

1 Introductory Remarks

While preparing this work, I looked up the title *Science and Religion* on the online catalogue of the British Library, said to be the largest in the world in terms of the number of items it contains. My search turned up some 33,467 results. Most were short pieces – articles – but a full 7,201 items were books. A search on Google Scholar returned an even larger number: 86,000 items, books, and articles combined. That’s just for the full phrase. Searching by the terms “science” and “religion” in any combination returned 2,900,000 items. So there is a lot of material out there. Why have I added to this plethora of literature? What does this Element have to offer?

What it has to offer is a broader vision of the science and religion debate. Seen from a global perspective, the existing literature appears astonishingly provincial. It deals almost exclusively with *modern* science and the *Christian* religion. The aim of this Element is to widen the discussion. It will talk about modern science and Christianity. In doing so, it will address some familiar questions. It will ask, for instance, about apparent conflicts between science and religion, such as Galileo’s conflict with the church or the rejection by some believers of Charles Darwin’s theory of evolution. But it will not limit itself to modern science. Neither will it restrict itself to one kind of religion. It will present the relation between modern science and the Christian religion as one instance of a broader phenomenon. That phenomenon has to do with two different ways in which humans have thought about what we call “the natural world.”

A first way of thinking about the natural world explains its functioning by reference to a set of principles, which are derived from observations of the way the world regularly operates. (“Why did the stone fall when released from my hand?” “Because all objects fall toward the center of the earth when not otherwise supported.”) The other interprets and explains the natural world by reference to what we may call “metapersons” (Sahlins 2017: 92) – gods, spirits, and ancestors – who inhabit a realm inaccessible to ordinary perception and who have qualities and powers human beings lack. (“Why was the city destroyed by an earthquake?” “Because God was punishing its inhabitants.”)

In our society, these two ways of thinking about the world go by the terms “science” and “religion.” Many societies do not distinguish them so clearly; they may even lack these categories altogether. But even when they lack the categories, they employ both ways of thinking, in varying degrees and in differing ways. All peoples interpret and explain what they see happening around them both by reference to observable regularities (and the principles thought to underlie them) and by reference to powerful metapersons, who can

be accessed and influenced by prayer and ritual. It is the relation between these two ways of understanding the world that is the topic of this Element.

1.1 A Question of Terminology

What should I call these two forms of understanding? The customary term “religion” will serve for one of them – the one that invokes powerful and normally invisible metapersons – provided we keep in mind the variety of forms religion takes. For the other – that which refers to observable regularities in the way the world operates – I am tempted to use the term “science,” while insisting that it be understood in a broader-than-usual sense. But this usage is likely to give rise to misunderstandings, so widespread and firmly rooted is our modern understanding of the word “science.”

Take, for instance, the cosmology that underlies Chinese traditional medicine. This is a set of principles, derived from observations of the way the world regularly operates. It generally eschews talk of invisible and powerful metapersons. But what should we call it? No thinker has done more to alert us to the history of intellectual achievement in China than Joseph Needham (1900–95). When Needham began describing this traditional cosmology, he did so under the heading: “The Fundamental Ideas of Chinese Science” (Needham 1956: 216). In one sense, he was right to do so, for the cosmology in question is functionally equivalent to science (Bodde 1991: 11–12). But the principles by which it operates are so different from those of modern science that the use of the term created some confusion (Peterson 1980: 29). Indeed, Needham himself felt compelled to describe many of the practices involved as “pseudo-sciences” (Needham 1956: 216).

However, the use of the term “pseudo-science” is also unhelpful, since it has proved extraordinarily difficult to distinguish science from pseudoscience. But the differences between Chinese cosmology and modern science need to be respected. Similar remarks could be made about other traditions of inquiry into the natural world. Take, for instance, the tradition established by Aristotle (384–322 BCE), which I shall call “natural philosophy.” To call this “science” would not only mislead the reader; it would also invite a premature rejection of Aristotelian thought for not doing what (our) science does. So, what term *can* I use? What word would be broad enough to encompass all traditions of organized reflection about the natural world?

With some hesitation, I have chosen to use the Latin term *scientia* for this broader category of knowledge, while keeping the word “science” for “modern science.” (The adjective “scientific,” however, I shall continue to use for both.) If only for the sake of symmetry, I am tempted to replace the English word “religion” by the corresponding Latin term *religio*. But I shall (for the most part) resist this

temptation. The use of another Latin word seems superfluous and the historical associations of the word *religio*, which originally meant something along the lines of “reverence” or “scrupulousness,” would also be misleading.

The word *scientia*, by way of contrast, has helpful historical associations. Pronounced as either *ski-en-tia* or *shi-en-zia* (depending on where you learned Latin), the term was widely used by medieval writers, in a way that was broader than our use of the word “science.” *Scientia* referred to any body of systematic knowledge of the principles by which the world operates. The most basic of these principles were known by observation; others could be deduced from them. Thinkers in the Aristotelian tradition developed a particular variety of *scientia*. This sought to explain the behavior of objects by grouping them under categories of beings that shared a common nature. But if we stick to the more fundamental sense of the term *scientia*, we can employ it more broadly. We can use it to refer to any systematic body of knowledge, drawn ultimately from observation, that seeks to identify the principles by which the world operates.

1.2 The Science and Religion Literature

I shall come back to these conceptions of *scientia* and religion shortly. But what I have said allows me to restate the point I made earlier about the existing literature. Most such works are discussions of (modern) science and the Christian religion, rather than of the various forms of *scientia* and religion. They limit themselves to one form of *scientia* and to one form of religion. Many of them have an even narrower focus: they examine what is commonly called the “conflict” or “warfare” thesis. So widespread is this theme that a discussion of it can provide us with a path into the existing literature.

What is the “conflict” or “warfare” thesis? In its strongest form, it would involve one or more of the following claims: (a) that science and religion have always been in conflict, (b) that religious belief hinders scientific progress, and that (c) one cannot consistently accept what science tells us while remaining a believer. Stated in this way, the conflict thesis is something of a straw man. Few, if any, thoughtful authors have defended any of these positions. Views (a) and (b) are commonly attributed to two nineteenth-century writers, namely John William Draper (1875) and Andrew Dickson White (1896). Draper and White do offer repeated examples of (what they take to be) conflicts between science and religion. But neither holds that all forms of religion have been opposed to science, hindering its progress, or that religion and science are incompatible (Dawes 2016: 2–8). For Draper, it is Roman Catholicism that poses a threat to science, particularly when its authorities gain political power. For White, the problem lies not with religion as such, as with a certain kind of dogmatic theology: one that uses biblical authority to oppose scientific theorizing.

There are more recent writers who defend a form of conflict thesis. Notable examples are to be found among the thinkers popularly known as the “new atheists,” particularly Richard Dawkins, Sam Harris, and Dan Dennett. All three are scientists, or scientifically oriented philosophers, who use their knowledge of science to argue that it is in conflict with religion. Richard Dawkins, for instance, focuses not merely on the claims made by religions, but also the attitude of mind they encourage. Religion, he believes, is opposed to science insofar as it encourages an uncritical acceptance of what is being proposed for belief (Dawkins 2006: 284). But the new atheists are not alone in defending a conflict thesis. A more nuanced version is found, for instance, in the work of the historian and sociologist, Yves Gingras (2017).

Although a modest form of conflict thesis continues to have its advocates, it has fallen largely out of fashion (De Cruz 2018: sect. 1.3). The first to reject it were historians, who pointed out the oversimplifications and sometimes outright errors found in the works of Draper and White. Key figures among the historians include James Moore (1979), who studied the reception of Darwin’s work in the English-speaking world, and John Hedley Brooke (1991), whose writings offer insights into the complexity of the religion and science relation. Noteworthy, too, is the work of Jon H. Roberts on nineteenth-century responses to Darwin in America (1988), Edward Larson on the debates regarding the teaching of evolution (1997, 2003), and Ronald Numbers on twentieth-century creationism (2006).

Some opponents of the conflict thesis have tried to set out alternative views of the relation between science and religion. A pioneer in this respect was Ian Barbour. Barbour begins his discussion with the conflict view, which he attributes to both “scientific materialists” and “biblical literalists,” before describing three other ways in which science and religion can be thought to be related: “independence,” “dialogue,” and “integration” (Barbour 1997: 77–105). A more recent analysis of this kind has been offered by Mikael Stenmark (2004), whose discussion of the “dimensions” of the religion and science relation has helped shape the present work. Many such thinkers are themselves religious or are sympathetic to religion. But not all are. The evolutionary biologist Stephen Jay Gould, for example, was not himself a religious thinker. But he argued for a form of the “independence” view, suggesting that science and religion have “nonoverlapping *magisteria*” (NOMA). (As Roman Catholic readers may know, the term *magisteria* is the plural of the Latin *magisterium*, which means “teaching authority.”) Science and religion are independent, on this view, since science deals with matters of fact, while religion deals with matters of value (Gould 2001: 739).

Other opponents of the conflict thesis go further, arguing that science and religion, far from being at odds, actually lend support to one another. In doing

so, they follow in the footsteps of Robert Merton (1938), who argued that modern science developed within a particular social and religious context, that of Protestant Christianity. Scholars such as Reijer Hooykaas (1972) and Rodney Stark (2006), for instance, have argue that certain religious beliefs prepared the way for scientific thinking. By making a sharp distinction between God and the world, for instance, Jews and Christians are thought to have freed up that world for scientific inquiry. Other authors argue that science actually lends support to religious belief (Swinburne 2010: 44–61) and enriches our view of the divine (Peacocke 2001).

A final view is worth noting because it involves a reaffirmation of the conflict thesis, but in a way that favors religion rather than science. It is found among those known as “creationists,” who reject evolutionary theory. In common with the new atheists, creationists agree that there are conflicts between religion and science. But they hold that the fault lies not on the side of religion, but on the side of science. The science on offer, they argue, is not true science; it is what they sometimes describe as “science falsely so-called” (1 Tim 6:20), which is corrupted by atheistic assumptions. A sophisticated version of this view has been advanced by Alvin Plantinga, who blames conflicts on the “naturalism” of the sciences: their refusal to allow any but natural explanations (Plantinga 2011: 311).

1.3 Which *Scientia*, Whose *Religio*?

So much for the existing literature. What about the present Element? What forms of *scientia* and religion will it study and what topics will it address?

1.3.1 *Varieties of Scientia*

Let me begin with *scientia*. The quest to understand how the natural world operates is (one may assume) as old as human beings themselves. Indeed, there are some broadly “scientific” principles that we may not need to learn, since we are born knowing them. Even infants seem to have certain expectations about their environment and the behavior of physical objects (Spelke 1998). But whatever our native endowment, we seek to supplement it by observation and reflection. Such observations and reflections are the basis of the various forms of *scientia*.

What about religion? Does it have a similar origin? Did religion also arise from attempts to understand how the world operates? Some early anthropologists suggested it did, arguing that those who first developed belief in gods were primitive scientists. They, too, were trying to explain what they saw happening around them: events such as storms or earthquakes. But instead of explaining these by reference to impersonal powers, operating in predictable ways, they

explained them as the work of invisible personal agents: gods, spirits, demons, or ancestors. On this view, spirits are simply “personified causes” (Tylor 1913: 108).

This view is not entirely mistaken, for religious beliefs are sometimes used to explain natural phenomena. But as an account of the origin of religion, it seems implausible. First, it is highly speculative, reading modern attitudes back into the distant past (Evans-Pritchard 1965: 24–7). Second, it overlooks the fact that the founding figures of the major religions – think of Moses, Jesus, Muhammad, the Buddha, or Bahā’ullāh – were not regarded as clever observers of the natural world. They were regarded as individuals who had attained personal enlightenment, were divinely inspired, or were incarnations of a divinity. Yet even if stories about gods were not *created* to explain how the world operates, they can still have an explanatory role. They can still be used to tell us why certain events occurred. To this extent, the aims of *scientia* and religion overlap, as we shall see.

For the moment, however, it is *scientia* with which I am concerned. Can I describe more precisely what I mean by this term? The diversity of the traditions embraced by this term might appear to make a definition impossible. But it is worth making an attempt. So here it is. For the purposes of this study, I shall take a *scientia* to be

a communal tradition of inquiry whose aim is to create a systematic account of the principles governing a set of regularly observable phenomena within the natural or human world.

Let me spell that out. First, a *scientia* is a communal tradition, that is to say, a collective enterprise that extends over time. Second, its aim is to create a set of general claims that are related to one another in a systematic manner. Third, those claims have to do with what can be regularly observed: with what happens “always or for the most part” (Aristotle 1925: 304 [1027a21–22]).

While there are many traditions of inquiry that would fall under this definition, the present study will focus on three of them. These are (a) *scientia* as integral cosmology (as found in ancient China), (b) *scientia* as natural philosophy (as found in medieval Europe), and (c) *scientia* as a form of specialized knowledge (modern science). Alongside these three categories of *scientia*, I shall also speak of a fourth category, which I shall call “traditional knowledge.” This sometimes goes by other names, such as “local knowledge,” “indigenous knowledge,” and “ethnoscience.” It consists of the beliefs about the natural world that are found within small-scale societies, particularly those lacking literacy.

The first form of *scientia* – what I am calling an “integral” cosmology – is “integral” in the sense of all-embracing. It does not merely describe the principles

that govern the universe. It also makes normative claims (claims about how we ought to live) that are based on these principles. It is a “cosmology” in the sense of a systematic account of the entities that make up the world and the principles that govern their behavior (Tambiah 1985: 130). The term “cosmology” is often used today to refer to theories about the origins of the universe. But I am using it more broadly. Cosmologies (as I am using the term) may or may not speak of origins, but they do speak of the principles by which the world operates.

My example of an integral cosmology will be the one that emerged in China during the period of the Warring States (403–221 BCE) and that of the Qin (Ch’in) (221–206 BCE) and former Han (206 BCE–9 CE) dynasties. This is sometimes called a “correlative cosmology” because it posits the existence of mutually dependent relations between different classes of phenomena. By the first century BCE, this cosmology had become the dominant way of viewing the world among Chinese thinkers (Harper 1999: 861) and has remained influential until modern times. Cosmologies of this kind are by no means unique to China. A form of correlative cosmology is also found in the history of European thought, in the systems of correspondence so popular during the Renaissance (Graham 1989: 318). Here, too, the correspondences were thought to have normative significance (Tillyard 1943: 82–91). But the intellectual history of China offers a particularly striking example.

My second variety of *scientia*, namely “natural philosophy,” was first developed in ancient Greece, but found its fullest expression in the medieval European and Muslim worlds. This is not an integral cosmology of the kind found in China, for its investigation of the natural world is distinguished from mathematics, metaphysics, and ethics. Yet while natural philosophy was distinguished from these other intellectual tasks, it was not divorced from them. Natural philosophy formed part of a larger enterprise. That larger enterprise included moral inquiry and metaphysics, the latter being a kind of (natural) theology, which spoke about the divine.

A third variety of *scientia* is what we call “science,” although I shall often refer to it as “modern science.” This tradition of inquiry began in the seventeenth century, but took on its present form only with the professionalization of scientific disciplines in the nineteenth century. Modern science is itself a diverse enterprise. It embraces many different forms of inquiry and is practiced in different ways in different contexts (Livingstone 2003: 17). But there are two features of modern science that I shall focus on here. The first is its institutionalization in dedicated scientific organizations. The second is its relative isolation from broader intellectual and ethical concerns.

What about my category of “traditional knowledge,” the bodies of belief about the natural world found in small-scale societies? One should not, in my

view, refer to these as forms of *scientia*. There are two reasons to avoid the term in this context. The first is that while such bodies of knowledge may appeal to general principles – such as that of a “kinship” relation between all things (Prytz-Johansen 2012: 3) – they do not expound these principles in a systematic fashion. A second reason is that traditional knowledge has distinctive features of its own. Some authors have even suggested that the term “knowledge” fails to capture what is involved, preferring the phrase “indigenous ways of living in nature” (Aikenhead & Ogawa 2007: 553). This reflects the idea that traditional knowledge is a way of “being in the world,” not merely a way of understanding it. I shall, however, continue to use the term “knowledge,” although my use of the term will embrace both practical (skill-based) knowledge and the knowledge expressed in rituals and narratives.

Even if we do not call traditional knowledge “science,” it has something in common with the various forms of *scientia*. It also involves conceptions of the natural world and how it operates. Those conceptions fall into four categories. A first category has to do with the classification of natural objects: how the members of a culture pick out and describe and the features of the nonhuman world, particularly plants and animals. A second category is that of etiological beliefs: stories regarding the origins of humans, animals, and features of the landscape. A third category has to do with the properties of natural objects, such as the healing properties of plants or the kind of inner life experienced by animals. A final category is that of practical knowledge – “knowing how” rather than “knowing that” – which is embodied in the learning of certain skills. Each of these forms of knowledge has a slightly different relation to the religious practices of the societies in which they are found.

1.3.2 *Varieties of Religion*

What about religion? If it is difficult to come up with a definition of *scientia*, it is even more difficult to come up with a definition of religion. But I shall once again make an attempt. For the purposes of this study, I shall take a religion to be

a communal tradition of ritual action that seeks to make contact with a hidden realm of metapersons and powers and whose goal is to bring this-worldly and/ or other-worldly benefits to the individuals or community in question.

Again, a few words of explanation may be helpful. First, I am defining religion as a form of *practice* rather than a system of *beliefs*. Most philosophers focus on religious beliefs, which is understandable, given their interests. But many communities engage in religious practices without articulating the assumptions that underlie them. Members of such communities surely have beliefs: there are

claims about the gods they hold to be true. But for much of the time these beliefs remain implicit. They are not articulated in the form of creeds (Mbiti 1969: 3, 67).

There is a second feature of religion that is highlighted by my definition. It is that religious practices seek to make contact with an “occult” or hidden realm: a world of metapersons and mysterious forces that parallels the observable world of everyday, practical action. Religious practices seek to make contact with this realm in order to benefit the community or individuals involved. Many religions do have a further goal, which is that of ensuring that their practitioners behave in certain ways. But in order to cast the net as widely as possible, I shall avoid making that a defining feature of religion.

What types of religion shall I discuss in the sections that follow? There are many ways of classifying religions. One can, for instance, distinguish between religions for which belief in a god or gods is essential (such as Islam and Christianity) and those (such as Theravada Buddhism) for which belief in gods is of secondary importance. But the classification I shall use here has a different basis. It has to do with the relation of religious practices to the society in which they are found. Based on this criterion, we can distinguish between (a) “diffused” religions, in which religious practices permeate a society, (b) “institutional” religions, which have a distinctive form of organization, and (c) the “privatized” religion of modern secular societies.

“Diffused” religions are easily overlooked, precisely because they are not embodied in distinct institutions (Yang 1961: 20). In a society whose religion is of this kind, people will be aware of the difference between religious and nonreligious practices. They will be aware, for example, of the difference between digging a garden and invoking a god to ensure the plants grow. But the two kinds of activity will be carried out alongside one another, commonly in the same place, at (more or less) the same time, and often by the same practitioners.

Diffused religions can take two forms. There are the diffused religions of small-scale societies. These societies are relatively egalitarian, with little or no social stratification and relatively little specialization of roles. They commonly lack literacy and have simple forms of technology (although the use of their technology may require high levels of skill). In small-scale societies, the community of religious practitioners will be coextensive with some “natural” grouping, such as that of the family or the tribe (Wach 1947: 56–9). But forms of diffused religion are also found in larger, more differentiated societies (such as that of ancient China). What makes a religion a diffused religion in this context is that it is embedded in institutions it has not itself created. In ancient Chinese society, for instance, the veneration of ancestors and local deities did not give rise to distinct community, comparable to the Christian church or the *ummat al-*

islām (the people of Islam). Rather, such religious practices formed an integral part of community life (Yang 1961: 296–8).

So much for diffused religion. A second variety of religion is what I shall call “institutionalized” religion. Religions of this kind have created their own forms of community life. They have systematized and coordinated bodies of beliefs, organized forms of worship, and an established form of leadership (Yang 1961: 294). As in the case of diffused religions, people generally belong to an institutional religion by virtue of being born into a particular family. But the family will be identified as, for instance, a “Christian,” a “Muslim,” or a “Buddhist” one. In premodern societies, movement from one religious community to another may be possible, but will be rare and socially fraught.

Institutional religions are also of two kinds. There are those that play a dominant role in their societies. Their leaders seek to shape the practices of their society in ways that go beyond the influence exerted on individuals. (The medieval Christian church was an institutional religion of this kind.) Such societies tend towards the “hierocratic,” in the sense of being controlled by a religious hierarchy. But there are also institutional religions existing within hierocratic societies that make no attempt to shape that society as a whole (perhaps because they have no opportunity to do so). A paradigmatic instance of such an institutional religion is that of Judaism, during the periods in which it existed as a minority community within Christian or Muslim societies.

My third variety of religion is what I shall call “modern” religion. This is the form of religion characteristic of the secular states established by the European and North American political revolutions of the eighteenth century. In early forms of modern religion, religious affiliation – one’s confessional allegiance – was an important source of identity. But modern religion has increasingly become a matter of personal choice. While distinct communities continue to exist, movement from one to another has become relatively easy. Modern religious practice may involve participation in the life of an institutional religion, although many such religions have renounced their hierocratic aims. But it can also involve what I shall call “post-institutional” religion: participation in loosely organized and informal religious groups, such as the Wiccan and neo-pagan movements of modern Western societies.

1.4 A Multifaceted Relation

Given the very different forms taken by both *scientia* and religion, it should already be clear that one cannot make general claims about their relation. (“What is the relation between *scientia* and religion?” “Well, it depends.”) There is a further difficulty about generalizations, which has to do with the different facets, the different dimensions of the relationship. I shall discuss four such dimensions.