and] employ it on matters above its sphere and deny the truth of whatever it could not explain.”<sup>9</sup> Sprat answered these criticisms with his faith in natural theology, asserting that philosophical inquiry led one closer to God.

Thanks in part to the Royal Society and the ascendancy of the Latitudinarians, by the late seventeenth century natural theology had become too popular to be stopped. Its religious opponents, however, continued to assert that the campaign was in many respects blasphemous. Teleological reasoning, which many advocates of a plurality of worlds had chosen to rely on so heavily, caused the most problems, as the Newtonians let their imaginations run wild in populating the universe with beings superior to humans, angels and devils, or even departed human souls. Even William Derham, who had shown no qualms in dismissing “the old vulgar opinion, that all things were made for man,” stopped himself short of saying exactly for whom God had created the other stars and planets, writing that it would require a “revelation.”<sup>10</sup> Derham’s “revelation” calls to mind the second main objection to natural theology as a whole, and the one that most perturbed Ross, that by and large natural theology ignored Scripture.

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<sup>8</sup> Thomas Sprat, *History of the Royal Society*, quoted in R. H. Syfret, “Some Early Reflections to the Royal Society,” *Notes and Records of the Royal Society of London* 7, no. 2 (April 1950): 229.

<sup>9</sup> *Ibid.*, 233.

<sup>10</sup> William Derham, *Astro-Theology: or a Demonstration of the Beings and Attributes of God, from a survey of the Heavens* (London, 1775), 64, xxxvi.

Without revealed religion, natural theology had few characteristics to identify it as Christian other than a specific proponent's beliefs (and assurances) that it was so. When read blindly, how much difference really existed between Bentley's pluralist universe and the deist Charles Gildon's? Pluralist conjecture and the beauty and order of Newtonian mechanics might inspire one to believe in an intelligent, powerful God, but not necessarily one of an Anglican (or even Christian) faith. Rumors of heresy, specifically Arianism, followed Newton's circle well into the eighteenth century. Two years after delivering the Boyle Lectures for 1707, William Whiston made his Arian inclinations public in his *Sermons and Essays* (1709), which eventually resulted in his expulsion from the Lucasian chair at Cambridge in 1710.<sup>11</sup>

Nervous High Churchmen had even more notorious examples of Latitudinarian associates than Whiston who had fallen into heterodoxy in the early 1700s. Samuel Clarke, another latitudinarian member of Newton's circle, wrote *The Scripture Doctrine of the Trinity* (1712) for which he was accused of Arianism.<sup>12</sup> Clarke, who had delivered the Boyle Lectures in 1704 and 1705, traveled to the Upper House of Convocation to answer the charge, ultimately promising that he would not publicly discuss the doctrine of the Trinity.<sup>13</sup>

Even more appalling for the High Church faction than Samuel Clarke was the case of Benjamin Hoadly, who enjoyed so much Whig patronage that he was successively bishop of Bangor, Hereford, Salisbury, and Winchester. While at Bangor

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<sup>11</sup> Whiston's lectures were published as *The Accomplishment of Scripture Prophecies* (1708). Stephen D. Snobelen, "William Whiston," *Oxford Dictionary of National Biography* (Oxford UP, 2004 online edition), <http://www.oxforddnb.com/view/article/29217>.

<sup>12</sup> Miller states matter-of-factly that Clarke "did not believe in the Trinity." Miller, *The Glorious Revolution*, 61.

<sup>13</sup> *A Demonstration of the Being and Attributes of God. More particularly in answer to Mr. Hobbes, Spinoza, and their followers.* (1704) and *A Discourse concerning the Unchangeable Obligations of Natural Religion and the Truth and Certainty of Christian Revelation* (1705).

Hoadly proclaimed that “God required only that one should only be sincere in one’s beliefs: He had laid down no dogmas or doctrines. Any church was as good as any other—indeed, there was no need for any churches at all.”<sup>14</sup>

The patronage that someone like Hoadly could benefit from struck an obvious sore spot with the High Church. In the polemics of the time, the Latitudinarians and their Low Church brethren were represented as politicians in clerics’ clothing. An anonymous tract described how when a Whig ascends the Pulpit, [he] puts on his “Praying Face” and “In naming his Text, he turns over as many Leaves in his Bible, as if Chance, or Inspiration must direct him to’t; and that he knew not whether the text was in the Old or New Testament.”<sup>15</sup> As early as 1673, when “Latitudinarian” was a much more pejorative term, John Bunyan responded to Edward Fowler’s denial of some of the Thirty-Nine Articles by calling Fowler a “pretended minister.”<sup>16</sup> Furthermore, he presented Fowler to his “good Reader” as “a glorious latitudinarian that can, as to religion, turn and twist like an eel on the angle, or rather like the weathercock that stand on the steeple.”<sup>17</sup>

If there were High Churchmen who did not subscribe to the Tory party line of “Church in Danger” before, these examples probably convinced them that the 1688-89 Revolution had indeed sounded the Church’s death knell. William’s steadfast position in favor of toleration added to the already extreme difficulties that many in the Church—not just the most ardent of Jacobites—had in taking the oath of allegiance to the new

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<sup>14</sup> Miller, *The Glorious Revolution*, 61.

<sup>15</sup> Anonymous, *The Character of a Whig, Under Several Denominations. To which is added, the Reverse, or the Character of a True Englishman* (London, 1700), 7-8.

<sup>16</sup> John Bunyan, *A Defence of the Doctrine of Justification, by Faith in Jesus Christ: Shewing, True Gospel-Holiness flows from thence*. (London, 1673), 1.

<sup>17</sup> *Ibid.*, 91.

monarchs. Many, of course, never did and found themselves deprived of their livings for someone who would support both the King and his Toleration. Johnathan I. Israel estimates that roughly 80% of the lower orders of the Anglican clergy opposed all attempts at toleration after 1688, though William neither could nor wanted to replace them.<sup>18</sup> Thus, when William turned to the Latitudinarians to stock the episcopacy, they inherited a Church whose members by and large blamed them for destroying it from the inside. Despite all this opposition, the Latitudinarians grew in power and influence throughout the 1690s to the point that they had largely taken over the Low Church position.<sup>19</sup> Despite its brief return to power late in Anne's reign, the High Church "had no influence in the upper reaches of the Church" and the Latitudinarians continued to dominate.<sup>20</sup>

William's plan for toleration was essential for the Latitudinarians' success, whose own pan-Protestant agenda left full support for the Newtonians' campaign. As presented in their natural theology, the Newtonians specifically intended plurality to include as wide an array of Protestants as possible. Or as Robert Boyle, one of its most ardent supporters put it, natural theology's point was "for proving the Christian Religion, against notorious Infidels, viz. Atheists, Theists, Pagans, Jews, and Mahometans, not descending any lower to any Controversies, that are among Christians themselves."<sup>21</sup> The supposed depravity of the late Stuart period—caused, no doubt, by these "infidels"—had convinced both the Latitudinarians and the Newtonians that the real

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<sup>18</sup> Johnathan I. Israel, "William III and Toleration" in *From Persecution to Toleration*, 162.

<sup>19</sup> Miller, *The Glorious Revolution*, 64.

<sup>20</sup> *Ibid.*, 65.

<sup>21</sup> This quotation comes from Boyle's will on the founding of the Boyle Lectures. Henry Guerlac and Margaret C. Jacob, "Bentley, Newton, and Providence: The Boyle Lectures Once More," *Journal of the History of Ideas* 30, no. 3 (July-September 1969): 309.

enemies were those godless atheists. Plurality's most important purpose was to show these atheists, along with their slightly less odious brethren, the deists and Catholics, the errors of their ways, and in so doing, protect English society.

It is within this context of England's particular religious situation that gives us a fuller understanding of why exactly a plurality of worlds became so popular there in the late seventeenth and early eighteenth centuries. As examined in previous chapters, the Newtonians had a rich, century-long English tradition from which to draw on in their analyses of a plurality of worlds. The religious implications, of intense importance to the Newtonians, were already being explored in plurality's seminal English work, John Wilkins's *A Discovery of a New Planet* (1638). Wilkins's brave denial of Scripture's authority in scientific matters along with his forays into teleological reasoning, most notably that God made the moon's seas and geographical features for its creatures, set the stage for pluralist thought in England, and his influence can be traced all the way to the Newtonians. His fellow bishop, Francis Godwin, envisioned the moon to be populated with beings full of the proper reverence for the Creator, an idea that would be repeated later in the century.

While opposition existed to what Wilkins had started, most vociferously from Ross, plurality's rise continued an unabated, if slow rise in popularity. Henry More extended the doctrine of final causes to other stars enlightening other planets, while Richard Baxter attacked as atheists who could not see the majesty of God in the possibility of other worlds. Thus by the early 1680s, the form of plurality that the Newtonians would make the staple of natural theological thought had already started to take shape. The discovery of stars too far away to be seen without a telescope helped

transform the “vulgar” idea that all of God’s creations were meant for the use of humans to one in which each celestial body had its own function for its own inhabitants. With a few notable exceptions,<sup>22</sup> the Bible was denied any authority on the subject, either for or against. Plurality was a subject borne of a faith that God had intended the natural world as a proof of his existence, glory, and intelligence independent from that of the revealed word.

In many respects, the Newtonians made this “Book of Nature” as symbolized in plurality more important than the Bible. A plurality of worlds satisfied the key essentials of their dogma by strengthening belief in God without threatening Protestant unity, and by also providing a reasoned challenge to the godless. It is no coincidence that the first Newtonian to incorporate pluralist conjecture into natural theology, Richard Bentley, did so in delivering the first series of Boyle Lectures—which Boyle had founded to further these particular aims. Bentley’s *Confutation* combined plurality with Newton’s laws and so provided a model that numerous others would follow. For perhaps one of the few and last times, science and religion joined together to fight against the scourge of “notorious Infidels.”

Nehemiah Grew, William Derham, William Whiston, and Daniel Sturmy all followed Bentley in the first few decades of the eighteenth century with their own versions of a plurality of worlds. Each one found the religious aspect an important, if not the most important, facet of the theory. Grew thought plurality would protect against the “Leud Opinions of the anti-scripturists,”<sup>23</sup> while Derham hoped the magnificence of God

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<sup>22</sup> Pierre Borel’s *A New Treatise* (1658) and Robert Wittie’s *Survey of the Heavens* (1684) both made extensive use Scripture to support their beliefs in a pluralist universe.

<sup>23</sup> Nehemiah Grew, *Cosmologica Sacra: or a Discourse of the Universe as it is the Creature and Kingdom of God* (London, 1701), 1 of “Preface.”

as expressed in a pluralist universe would cure those “men that had so debauched themselves with drink and enervated their minds by pleasure.”<sup>24</sup> Sturmy had a similar goal in mind when he described how other planets served as places of rest for souls after death, and Whiston often alluded to God’s providence when writing of otherworldly beings (though he remained silent on whether or not he thought they were Arian).

Writers continued to make a plurality of worlds a popular subject throughout the eighteenth and even the nineteenth centuries.<sup>25</sup> Modern telescope technology may have revealed that the moon did not in fact have oceans or cities built by lunar giants, but to judge Newtonian pluralist speculation based on what their wildest imaginations could conceive of would ignore the central point. The Newtonians lived in an exciting, but also philosophically dangerous age of scientific discovery. Their response to employ this new science in an attempt to stabilize English society from godlessness was of crucial consequence to their age, and shows that science and religion can achieve mutual benefit.

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<sup>24</sup> William Derham, *Astro-Theology: or a Demonstration of the Beings and Attributes of God, from a survey of the Heavens* (London, 1715), 196-97.

<sup>25</sup> The astronomer Thomas Wright, Thomas Paine, and Lord Byron are just a few examples of those who supported a plurality of worlds in the eighteenth and nineteenth centuries. For a full discussion, see Steven J. Dick, *Plurality of Worlds: The Extraterrestrial Life Debate from Democritus to Kant* (New York: Cambridge UP, 1984) and Michael Crowe, *The Extraterrestrial Life Debate, 1750-1900: The Idea of a Plurality of Worlds from Kant to Lowell* (Cambridge, Mass: Cambridge U, 1986).

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