

NATURAL THEOLOGY IN THE SCIENTIFIC
REVOLUTION: GOD'S SCIENTISTS

BY

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INTRODUCTION

I appeare now in the plaine shape of a meere Naturalist, that I might vanquish Atheisme ... For hee that will lend his hand to help another fallen into a ditch, must himself though not fall, yet stoop and incline his body ... So hee that would gaine upon the more weake and sunk minds of sensuall mortalls, is to accommodate himself to their capacity.

Henry More, *An Antidote against Atheism* (1653)

Thus far the Doctor [Cudworth], with whom for the main I do consent. I shall only add, that Natural Philosophers, when they endeavor to give an account of any of the Works of Nature by preconceived Principles of their own, are for the most part grossly mistaken and confuted by Experience.

John Ray, *The Wisdom of God* (1691)

At stake in both of these statements is the epistemological authority of nature and the legitimacy of empirical science. Henry More concedes that nature may be useful in educating those who shy away from the better means of reason; John Ray voices suspicion of anyone whose reason does not start by listening to nature. By the end of the seventeenth century, Ray's view had come to prevail in England, as the humanistic programme of learning that had displaced scholasticism was itself displaced by the sciences of observation: natural philosophy and natural history. Those whose efforts brought about these changes, including Ray and his colleagues in the Royal Society, cared deeply about the best means of advancing knowledge – but they also engaged questions about meaning and purpose, asking not merely *how* to advance learning, but *why* it is good and right to do so. Such questions, about the purpose and interpretation of knowledge, are the province of natural theology, a branch of philosophy that had been especially lively in the Middle Ages and which was bound to change in response to the developments collectively known as the Scientific Revolution. As new methods of acquiring knowledge came to dominate in seventeenth-century England, there arose a new kind of natural theology, known as 'physico-theology'. Authors of physico-theology argued for the existence and providence of God from empirical data: the intricate structure and operations of physical phenomena, they argued, are so well fitted to their various uses that nature must have a wise

and powerful designer. Conversely, they said, practices that every day uncovered more evidence of the power and wisdom of God are worthy for that fact.

In this way the stories of natural theology and natural science involve each other: empirical science needed to be shown to be in harmony with the aims of religion if it was to gain traction in England in the seventeenth century,¹ and devout intellectuals wanted to reconcile new knowledge and methods with their old faith. Importantly, not all of these reconciliation efforts resemble the design arguments familiar from natural theology's eighteenth- and nineteenth-century heyday, and the shorter-lived efforts have as much to contribute to our understanding of the historical relationship between science and religion as do the historical successes. A seventeenth-century natural theologian might argue for witches and demons and genii as well as for the fittedness of the wonderfully contrived human eye to its purpose. An invective in defence of sensory observation might appear alongside a deductive argument for the utility of humans as instruments of God's praise. An author might reason, circularly, that educated people with leisure to philosophize should be believed on the topic of God's existence – except, of course, when they conclude that God does not exist, in which case the pure simplicity of the vulgar is to be preferred. These authors saw evidence for the Creator in the ant, the Milky Way, the bird of paradise, Hooke's *Micrographia*, Newton's *Principia* and Milton's *Paradise Lost*. Sometimes they took the offensive, attacking supposed atheists for their folly or accusing them of humoural imbalance; sometimes they preached to the choir, buttressing thoughtful Christians against the onslaughts of doubt. They were philosophers, theologians, natural historians and university administrators; Oxbridge educated or self-taught. Some held, conservatively, that natural theology was inadequate for persuasion and conversion; others claimed to prove Christianity conclusively. All of them contributed to the story in some way.

The purpose of this book is to show the width, breadth and depth of that contribution. Reading closely five works of natural theology penned in the latter half of the seventeenth century in England, I argue that our current understanding of the role of natural theology in the history of science and religion is Whiggish, focusing on one (fatally flawed) type to the exclusion of other, more robust strands. Some of this Whig history is easy to spot: an earlier generation of science historians could pooh-pooh or ignore seventeenth-century treatment of supernatural phenomena, for example. But other omissions are more subtle. Because of how 'natural theology' came to be defined after the period under study, there is general scholarly silence regarding the presence in these works of authorities traditionally placed outside of, often above, philosophy, such as scripture, oracular revelation and poetry.

A Powerful Myth

Before focusing on the fifty-year period during which physico-theology came into being and established itself on the English landscape, it is helpful to take a step back and look at the larger story in which this story is implicated: that of the rise of ‘modernity’, and with it the triumph of reason over faith. This story is a myth in the sense of being a powerful understood metanarrative, and also – as recent scholarship has shown – in the sense of failing to square with the facts.² While no historian of science would now fully accept this understood metanarrative, the work of revision has proceeded only slowly, as different threads of the story are challenged one by one. One of these threads is the story of natural theology in England. What follows is a survey of this story’s initial concoction and its endurance down the decades as wider critical understanding of the historical relationship between science and religion has evolved.

If William Draper is chief propagator of the myth of a centuries-long war between science and religion, the myth of a decisive battle in that war, between natural theology and reason in the seventeenth and eighteenth centuries, was chiefly propounded by Leslie Stephen. Beginning in 1868, Stephen originally set out to study the rise and development of deism; in 1876 his *History of English Thought in the Eighteenth Century* was published, an impressive two-volume exposition of English philosophy, political and economic theory, and literature beginning with the aftermath of Descartes and ending with the Romantics. (Concurrently Stephen continued to publish polemical essays in defence of the agnosticism that had forced him to give up his post of tutor at Cambridge in 1862.) In its own context, the work marked the beginning of a pendulum swing in public opinion from reactive derision of the Age of Reason to a more charitable assessment. Far from a detached survey of others’ arguments, Stephen’s history actively engages the ‘continuous debate’ waged over deism during those years, examining each logical position for fallacies and explaining how one led to the next.

In the beginning, he says, English divines reacted against continental Catholic narrow-mindedness by an appeal to scripture alone and a condemnation of sectarian disputes. ‘Tolerance’ was the watchword among these men, the noblest of whom anticipated the full-fledged liberalism of later centuries (he names Milton’s *Areopagitica*). An emphasis on natural theology arose organically in this intellectual climate, in which controversies regarding scripture itself were thought best solved by recourse to common natural reason – for it could not be right to let a tyrannical few decide for all. Stephen explains:

As sects ramified, it was necessary to fall back further for a principle common to all; the same method, therefore, which caused [William] Chillingworth to appeal to Scripture, implied an appeal to reason as soon as Scripture authority should be impugned. And, in fact, the great Protestant divines of the seventeenth century are

rationalist in principle ... Thus, in many of their arguments it is sufficient to substitute Revelation for Rome to make the attack upon Catholicism available for an attack upon all supernatural authority.³

At first this Protestant appeal to a combination of reason and scripture seemed to work. For a brief 'golden period of English theology', he goes on, 'reason and Christian theology were in spontaneous alliance': men such as the Cambridge Platonists and, later, early Boyle lecturers such as John Tillotson sought with perfect sincerity to construct a pure philosophical religion. Stephen builds a mounting sense of doom here, referring to the 'unconsciousness with which [these men] put forward arguments capable of being turned against themselves' and the 'dangerous task of demonstrating the fundamental tenets of theology'. To explain what he means by 'dangerous', Stephen quotes the deist Anthony Collins: 'Nobody doubted the existence of the Deity until the Boyle lecturers had undertaken to prove it.'⁴

While admitting that varieties of scepticism were present in England before the Boyle lectures, Stephen asserts that Collins's satirical statement was partly right: 'Demonstrations naturally evoked skepticism', he explains; 'a doctrine is first received as an intuitive truth, standing beyond all need of demonstration; then it becomes the object of rigid demonstration; afterwards the demonstration ceases to be conclusive ... and, finally, the effort is limited to demonstrating that there is no conclusive reason on the other side'. Such a depreciation of belief took place as the seventeenth century drew to a close, and as a result the relationship between Christian orthodoxy and reason began to cool. 'Philosophy, hitherto in alliance with Christianity, began to show indications of a possible divorce', he writes. It was found that philosophy could support heterodox systems, such as deism, as well as orthodoxy. At first, all the resources were on the side of orthodoxy, with the most intelligent and powerful men giving withering lectures and penning 'very Goliaths among books' against the 'shriveled little octavos' of the deists. What is more, the unorthodox were still legally disadvantaged in England and Scotland, ineligible for public office and occasionally susceptible to imprisonment or even hanging. Nonetheless, the seeds were there: Herbert of Cherbury and later Spinoza (with yet 'greater boldness or perspicuity') had developed systems of natural religion independent of specifically Christian doctrine. Eventually, out of this uneven battle arose 'the profoundest as well as the clearest of English philosophers of the century', David Hume.⁵

Characteristically, rather than merely narrating Hume's triumph, Stephen explains how his 1777 *Dialogues Concerning Natural Religion* exploded the ontological, cosmological and physico-theological arguments of the orthodox natural theologians. Hume made short work of the ontological and cosmological arguments represented by his disputant Demea as absurd. He then attacked

more thoughtfully the physico-theological argument of Cleanthes, modelled on the latitudinarian John Wilkins,⁶ at the level of its assumed analogy between the creator of a universe and the human designer of a watch or a building. Hume's sceptic, Philo, argues that the only kind of creator whose existence can rest on such an argument is a creator very like a human, 'finite in power and imperfect in skill';⁷ a perfect, universal creator cannot by definition be explicable in human terms – as the realist Demea also insists. And in any case, Philo and Stephen add, the present world argues an imperfect creator or 'any number of creators' more than a perfectly beneficent and powerful one. In the end, Stephen says, the most Hume's physico-theological disputant can claim is that the world is not incompatible with the God of Christianity. He cannot prove that such a deity exists; much less can he prove that that deity cares for and exercises moral rule over the world.⁸

Thus, in Stephen's account, the first physico-theologians aspired too high. But their fault was limited to a lack of perspicuity and perhaps hubris; as the eighteenth century wore on, he writes, attempts to formulate philosophical theology came to constitute 'a huge development of hypocrisy, of sham beliefs'. Stephen concludes that continued shadow-boxing with self-deluding divines is 'the price which we have had to pay for our not daring to meet the doubts openly expressed by Hume, and by Hume alone.'⁹ Once it was clear that physico-theology could do nothing, or very little, for Christian orthodoxy, the project ought to have been put to rest. Those who continued to believe would have to do so without reason behind them.

So runs Stephen's narrative of the development and demise of physico-theology. It is an important narrative to have in mind for three reasons: first, as mentioned earlier, this narrative still governs our understanding of natural theology's role in English intellectual history because none equally thorough has succeeded it. Second, much of what he says still squares with the facts: it is clear that Protestant England lays a peculiar claim to the development of the physico-theology in the seventeenth century. It is clear, too, that certain works of physico-theology mentioned by Stephen – such as John Tillotson's and Samuel Clarke's – were susceptible to the critique later levelled by Hume, a critique Stephen summarizes ably. Third, however, it is important to recognize the rhetorical and interested nature of his history:¹⁰ as this book will show, close examination of natural theology written in England in the latter half of the seventeenth century complicates this account of early ambition leading to later unease and defensiveness, and ultimately, defeat at the hands of Hume.

Since the time of Draper and Stephen, historians have contested the assumption of a necessary conflict or divorce between science and revealed religion, as well as the assumption that the trouble – whatever it was – began in the seventeenth century.¹¹ While the myth persists in popular culture and many academic disciplines,¹² much recent scholarship has shown that our categories 'science'

and ‘religion’ were only beginning to develop during the early modern period (a situation necessitating a section on definitions below), making discussion of conflict anachronistic.¹³ Nonetheless, there remains a story of ‘secularization’ in the West, and physico-theology continues to be cast as one of its symptoms or causes. In his magisterial 2007 *A Secular Age*, Charles Taylor argues for a ‘modern secularity’, which he says arose

with the rise of a society in which for the first time in history a purely self-sufficient humanism came to be a widely available option. I mean by this a humanism accepting no final goals beyond human flourishing, nor any allegiance to anything else beyond this flourishing. Of no previous society was this true.¹⁴

Like Stephen, Taylor sees deism as the turning-point in the drama: the late seventeenth and eighteenth centuries, he argues, saw an ‘anthropocentric shift’ in our understanding of the world as designed by God, an increased emphasis on impersonal order, and a new drive to uncover a pure natural religion. It was this ‘Providential Deism’, Taylor argues, that ‘made exclusive humanism a live option for large numbers of people.’¹⁵

Taylor does not agree that reason *per se* drove revealed religion out of the ring: while developments in science challenged some beliefs that had come to be held as religious (such as Ptolemaic astronomy and scholastic method), the rise of observational sciences alone does not explain the reduction of religious belief to a system of moral conduct. Nonetheless, in narrating the philosophical–theological trends of the late seventeenth and eighteenth centuries, he highlights largely the same points as Stephen: attempts by John Tillotson and Samuel Clarke to render Christianity the only rational choice, statements of bravado by Anglican divines about the complete harmony between their beliefs and the ‘light of reason’; their ignorance of the ways in which their own arguments would be used against them.¹⁶ Also like Stephen, Taylor sees England as ripe for these developments because their recently lived experience of the cost of sectarianism inclined them towards peace and tolerance. This inclination, combined with the anthropocentric teleology and bracketing of evil put in their starkest form in John Toland’s *Christianity Not Mysterious* (1696) and Matthew Tindal’s *Christianity as Old as Creation* (1730), led to a reduction in the ‘role and place of the transcendent’ in English thought.¹⁷

Another recent account of the demise of the transcendent is found in Brad Gregory’s *The Unintended Reformation* (2012). Tracing the ways in which the developments of the Reformation led to the secularization of society – by now a familiar story – Gregory considers in his first chapter the process by which many came to believe that scientific ‘explanations for natural phenomena undermine the central claims of revealed religion.’¹⁸ Like Taylor (and Max Weber before him) Gregory sees this process as one of gradual disenchantment. Following

Amos Funkenstein, Gregory locates the intellectual bases for this disenchantment in medieval metaphysics: the scholastics lost an older conception of God as transcendent, ‘altogether other’ and ‘radically distinct’ from the natural world, he explains, and began to talk of God as ‘some *thing*, some discrete, real entity, an *ens*’. By this means they opened ‘a path that would lead through deism to Weberian disenchantment and modern atheism.’¹⁹ One stop on this path was Ockham’s teaching that explanations should not be multiplied; another was the denial of divine immanence implicit in Protestant attacks on the doctrine of transubstantiation. Under these conditions, Gregory says, if the natural world could be adequately explained without appeal to the divine, there seemed to be no more place for the ‘active, ever-present, biblical God of Christianity, nor a reason to refer to him except perhaps as an extraordinarily remote, first efficient cause.’²⁰ The rise of secularity in the centuries following these conceptual changes simply developed a trajectory already in place.²¹

Taken together, these sweeping intellectual histories complement rather than challenge Stephen’s narrative of natural theology as contributing to the rise of secularism. Gregory’s account shares with Taylor’s a sense of flattening of theological categories, the setting up of conditions under which the contest described by Stephen could be waged in the first place. Like Taylor, Gregory leaves Stephen’s account of the contest itself more or less intact. Passing over the latter half of the seventeenth century, he alights on Hume as the major contributor to the “great debate on miracles” in early eighteenth-century Britain’ and spends a few pages showing how Hume’s philosophy cannot legitimately support metaphysical naturalism – nor can any empirically based system.²² In terms of the story of natural theology, an important conclusion follows from this logic: the attempt on the part of English divines to support Christian orthodoxy from reason and observation of the natural world was equally fallacious. In these two accounts of secularization, then, one sees a general pushing back against Stephen’s account of a philosophical triumph of reason over faith, at the expense of natural theology. Adding weight to this view is Gregory’s invocation of Karl Barth, who repudiated natural theology as assuming that God is not ‘entirely other’: Gregory seems to suggest that a fallacy may be inherent in the practice of natural theology generally.²³ On this point, perhaps, Hume was right.

What is Natural Theology?

The preceding discussion assumed general agreement on the nature of ‘natural theology’, at least in England in the seventeenth and eighteenth centuries. But already in the accounts of Stephen, Taylor and Gregory there are subtle differences: Taylor acknowledges, for example, that any discussion of the relationship between ‘reason’ and ‘faith’ in this period is complicated by the fact that some

authors took intuition to be part of 'reason' while others did not.²⁴ As was the case then, there are very different understandings of 'natural theology' at play in contemporary scholarship, and this confusion has often made it difficult to assess natural theology's role in the broader history of thought. After outlining the most significant of these fault lines, I will touch on the understanding of natural theology that operates in this book.

One perplexing phenomenon arising in historiography on natural theology is a difference of scholarly opinion regarding how long natural theology has been around, and whether it still is. Consider the following summary by Alister McGrath:

It is clear that natural theology – as this notion would now be understood – is a recent invention, and is to be seen as a response to upheavals in the intellectual world in England during the seventeenth and eighteenth centuries ... it is clear that these ideas were taken up with enthusiasm throughout Europe as a new means of defending the intellectual coherence of the Christian faith at a time when many perceived it to be under attack.²⁵

Perhaps this historical phenomenon, arising fairly recently as a defensive response to certain intellectual upheavals, ran its course and died, whether by its inherent flaws or simply by the march of history. After all, critics more recent and less polemical than Leslie Stephen have agreed that the battle is over.²⁶ But many, including McGrath himself and physicist-turned-priest John Polkinghorne, believe that natural theology is alive and well and enjoying a 'third period of intense activity', the first two of which were exemplified in Anselm and Paley.²⁷ In this view, natural theology is not a 'recent invention', but a longer tradition going back through Aquinas, Anselm and St Paul, perhaps even to the biblical Psalmist. Not surprisingly, these different understandings of natural theology's longevity arise from different conceptions of what constitutes 'natural theology': with his parenthetical qualification, McGrath suggests that people in other times and other places might have understood natural theology more broadly. Indeed, in order to construe natural theology as newly invented and short-lived, one must make at least one of two limiting assumptions.

The first of these concerns modes of reasoning and is evident in McGrath's conscious use of 'natural theology' to refer to what was once called 'physico-theology'. Above I quoted from works by Henry More and John Ray on the viability of empirical observation as a means of learning, and particularly of learning about God's existence and providence. As mentioned, in the wake of the educational reforms instigated by Francis Bacon and others, natural theologians began to reason more empirically from observation of design in the natural world and less by logical deduction, either from a metaphysical realm of ideas or to a first cause. Thus the lines of reasoning known as the 'ontological' and 'cosmological' arguments for God's existence fell out of favour, to be replaced by a modified version of the 'tele-

ological' argument known as physico-theology. As it is understood today, natural theology not only incorporates the physical world – the old system of signs and signatures had done that – it argues for God's existence, power and wisdom based on observation of a degree of fittedness of natural things to their (more or less anthropocentric) purposes that cannot be explained by chance or determinism. It is true that arguments for God's existence are now often limited to this type – and clearly, the works of Anselm and Aquinas do not pass by this definition.

The second limiting assumption runs deeper and concerns the epistemological framework for natural theology. It is succinctly put in John Polkinghorne's answer to the question 'Where is natural theology today?' in a lecture delivered in 2006. 'Alive and well', Polkinghorne declares, 'having learned from past experience to lay claim to insight rather than to coercive logical necessity'.²⁸ In this view, it is natural theology that 'lays claim to coercive logical necessity' that was demolished by Hume and then again by the theory of natural selection; a natural theology that lays claim only to insight might survive both of these attacks – as Polkinghorne insists that it has. The distinction here is a question of initial assumptions: must natural theology begin, as in William P. Alston's widely accepted definition, 'from premises that neither are nor presuppose religious belief'?²⁹ If no argumentation that presupposes religious belief qualifies as natural theology and if, as Peter Harrison has argued, even Aquinas at his most rational was not free from religious belief in the way empirical scientists would be, then natural theology did not exist before the early modern period.³⁰ Constituted by those arguments, made in the late seventeenth and eighteenth centuries, which set out to prove the Christian religion once and for all, it aimed to put to rest all objections without appealing to any authority beyond common reason. Such arguments were roundly rebutted, as Stephen explained long ago, and they are now of only archaeological interest.

In light of the damning consequences of this latter assumption, it is small wonder that scholars have pushed back against definitions of natural theology that bracket all appeal to authority.³¹ Polkinghorne is one example. Alister McGrath, too, having given the popular view, nonetheless includes Anselm and Aquinas among the number of natural theologians, taking Alston's restrictive definition as a 'starting point' for discussion rather than the final word.³² Many philosophers of religion have likewise argued that natural theology is possible within confessional bounds – and have claimed to be practising it.³³ And finally, another work of rehabilitation is found in the new *Oxford Handbook of Natural Theology* (2013), whose introduction forthrightly lists among its goals to put to rest 'a widely accepted and deeply ingrained standard narrative of the rise and fall of natural theology', adding that 'the "natural" versus "revealed" characterization of natural theology is frequently hard to sustain and serves only to obscure or distort the real concerns and issues at the heart of natural theological thinking'.³⁴

In that volume, historians trace natural theology through the patristic, medieval, early modern and modern periods, and philosophers outline the major natural theological conversations now in process. Because of its collaborative nature, the editor chooses to allow contributors to understand ‘natural theology’ in the way most responsible to the demands of their various projects. The end of all this scholarship is a mounting sense of the inadequacy of Alston’s definition.

As is illustrated by the *Oxford Handbook*, however, once this misleading definition has been discarded, the question of what natural theology is returns in force. One way of dealing with this problem is consciously to define natural theology specifically to the context, without making sweeping transhistorical claims about its nature. This approach is especially suited to philosophical treatments of natural theology, and to historical contexts in which one definition was held in common by its practitioners. It is difficult to approach seventeenth-century natural theology in this way, however, because it was during this period that natural theology began to be practised in the methodologically and epistemologically limited ways described above. At the same time, the more broadly conceived type did not disappear and (as this book will show) there was a lack of authorial consensus regarding both how natural theology was best conducted and what it was meant to achieve. The few existing articles on seventeenth-century natural theology face up to this heterogeneity of content and purpose and help to make sense of the wide variety of natural theologies written during the period by dividing them into categories based on these differing contents and aims.³⁵ The present study is indebted to those taxonomies but takes a different approach: being guided by the question *how well does late seventeenth-century natural theology fit into our received metanarrative?* I resist categorization as much as possible in an effort to let the texts stand on their own.

In speaking of ‘natural theologies’ rather than ‘natural theology’ in the following chapters, then, I hope to avoid presenting a skewed picture of the structure, content and aims of late seventeenth-century works described by their authors as natural theology.³⁶ At the same time, I am conscious that the authors themselves operated under the assumption that there is such a thing as natural theology and believed much was at stake in how the project was understood. Insofar as they worked to shape (or splinter) natural theology in ways that can still be observed, these works *are* part of a narrative, albeit a more complicated one than that put forth by Leslie Stephen. Ultimately I will draw some conclusions about the two developments I have been discussing: the rise of physico-theology and the marginalization of religious presuppositions. Based on the structure, content and aims of these individual texts, I will ask in closing, does natural theology in this period evince an exclusion of religious presuppositions in the interest of combating atheism rationally – free as other, older types of natural theology may be

from that limiting assumption? Or have these texts been wrongfully implicated in the rise of atheism and to the demise of natural theology itself?

Because each chapter of this book concentrates on a particular work in order to avoid flattening them into categories, here I wish to put those works into their broader historical context. The following history will unfold in two stages: first, I briefly survey the long story of the interaction between ‘revealed’ and ‘natural’ religion in Christian theology, gently questioning the notion that there was no exclusively ‘natural’ theology prior to the early modern period; and second, I consider the decades leading up to the period under study, during which Francis Bacon and others took part in reforms sometimes collectively called the Scientific Revolution, with evident implications for natural theology. Through this contextualizing, I hope to enable readers to approach the conversation among natural theologians in the latter half of the seventeenth century with a sense of how it sounded to those taking part in it.

A Brief History of Rational Christianity

Before asking whether it was possible to conduct science without prior reference to theology, it is necessary to ask what such a claim would look like in an intellectual context in which the territory held by ‘science’ and that held by ‘religion’ was demarcated differently. Only then can we see to what extent the intellectual plot ‘free from religious presuppositions’ went undiscovered until the early modern period. While accounts of secularization hold at one level, I suggest here that at another level it was always possible to conduct theology without ‘religious presuppositions’.

A good place to start tracing the historical Christian distinction between revealed and natural knowledge is with St Paul, the first rational theologian in the Christian tradition. The Judaism from which Paul converted to Christianity already held human wisdom in tension with, and subservient to, the divine word,³⁷ and Paul looks back to Isaiah even as he proclaims the now complete expression of that word in Christ:

For since, in the wisdom of God, the world did not know (*egno*) God through wisdom, it pleased God through the folly of what we preach to save those who believe (*pisteuontas*). For Jews demand signs and Greeks seek wisdom, but we preach Christ crucified, a stumbling block to Jews and folly to Gentiles, but to those who are called, both Jews and Greeks, Christ the power of God and the wisdom of God.³⁸

Here Paul addresses the question at the heart of natural theology, of how God’s wisdom and power may be apprehended by human beings. The key distinction in this passage is not between reasoning from religious presuppositions and reasoning in a vacuum, however, but between ‘believing’ and ‘knowing’: Greeks and Jews try fondly to ‘know’ God through wisdom and signs, while those who ‘believe’ are saved. Far from merely holding an opinion (as ‘believe’ is often now

understood) *pisteuo* denotes the simple acceptance of knowledge and is the appropriate response to revelation. What is apprehended by *gignosko*, then, is everything else, and Paul claims later in the letter that this knowledge (*gnosis*) will pass away.³⁹ *Gnosis*, therefore, belongs to the ‘secular’ world in the literal sense that they exist in time. Here Paul divides *gnosis* into two types: knowledge gained from miraculous signs, and that gained by ‘wisdom’, including the kind of philosophy he encountered at the Areopagus in Acts 17.

Paul’s claim in the preceding passage would naturally have far-reaching consequences for natural theology. Far from embodying or even permitting the practice of an exclusive natural theology, he instead declares that ‘religious presuppositions’ are absolutely prerequisite for worthwhile conversation.⁴⁰ Further, in Paul’s view one might make religious presuppositions, but unless they are uniquely Christian presuppositions, one will not arrive at the necessary truth about God’s power and wisdom. This puts in a different light the secularization narratives outlined above: in one strand of Christian theology, at least, the ‘secular’ worldview contained everything outside orthodox Christianity and was popular long before the modern era. This is not the type of secularity that most concerns Charles Taylor and Brad Gregory and others in showing that there is something new under the sun;⁴¹ it was, however, the type that concerned authors of natural theology during western Christendom – and it was still a major concern for authors of natural theology in seventeenth-century England.⁴² Regarding the critical line between ‘natural’ and ‘revealed’, then, pre-modern theologians seem more concerned with mode of reception than with presuppositions, seeing ‘natural’ knowledge as the kind comprehended through reason and ‘revealed’ as the kind simply received as truth.

Although it may seem ironic given his insistence on its relative worthlessness, St Paul’s writings served as the backbone of natural theology for many centuries.⁴³ In acknowledging the existence of secular means of knowing, he raised the question of their purpose; it was Paul, moreover, who alleged in Romans 1:20 that God’s qualities could be seen in creation, and who used Greek learning to reason with the philosophers at the Areopagus. Sixteen hundred years later, it was Paul to whom Richard Bentley would appeal in framing his inaugural Boyle Lectures.⁴⁴ Paul, the apostle to the Gentiles, had shown that secular knowledge could be a powerful tool in the service of the Christian faith. The question for patristic and medieval theologians was to what extent they could use that tool, and when revelation must take over.

A variety of answers to this question were possible, and some of them ventured into the territory of exclusively natural theology, in the broad Pauline sense. Typically Reason, figured by Abraham’s slave Hagar, was thought to have a measure of blessing but to be subservient to Faith, represented by Abraham’s wife Sarah, through whose line the full revelation of God would come in the

incarnate Christ.⁴⁵ The theological heavyweights Augustine and Jerome both held this view, making allegorical use of Levitical law surrounding the sanctification of gentile property: just as pagan women and spoils could be cleansed and brought into the nation of Israel, they explained, so could pagan writings be pillaged for wisdom worthy to draw humans towards better knowledge of God.⁴⁶ All the while, both insisted that secular learning is of very limited use and is dwarfed by the truth available in scripture.⁴⁷ But others were more accommodating. There remained, even at the height of Christendom, a great incentive for widening the reach of secular wisdom beyond Pauline bounds: the plight of the virtuous pagan. Contrary to Leslie Stephen's assertion that in the Middle Ages 'Christendom was regarded as approximately identical with the universe', thoughtful Christians were aware of people without access to the revealed truth in Christ for reasons that seemed beyond their control.⁴⁸ Nor did the fact that most outsiders held generally theistic or religious views necessarily ease these concerns.⁴⁹ What might reason do for them?

In answering this dangerous question, too, Paul's writings provided help: the apostle had explained the operations of the Gentile conscience in the first chapters of Romans, linking right reason with right behaviour and opening a path for subsequent generations of Christian theologians to imagine a potentially salvific pagan philosophy.⁵⁰ 'Imagine' is the appropriate word, for while medieval theologians frequently spent themselves on the question of how far pagan philosophy might reach towards theological truth, it was in the imaginative literature surrounding the virtuous pagan that an exclusive natural theology can be most clearly seen in medieval thought.⁵¹ These narratives took two forms: either the virtuous pagan is given miraculous access to Christ's saving power after death,⁵² or – as in the case of the emperor Trajan in Dante's *Paradiso* – the person's virtue somehow simply carries him or her into the company of the blessed, most of whom got there by the more usual means of revelation. Cited in defence of this more daring formulation were Old Testament examples of Gentile faith, such as Enoch and the Queen of Sheba. Both types of narrative, however, presume that the pagan is 'virtuous' in the first place, a judgement necessitating a high estimation of the potential of natural knowledge. In the strict Pauline view, 'virtuous pagan' is an oxymoron.

To say that imaginative literature gave the most ground to natural theology in the medieval period is not to say that these stories had no theoretical backdrop. There were, firstly, the 'heretical' strains of thought against which Augustine and others arrayed themselves: Pelagians, Manicheans and Gnostics, schools that in one way or another asserted human reason and will over (and, in consequence, against) revelation.⁵³ Further, although over the course of his life he became increasingly suspicious of natural theology, Augustine himself brought the term *theologi naturae* into the Christian tradition in his *De Civitate Dei*, taking up a

threefold distinction of theology inherited from Cicero through Varro (116–27 BC); while better than popular or civic theology, Augustine explains, natural theology is nonetheless insufficient and finally indistinguishable from the others when viewed next to revealed theology.⁵⁴ And other major theologians gave reason a more prominent place in their theology: over the centuries Justin Martyr, Clement of Alexandria, Origen, Anselm of Canterbury, Peter Abelard and Thomas Aquinas ascribed great efficacy to human reason. These authors were steeped in Greek philosophy and could not but applaud the nearness to Christian truth that such philosophy, whether Plato's or Aristotle's, sometimes attained. Such rational Christians held, first, that a rational faith exceeds a simple faith, making reason an enrichment for the Christian, and second – from Clement of Alexandria's time onwards – some also held that one might assent to a theological doctrine *as a result of* rational demonstration.⁵⁵ If the more conservative theologians held, *Salus extra Ecclesiam non est*, a more inclusive school wished to widen the territory held by the *Ecclesia*, insisting on salvation for 'Socrates' on grounds that emphasized his worldly wisdom,⁵⁶ even if such a soteriology required theorizing that the gospel must have reached down to hell. Reasoning that Christ's sacrifice worked to prevent people from being unjustly condemned, both Clement and his student Origen concluded that both pre-incarnation Jews and virtuous pagans would hear the gospel in hell: the Jews, from the mouth of Christ himself; the pagans, perhaps from the apostles.⁵⁷ Whatever the eventual means of these pagans' salvation, their employment of reason was instrumental and in some measure made up for the deficiency in revelation.⁵⁸

In the literature surrounding the virtuous pagan, then, one finds medieval minds actively engaging the question of how far one might go without the benefit of revelation. Paradoxically, as a number of scholars have commented, they do not go very far themselves, in their natural theological arguments.⁵⁹ Anselm and Aquinas developed their famous arguments for God's existence within the bounds of Christian orthodoxy, and subsequent generations saw various modifications of their arguments but no major stepping outside of those bounds.⁶⁰ Nonetheless, in making these arguments, they gave flesh to the natural theological wisdom to whose existence Paul had attested. In considering the fate of those without revelation, some would suggest that this wisdom was available not only for the edification of the Christian, but perhaps also for the pagan who should have need of it. In the early modern period, these two threads would be brought together, and natural theology would begin to address itself to the reasonable pagan.

Natural Theology in the Scientific Revolution

Ergo vivida vis animi pervicit et extra
 Processit longe flammantia moenia mundi
 Atque omne immensum peragravit mente animoque
 Unde refert nobis victor quid possit oriri,
 Quid nequeat, finite potestas denique cuique
 Qua nam sit ratione atque alte terminus haerens.

Lucretius, *De Rerum Natura*⁶¹

In 1605, Francis Bacon published his *Of the Proficiency and Advancement of Learning, Divine and Human*. As its title suggests, in that famous tract he comments on the relationship between theology and reason, consequently staking out the proper province of natural theology. While the enterprise would likely have carried on with or without Francis Bacon, and while Bacon himself would rather it had not, many of the changes natural theology underwent in England in the seventeenth century reflect his vision for the reorganization of the ‘divine and human’ sciences. It is therefore with Bacon that we begin our consideration of the progress of natural theology in the seventeenth century. His vision in place, I will then gather under a few headings the conclusions of recent historiography regarding what exactly constituted the Scientific Revolution, highlighting the points of dispute that most concerned natural theologians at the time.

Bacon’s *Advancement* set out to make two major revisions to the old understanding of the relationship between human and divine learning. The first was to elevate Reason from her ancillary role; the second, to limit aggressively the plot of human learning belonging to natural theology. Taken together, these two changes might relegate theology to the realm of the ineffable – a result that was not unwelcome in some religious circles – or they might eclipse theology altogether. The first revision, the elevation of reason, Bacon puts forward in making the larger point that natural as well as theological knowledge may contribute to ‘the use and benefite of man’. Bacon declares:

Neither is my meaning ... to leave natural Philosophy aside, & to apply knowledge onely to manners, and policie. But ... that knowledge may not bee as a Curtezian for pleasure & vanitie only, or as a bond-woman to acquire and gaine to her Masters use, but as a Spouse, for generation, fruit, and comfort.⁶²

Bacon does not explicitly place knowledge above faith in this passage; instead, he subtly eclipses the old ‘Sarah’, leaving open the question of her role in the new order. Elsewhere he insists that divine things are higher than human, suggesting that the new arrangement might be one of Petrarchan devotion to religious faith and wedded consummation with natural philosophy. In any case, however, the

elevation of reason here jars with the spirit of the Augustinian view, and readers with a medieval sensibility would find the assertion startling.⁶³

Having asserted that the knowledge reason produces may be useful even if it is not divine, Bacon addresses the question of how, and how well, she may attain to divine things at all. At first he lists natural theology, or 'divine philosophy', as one of the three categories of philosophy, in turn one of the three parts of knowledge along with history and poesy. He takes care to separate divine philosophy from the human sciences, on account 'of the extreame prejudice, which both Religion and Philosophie hath received, and may receive by beeing commixed together; as that which undoubtedly will make an Hereticall Religion; and an Imaginarie and fabulous Philosophie'.⁶⁴ That pious boundary-stone in place, Bacon makes three general observations about natural theology: first, it is of limited use; second, these limits have already been reached; and third, those practising it run the risk of impertinence. 'Touching Divine Philosophie', he writes, 'I am so farre from noting any deficiencie, as I rather note an excesse' and calls for studious men to devote their time and energy to natural history and philosophy instead. In so doing, they might also avoid a danger of hubris: 'Men and Gods were not able to draw Jupiter down to the Earth, but contrariwise, Jupiter was able to draw them up to Heaven', Bacon reasons, 'so as wee ought not to attempt to drawe downe or submitte the Mysteries of GOD to our Reason; but contrarywise, to raise and advance our reason to the Divine Truth'.⁶⁵ Bacon's gloss on Homer here echoes his title and provides a window into his larger project in the *Advancement*: humans are not meant to comprehend abstract metaphysical truths – to 'draw Jupiter down', as it were – but to raise ourselves to a vantage point from which we can observe nature as God does, advancing our reason to the 'divine truth' of what things are and how they work.

Bacon not only constrains natural theology from without; he also carefully defines it from within. Ironically, though his object is to persuade his fellow Englishmen that the project so delineated has already been 'excellently handled by diverse', in explaining what natural theology is, he inadvertently sets the stage for the proliferation of physico-theology later in the century. 'Divine philosophy', he writes, is 'that knowledge or Rudiment of knowledge concerning GOD, which may be obtained by the contemplation of his Creatures which knowledge may bee truely tearmed Divine, in respect of the obiect; and Naturall in respect of the Light'. Already in limiting the method to contemplation of creatures, Bacon excludes the old ontological argument; he then limits natural theology yet further as he explains its method and purpose:

The boundes of this knowledge are, that it sufficeth to convince Atheisme; but not to informe Religion: And therefore there was never Miracle wrought by God to conuert an Atheist, by cause the light of Nature might have ledde him to confesse a God: But Miracles have benee wrought to convert Idolaters, and the superstitious, because no

light of Nature extendeth to declare the will and true worship of God. For as all works do shewe forth the power and skill of the workeman, and not his Image: So it is of the works of God; which doe shew the Omnipotencie and wisdom of the Maker, but not his Image: And therefore therein the Heathen opinion differeth from the Sacred truth: For they supposed the world to bee the Image of God, & Man to be an extract or compendious Image of the world: But the Scriptures never vouch-safe to attribute to the world that honour as to bee the Image of God: But onely The worke of his hands, Neither do they speake of any other Image of God, but Man: wherfore by the contemplation of Nature, to induce and inforce the acknowledgement of God, and to demonstrate his power, providence, and goodnesse, is an excellent argument, and hath bene excellently handled by diverse.⁶⁶

In this crucial passage, a number of old views are called into question and a new path for natural theology is mapped out. Voicing a thought he would repeat in the 1625 edition of his *Essays*, Bacon explains that observation of the workings of the natural world will convince the atheist that the world has a creator.⁶⁷ Those who already believe in a creator, on the other hand, must be converted by other means such as miracles – the other means, we may note, that Paul had classed as natural knowledge and ineffectual for salvation. Subsequent natural theologians would appeal to both means, sometimes arguing for God's existence and providence from the lawful operation of the natural world and sometimes from wondrous phenomena.⁶⁸ For if, as Bacon declared, God's image was not imprinted directly on the world and was instead to be found in the human activity of contemplating nature, it seemed to many that natural theology had surely *not* been 'excellently handled,' with so much existing work relying on signs and signatures in plants and animals, a neoplatonic Christian practice which Bacon bitingly conflates with 'Heathen opinion.'

While some of Bacon's successors would thus use his comments to further natural theology's progress, others would follow their spirit more faithfully. In the view that natural theology had overleapt its bounds (a view reflected in Bacon's preferred term, 'divine philosophy' – for what right has this human science to call itself 'theology?') Bacon would be followed by educational and ecclesiastical reformers who wished to see an end to the old scholastic curriculum in British universities. Notable among these was John Webster, who argued enthusiastically in his 1653 *Academiarum Examen* for a curriculum of experimental philosophy, chemistry, astronomy and natural history. Webster spurned natural theology in particular, quoting Bacon on its uselessness 'to assert or build up Religion.'⁶⁹ Meanwhile, as the universities responded to these pressures, in London a group of experimentally minded men formed the Royal Society for Improving Natural Knowledge in 1660. The group was loosely inspired by the collaborative vision found in Bacon's *New Atlantis*, and in its early years it saw lively debate on the topic of whether metaphysical matters landed within its purview. In the end, however, final causes were excluded.⁷⁰ In emphasizing the arrogance of

approaching the divine by means of reason, these reforms in natural philosophy were in harmony with a reformed theology that reacted against the *quod in se est* thinking of Aquinas: human reason is too corrupt to approach salvific truth, they said; these things must simply be believed.⁷¹ The mental energy freed in the process could then be redirected towards pursuing a more thorough understanding of the natural world, which was the appropriate way for humans to demonstrate their creation in God's image. In pursuing such understanding, many reformers also hoped to restore humankind to their unfallen state, a state which some believed was characterized not only by innocence, but also by a remarkable knowledge of natural philosophy demonstrated in Adam's naming of the animals.⁷²

Broadly speaking, then, the new direction in which natural philosophy was being taken in the seventeenth century could occasion two extreme views of natural theology: that it was useless and arrogant, with knowledge of God only available by revelation, or that a new natural theology was needed to accommodate the new science. Various positions along the intervening spectrum developed slowly, as more conservative views remained in circulation throughout the century. A sermon given in 1679 by the high-church clergyman Robert South, for example, retains the conventional notion of correspondence but de-emphasizes the resemblance between God and the natural world, asserting that God's image is much clearer in man, while 'in other Creatures we have but the trace of his foot-steps.'⁷³ Besides footstep-tracing, South sanctions the study of the natural world in itself, commenting on Adam's ability to write 'the Nature of things upon their Names: he could view Essences in themselves, and read Forms with the comment of their respective Properties; he could see Consequents yet dormant in their principles, and effects yet unborn in the Womb of their Causes.'⁷⁴ Having begun conventionally, the sermon comes to rest on a point that sounds Baconian in its enthusiasm for mastery of nature and bracketing of theological ends.

This redirection of natural knowledge towards worldly rather than divine objects forms one of the defining features of gradual turn in British thought collectively referred to as the Scientific Revolution. Like the story of science and religion, the story of the scientific revolution has been told and revised down the decades.⁷⁵ Although the story is complicated, recent scholarship continues to discern some broad-scale changes. Here are three of the most clear, which in turn help explain the transmutation of the ontological and cosmological arguments in the latter half of the century:

1. *The Mechanization of the Cosmos*. Before the modern period, natural phenomena were largely described as self-moving, vital and organic; after Descartes, however, philosophers and lay people came increasingly to use mechanical language to describe the world.⁷⁶ In Descartes's dualistic view, matter is passive and moved by a wholly other, active spirit. Descartes did not conceive of matter as particulate, but his mechanistic

philosophy was amenable to the ‘corpuscular hypothesis’, which came from Epicurean philosophy and enjoyed great popularity in the seventeenth century because of adaptations such as those of Pierre Gassendi (Latin) and Walter Charleton and Thomas Hobbes (English) and was eventually confirmed empirically by Robert Boyle.

2. *Anthropocentric Teleology*. Contrary to some accounts of the pre-Copernican view, the medieval cosmos was, to use C. S. Lewis’s coinage, ‘anthropoperipheral.’⁷⁷ In the seventeenth century, partly because of the Baconian arguments outlined here, natural philosophers began to be motivated by the search for the *purposes* of things rather than their referential meaning.⁷⁸ While some insisted that these purposes might be for lower creatures or extraterrestrials, or exclusively for God, the vast majority of natural purposes uncovered by this method conduce to human existence and flourishing. It has been suggested that this anthropocentric teleology is as much responsible for the rise of empirical methods as it is a result of those methods.⁷⁹
3. *Probability and Certainty*. Many accounts of the Scientific Revolution describe a shift, not only in how humans gain knowledge, but in how they think they *can* gain knowledge,⁸⁰ with sensory data gaining an epistemological authority that had previously rested with authoritative texts (including the referential ‘text’ constituted by the natural world in Augustinian semiotics) or in deductive reason. In contrast with Cartesian metaphysics – itself a departure from older notions of certainty – the empirical worldview assumes a degree of fidelity to observed fact that precludes claims to rational certainty, and natural philosophers began to emphasize a persuasive probability for their theories.⁸¹

These changes did not take place in an instant, but as the ideas of Descartes and Bacon and others began to take hold of the English imagination, the old arguments for faith underwent a dramatic renovation. The ontological line of reasoning formulated by Anselm, who followed Plato in starting in the realm of eternal ideas, would become in the wake of Descartes’s mechanization of the cosmos the rational Christianity of the mid-century Cambridge Platonists. Its old antithesis, the evidence-based arguments of Aristotle, brought into the service of Christianity by Aquinas, would in the wake of Bacon give rise to physico-theology, the new branch of natural theology whose beginning is related in this book.

Selection Principles

We have now arrived at the plot of intellectual history explored in the following chapters: the rise of physico-theology in the latter half of the seventeenth century in England. The latter half of the seventeenth century is often passed over in

broad-brush historiography of natural theology, and especially in the secularization narratives I have mentioned. Both Taylor and Gregory see the development of deism as a result of the shifts in metaphysics in the twelfth through fourteenth centuries and move quickly through the years between those shifts and the ‘wars of controversy’ of the eighteenth century, when the trouble seems to have surfaced. Stephen, too, though focused on the seventeenth and eighteenth centuries in particular, has little to say about physico-theology written before the 1690s, omitting to mention More’s influential *An Antidote against Atheism* (1653) and Wilkins’s popular *Of the Principles and Duties of Natural Religion* (1675). To Ray’s *The Wisdom of God Manifested in the Works of Creation* (1691), perhaps the most influential work of physico-theology ever written, he gives two lines in a footnote. As representing the Cambridge Platonists, Stephen chooses Ralph Cudworth, whose *True Intellectual System* (finally published in 1678) is perhaps the thoroughly rationalistic of all the Cambridge Platonists. After treating the (largely undifferentiated) ‘Cambridge Platonists’, Stephen passes on to John Tillotson, John Locke, Samuel Clarke, William Derham, Richard Bentley and deists such as Matthew Tindal, John Toland and William Whiston. Interestingly, one selection principle operating here seems to be a preference for the later, Newtonian brand of physico-theology that emphasizes natural law and claims a greater degree of mathematical certainty than do other works. More generally, selection is made of the most philosophically tight and compulsive arguments – perhaps in the interest of fair play – arguments that consequently illustrate most clearly the trajectory towards deism and exclusive naturalism. Another result of this selectivity on the part of Stephen, Taylor and Gregory is the impression that natural theology became interesting from a historical perspective only in the last decade of the seventeenth century.

Within those decades, we will read closely five works of natural theology. In choosing particular texts, too, one important aim is to give voice to any natural theological ‘minority reports’ that have previously gone unnoticed. Naturally, those who focus more narrowly on the story of natural theology make clear that physico-theology was developed before the 1690s, in More’s *An Antidote*. (The paradox by which a Cambridge Platonist came to level the first empirical design argument will be explored in Chapter 1.) Mention is made of Wilkins, Ray and Derham, to whom educational and ecclesiastical reformers would later refer in waging their cause. In this discourse too, though, it is easy for ‘physico-theology’ to become ‘Newtonianism’, passing over the chaotic decades before the ‘golden age’ of physico-theology was symbolically inaugurated in the Boyle Lectures.⁸² Such slippage is one example of the general difficulty of constructing any clear transhistorical narrative about the progress of natural theology: inevitably, the texts (and arguments within texts) that do not fit the story become obscured.

Nonetheless, it is already evident from existing scholarship that there was a thriving industry in natural theology between 1650 and 1700. The question is how exactly these authors spent their intellectual energy in those texts, and to what extent they answer to a story of short-lived ‘spontaneous alliance’ between reason and Christianity leading inevitably to a divorce. The five texts considered in this book were chosen from among dozens of specimens, each with a different perspective on the appropriate method and end of natural theology, some of which were incompatible with each other: God’s image can be seen in the world, God’s image can be seen in human reason, God’s power and wisdom can be seen in the natural world, we best reflect God’s image by turning our intelligent gaze away from divinity and onto the created order – an author might assume each of these in succession, or fight fiercely for one view over others. To give a sense of the number and variety of natural theological arguments waged during this time of revolution, here is a partial list of titles:

Table I.1: Natural Theologies of the Scientific Revolution.

(Works landing outside the years of this study are included for context; relevant works by Bacon, Boyle and Newton are included as points of reference.)

| Author | Title | Date |
|--------------------------------------|--|-------------------|
| Vives, Juan Luis (1493–1540) | <i>De veritate fidei Christianae</i> | 1543 |
| Bacon, Francis (1561–1626) | <i>Essays: ‘Of Atheism’ (The Advancement of Learning)</i> | 1597 |
| Fotherby, Martin (c. 1560–1620) | <i>Atheomastix</i> | 1622 |
| Grotius, Hugo (1583–1645) | <i>De veritate religionis Christianae</i> | tr. 1627 |
| Charleton, Walter (1620–1707) | <i>The Darkness of Atheism Dispelled by the Light of Reason</i> | 1652 |
| Ward, Seth (1617–89) | <i>A Philosophicall Essay towards an Eviction of the Being and Attributes of God</i> | 1652 |
| Culverwel(l), Nathaniel (1619–51) | <i>An Elegant and Learned Discourse of the Light of Nature</i> | 1652 |
| B[oreman], R[obert] (d. 1675) | <i>The Triumph of Learning over Ignorance and of Truth over Falsehood</i> | 1653 |
| More, Henry (1614–87) | <i>An Antidote against Atheism</i> | 1653; 1655 |
| | <i>Enthusiasmus Triumphatus</i> | 1656 |
| | <i>On the Immortality of the Soul</i> | 1659 |
| Stillingfleet, Edward (1635–99) | <i>Origines Sacrae, or A Rational Account of the Grounds of the Christian Religion</i> | 1662 |

| Author | Title | Date |
|-------------------------------------|---|-------------|
| Boyle, Robert (1627–91) | <i>(Some Considerations Touching the Usefulness of Experimental Naturall Philosophy)</i> | 1663 |
| | <i>A Free Enquiry into the Vulgarly Received Notion of Nature</i> | 1686 |
| | <i>A Disquisition about the Final Causes of Natural Things</i> | 1688 |
| Parker, Samuel (1640–88) | <i>Tentamina de Deo</i> | 1665 |
| | <i>A Free and Impartial Censure of Platonick Philosophie</i> | 1666 |
| | <i>An Account of the Nature and Extent of the Divine Dominion and Goodness</i> | 1667 |
| | <i>A Demonstration of the Divine Authority of the Law of Nature and of the Christian Religion</i> | 1681 |
| Wolseley, Charles (1629/30–1714) | <i>The Unreasonableness of Atheism Made Manifest</i> | 1669 |
| | <i>The Reasonableness of Sustained Belief</i> | 1672 |
| Harvey, Gideon (1636/7–1702) | <i>Archelogia philosophica nova, or New Principles of Philosophy</i> | 1663 |
| Tillotson, John (1630–94) | <i>The Wisdom of Being Religious</i> | 1664 |
| (Newton, Isaac [1642–1727]) | <i>(Quaestiones quaedam philosophicae)</i> | c. 1665 |
| Baxter, Richard (1615–91) | <i>The Unreasonableness of Infidelity</i> | 1655 |
| | <i>The Reasons of the Christian Religion</i> | 1667 |
| | <i>More Reasons of the Christian Religion and No Reason Against it</i> | 1672 |
| | <i>Considerations on the Existence of God and the Immor- tality of the Soul</i> | 1676 |
| | <i>The Divinity of the Christian Religion</i> | 1677 |
| | <i>Of the Immortality of Man's Soul</i> | 1691 |
| Tenison, Thomas | <i>The Certainty of the World of Spirits</i> | |
| | <i>The Creed of Mr Hobbes Examind</i> | 1670 |
| Glanvill, Joseph (1636–80) | <i>Scep sis Scientifica</i> | 1665 |
| | <i>A Blow at Modern Sadducism in some Philosophical Considerations about Witchcraft</i> | 1668 |
| | <i>Reason and Religion</i> | 1676 |
| | <i>Saducismus Triumphatus: or, Full and Plain Evidences concerning Witches and Apparitions</i> | 1681 |
| Cumberland, Richard (1631–1718) | <i>De Legibus Naturae</i> | 1672 |
| J. M. | <i>Atheist Silenced</i> | 1672 |
| Barker, Matthew (1619–98) | <i>Natural Theology</i> | 1674 |
| Wilkins, John (1614–72) | <i>A Discourse Concerning the Beauty of Providence</i> | 1649 |
| | <i>Of the Principles and Duties of Natural Religion</i> | 1675 |
| Howe, John (1630– 1705) | <i>Living Temple, against Atheism, or Epicurean Deism</i> | 1675 |
| Bates, William (1625–99) | <i>Considerations of the Existence of God and of the Immor- tality of the Soul</i> | 1676 |

| Author | Title | Date |
|---|---|-------------|
| Cudworth, Ralph (1617–88) | <i>The True Intellectual System of the Universe</i> | 1678 |
| Charnocke, Stephen (1628–80) | <i>Several Discourses upon the Existence and Atributes of God</i> | 1682 |
| Rust, George (c. 1628–70), tr. Henry Hallywell (d. 1703) | <i>Discourse of the Use of Reason in Matters of Religion, Shewing, that Christianity contains Nothing Repugnant to Right Reason; Against Enthusiasts and Deists</i> | 1683 |
| Hale, Matthew (1609–76) | <i>A Discourse of the Knowledge of God, and of our Selves I. by the Light of Nature, II. By the Sacred Scriptures</i> | 1688 |
| Ray, John (1627– 1705) | <i>The Wisdom of God Manifested in the Works of the Creation</i> | 1691 |
| | <i>Three Physico-Theological Discourses</i> | 1693 |
| Bentley, Richard (1662–1742) | <i>The Folly and Unreasonableness of Atheism</i> | 1692 |
| | Second Boyle Lectures [unpublished] | 1694 |
| Ellis, Clement (1633–1700) | <i>The Folly of Atheism, Demonstrated, to the Capacity of the Most Unlearned Reader</i> | 1692 |
| Blount, Thomas Pope (1649–97) | <i>A Natural History containing Many Not Common Observations Extracted out of the Best Modern Writers</i> | 1693 |
| Locke, John (1632– 1704) | <i>The Reasonableness of Christianity</i> | 1695 |
| Edwards, John (1637–1716) | <i>Thoughts on the Causes and Occasions of Atheism</i> | 1695 |
| | <i>A Demonstration of the Existence and Providence of God from the Contemplation of the Visible Structure of the Greater and Lesser World</i> | 1696 |
| Becconsall, Thomas (?–1709) | <i>The Grounds and Foundation of Natural Religion</i> | 1698 |
| B. | <i>Mystery of Atheism, or The Devices to Propagate It</i> | 1699 |
| Grew, Nehemiah (d. 1712) | <i>Cosmologia sacra</i> | 1701 |
| Clarke, Samuel (1675–1729) | <i>A Demonstration of the Being and Attributes of God</i> | 1705 |
| Derham, William (1657–1735) | <i>Astro-theology, or, A Demonstration of the Being and Attributes of God</i> | 1715 |

In one way or another, each of these works ignores Francis Bacon's warning and seeks to underscore the reasonableness of Christianity in a time when the term 'reasonable' was unusually shift. As is evident from their titles, some texts took more offensive stances; others, more defensive; some appealed to natural law, others to natural history; some were written in Latin for educated audiences, others for 'the most unlearned'; some were compendious surveys of existing arguments while others brought in new material; some assumed their theoretical ground while others discussed the use of reason in the service of theology. There is no great gulf between the natural theologians mentioned here – especially later ones – and deists such as Herbert of Cherbury, John Toland and

William Whiston; nor, on the other side, between the more conservative among these works (such as Hale's, Barker's and Baxter's) and those, such as John Owen's 1655 *Diatriba de divina justitia* or Robert Ferguson's 1675 *The Interest of Reason in Religion*, which question natural theology's usefulness in light of the necessity of revelation. Instead, texts that rely exclusively on natural reason shade into those that assume the necessity of revelation. Indeed, an author might give varying degrees of weight to revelation within a single work – John Wilkins's posthumously published *Principles and Duties* is a good example. Some authors (such as Henry More and Richard Bentley) were clearly motivated by a perceived threat of atheism and attempted to construct philosophically airtight arguments. But other natural theologians were less polemical than enterprising: they saw an opportunity and capitalized. And sometimes, as in the case of John Ray, they put themselves in the role of Psalmist or priest, ministering to a believing congregation.

Three criteria were applied in choosing five texts from among the dozens of options here. First, because I am interested in the rise of physico-theology, I bracket texts that do not appeal at all to external observation, though much room is left for differences in how much an author appeals to the natural world, or how noble a strategy he thinks this is. Second, I chose only texts that were very popular and influential in their own time, as measured by the number of printings or references in other texts. Third, among the well-known works that assign value to sensory observation, I attempt to display as wide a variety of philosophical and theological viewpoints as possible. Situated at one end of this chronology is More, a Cambridge Platonist whose sympathies were with Catholicism and the old philosophy; at the other, Ray and Bentley, proponents of Baconian natural history and Newtonian physics, respectively. Holding up the cable between these two pillars, as it were, is Wilkins, Anglican bishop and avid supporter of the experimental science who nonetheless had no wish to leave what was worthy of the ancients behind. The remaining author, Richard Baxter, stands apart. The stubborn old Puritan cared less about method of advancing knowledge than about personal holiness and argues deductively, though on several occasions he praises observational methods for their humility relative to cogitation. Baxter is the only author considered in this book who was not educated at Oxford or Cambridge, the latter of which in particular served as the centre of the burgeoning New Science.

Each of the following chapters offers a new 'reading' of the natural theologian that strives to respect their peculiar character and concerns. In addition to answering the general need for a sustained study of seventeenth-century natural theology, I also hope to add a dimension to existing scholarly considerations of particular authors.⁸³ Such studies tend to focus on their other works: historians of science are interested in Ray's taxonomies and Wilkins's work on a universal language, for example, and philosophers are interested in More's ontology and Bentley's theory of void, while classicists still refer to Bentley in editions of Greek and Latin texts. Readers of Baxter, usually of a more theological stripe, often focus on his treatment

of more theological topics (though there has been a recent surge of interest in his rational side). However, these men all concerned themselves with natural theology in addition to their other pursuits, and that aspect of their work should be incorporated into our understanding of their lives and thought.

The first chapter, 'Rational Theology', considers More's 1653 *An Antidote against Atheism*, a text that seems almost medieval in its uncritical appropriation of classical argument and sustained attention to phenomena such as witches, apparitions and genii – but these features evince rather a militant rationality than a religious credulity. More celebrates reason more than any other natural theologian considered in this study, launching a spirited attack on enthusiasm, the mistaken claim of an individual to have access to divine knowledge without reason. To More's mind, enthusiasm poses a greater threat to true knowledge than does atheism, its more infamous bedfellow. Regarding methodology *An Antidote* is remarkably difficult to categorize: More draws evidence inductively from the sub- and super-lunary world as well as by deduction from first principles, and he asserts the truth of supernatural events as well as urging the wondrousness of nature's order and fitness. The one clear aim that can be traced from start to finish is a polemic against irrationality and corresponding elevation of human reason.

Although the second book of *An Antidote* inaugurates English physico-theology, with More arguing for the optimality of the present universe and attempting to resolve every case of perceived unfitness, he insists that this approach is a concession to the 'weake and sunk minds of sensuall mortalls' and places the weight of his argument on human cognition. More held that accurate ideas about God and the cosmos, like ideas pertaining to geometry, are innate in the human mind and may be excavated by a careful process of reason. He gives significant weight to the tradition while insisting that he looked only to his own mind for his arguments. More's rationalistic bent sets him in stark contrast with his Puritan parents, whose doctrines came to repel him early in life.

However, not all Puritans recoiled from the application of reason to divine things. In Chapter 2 I take up Richard Baxter's popular 1667 *The Reasons of the Christian Religion*, later hailed by Dr Johnson as 'the best collection of evidences of the Christian system.'⁸⁴ Like More, Baxter advocates more and better learning as the best means for buttressing one's Christian belief against the onslaughts of doubt. Unlike More, however, he also maintains a robust theology of 'things unrevealed', as well as of human fallibility. While insisting that fallen humans must learn through the humble means of sensory observation, Baxter challenges the Baconian elevation of the sciences and marginalization of theological concerns, arguing that science itself is theologically motivated. To study nature without reference to the creator, he claims, is 'to gaze on the glass and not see the image in it, or to gaze on the image, and not consider whose it is.'⁸⁵ Conversely, he argues, Christians who claim that it is sinful to examine doctrine rationally do a disservice to doubting brothers and sisters, and charity demands that nat-

ural theology be brought in to help them. Baxter rehearses arguments for the Christian faith, like More little regarding the distinction between old deduction and new empiricism. His reasoning is circumscribed by his faith, however, making Baxter an example of an early modern natural theologian whose arguments rested on religious presuppositions and were aimed at a Christian audience. He gives a startling degree of weight to God's sovereignty and stakes out a peculiar position regarding the necessity of revelation, drawing a distinction between the Bible and 'God's word'. This allows him to subject scripture to rational verification while still subjecting his own reason to divine authority.

At the halfway point of this fifty-year period Wilkins's *Principles and Duties* was published. Following Aristotle, Wilkins sets a high value on the golden mean, positioning himself in the middle in debates over the old and new science, miracles and natural law, and human reason and the authority of scripture. Wilkins consistently espoused latitudinarian principles and strove to unite those with differing viewpoints in the institutions over which he presided. Ever practical, Wilkins gives unusually generous attention to ethics, running into philosophical trouble as he rationalizes the Christian virtues. His managerial peacekeeping spirit is also evident in his appropriation of a variety of witnesses to God's existence and providence: ancient texts and scripture as well as natural world and common consent. Wilkins died before finishing the work, and it remains inconsistent: while the opening chapters speak strongly for human reason, as it approaches its close, Wilkins increasingly cites scripture and finally claims the 'necessity' of 'Divine Revelation'. The second of Wilkins's two voices has received scant attention, largely because of the homogenizing influence of *Principles and Duties's* posthumous publisher John Tillotson – an oversight I seek to correct in this chapter.

Having watched the gradual displacement of the older arguments from natural theology (and into the branch of philosophy Leibniz termed 'theodicy'), the final two chapters of this book turn to the beginning of physico-theology's golden age, the 'rise' of its notorious rise and fall. The year 1691 witnessed two important developments for physico-theology: the publication of John Ray's highly influential *Wisdom of God* and the inauguration of the Boyle Lectures, a series which has – with some interruption – continued until the present time. In the penultimate chapter of this book I examine the first of these, Ray's *Wisdom of God*. Ray not only argues for God's existence from empirical observation – More did that, scoffing – he also remains thoroughly committed to the new science and is still remembered as Linnaeus's mentor and a founding father of ornithology as well as noted early botanist. The book is arguably the most popular work of physico-theology ever written, going into twenty-three printings between its first publication in 1691 and 1846.⁸⁶ Ray expands the subject matter of the second book of More's *An Antidote* and explicitly avoids arguments both from an innate idea and from miraculous phenomena. He evinces the epistemological

humility of a new scientist: when he cannot verify a fact, he confesses as much, even if this weakens his argument for the fittedness of creation to its purpose.

‘But,’ he says of apparently purposeless phenomena, ‘it follows not that they are useless because we are ignorant’. Ray thus checks his deference to the book of nature with deference to the book of scripture. He sees both books as authoritative sources of fact, whose contents he seeks to understand rather than justify. His deferential relationship to these ‘books’ distances him from a number of his acknowledged sources, as well as from many who would be considered his intellectual successors. In *Wisdom of God*, Ray practises rather than theorizes about the apprehension of God through nature, spending tracts of text simply describing natural phenomena and exclaiming in awe rather than answering potential counterarguments. This celebratory, rather than argumentative, tone is intentional: in his preface he distinguishes what he is doing from philosophy and locates himself ‘in the tradition of the Psalmist’. Along with Baxter, Ray is another example of a natural theologian who writes for a believing audience.

Bentley, on the other hand, is far more congenial to the language of proof and certainty. Bentley’s inaugural Boyle Lectures, intended by their late patron to ‘prove the Christian Religion against notorious infidels’, were published under the title of *The Folly and Unreasonableness of Atheism* (1692), and I examine them in my final chapter, ‘God’s Philologist’. Bentley was not only an avid Newtonian but also a remarkably skilful classical scholar, and the latter of these two traits dictates the form of his natural theology as the former dictates its content. If Ray writes in the tradition of the Psalmist, Bentley writes in the tradition of St Paul, explicating Pauline epistles and framing his argument in a discussion of Paul’s encounter with pagan learning at the Areopagus in Acts 17. In Paul, Bentley sees a canny rhetorician, formidable debater and zealous champion of Christianity. Bentley’s yoking of belief with behaviour aligns him with Richard Baxter, while his combativeness resembles More’s – and his description of the book of nature as a ‘great, dramattick Poem’ is unique. While his emphasis on the poetic nature of the book of the cosmos distances him from the Cambridge Platonists in their attempt to find a thoroughly rational reading and its attendant problem of unfit-ness, his insistence on the scientific accuracy of scripture opened his arguments to criticism and, eventually, caused personal doubt on Bentley’s part. Nonetheless, in his first Boyle Lectures, we find a firm conviction that a sufficiently wise person, focusing on the mathematically certain superlunary sciences and the (to his mind, equally certain) science of textual exegesis, will find a logically compelling harmony between nature and scripture. In this claim to logical compulsion one can sense the approaching doom predicted by Leslie Stephen.

For part of my aim in diversifying seventeenth-century natural theology is to identify more particularly who can be credited or blamed for the ideas inherited by eighteenth-century deists and later exclusive naturalists. In the claims to logical and moral certainty made respectively by Henry More and the late-career

John Wilkins, I will argue, are laid foundations for rational deism, although these two authors did not see the need to abandon particular Christian doctrines as their English successors (and, more famously, Voltaire) would later do. John Ray's more empirically argued *Wisdom of God* took a different course: in various forms it would be taken up by hundreds of natural theologians, from Paley through the Bridgewater Treatises and, in certain camps, up to the present day. The underlying logic of his argument would indeed receive a round thrashing from Hume in the eighteenth century and from Darwin in the nineteenth; and although not everyone listened to Hume on religion, intellectual historians from Leslie Stephen onwards have recognized with Hume that rational demonstration of Christianity by *a posteriori* argumentation is not possible. But unlike More or Wilkins, Ray cannot easily be fit into this genealogy, for Ray already knew what Hume would demonstrate.⁸⁷ Hume showed that thoroughgoing evidentialism is finally incommensurate with Christian faith. Ray did not say this explicitly, but he gives readers much evidence that he would have agreed with Hume about the 'irrational' nature of natural theology, evidence I shall consider in the chapter.

Although these five men hold widely differing philosophical and theological views, they are unified by a fervent interest in the same questions. In their era new questions came to the fore: is Providence best seen in the wonderful and lawful ordering of creation, or in those aspects of the world that laws cannot account for? Old questions took new shapes. Plato and Aristotle faded to the background as Descartes and Bacon came to represent ways of advancing learning, and natural theologians wondered whether innate ideas or external order provide the best starting point for reasoning about God. Ecclesiastical and theological debates, too, made their way into these texts, as authors asked how certain passages in Scripture can be reconciled with new knowledge about the physical world, and whether Scripture need be read in that way at all. And some old questions remained just the same. Physico-theologians were as keenly interested in suffering and the problem of evil, in human depravity and personal holiness, as were their predecessors. These enduring questions, moreover, might prove to be best answered not in prose, but in poetry – or perhaps not. Others, with whom these natural theologians were in conversation, were trying that experiment.

In turning to the first of these natural theologians, then, I wish to return to the centuries-long Christian problem of holding faith in tension with reason, and to suggest that natural theologians of the Scientific Revolution continued the work their forebears had undertaken. Despite the great variety within this tradition, these authors fought together to maintain ground for theological insight in the new and growing practice of empirical natural philosophy. And in many cases, they shared yet more. Despite the centuries between them, there is no great distance between Paul's theology of human reason in Romans 1 and the Cambridge Platonist Nathaniel Culverwell's injunction to readers in 1652: 'Render unto *Reason* the things that are *Reasons*, and unto *Faith* the things that are *Faiths*'.⁸⁸