“The Creation We Behold”: Thomas Paine’s
_The Age of Reason_ and the Tradition of
Physico-Theology

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THE WORD OF GOD IS THE CREATION WE BEHOLD: And it is in
this word, which no human invention can counterfeit or alter, that God
speaketh universally to man.

—Thomas Paine, _The Age of Reason_¹

Far from being the atheist that some have portrayed, Thomas
Paine was a “scientific deist” who believed that the omnipotence and
benevolence of God are evident in the structure of the universe. The
epigraph above is one of his most elegant expressions of this view.
What is more surprising than Paine’s reverence is that _The Age of Reason_
(1794–95) appears to owe much to a tradition of Christian apologetics that
originated in a type of writing called physico-theology. More than a hundred
years before the appearance of _The Age of Reason_, physico-theological writ-
ers discoursed about the apparently purposeful design of the universe, and
rhapsodized on the glories of Creation. In _The Age of Reason_, Paine adapts
themes and poetics that originated in physico-theological writing to argue
for the superiority of deism to Christianity.

As a book that was among the last and most popular defenses of deism,
_The Age of Reason_ has been the subject of numerous studies, but few have

¹Thomas Paine, _The Age of Reason_, in _The Writings of Thomas Paine_, ed. Moncure Dan-
iel Conway (New York: Burt Franklin, 1908), 4: 45. Throughout this essay I will cite the Conway
edition of _The Age of Reason_. It is a highly accessible edition of _Age_, freely available (without the
other material in volume 4) from Google Books with the same pagination, under the title _The Age
of Reason: Being an Investigation of the True and Fabulous Theology:_ http://books.google.com/
books?id=gnfo3FGMXs8C&dq. It is the only modern edition to preserve the chapter headings that
appeared in the early French editions and were probably written by Paine himself. See Conway’s
“Editor’s Introduction,” 2–3.
examined the influence of antecedent literature. Studies of *The Age of Reason* by James Smylie, Franklyn K. Prochaska, Michael J. Williams, Richard H. Popkin, Jay E. Smith, and Gregory Claeys attest to the importance of the work. Prochaska says, “Few books have created a greater furor in the history of religion than Thomas Paine’s *Age of Reason.*” Smith says reaction to *The Age of Reason* was perhaps “unparalleled in American history.” Herbert Morais, a historian of deism, calls it “the axis about which deistic thought in America rotated.” The *Age of Reason* had gone through seventeen American editions by 1796. Nearly seventy replies to *The Age of Reason* had been published by 1800. Given the number of replies, it is no great wonder that most studies of *The Age of Reason*, including all those listed above, have concentrated on reaction to it. The most detailed analysis of the influences that worked on Paine is Edward H. Davidson and William J. Scheick’s *Paine, Scripture and Authority.* But they look at *The Age of Reason* mostly in the light of antecedent biblical commentary. Leading biographies of Paine also have sections devoted to *The Age of Reason*, but these concentrate on composition and reception.

Physico-theology has been absent from the long-standing debate among Paine scholars about whether Quakerism or “Newtonian Science” was a greater influence on Paine’s religious outlook. Moncure Conway, one of

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7Smith, n. 43.


Paine's earliest reasonably impartial biographers, played up the influence of Quakerism on Paine's religious outlook. Although he did allow for other influences, he stated flatly, “Had there been no Quakerism there had been no Thomas Paine.”  

Harry Hayden Clark “reinterpreted” Paine's religion as more a product of Enlightenment science than of the Quaker “inner light.” Subsequent scholars such as Robert Falk and Vikki J. Vickers have attempted to strike a balance between these two views. Jack Fruchtman Jr. suggests that Paine often employed a homiletic style to promote what he calls Paine's “religion of nature” and that his political philosophy was rooted in his religious outlook. Edward Larkin, who gives a very full account of Paine's encounter with science, observes in passing that “Paine replaces those kinds of experiences [of personal contact with the divinity] with observation of material phenomena such as the motion of the planets.” But it was not just “Newtonian science” that influenced Paine; it was also what might be called “Newtonian religion.” The tradition of apologetics that grew up from physico-theology was rooted in Newtonian science, but often expressed itself in the exuberant language of the psalmist. It gave Paine and other champions of “rational religion” a mode of rhetoric that, although “scientific” in the broad sense, was also genuinely spiritual and could come close to matching the emotional intensity of the most enthusiastic Calvinist preachers.

In this essay, I wish to draw attention to the constructive case that Paine makes for deism in The Age of Reason and the debt it owes to the rhapsodic style of apologetic that originated in physico-theology, and to show how Paine innovated on this tradition by adapting some of the arguments of this species of Christian apologetic into a defense of deism against Christianity. Below, I will sketch the history of the physico-theological tradition and then

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10Moncure Daniel Conway, The Life of Thomas Paine, with a History of His Literary, Political and Religious Career in America, France, and England (New York: G. P. Putnam's Sons, 1908), 1:11; also see vol. 2:201-02 and the “Editor's Introduction” to the Conway edition of Age, 4-5.


14Jack Fruchtman Jr., The Political Philosophy of Thomas Paine (Baltimore: Johns Hopkins University Press, 2009).

explore Paine’s unique appropriation of it.

**The Rise of Physico-Theology**

Physico-theology was an apologetic movement that arose in the wake of the success of Isaac Newton’s *Philosophiae Naturalis Principia Mathematica* (1687). The central thesis of physico-theology was that the existence of an omnipotent and benevolent God could be deduced from the order of Creation. As a genre, it was by turns both apologetic and epideictic. Physico-theology fulfilled an apologetic function by using reason to prove the existence of God against the claims of unnamed atheists, infidels, and deists, who were alleged to be atheists in disguise. This apologetic aim was in keeping with the goals of the Boyle Lectures at Cambridge, which were a prominent forum for physico-theology. Physico-theology was as much an apology for science in religious terms as it was an apology for religion in scientific terms: the best way to know the Creator is the study of Creation, it argued. Some writers also attempted to use science to prove the truth of revelation. Many works of physico-theology also have an epideictic element, celebrating Creation in rich prose drenched with the language of the psalms. It is to this rhapsodic mode of physico-theology that Paine is especially indebted.

Physico-theology arose from the confluence of natural religion and Baconian and Newtonian science. Natural religion, a concept closely related to Aquinas’s natural theology, had received its earliest detailed Protestant formulation in Richard Hooker’s *Of the Lawes of Ecclesiastical Politie* (1595), in which it is argued that human conduct is rightfully and naturally governed by a more-or-less self-evident Law of Reason that is universally available to all humans even without divine revelation. The theme was developed by Dutch theologian Hugo Grotius and Lord Edward Herbert of Cherbury. From the late seventeenth century through the eighteenth century, the comparison between natural and revealed religion became a theological commonplace. In its early modern phase, British science attempted to justify itself in the context of natural religion: any religion that could establish itself firmly on a natural philosophy supported by experimental research would appeal to all reasonable people and must eventually become dominant, it argued. At least

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two of the twelve charter members of the Royal Society of London, the first organization devoted to the promotion of experimental science in the Baconian mode, had written about natural religion: Latitudinarian bishop John Wilkins, who reportedly hosted the first meetings of the “Invisible College,” and Robert Boyle, who produced not only Boyle’s Law (pertaining to gas volume and pressure) but also treatises on natural religion including *Some Considerations about the Reconcileableness of Reason with Religion* (1675) and *A Disquisition about the Final Causes of Natural Things* (1688).

Thomas Sprat, the first historian of the Royal Society, connects the Society’s scientific mission and natural religion in his *History of the Royal Society* (1667) in a way that prefigures the main themes of physico-theology. Sprat opines that, although the Society was charged to advance learning only in natural philosophy, its work would foster a type of religion that would have a universal appeal, for its work would necessarily make evident the “Power, and Wisdom, and Goodness of the Creator . . . display’d in the admirable Order and Workmanship of the Creatures. . . . This is a religion which is confirm’d by the unanimous Agreement of all Sorts of Worship.”

The validity of this approach to science seemed to be vindicated by the success of Newton’s *Principia* in describing universal laws of mechanics. And the connection between science and spirituality was embodied by Newton himself, who devoted considerable time to biblical criticism and left open the possibility that God acted directly upon the universe.

In the wake of Newton’s success physico-theology emerged in the context of the Boyle Lectures. In *Final Causes* Boyle had argued that some inferences could be made about the nature of God by studying Creation. At his death, Boyle endowed the Boyle Lectures, which became the premier platform for disseminating physico-theological ideas. The first Boyle lecturer, Richard Bentley, who was primarily a classical scholar, delivered the proto-

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19 Sprat, 82.


typical physico-theological discourse in a series of sermons for the Boyle Lecture, entitled “A Conflation of Atheism from the Origin and Frame of the World.” Newton himself commended Bentley’s efforts.23 Other Boyle Lecture series devoted to physico-theology included The Evidences of Natural and Revealed Religion, delivered by Samuel Clarke in 1705, and Physico-Theology, or a Demonstration of the Being and Attributes of God from his Works of Creation, delivered by William Derham, a fellow of the Royal Society, in 1711-12. This latter was the most rhapsodic of the lectures, departing from Clarke’s terse, deductive style for a rich description of the glories of Creation.

Physico-theology also had a healthy life outside the Boyle Lectures. One prominent author was John Ray, a naturalist elected to the Royal Society in 1667. His The Wisdom of God Manifested in the Works of the Creation (1690) is a magisterial panegyric of Creation as only a naturalist could write it, a prime example of the rhapsodic mode of physico-theology whose style influenced Derham and later writers. Inhabiting a realm between science, poetry, and theology, Ray explores every aspect of Creation, from the weather, through the multitudinous varieties of animals and plants, to geography and the anatomy of the human body. Psalms are presented side by side with the fruits of astronomical observation and animal dissection. Throughout, he aims to deeply impress the reader with the immensity of the universe, the rich diversity of life that inhabits it, and the way that every detail of this Creation evinces divine purpose and power.

Psalm 19.1: The heavens declare the glory of God, and the firmament sheweth his handy-work. And therefore the Psalmist, when he calls upon the sun, and moon, and stars, to praise God, doth in effect call upon men and angels, and other rational beings, to consider those great effects of the divine power and wisdom, their vast dimensions, their regular motions and periods, their admirable disposition and order, their eminent ends and uses in illuminating and enlivening the planets, and other bodies about them, and their inhabitants, by their comfortable and cherishing light, heat and influences, and to give God the glory of his power, in making such great and illustrious bodies, and of his wisdom and goodness in so placing and disposing them . . . as to render them beneficial to man, and all other creatures about them.

The like may be said of fire, hail, snow, and other elements and meteors, of trees, and other vegetables, of beasts, birds, insects, and all animals, when they are commanded to praise God, which they cannot do for themselves; man is commanded to consider them particularly, to observe and take notice of their curious structure, ends, and uses, and give God the praise of his wisdom, and other attributes therein manifested.24

This is physico-theology in its full rhapsodic mode.

Other works of physico-theology followed in the wake of Ray’s book, all of which defended the thesis that the existence of a powerful and be-

nevolent God could be deduced from the study of Creation. Scottish-born physician George Chenye published *The Philosophical Principles of Natural Religion* in 1705. Derham followed the success of his *Physico-Theology* with the equally descriptive *Astro-Theology* (1714). Dutch thinker Bernard Nieuwentyt’s 1715 work of physico-theology was translated into English under the title *The Religious Philosopher: Or, the Right Use of Contemplating the Works of the Creator* (1718). Joseph Addison’s *Evidences of the Christian Religion*, which he was writing at the very end of his life and which appeared posthumously in 1721, contains a section called “The Power and Wisdom of God in Creation.”


Ray’s 1693 *Three Physico-Theological Discourses* established a significant variant in the physico-theological tradition. These discourses—on the creation of the world, the deluge, and the eventual destruction of the world by fire—attempted to reconcile Judeo-Christian scripture with other ancient texts from the Greco-Roman world and contemporary science, a task that was still plausible at the dawn of the eighteenth century. Whiston carried on the project of using science to explain and support scripture in *A New Theory of the Earth, from its Original, to the Consummation of All Things* (ca. 1725), focusing on creation, deluge, and conflagration just as Ray had.

By the latter half of the eighteenth century, the label of “physico-theology” had begun to fade from vogue, but the substance of the tradition continued in discussions of natural religion, and as a justification for the study of natural science, as will be demonstrated in the next section.

Although most British deists were Newtonians, none before Paine had the character of rhapsodic physico-theology. Many deists, or reputed deists, such as Anthony Collins, Thomas Woolston, Conyers Middleton, and Peter Annet, concerned themselves mainly with proving that miracles and prophecies should not be understood in a literal sense, and had little cause to rhapsodize the glories of Creation. Other deists who defended the broader thesis that true religion is founded in nature (Shaftsbury, Bolingbroke, Thomas Chubb) and that Christ preached nothing more than this natural religion (Matthew Tindal), looked more to history and human nature than to the physical world for support. Bolingbroke apparently spoke for many of the British deists when he wrote, “... [W]e wanted neither a Boyle, nor a Ray, nor a Derham,

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nor a Newyntit, to convince us of the self-existence of an intelligent Being, the first cause of all things: and I am sure we are much to blame if we want a Bentley, or a Clarke, to put us in mind, for in truth they do no more, of the existence of such a Being.”

Those deists who did make forays into natural philosophy did so in order to create materialist accounts of the soul and of God, not to show how the goodness and power of God are manifest in the Creation. John Toland’s *Letters to Serena* (1704) disputed with Newton in an argument for a material soul. His *Pantheisticon* (Latin 1720/ English 1751) explicated a materialist conception of God based more on the cosmology of Heraclitus and other ancient Greek philosophers than on the physics of his day. Thomas Morgan attempted to account for human free will in physical terms in a treatise entitled *Physico-Theology* (1741). Although Morgan presents a full-blown system of natural theology based in Newtonian physics, he does not compare it to Christianity or directly disparage revelation. He opposes his deism only to atheism. Absent from Morgan is the rhapsodic tone of the apologetic physico-theologians. Despite its title, Morgan’s *Physico-Theology* has more in common with Toland’s *Pantheisticon* and later French materialism than it does with previous works of physico-theology.

**Thomas Paine and Physico-Theological Tradition**

Thomas Paine was a radical pamphleteer who rose to fame with the publication of *Common Sense* (1776), and went on to author *The Crisis Papers* (1776-83), *Public Good* (1780), *The Rights of Man* (1791) and *Agrarian Justice* (1797), in addition to *The Age of Reason*. Born to a Quaker father and

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31Ibid., 171.
an Anglican mother in Thetford, England, Paine was not formally educated beyond grammar school, where he studied mathematics rather than Latin. According to his own account, he had a lifelong fascination with science that resulted in his acquaintance with a number of prominent men of science, in his refining the formula for gunpowder and designing an iron bridge, and in his exposure to the physico-theological tradition.

Paine was exposed to the physico-theological tradition at lectures he attended in London in the winter of 1757-58. During that winter, the twenty-year-old Paine was in the city, flush with the prize-cash he had earned as a hand on the British privateer King of Prussia. He did not spend all his bounty in the ways that are, I suspect, customary for a young man on his own in the metropolis for the first time. Rather, he attended lectures by two renowned popularizers of Newtonian science, James Ferguson and Benjamin Martin, and became personally acquainted with them. He renewed his acquaintance with Martin and Ferguson in the winter of 1772-73, and added to them that of John Bevis, an astronomer, and Benjamin Franklin, a friend of Ferguson.

As soon as I was able, I purchased a pair of globes, and attended the philosophical lectures of Martin and Ferguson, and became afterwards acquainted with Dr. Bevis, of the Society called the Royal Society.

After I had made myself master of the use of the globes and of the orrery, and conceived an idea of the infinity of space, and of the eternal divisibility of matter, and obtained, at least, a general knowledge of what is called natural philosophy, I began to compare, or, as I have said before, to confront, the internal evidence those things afford with the Christian system of faith.

The public lectures Paine heard that winter were given by self-made men of science, with origins and educations much like his own, who existed well outside the academic establishment. Ferguson was a Scotsman, the son of a tenant farmer. Largely self-educated, he began his professional life as a miniature portrait artist and maker of scientific instruments, including the orrery mentioned by Paine, which was a mechanical device that reproduced the motion of the planets. By 1746 he had settled in London, giving public

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32Paine, Age, 62-63.
33Ibid., 63. Larkin gives a fully developed account of some aspects of Paine’s encounter with science in Literature of Revolution, 114-48.
34On the gunpowder experiments see Hawke, 35. On Paine’s attempted career as a bridge designer, see Keane, 267-71. Larkin provides a brilliantly contextualized reading of Paine’s bridge project: Literature of Revolution, 120-32.
35Keane, 36-45.
36Ibid., 40-45.
37Paine, Age, 63.
38Ibid., 66.
lectures on an array of topics in natural philosophy. He was elected a fellow of the Royal Society in 1763. Martin, the son of a wealthy farmer, was also largely self-taught. He apparently gave himself a very broad education, for his first success was the publication of *The Philosophical Grammar* in 1735, which was nothing less than a treatment of the whole of natural philosophy. After years as a traveling lecturer, in 1756 he set up a shop in London to sell “philosophical, optical and mathematical” instruments and began to lecture steadily in the city.

There is reason to think that both Martin and Ferguson incorporated some of the basic ideas of physico-theology into their lectures. In the winter of 1757-58 Ferguson’s book, *Astronomy Explained upon Sir Isaac Newton’s Principles*, first published in 1756, had just gone into its second edition. The introduction of this work reads, “Of all the sciences cultivated by mankind, Astronomy is acknowledged to be, and undoubtedly is, the most sublime, the most interesting, and the most useful . . . our very faculties are enlarged with the grandeur of the ideas it conveys . . . and our understandings clearly convinced, and affected with the conviction, of the existence, wisdom, power, goodness, and superintendency of the SUPREME BEING! So that without hyperbole, ‘An undevout Astronomer is mad.’”

Although this book is a work on astronomy, not astronomical religion à la Derham or Whiston, it does borrow the physico-theological justification for the study of the stars. It seems likely that Paine would have been exposed to such material over the course of Ferguson’s lectures. One lecture definitely seems to have partaken in a Whiston-style use of astronomy to prove the literal truth of scripture, judging by the advertisement: “[T]he Prophet Daniel’s 70 Weeks explained, and the Darkness at the Time of our Savior’s Crucifix-

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40*The Philosophical Grammar; Being a View of the Present State of Experimen-


ion proved to have been supernatural.” The fact that Paine did eventually read Whiston is proven by his citation of him in “Examination of Prophecies,” where he refers to a work that is probably Whiston’s A Short View of the Chronology of the Old Testament (1702).

Martin’s lectures covered a plethora of topics in physics and chemistry, and began with a lecture on the “fundamental principles of philosophy,” which likely contained the “know the Creator through the Creation” justification of the natural sciences. As mentioned in the advertisement for his course, much of the lecture material was contained in A Plain and Familiar Introduction to Newtonian Philosophy (1751). The penultimate page of the preface of this work refers readers to Martin’s Panegyrick [sic] on the Newtonian Philosophy (1751) for a full treatment of things that can be said to recommend the study of science. And in Panegyrick one finds a full-blown physico-theological defense of “Newtonian Philosophy,” some part of which was likely to have found its way into the “fundamental principles” lecture: “The Business of this Science is to enable us, in a proper manner, to consider the HEAVENS, that is, the infinite Space, the interminable Void, the To-pan, or Universe of all created worlds, the Sun and the Stars which God has ordained . . . it astonishes the Mind with a certain and indubitable Proof and Prospect of an Infinity of Worlds, and creates an Idea every way worthy of, and adequate to the Notions we ought to entertain of an infinitely wise, perfect, and powerful Being.”

It is also worth noting that in 1737 Martin had published a subscription digest of “literary arts and sciences,” called the Bibliotheca Technologica, covering a great range of topics. The very first chapter of this work is devoted to natural theology and rehearses the standard physico-theological arguments for the existence of God. Martin’s familiarity with physico-theology is further evinced by the inclusion in his A New and Comprehensive System of Philol-

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44 Millburn, “London Evening Courses,” 448, provides a full list of lecture topics.
46 Millburn, Benjamin Martin, Supplement, 27, and “London Evening Courses,” 453.
ogy (1759) of a section devoted to physico-theology.\footnote{Martin, A New and Comprehensive System of Philology; or, a Treatise of the Literary Arts and Sciences, According to Their Present State (London, 1759), 1:10-11 [database online]; Eighteenth Century Collections Online, Gale Document Number CW111928511.}

Although Paine implied that his deism originated in what he learned from Martin and Ferguson,\footnote{Paine, Age, 66.} he is not likely to have met with any real deism in their company. Ferguson, as we have seen, occasionally tried to employ his astronomy to prove the truth of Christian revelation. And the third chapter of Martin’s Bibliotheca is a defense of Christian revelation, as is the fifth chapter of his System of Philology. What Paine probably did encounter was the physico-theological justification for the study of natural science and the poetics of physico-theology that are evident in Martin’s Panegyric. Paine’s innovation was to take these arguments from Christian apologetics and “to confront,” as he said, the Christian system of faith with them.

Ferguson and Martin’s lectures were probably not the only place where Paine met with the physico-theological tradition. In his Autobiography, Franklin, with whom Paine was well acquainted, traces his deism to reading some Boyle Lectures.\footnote{Benjamin Franklin, The Autobiography of Benjamin Franklin, ed. Albert Henry Smith (New York: American Book Company, 1907), 118 [book online]; available from http://books.google.com/books?id=cJgVAAAAYAAJ&dq.} Some passages in his 1728 “Articles of Belief and Acts of Religion” are infused with the flavor of physico-theology. Although the mature Franklin thought it most prudent not to publicly promote deism at the expense of Christianity,\footnote{On Franklin’s “scientific deism” see Alfred Owen Aldridge, Benjamin Franklin and Nature’s God (Durham, N.C.: Duke University Press, 1967), 25-46.} it is likely that he and Paine exchanged private views on the subject.

Even leaving aside the extraordinary figure of Franklin, the physico-theologically infused natural theology was well established in Philadelphia by the time that Paine arrived there, and he is likely to have had at least some encounters during his first period of residence in America (1775-87) that would have re-enforced the sort of natural theology to which he was first exposed through Martin and Ferguson. Nina Reid-Maroney argues that the reception of Enlightenment thought in Philadelphia was strongly influenced not only by its colonial status, but by its unique religious climate, colored by the schism between the moderate Old Light Protestants and the New Light Protestants touched by the enthusiasm of the Great Awakening.\footnote{Nina Reid-Maroney, Philadelphia’s Enlightenment 1740-1800: Kingdom of Christ, Empire of Reason (Westport, Conn.: Greenwood Press, 2001). Reid-Maroney is especially concerned with the schism within the Presbyterian Church that split it between the “New Side” and the “Old Side” between 1741 and 1758.} The naturalist John Bartram’s Quietist brand of Quakerism, which shared the tone of the Old Lights, led him to see the natural world as “a point of contact be-
tween God and the quiet heart of the believer.” 55 Bartram, who was considered the pre-eminent botanist in the colonies from the 1730s until his death, approached his work very much in the spirit of John Ray’s The Wisdom of God Manifested in the Works of the Creation, with which, as a naturalist, he was probably familiar. He not only saw his own work in this light, but wrote to his children that the “foundation of true religion . . . is manifest to us in great degree by the pious contemplation of his power, majesty and wisdom in the incomprehensible magnitude and number and distances of the celestial orbs. . . .”56 One of those children, William, a near-contemporary of Paine’s, would carry on in his father’s footsteps as a naturalist.

Ebenezer Kinnersley, a younger associate of Franklin’s, is a strong example of how Old Lights combined Newtonian science and natural theology to counter what they saw as the dangerous enthusiasm of the New Lights. Ordained as a Baptist minister in 1743, he had fallen out with the Baptist communion when he spoke against a fellow minister, whom he accused of “Preaching of Terror,” and turned his attentions to science. Between 1747 and 1751, Kinnersley gave public lectures on the Newtonian system throughout the colonies. 57 Like the lectures of Martin and Ferguson that were taking place at about the same time on the other side of the Atlantic, Kinnersley’s lectures made dramatic use of scientific apparatuses for demonstration and experiment and were justified by a similar brand of natural theology. In the advertisements for his lectures, he claimed that they were designed “to enlarge the human mind, and give us more grand and exulted ideas of the Author of nature.”58 Reid-Maroney details the progress of this sort of natural theology not only among Old Lights like Bartram and Kinnersley, but also among the New Lights, in whose number she counts Benjamin Rush, Paine’s close associate during the revolutionary period. Rush, like a number of other New Lights, was a good Newtonian, but followed John Calvin in seeing human understanding, in its fallen state, as being limited, and natural laws as being contingent upon God’s will.

New Lights and Old Lights mingled in the group of scientifically minded gentlemen that belonged to the American Philosophical Society (APS hereafter), which Franklin had proposed as the colonial counterpart to the Royal Society of London. John and William Bartram, Kinnersley, and Rush were all among its members. These and other members fre-

55 Reid-Maroney, Philadelphia’s Enlightenment, 39.
57 Reid-Maroney, Philadelphia’s Enlightenment, 52–60.
58 The line is from Kinnersley’s lecture at Newport in 1752. It was found by Reid-Maroney in a reprint of the advertisement in Bern Dibner, Early Electrical Machines (Norwalk, Conn.: Bundy Library, 1957), 35. See Reid-Maroney, Philadelphia’s Enlightenment, 72, n. 22.
quently justified their scientific enterprise in language that echoed the themes and poetics that originated in physico-theology. A prime example comes from the address on astronomy given to the APS on 24 February 1775 by David Rittenhouse, an American watchmaker and astronomer, who, like Ferguson, had constructed an orrery. It is very possible that Paine, who was himself elected a member of the APS in 1785, either attended this lecture or read the published version, for he was a friend of Rittenhouse and had just assumed, at the end of January, his duties as editor of the *Pennsylvania Magazine*, a publication that frequently delved into scientific subjects. Among many sentiments with a physico-theological flavor expressed in Rittenhouse’s lecture, is, “Nothing can better demonstrate the immediate presence of the deity in every part of space, whether vacant or occupied by matter, than astronomy does.” Rush, a friend of both Paine and Rittenhouse, soared to similar starry heights in his eulogy for Rittenhouse in 1796, but he also made it absolutely clear that Rittenhouse was a believer in Christian revelation, as indeed Rittenhouse himself had done.

Although public expressions of deism were rare in America, American deists tended to draw more strongly on the tradition of physico-theology than their English cousins had. One of the few Americans to publish a full-length work of exclusively deistic theology before the publication of *The Age of Reason* was Ethan Allen. His *Reason: The Only Oracle of Man* (1784), although never widely circulated, is perhaps an index of the influence of science on the latent American deism that stood in the shadows of the “Christian Enlightenment.” It contains arguments for the “eternity and infinity of

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59This literature is surveyed in Harold E. Taussig, “Deism in Philadelphia during the Age of Franklin,” *Pennsylvania History* 37.3 (1970): 217–36. Taussig, it should be noted, labels anyone who discourses on natural theology a deist, regardless of their views on scripture.

60Keane, 107, 185, 193; Hawke, 100–01; Foner, 73, 116.

61Keane, 92–93.


65Rittenhouse, 19.
God” based on observations about Creation. And a Painite vision of the glories of God expressed through Creation was to burst forth in its most rhapsodic form in some of the later poems of Philip Freneau, such as “Reflections on the Constitution, or Frame of Nature.” But these emerged only in the wake of The Age of Reason.

The Influence of Physico-Theology on the Positive Deism of The Age of Reason

Although in this study I will concentrate on those parts of The Age of Reason that make the positive case for deism, it should be noted that The Age of Reason also contains a large portion of “critical deism,” that is, the sort of deism that consists in criticism of received religious doctrines and scriptural interpretations. The earliest edition of part 1 of The Age of Reason supervised by Paine was published with seventeen chapter headings. Paine’s positive case for deism is made almost exclusively in chapters 9–16 of part 1, with a brief reprise in the conclusion of part 2. Part 2 of The Age of Reason is organized as a book by book attack on the credibility and authority of the writers of the Bible, and is almost entirely in the mode of critical deism.

The Age of Reason is unique among deistic works in the extent to which it employs the poetics of physico-theology and in the use of arguments from physico-theology and natural religion to “confront,” as Paine put it, Christianity. The following sections explore how Paine adapted one or more themes of physico-theology in The Age of Reason.

Humanity Was Endowed with Reason in Order to Discover God

The idea that reason is a gift from God, given so that humans might come to know God, had long been part of the tradition of natural religion. Such ideas formed the basis of the thought of Hooker, Grotius, Herbert, and John Toland. John Locke influentially argued in The Reasonableness of Christianity (1695) that because God made man a “Rational Creature,” man must live by the “Law of Reason” that reveals his moral duties. He adds, however, that


68See n. 1.
this task is so difficult that none can accomplish it without faith and the aid of revelation.\textsuperscript{69}

In the context of physico-theology, Ray is among the most poetic in describing the duty of rational creatures to discover God in his Creation, expounding on the first verse of the 19th psalm. Whiston voices a similar thought in \textit{Astronomical Principles}: “This foundation of all religion, the belief of a supreme deity, is the first, the most natural and obvious deduction of human reason.”\textsuperscript{70} Martin \textit{defines} reason as the faculty that reveals the existence of God: “And as the whole frame and order of things, which we behold, is what is called nature; so that act of mind whereby we consider and compare things, according to their various natures and relations, and deduce from thence the existence of a God, is what is called reason. . . .”\textsuperscript{71}

From such physico-theologically inflected discourse about natural religion, Paine took up the theme of reason’s true purpose. Emphasizing the sacral nature of reason, he turned it against revelation. He calls reason the “choicest gift of God to man,” a gift that is rejected by the follower of revealed religion with grave consequences:

\ldots [H]aving endeavored to force upon himself the belief of a system against which reason revolts [i.e., revealed religion], he ungratefully calls it human reason, as if man could give reason to himself.

Yet, with all this strange appearance of humility, and this contempt for human reason, he ventures into the boldest presumptions.\textsuperscript{72}

Paine goes on to make the familiar teleological argument for the existence of God: everything in nature must have a first cause, and that first cause must be God. Paine underlines that this first and best proof of God’s existence presents itself through reason alone. Those who diminish reason through belief in a “system against which reason revolts,” he implies, diminish this best proof of God’s existence: “It is only by the exercise of reason, that man can discover God. Take away that reason, and he would be incapable of understanding anything. . . . How then is it that those people pretend to reject reason?”\textsuperscript{73}

Paine criticizes scripture for not furnishing as good a proof of God’s


\textsuperscript{72}Paine, \textit{Age}, 44.

\textsuperscript{73}Ibid., 47.
existence as Creation, when contemplated by reason, does. He states that only a few psalms and the Book of Job provide a truly deistic proof of God's existence. As an example, Paine, who was writing in Paris without being able to reference a Bible in the only language he read, English, quotes Addison's paraphrase of Psalm 19. Psalm 19 was a favorite text in the physico-theological tradition, being referenced not only by Ray, but also by Martin and others, and it is interesting that Paine should quote the rendition of Addison, who himself added to the apologetic literature of physico-theology.

Paine takes an argument that had in every previous writer been supplementary to, or independent of, revealed religion, and turns it against scripture. Toland's *Christianity Not Mysterious* (1696) had argued categorically that nothing in the Gospels could be against reason, but did not call for the rejection of scripture. Most writers on natural theology in the eighteenth century subordinated it to revealed religion. And radicals such as Peter Annet who did call for the rejection of scripture did not dwell on the sacred nature of reason. Paine's innovation was to turn a sacred conception of reason against revelation by arguing that to accept revelation one needed to reject reason, which was the only true way to God.

*Creation More Perfectly Expresses God's Power and Love Than Any Human Language*

There is in Ray's *Wisdom* an argument that the study of the “works of creation” should have, at least, a place in the hierarchy of knowledge equal to that of language-based studies. That foreshadows Paine’s much stronger words on the subject: “We content ourselves with the knowledge of the tongues, or a little skill in philology, or history perhaps, and antiquity, and neglect that which seems more material, I mean, Natural History; and the works of creation. . . .”

Ray’s remarks need to be understood in the context of the battle for Baconian experimental science to gain a foothold in the English university, a battle in which Ray, as a naturalist, was deeply involved. He perhaps took his cue from Francis Bacon himself, who said that the “first distemper of learning” occurs “when men study words, not matter.”

The Baconian attitude toward the study of language reflected in Ray was still very much alive in the colonies at the end of the eighteenth century. Wil-
liam Smith, provost of the College of Pennsylvania, states that the trustees established a college devoted mostly to the sciences, because “[t]hey were very sensible that the knowledge of Words, without making them subservient to the knowledge of Things, could never be considered as the business of education.” Rush drives home the same point in his eulogy for Rittenhouse: “In speaking of Mr. Rittenhouse, it has been common to lament his want of what is called a liberal education. . . . Had the usual forms of a public education in the United States been imposed upon him, instead of revolving through life in a planetary orbit, he would have probably consumed the force of his genius fluttering around the blaze of an evening taper. Rittenhouse the Philosopher, and one of the luminaries of the eighteenth century, might have spent his hours of study in composing syllogisms, or in measuring the feet in Greek and Latin poetry.”

Paine turned the commonplace opposition between words and things to a new purpose: the promotion of a scientific deism in opposition to Christianity. He argued that a truly benevolent God, whose love embraced all rational beings, would not reveal himself to only the few beings at a particular time and place that happened to understand the language of scripture. Rather, he would speak in a universal language. Paine reasons that Creation itself, which alone is universally accessible to all creatures, is the true language of God: “THE WORD OF GOD IS THE CREATION WE BEHOLD: And it is in this word, which no human intervention can counterfeit or alter, that God speaketh universally to man. . . . The creation speaketh a universal language, independently of human speech or human language, multiplied and various though they may be. It is an ever existing original, which every man can read.”

Paine is expansive in his criticism of the academic study of language, which takes up the greater part of chapter 12, “The Effects of Christianity on Education. Proposed Reforms.” Characteristically, Paine turns the argument for “matter” over “words” into an indictment of organized Christianity: “As the Christian system of faith has made a revolution in theology, so also has it made a revolution in the state of learning. That which is now called learning, was not learning originally. Learning does not consist, as the schools now make it consist, in the knowledge of languages, but in the knowledge of things to which language gives names.”

There is in this argument still a justification for the study of things rather than words, but the

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79 Rush, 23–24.


81 Ibid., 55–56.
logic had been extended to exclude the possibility that God would choose to speak to humanity in any particular human language.\textsuperscript{82}

**The Scientific Study of Creation is a Kind of Worship**

This thesis is present in Sprat’s justification of the Royal Society and is defended implicitly or explicitly in Ray, Derham, Whiston, Martin, and Ferguson, and by colonial men of science. For instance, Derham, at the end of his *Physico-Theology*, draws the practical inference that “God’s Works ought to be enquired into” for “the more we pry into, and discover of, them, the greater and more glorious we find them to be, the more worthy of, the more expressly to proclaim the great Creator.”\textsuperscript{83} For Rittenhouse, science opens the way to an ever-deepening understanding of the Creator. Every new field of exploration that is opened up by the telescope or the microscope should make us “happy in a continual approach to the deity”\textsuperscript{84} and “will very probably render us more and more sensible of his inexhaustible stores of communicable bliss, and of his inaccessible perfections.”\textsuperscript{85}

Paine picks up the science-as-worship theme in order to oppose revealed religion with science. Science becomes a “true theology” that can be opposed to the “fabulous theology” of Christian revelation: “That which is now called natural philosophy, embracing the whole circle of science, of which astronomy occupies the chief place . . . is the true theology.”\textsuperscript{86} If God speaks to man through creation, man “hears” God through science: “The Almighty lecturer, by displaying the principles of science in the structure of the universe, has invited man to study and to imitation. It is as if he had said to the inhabitants of this globe that we call ours, ‘I have made an earth for man to dwell upon, and I have rendered the starry heavens visible, to teach him science and the arts.’”\textsuperscript{87}

The idea that science, as the “true theology,” should be the central pillar of learning rather than languages also resonates with Paine’s account of his own education, which was less deficient in science than in Latin.

\textsuperscript{82}As Professor Michael Zuckerman, who reviewed this manuscript, notes, it is ironic that the mathematical language spoken by the likes of Newton and Boyle was actually understood by fewer people than any of the languages in which the Bible was written.


\textsuperscript{84}Rittenhouse, 26.

\textsuperscript{85}Ibid., 27.

\textsuperscript{86}Paine, *Age*, 50.

\textsuperscript{87}Ibid., 55; also see 51–53.
The Omnipotence of God Is Evident in the Diversity and Extent of Creation
The Benevolence of God Is Evident in the Order of Creation

These two propositions, analytically distinct, are frequently elided in practice. Together they constitute the conceptual core that gives rise to much of the poetics of the rhapsodic mode of the tradition of natural theology that flowed from physico-theology. Paine takes these conceptions into *The Age of Reason*, and, to a far greater extent than Morgan or Allen or any other deistic writer, revels in the poetry that arises from them. What is more important, he innovatively turns one of the key phrases of Christian natural theology—the “plurality of worlds”—into an argument against Christianity.

Many examples could be cited from the physico-theological tradition of rhapsodic prose amplifying the theme of God’s goodness and power as manifest in the richness of his Creation. Addison, for one, celebrates the cornucopian abundance of Creation: “The exuberant and overflowing goodness of the Supreme Being, whose mercy extends to all his works, is plainly seen, as I have before hinted, from his having made so very little matter, at least what falls within our knowledge, that does not swarm with life: nor is his goodness less seen in the diversity, than in the multitude of living creatures.”

Ray begins *Wisdom* by commenting on verse 24 of Psalm 104—“How manifold are thy works, O Lord! In wisdom hast thou made them all”—and celebrates the manifold character of Creation throughout his book.

Besides celebrating the diversity of Creation, it was common for physico-theological treatises to celebrate the power of God, manifest in the vast extent of Creation, with a tour of the solar system and with speculation about countless other planetary systems circling countless other suns, each teeming with as much life as can be found on earth. Ray, a naturalist with a highly terrestrial orientation, provides only a short tour of the universe in *Wisdom*. Whiston, the astronomer, devotes a full chapter to describing the size, distance, and speed of all the known planets. Later, he deduces “divine power” and “almighty efficacy” from “the system of the world”: “[T]he Supreme God, who made and governs it, is a most powerful and mighty being. . . . That we may have some particular notion of the greatness of the divine power, and almighty efficacy in this our own system, let us consider the greatness of the bodies it everywhere moves; and the velocity with which it moves them. . . . it appears that the planets alone, which are continually moved, are together above four hundred millions of millions of cubical miles in magnitude; that the velocity wherein they are mov’d, in their annual motion, is, at a mean, about 52000 miles in an hour; and that the velocity of the corpusclesles

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88Addison,101.
of light is still vastly greater. . . .”

In popular works devoted to astronomy, it was not uncommon to draw the connection between the grandeur of the cosmos and God’s great power, and to deduce the beneficence of God from the usefulness of studying his heavens. Ferguson proclaims that astronomy convinces our understandings of “the existence, wisdom, power, goodness, and superintendency of the SUPREME BEING!” Rush states that “[t]here appears to be a natural connection between a knowledge of the works of nature and just ideas of divine perfection.”

A good deal of the force of Paine’s argument for deism derives from his use of the same poetics that had been employed by Ray, Addison, Whiston, and Martin. Like these writers, Paine celebrates the richness and immensity of Creation, but does so in the service of deism rather than Christianity. Paine opens upon the subject in chapter 13 of part 1: “The true deist has but one Deity; and his religion consists in contemplating the power, wisdom, and benignity of the Deity in his works. . . .” Paine tries to impress upon his readers the immensity of Creation, with its countless suns, orbited by countless planets teaming with life:

If we take a survey of our own world . . . we find every part of it, the earth, the waters, and the air that surround it, filled, and as it were crowded with life, down from the largest animals that we know of to the smallest insects the naked eye can behold, and from thence to others still smaller, and totally invisible without the assistance of the microscope. Every tree, every plant, every leaf, serves not only as an habitation, but as a world to some numerous race, till animal existence becomes so exceedingly refined, that the effluvia of a blade of grass would be food for thousands.

Since then no part of our earth is left unoccupied, why is it to be supposed that the immensity of space is a naked void, lying in eternal waste? There is room for millions of worlds as large or larger than ours, and each of them millions of miles apart from each other.

To make sure that he has driven his most important point home, Paine reiterates his affirmation that the structure of the universe proves God’s power and goodness at the end of chapter 15, and again in the conclusion of part 2:

Could a man be placed in a situation, and endowed with power of vision to behold at one view, and to contemplate deliberately, the structure of the universe, to mark the movements of the several planets, the cause of their varying appearances, the unerring order in which they revolve, even to the remotest comet, their connection and dependence on each other, and to

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90Whiston, *Astronomical Principles*, 120.
92Rush, 26–27.
94Ibid., 67–68.
95Ibid., 73.
know the system of laws established by the Creator, that governs and regulates the whole; he would then conceive, far beyond what any church theology can teach him, the power, the wisdom, the vastness, the munificence of the Creator. He would then see that all the knowledge man has of science, and that all the mechanical arts by which he renders his situation comfortable here, are derived from that source. 96

Richard Watson, an able critic of part 2 of *The Age of Reason*, perhaps recognizing the spirit of the old physico-theology, has some rare words of praise for this section, telling Paine he is “animated with proper sentiments of piety, when [he speaks] of the structure of the universe.” 97

To the poetics of immensity and abundance familiar from physico-theology, Paine added his own unique argument for the benevolence of the Creator. Chapter 14 of part 1 is a Ferguson-style tour of the solar system remarkable for its neglect of Uranus, which had been discovered in 1781. 98 In Paine’s hands, this section not only serves as a testament to the workmanship of the Creator, but also sets up his unique argument for the benevolence of God. God created the solar system as a “plurality of worlds” revolving around the sun, to make it possible for the inhabitants of all these worlds to discover the most useful principles of science and mechanics. Paine contends that had the solar system been structured in any other way, it would not have been possible for humans to have gained the knowledge of science and the mechanical arts that presently eases their lives: “Had then the quantity of matter which these six worlds contain been blended into one solitary globe, the consequence would have been, that either no revolutionary motion would have existed, or not a sufficiency of it, to give us the ideas and knowledge of science we now have, and it is from the sciences that all the mechanical arts that contribute so much to our earthly felicity and comfort are derived.” 99

The phrase “plurality of worlds” has a rich history in the physico-theological tradition, appearing in Addison’s *Evidences* 100 and Derham’s *Astro-Theology*. 101 Significantly, it is used by Rittenhouse in his APS oration, where he explicitly argues that the “doctrine of the plurality of worlds” does not contradict Christian revelation, even though it “is still thought, by some

96Ibid., 191–92.
98See Conway’s “Editor’s Introduction” to *Age*, 3–4. Paine scholars have long wondered how Paine, with all his enthusiasm for science and especially astronomy, could have failed to take note of the discovery of a new planet.
100Addison, 99.
pious persons, and by many more I fear, who do not deserve that title, to militate against the truths of the Christian religion.”

Paine, whom Rittenhouse would not have considered pious, exploits the idea of a plurality of worlds not only to prove the benevolence of God, but to oppose the “Christian system.” If God made even more worlds than there are stars, why should a singular savior have been born on this particular one? The belief “that God created a plurality of worlds . . . renders the Christian system of faith at once a little ridiculous; and scatters it in the mind like feathers in the air.” Later, Paine reiterates and clarifies this argument: “From whence then could arise the solitary and strange conceit that the Almighty, who had millions of worlds equally dependent on his protection, should quit the care of all the rest, and come to die in our world, because, they say, one man and one woman had eaten an apple!”

Where earlier deists argued that a truly benevolent God would not arbitrarily confine the possibility of salvation to those who happened to have become acquainted with Christian revelation, Paine implies that it would be astronomically unworthy of a benevolent God to arbitrarily confine the possibility of salvation to a single planet.

Conclusion

Although the biblical criticism of The Age of Reason certainly owes much to such deistic writers as Collins, Woolston, and Annet, its positive case for deism owes more to the Christian physico-theological tradition to which Paine was exposed through contact with Martin, Ferguson, Rittenhouse, and Rush. Paine incorporated the themes and the poetics of the rhapsodic mode of physico-theology into The Age of Reason. He innovated on the themes of the tradition by using them “to confront” the “Christian system of faith.” For Paine, submission to revelation is a submission to a “system against which reason rebels.” It damages the “gift of reason” that provides the best proof of God’s existence. Science is a “true theology,” which can be opposed to Christian theology. Paine uses the Baconian commonplace opposition between words and things to argue that God would never reveal himself in words. He employs the “plurality of worlds”—which had for Addison, Derham, and Rittenhouse signified the plentitude of the Creation bequeathed to humanity by a Christian God—to “scatter” the “Christian system of faith . . . like feathers in the air.”

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102 Rittenhouse, 19.
103 Paine, Age, 66.
104 Ibid., 73.