

## 1 Aims and Terms

### 1.1 Aims

Science, as everyone knows, has through its many wonder-inducing activities attained a position of eminence in our culture. In this Element I will trace the effects of science's rise on the cultural status of a religious idea known as monotheism – the idea that there is exactly one God, supreme over all. The Element does not address normative issues about whether monotheism or something like monotheism is true or rationally believed. I have discussed such issues in other writing, but here the aim is just to get clearer about what belongs to and may yet appear in a certain layer, as it were, of cultural evolution, by thinking about past, present, and future in turn.

How the cultural status of science affects that of monotheism now – today – naturally gets a lot of attention from those who think about such things. Many would say that science's steady rise and sustained prominence have greatly weakened monotheism's hold on cultural power in the West. Explanatorily, and even on an existential level, a scientific approach to life is in effect replacing monotheism in our culture. Or so it is often thought. I will explain these views and offer an assessment.

But before coming to that issue, which is about the present, I wish to address some issues about the past that allow us to consider the possibility that, however things may be today between monotheism and science, they have not always been contentious. It is sometimes said that monotheism's cultural dominance in the Europe of the seventeenth century contributed to science's early rise by, for example, generating presuppositions favourable to the scientific exploration of nature. Much less often do we hear about science's subsequent cultural standing providing aid and support, until fairly recently, for the continuing success of monotheism in the West. As it turns out, there are interesting arguments for both suggestions. I shall assess their force.

Then also, on the *other* side of the obvious question about the present, I aim to consider how the relationship between science's high standing and the status of monotheism might appear in the future. Of course, when dealing with the future, one has little to go on. I shall give the more positive possibilities a chance here too, though, asking whether there are scientific results we have been taught to honour that, when applied in the right way, might help monotheism evolve in such a way as to be once more a significant cultural player. Could something like monotheism rise again, and might science help it do so? I will seek to answer these questions.

Because my treatment of monotheism's prospects is not unfriendly, some who reach the end of this Element may wonder whether what they have been

reading is itself a religious work – perhaps a new sort of natural theology? My thought earlier about a shelving of normative issues is relevant at this point. But let me add a thought that may be more informative. One of the tasks of the most openminded and impartial inquiry, alive to all that may remain unseen as well as our human infirmities, is to bring to light overlooked or neglected possibilities and then invite further discussion instead of offering final pronouncements. Here as elsewhere, I am enthusiastically committed to this task.

### 1.2 Terms

So much for my aims. Let me now clarify some terms. *Science* I shall take broadly, as referring to the intellectual tradition focused on understanding the natural world that (with significant precursors in ancient Egypt and Mesopotamia) had its beginnings among the ancient Greeks, was ably represented by Muslim scholars in the medieval period, and most importantly is associated with what we call modern science. *Modern science*, in common with other writers, I shall take as referring to the distinctive part of this tradition that goes back to the flowering of scientific inquiry in Europe during the century and a half after Copernicus published his heliocentric astronomy in 1543, a time when scientists were still called natural philosophers. This period is of course the one often designated as hosting the ‘scientific revolution’. Though a small part of it belongs to the sixteenth century, I shall follow the usual practice, which is to speak of the scientific revolution as a seventeenth-century phenomenon.

*Cultural status* (a term I treat synonymously with *cultural standing*, *cultural position*, and *cultural power*) will here mean the degree of prestige – that is, respect or admiration – and influence enjoyed by an idea or movement or tradition in some cultural context. Cultural status, as here understood, clearly cannot be quantified in any precise manner, but we can still have reason to speak of the cultural status of monotheism or science in the West as high or low or growing or diminishing. And for our purposes that will be sufficient. By the *rise* of science or of monotheism I shall mean an increase in its cultural status and especially (for science) the striking growth in cultural power realized in and after the seventeenth century. It is worth noting that our focus will usually be on Western culture, since it is in this part of human culture that science arose and monotheism once dominated, and it is here, more recently, that the ‘religion wars’ and debates about ‘science and religion’ have been most pronounced. Of course, it is also often easier to make reliable claims about cultural developments when one’s focus is thus restricted.

What about religious terms? Let us start with *theism*, which I define quite generally as referring to the claim (or statement or proposition or view or idea) that there is at least one god. More specific types of theism are generated if we add

to this claim the claim that two or more gods warrant our attention (this view is called *polytheism*) or add the claim that there is just one, holding that it is the only god that exists and thus God (*monotheism*). Considering only the content of the latter claim, we would be hard pressed to say why the claim that everything is God, known as *pantheism*, should not be regarded as a form of monotheism. After all, pantheism is a form of theism, and entails that there is just one divine reality. Towards the end of the Element we will have reason to entertain such thoughts further, but for now I will go along with the assumption, common both in the literature and in non-academic religious discourse, that the single God of monotheism is to be distinguished from other things, including any universe, and is not, as pantheism would have it, to be viewed as the sole reality.

Sometimes such god-related terms as I have listed here are used to refer not just to claims but also to more complex sets of things, including belief of these claims and corresponding forms of worship. So it is important to note that mine is a narrower or simpler usage in this respect. Especially today, it is the *claim* monotheists make that is the focus of intellectual discussion and that is thought to be challenged by the rise of science, so I have elected to chart the fortunes of this claim through time in relation to science's own fortunes. But corresponding forms of belief and worship will not be entirely left aside, since part of the influence of monotheism as I am understanding it comes precisely in the extent to which it elicits belief and worship.

In contemporary philosophy the term *theism* is often used in a manner that diverges from my usage here: to refer, specifically, to the claim that there is a personal deity or divine being who is omnipotent, omniscient, and omnibenevolent. This philosopher's theism can, however, quite easily be converted into something compatible with my usage by labelling it *omnitheism*. *Omnitheism* overlaps with *monotheism*, since the omni-concept that philosophers have developed is plausibly seen as implicit in the claims about God made in Judaism, Christianity, and Islam – the traditions that have shepherded the monotheistic idea from the time of its Hebrew origin until now.<sup>1</sup>

But there is still something to distinguish my use of *monotheism* from the philosophical *omnitheism*. Contexts in which the former term is used are often ones in which the history of God talk – more on this in a moment – is relevant in a way it generally is not relevant in situations involving omnitheism, and in which the themes of unity, universality, and ultimacy, as applied to the divine, figure more prominently. The discussion of this Element will be another such context.

<sup>1</sup> Its Hebrew origin, by the way, we should distinguish from its origin *simpliciter*, since there are Greek and Egyptian precursors. On this see, for example, Kirk et al. (1983) and Hoffmeier (2015).

In scholarly historical work, monotheism, which affirms that no god other than the favoured one exists, is commonly distinguished from henotheism, which favours one God among others whose co-existence is granted. The history of God-related talk and other religious behaviour is often seen as involving stages of polytheism, henotheism, and monotheism – though these are not always presented as coming neatly in that order. In such discussions henotheism, like the other theisms, is commonly depicted as involving a certain form of worship, but, as noted, I will not follow this precedent, focusing instead on what is being claimed. So if the term *henotheism* is to make an appearance in the present context, we will need a claim to go with it. By looking for one, incidentally, we accommodate another complexity of usage, which is that in some scholarly work the term *monolatry* replaces *henotheism*. The former clearly refers to a form of worship – worship of one God while in some way countenancing the existence of others. So by treating henotheism as a claim, we can give the corresponding term a job to do that has not already been taken over by *monolatry*. What claim should it be? I suggest we think of henotheism as the claim that one god deserves our attention more than others do, even though other gods also exist. Henotheism, as a claim, thus falls at a point intermediate between polytheism and monotheism. In the next section of this Element, which begins our tour through time by directing our attention to contact between science and monotheism in the past, we will have occasion to revisit not just monotheism but these other, alternative religious views as well.

## 2 Did Monotheism Benefit from Science's Rise?

As I mentioned in Section 1, that monotheism had by the seventeenth century become culturally entrenched in Europe is often said to have contributed to science's early rise. There is considerable support for such claims, and I will now detail some of this. But then I will move on to an issue almost never broached: did science subsequently *return* the favour by aiding and protecting monotheism?

### 2.1 How Monotheism Aided Science

We may begin by noticing that the cultural heft of monotheism afforded a kind of *negative* support for the rise of science by preventing what would have been an obstacle to it, namely widespread belief in the existence of multiple gods at work in nature. Monotheism helped, we might say, simply by *not* being polytheism or henotheism. Already during an earlier period of scientific development, in ancient Greece, advances in thinking about material causes were seen to depend on achieving some distance from the idea of interfering gods (Deming 2010, 17). Had the habit of linking mundane events to the decisions of gods

been culturally dominant in the seventeenth century, the explanatory power of a focus on mundane physical agencies quite without intentions or intentionality – on the causal properties inherent in physical things – might not have made itself known and would at least have been more difficult to see. Monotheism's high standing, culturally speaking, was sufficient to prevent such science-unfriendly conditions from obtaining.

But God too is a god, someone may say, so how exactly were things more science-friendly in a monotheistic cultural environment? Actually, the differences between 'God' and 'god' are very important here, given how the former was construed. Indeed, these differences allowed monotheism to be a good deal more science-friendly than we have yet seen, to afford not just the negative, obstacle-removing support we have been talking about – which, as you may have noticed, is compatible with monotheism itself constituting a different sort of obstacle – but also *positive* support for the rise of science.

This occurred quite contingently, because of certain features of the monotheism that was in fact influential in the Europe of the seventeenth century. Aristotle's monotheism, had it been culturally dominant then, would probably not have had the same effects, since along with it came a partitioned cosmos – perfect spheres beyond the moon and a corrupt sublunar sphere – that was inimical to the notion of universal laws of nature (Brooke 1991, 52–3). Indeed, some have argued that it was precisely because the Bishop of Paris in the 1270s *condemned* a host of Aristotelian claims, including the claim that God could not create multiple universes or move the universe in a straight line, substituting an emphasis on divine freedom associated with Catholic monotheism, that important space opened up for new scientific explorations later on (Lindberg 2002, 69). Others have said that it is particular features of Protestant Christian monotheism in the seventeenth century – perhaps its encouragement of a naturalistic reading of the 'book of nature' parallel to the literalism Protestants applied to the 'book of Scripture' – that we have to thank for the emergence of modern science (Harrison 1998). But without going into these specialized debates, whose issues are controversial, we can see a clear example of how monotheism was helpful by reflecting on certain broad and broadly influential monotheistic *presuppositions* that were encouraging to scientific activity.

By a 'presupposition' I here mean a widely imbibed picture of things that helps to shape the thought of a culture, that lies behind or reinforces the intellectual directions it takes, often in ways the people of that culture do not consciously recognize.<sup>2</sup> Notice that I only say 'helps' and 'lies behind or reinforces' – the

<sup>2</sup> Saying that a presupposition has this causal power, it should be noted, does not commit us to the view that without its help things could not have fallen out much as they did – that in possible worlds relevantly similar to the actual in which such a presupposition is not present, what it

relevant picture of things need not be conceived as doing the whole causal job all by itself. Three monotheistic ideas can be seen as presuppositions in this sense in relation to the cultural direction represented by modern science: God as rational law-giver; God as a personal being not entirely unlike ourselves, with whose mind ours has affinities; and God as omnipotent Creator. These three ideas contributed to the apparent plausibility of three highly significant assumptions animating modern science – assumptions not always sufficiently distinguished. Respectively, these are that there exist natural *laws*, that the order represented by these laws is *intelligible*, and that all of nature is *unified* by this lawlike order, which is exhibited everywhere in it, from head to toe.

Let us take these assumptions one at a time and consider their connections to monotheism, starting with lawlike order in nature. Immediately we face an objection. Monotheism, it may be suggested, was not at all needed for this idea. Already in various of the philosophical schools of ancient Greece, and not only in such as were incipiently or actually monotheistic, the idea of nature's rational order was celebrated. The approach of the Stoics was one such, and the Stoics' God is immanent in nature, not its transcendent creator.

However, it is one thing for something like the Stoic idea to be, as it were, in the intellectual wind, and another for it to be actively determining things on the ground in the period leading up to science's early rise in and after the seventeenth century in Europe. We do hear from Alfred North Whitehead that 'the most effective way in which the Stoics influenced the mentality of the Middle Ages was by the diffused sense of order which arose from Roman law' (Whitehead 1929, 14). And Paul Davies tells us that a 'strongly enforced concept of civil law' in medieval Europe had something to do with the emergence of the scientific idea of laws of nature (Davies 1992, 76). So we may suppose that Stoic ideas were finding some relevant work to do. But according to Davies, that is just one part of the story. Drawing on John Barrow's pioneering work on the history of our conception of laws of nature (Barrow 1988), Davies argues that 'the Christian doctrine of God's law manifested in nature' also played a significant role. The presuppositional influence of the latter notion is confirmed when we notice, as Davies does, that the astronomers Tycho Brahe and Johannes Kepler, when working out the laws of planetary motion, and also Isaac Newton, whose laws of motion and gravitation were of course absolutely central to the rise of science, 'believed that in studying the orderly processes of nature they were uncovering God's rational design' (Davies 1992, 76). And these are just a few striking examples among many we might contemplate. Later

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actually aids (e.g. some aspect of modern science) is commensurately *lacking* in assistance. Other conditions could, in some different way, provide this help in worlds where monotheism does not.

*Religion and Monotheism*

7

scientists would grow up singing about this sentiment in church, as John Kemphorne's 1796 hymn *Praise the Lord, Ye Heavens Adore Him* shows:

Praise the Lord! For he hath spoken  
 Worlds his mighty voice obeyed  
 Laws, which never shall be broken  
 For their guidance He hath made.

That natural philosophers or scientists saw themselves as uncovering *God's* laws is even more important when we come to the second central assumption of science, which concerns the intelligibility of nature – the assumption that nature's structure is open to the human gaze, that it can be *understood* by questing human minds if the right sorts of effort are brought to bear. On the monotheistic picture, natural laws are chosen by a personal divine being, not inherent in nature as many Greek thinkers including the Stoics assumed. Thus so long as our mindedness and personhood have some affinities with God's, and God is willing for God's ways to become known to us, we may have confidence that the study of nature will produce reliable results. And precisely this basis for confidence was offered by the theological presupposition at work in this second case.

For Whitehead, this is the point to be emphasized, and he does so eloquently. The conviction of intelligibility was 'vividly implanted in the European mind' by a picture of God that combined 'the personal energy of Jehovah' with 'the rationality of a Greek philosopher'. Whitehead says that he is talking about 'the impress on the European mind arising from the unquestioned faith of centuries'; in other words, a monotheistic presupposition. He concludes that the assumption of intelligibility – the sense of 'a secret that can be unveiled' in the absence of which 'the incredible labours of scientists would be without hope' – is 'an unconscious derivative of medieval theology' (Whitehead 1929, 15–16).

Other more recent writers have agreed (Brooke 1991, 19; Davis and Winship 2002, 123; Osler 2002, 148; Henry 2010, 53). There is even reason to think that support for the experimental method – this *way* of making nature's laws intelligible – was generated by monotheistic theology. That is because those who emphasized God's free imposition of laws ('voluntarists', as they are known) held that God could create and design things in any way at all, and so human investigators needed to get out and experience nature to determine how God's choices were actually made (Wilson 2002, 20). But here the contingency of such historical connections between monotheism and science must again be stressed. The voluntarist emphasis on the omnipotence and freedom of God, taken too far, could instead have been a disincentive to science. This has, from time to time, been a temptation for thinkers from various monotheistic traditions. Consider, for example, the view of the tenth-century Sunni Muslim thinker al-Ash'ari, who

sharply restricted and indeed entirely denied natural causal agency in the name of the same divine properties, ‘holding that God was the only and direct cause of all events, even of human actions’ (Dhanani 2002, 85). Such an emphasis on divine causes could certainly distract one from the thought of natural ones, and in this way, somewhat ironically, we would be back to worries very like those emphasized earlier in connection with polytheism and henotheism. Clearly, it is rather important that when theological voluntarism made an appearance in seventeenth-century Europe, it generally did not take this extreme form.

What about the third assumption critical to the rise of science, that nature is *unified* by its lawlike structure? Here we have a rather important bundle of ideas: about natural laws that hold universally, that are interwoven in their operation, and perhaps also gathered under some highest law – which today we might associate with a ‘theory of everything’. The third monotheistic presupposition, of God as omnipotent creator, was well suited to support these ideas about the unity of nature. For as the all-powerful creator, God alone is responsible for the existence and character of everything else. And a single rational Lawmaker in charge of everything may be expected to work according to a unifying plan.

The pioneers of science agreed. As Descartes said, we can expect a more perfect overall structure or organization for the various parts of a building ‘on which one man alone has worked’ than for a building whose construction had many masters (Descartes 1954, 296). In a similar vein, Isaac Newton wrote: ‘If there be an universal life and all space be the sensorium of a thinking being who by immediate presence perceives all things in it . . . the laws of motion arising from life will or may be of universal extent’ (quoted in Westfall 1971, 397). God not only is responsible for natural laws and their intelligibility, Europeans of the seventeenth century were inclined to think, but also impresses a lawlike structure on the *whole* of nature. This idea fed a belief in the unity of nature, which in turn has fed science.

## 2.2 How Science Aided Monotheism

That the rise of science was to some extent aided by the cultural dominance of monotheism in seventeenth-century Europe is therefore clear. And there are other forms of this aid that we have not mentioned. The esteemed historian of science, John Hedley Brooke, points out that not just monotheistic presuppositions but also monotheistic sanctions and motives were operative in the seventeenth century and encouraging to scientific activity (Brooke 1991, 19–33). However, it is time for us to move on. An interesting question awaits: did monotheism during and after the scientific revolution receive any *returns* on its investment in scientific thinking? Was it benefited by science’s early rise? This



question's interest derives in part from its answer, which is affirmative. A crass but popular view of the history of religion and science would have it that as soon as science gained in cultural standing, monotheism began a long trek out of cultural favour. But this view is mistaken. Monotheism's cultural status was instead maintained for a considerable period, and support gleaned from the rise of science was a part of the cause.

Once again we have both negative and positive support, though in the latter case there is a reversal: while, as we have seen, it took certain specific forms of monotheism to generate aid for science, when science returned the favour it was generally not this or that specific form of monotheism that benefited but rather the general idea of a single ultimate divinity. I will begin here by developing the second half of this point, concerning positive support.

Monotheism, considered under the aspect of a theory, can be seen as 'predicting' that the world of nature will be found to have certain features suggested by the character of the monotheistic deity. And what science did was to provide striking confirmation for these predictions. Thus it enabled monotheism to claim support from science for its central claims.<sup>3</sup> Naturally few *detailed* predictions of the sort generated by, say, a Lutheran Protestant Christian *version* of monotheism would have been viewed as confirmed, but the general ideas associated with the unity and wisdom and even benevolence of the divine were made to appear more plausible by reference to science's success at showing the world to be just as we should expect it to be if they were true. Central here was the lawlike structure of the natural world laid bare by science and certain particular features of the world thus displayed. A powerful tradition of natural theology grew up around such results which was to hold sway among European minds until scepticism induced by Darwinism, along with certain associated cultural events, began to dilute its effects around the end of the nineteenth century.

Charles Darwin himself, in his university years, experienced the persuasive power of science-fed natural theology. In his autobiography (Darwin 1958), written towards the end of his life, he reflected on how entranced he had been by William Paley's clever design arguments, which appealed to innumerable details unearthed by natural philosophers suggesting a beautiful providential adaptation of creatures to their environment. 'Just as we might expect if there really were a God!' one can almost hear Paley cry over and over again as one

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<sup>3</sup> Of course, as we have seen, monotheism earlier supported the attempt to do work including such confirmation! If a troublesome circularity appears to loom, remember that our aim is not to determine the extent of actual objective rational support for monotheism afforded by the rise of science but to describe how the effects of the latter were viewed and how monotheism's cultural status waxed or waned accordingly.

reads his *Natural Theology*. Perhaps not quite the omnitheism of the philosophers is being supported here, but certainly it is belief in a single divine reality with highly impressive qualities. For Paley, the works of creation testify to a wisdom far surpassing any with which we are acquainted (Paley 1809, 445). Here are some of his chapter titles: ‘Of the vessels of animal bodies’, ‘Comparative anatomy’, ‘Of insects’, ‘Of plants’. Benevolence is shown by the fact that where ‘contrivance’ – one of Paley’s favourite words – is perceived, it tends to produce benefit, and by the pleasure that, without any apparent purpose, commonly attends animal sensations. Bees and flies, he commented, seemed far happier as they whirled through the sky than they had any reason to be (Paley 1809, 454–7). The unity of the deity was proven by the uniformity of the plan natural philosophers had observed in the universe. ‘One principle of gravitation causes a stone to drop toward the earth, and the moon to wheel round it . . . The light from a fixed star affects our eyes in the same manner, is refracted and reflected according to the same laws, as the light of a candle’ (Paley 1809, 449–50). The young Darwin was ‘charmed and convinced by the long line of argumentation’ (Darwin 1958, 59).

Of course, as the older Darwin goes on to observe perhaps somewhat ruefully in his autobiography, much of Paley’s design argumentation had now been put in the shade by his own discovery of natural selection. He was no longer convinced. But it is interesting to note how even some scientific discoveries later associated with evolutionary theory, and indeed even certain aspects of Darwin’s own discovery, could be seen and were seen as supporting monotheistic ideas. Here is one of the first palaeontologists, the nineteenth-century scientist William Buckland, on fossil finds: [T]he discovery, amid the relics of past creations, of links that seemed wanting in the present system of organic nature, affords to natural Theology an important argument, in proving the unity and universal agency of a common great first cause’ (quoted in Rupke 1983, 173). And Darwin’s friend in America, Asa Gray, put into a textbook his thought that the divergence of biological species from a common ancestor, as shown by Darwin, was evidence that they are ‘all part of one system’, natural instantiations of ‘the conception of One Mind’ (Gray 1887, 177).

I have referred to predictions of theism shown to be successful by science. On the other side of the coin we have *failed* predictions of *non*-monotheistic notions such as polytheism, and I shall conclude this discussion of science’s positive support of monotheism with an example. The tradition of natural theology represented by Paley has survived into the present day, and my example comes from its most celebrated contemporary exponent, Richard Swinburne. Swinburne argues that we should explain the existence of our universe by