

The Territories of
SCIENCE AND RELIGION

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[PREFACE]

This book is a revised version of the Gifford Lectures, delivered at the University of Edinburgh in February 2011. The lectures sought to address the history of two overlapping sets of concerns—those to do with the nature of the physical universe and its operations, and those that concern the goals of human existence and the source of our moral values. We now tend to think of these questions as belonging to the distinct domains of science and religion. When we look to the past, however, we see that the boundaries of these two domains have been understood very differently and that questions concerning ultimate human meaning and value were rarely divorced from understandings of the nature of the universe. In one sense, then, this book is about the history of science and religion in the West. But it would be more accurate to say that it seeks to describe how it is that we have come to understand the world in terms of these distinct categories “science” and “religion”—how, in other words, we have come to separate the domain of material facts from the realm of moral and religious values.

This subject matter brings with it two particular challenges. The first should be more or less immediately apparent. This book cannot be a straightforward history of the relations between science and religion, since my argument is that these two ideas, as they are presently understood, are relatively recent conceptions that emerged in the West over the course of the past three hundred years. What I have sought to do, then,

is to examine past activities that we have typically thought of in those terms, or have regarded as leading to them. A significant part of this exercise will be a consideration of the fortunes of the Latin terms *scientia* and *religio*. These two notions both begin as inner qualities of the individual—“*virtues*,” if you will—before becoming concrete and abstract entities that are understood primarily in terms of doctrines and practices. This process of objectification is the precondition for a relationship between science and religion. In addition to a consideration of the Latin terms from which our modern English words “science” and “religion” derive, we shall also trace changing constellations of other conceptions that are genealogically related to our modern ideas of science and religion. They include “*philosophy*,” “*natural philosophy*,” “*theology*,” “*belief*,” and “*doctrine*,” all of which had meanings for past historical actors that are quite unfamiliar to us today. One of my suggestions will be that there is a danger of systematically misconstruing past activities if we mistakenly assume the stability of meaning of these expressions.

A second challenge concerns the historical range of this book, which begins with classical Greece and early Christianity, and extends into the late nineteenth century. This may seem rather ambitious, particularly in light of a trend in the academy toward tight historical specialization. But this scope is necessary, in part because I am seeking to call into question common narratives about the trajectory of science that mirror this scale, beginning with its birth among the ancient Greeks, its decline in the Christian Middle Ages, its revival with the scientific revolution, and final triumph with the professionalization of science in the nineteenth century. It is also relevant that as a historical religion, modern Christianity still measures itself against its earliest forms, and this warrants paying attention to the early Christian era. That said, I have not attempted to provide a comprehensive history of the manifold ways in which, in the West, the study of the natural world was related to broader philosophical and religious concerns. Rather I have tried to “drill down” into particular historical moments, before moving on to conduct similar exercises for later historical periods. This comparative sampling approach will inevitably leave out some important parts of the story, but it does enable us to take stock of relevant notions at various points in history and make an assessment of

the changes they have undergone. These gaps in the narrative also make it difficult to specify causes for all of the transitions that are identified, and in any case questions of historical causation are notoriously difficult. Nevertheless I will offer some suggestions about why what I consider to be the key transitions happen when they do.

The book is the culmination of a number of projects that I have been working on over the past twenty years, beginning with my early researches into our Western notion “*religion*” and taking in more recent work on the identity of *philosophy* and *science* in different historical periods and on the historical relations between science and religion. I will repeat versions of some arguments that I have advanced before, but the book offers what I believe is an entirely new perspective on these issues, particularly in its attempt to more closely relate the history of moral philosophy to the history of science. In relation to the lectures as delivered, while I have made significant revisions and additions, the six chapters of the book match the content of the six original lectures (in some cases more closely than in others). The first chapter offers a compressed overview of the general argument, and subsequent chapters fill out the details. I have also added scholarly apparatus in the form of fairly substantial endnotes for those interested in following up sources or who wish to pursue individual points in a little more detail. The notes will enable me to keep more arcane discussions out of the text and maintain at least some of the style of the oral presentations. In keeping with the original tone of the lectures on which this book is based, I have tried simply to tell the story, and have refrained (or at least have attempted to refrain) from intruding more recondite theoretical reflections into the narrative. That said, I have added a short epilogue in which I offer some brief remarks on theoretical matters along with observations on how my account relates to other discussions of the history of Western modernity.

The Territories of Science and Religion

How ridiculous are the boundaries of mortals!

—Seneca, *Natural Questions*¹

The ideas entertained of God by wicked men must be bad, and
those of good men most excellent.

—Clement of Alexandria, *Stromata*²

Maps and Territories

If a historian were to contend that he or she had discovered evidence of a hitherto unknown war that had broken out in the year 1600 between Israel and Egypt, this claim would be treated with some skepticism. The refutation of this claim would involve simply pointing out that the states of Israel and Egypt did not exist in the early modern period, and that whatever conflicts might have been raging at this time could not on any reasonable interpretation be accurately described as involving a war between Israel and Egypt. Neither would skeptical historians be impressed if their colleague produced medieval maps that indicated the existence of such places as Jerusalem and Alexandria, and included the various topographical features—rivers, deserts, mountains, plains, coastlines—that we currently might include in any description of the modern states of Israel

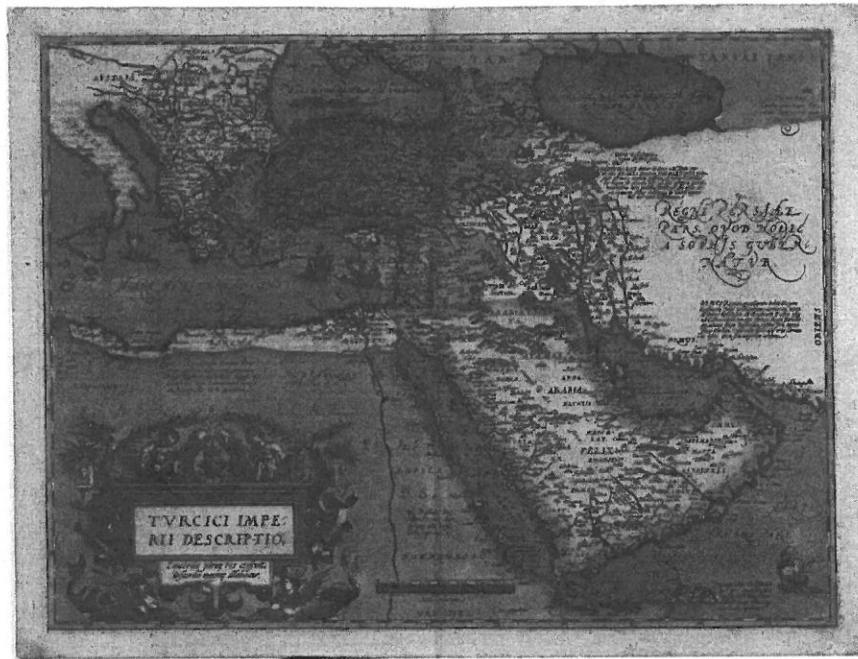


Figure 1. Abraham Ortelius's map of the Ottoman Empire, from the *Theatrum Orbis Terrarum* (1570).

and Egypt (see figure 1). At issue here would be not whether the relevant geographical territory existed then, but whether there were comparable boundaries and self-conscious national identities. Denial of the existence of a sixteenth-century Israel does not entail a denial of the existence of the territory that currently comprises that nation, but rather a denial that the territory was then viewed in a particular light, as something circumscribed by a set of boundaries and informed by particular ideals of nationhood.³ During this period the territories of what we now know as Israel and Egypt were part of the same thing, namely, the Ottoman Empire. The idea of a medieval Israel and a medieval Egypt could only come about through the mistaken application of our present maps onto past territories.

My suggestion is that something similar is true for the entities "sci-

ence" and "religion," and more specifically, that many claims about putative historical relationships are confused for much the same reason as claims about a sixteenth-century conflict between Israel and Egypt: that is to say, they involve the distorting projection of our present conceptual maps back onto the intellectual territories of the past. So familiar are the concepts "science" and "religion," and so central to Western culture have been the activities and achievements that are usually labeled "religious" and "scientific," that it is natural to assume that they have been enduring features of the cultural landscape of the West. But this view is mistaken. To be sure, it is true that in the West from the sixth century BC attempts were made to describe the world systematically, to understand the fundamental principles behind natural phenomena, and to provide naturalistic accounts of the causes operating in the cosmos. Yet, as we shall see, these past practices bear only a remote resemblance to modern science. It is also true that almost from the beginning of recorded history many societies have engaged in acts of worship, set aside sacred spaces and times, and entertained beliefs about transcendental realities and proper conduct. But it is only in recent times that these beliefs and activities have been bounded by a common notion "religion," and have been set apart from the "nonreligious" or secular domains of human existence.

In pointing out that "science" and "religion" are concepts of relatively recent coinage, I intend to do more than make a historical claim about the anachronistic application of modern concepts to past eras. What I have in mind is not only to set out the story of how these categories "science" and "religion" emerge in Western consciousness, but also to show how the manner of their emergence can provide crucial insights into their present relations. In much the same way that we can make sense of certain contemporary international conflicts by attending to the historical processes through which national boundaries were carved out of a geographical territory, so too, with the respective territories of religion and the natural sciences. Just as the borders of nation-states are often more a consequence of imperial ambitions, political expedience, and historical contingencies than of a conscious attending to more "natural" fault lines of geography, culture, and ethnicity—think in this context of the borders of the modern state of Israel—so the compartmentalization of modern Western culture

that gave rise to these distinct notions “science” and “religion” resulted not from a rational or dispassionate consideration of how to divide cultural life along natural fracture lines, but to a significant degree has been to do with political power—broadly conceived—and the accidents of history.

The Joints of Nature

Another way of thinking about these two concepts is to consider an analogy with what philosophers call “natural kinds.” The label “natural kind” is applied to natural groupings of things, the identity of which is natural in the sense that it does not depend on human beings. The sciences of chemistry and zoology, for example, seek to identify such kinds. Chemical elements and compounds are good examples of natural kinds—water, carbon, and hydrocarbons, for example. Occasionally, our everyday concepts, our ideas of what things go together do not map very well onto true natural kinds. We all know what jade is, for example. This lustrous, green, semiprecious stone would seem like a good candidate for being a natural kind. But as it turns out, there are two chemically distinct substances that are called “jade”—jadeite and nephrite.⁴ One is a silicate of sodium and aluminum; the other a silicate of lime and magnesia. Once microstructure is taken into consideration, it becomes clear that jade is not a natural kind, because it is actually two different kinds of natural thing. My argument with regard to the categories “religion” and “science” is that to some degree we are mistaken in thinking that they are analogous to natural kinds, because despite the apparent similarities among those things that we call religions and the things that we call sciences, in fact the concepts and the way we deploy them masks important empirical differences.

In the case of jade, the assumption that there is a single unitary entity can be dispelled by careful measurement of some less obvious properties. The two minerals have slightly different specific gravities, refractive indices, and hardnesses. Infrared spectrographic analysis will also reveal their different chemical makeup. In the case of religion, my suggestion is that in addition to careful examination of the empirical characteristics of the so-called religions—which already brings to light an enormous and possibly irreconcilable diversity—their history is also revealing. Another

instance of apparent kinds reinforces the point. Superficially, whales look like fish, and bats like birds, and folk taxonomies tend to group them together. Careful examination of the internal structures will reveal a different pattern of affinities, but so would the evolutionary history of these creatures, assuming that the latter could be established. The family histories of these groups would make it apparent that whales and bats should both properly be classified with the mammals. Similar considerations apply to both “religion” and “science,” and we can reconstruct the history of these ideas with much greater precision than we can establish the phylogeny of biological taxa. What the history of the categories will show is how disparate, or at least significantly distinct, activities have come to be classified together. In the case of science, “natural history” and “natural philosophy” came together under the rubric “science” for the first time in the nineteenth century. These activities had involved quite different approaches to the study of nature and arguably their modern descendants—biology and physics—still exhibit the vestiges of their genealogical past. Thus, just as our use of the single word “jade” disguises the different composition of the two kinds that now bear that label, so the use of “science” for both historical sciences such as geology and evolutionary biology and physical sciences such as chemistry and physics tends to mask fundamental differences. These differences will necessarily complicate any global claims about the entities “science” and “religion” and their imagined relationship.

What follows from these considerations is that we distort the past if we uncritically apply our modern categories to past activities that would have been conceptualized by those who engaged in them in a quite different way. We should not use our present maps to understand their territory. We should not assume natural kinds where there are none. This means that the idea of a perennial conflict between science and religion must be false, just as claims about an early modern conflict between Israel and Egypt must be false. And this will be equally true for any claimed relationship between science and religion before the modern period. In addition we can say that contemporary “science-religion” relations, however construed (that is to say, whether positively or negatively), are to a large degree determined by the historical conditions under which disciplinary

boundaries originated and developed over time. To advert once again to the map-territory analogy, we can ask whether the conceptual maps that we currently rely on to navigate through our cultural terrain are, to use the ugly but apt phrase, “fit for purpose.” Thus, the question of the origins of boundaries can move beyond description and understanding to a critical inquiry into the appropriateness of how current conceptual maps divide territory. Good concepts, to use Plato’s vivid image, carve nature at the joints (rather than, as he went on to say, dismembering it like a clumsy butcher).⁵ Part of the burden of this book, then, is to ask whether these particular ways of dividing aspects of contemporary Western culture—“science” and “religion”—are helpful ones. In addressing this question I hope to show that “science” and “religion” are not self-evident or natural ways of dividing up cultural territory, that history shows this to be the case (as indeed does present consideration of cultures other than our own), and that persisting with these categories in an uncritical fashion can not only generate unhelpful conflict between science and religion, but can also disguise what perhaps ought to be legitimate sources of tension between the ways of faith and the formal study of nature. In short, this project attempts to set out a historical cartography of the categories “religion” and “science”—arguably the two cultural categories most important for an understanding of the nature of modernity and its legacy—with a view to casting light on their present relationship.

All of this implies that there is something not quite right with how we presently think about the relationship between science and religion, whether we think of it in terms of conflict or congruence, or even if we think that they do not have much to do with each other. Not only is too much of our present discussion uninformed by relevant historical considerations—imagine a comparable analysis of tensions in the Middle East that made no reference to history—but it is also often oblivious to the problematic nature of the categories in question. Much contemporary discussion about science and religion assumes that there are discrete human activities, “science” and “religion,” which have had some unitary and enduring essence that persists over time. That this is not the case, I hope to illustrate in a number of ways, one of which involves closely attending to the history of the relevant terms.

In the remaining sections of this chapter I will make some rather cursory and compressed remarks about the history of the terms “religion” and “science” (or at least of their Latin equivalents). More extended treatments will come in the chapters that follow, but for now I am seeking simply to establish a basic case for the importance of reconsidering our historical understanding of these two concepts.

The History of “Religion”

In the section of his monumental *Summa theologiae* that is devoted to a discussion of the virtues of justice and prudence, the thirteenth-century Dominican priest Thomas Aquinas (1225–74) investigates, in his characteristically methodical and insightful way, the nature of religion. Along with North African Church Father Augustine of Hippo (354–430), Aquinas is probably the most influential Christian writer outside of the biblical authors. From the outset it is clear that for Aquinas religion (*religio*) is a virtue—not, incidentally, one of the preeminent theological virtues, but nonetheless an important moral virtue related to justice.⁶ He explains that in its primary sense *religio* refers to interior acts of devotion and prayer, and that this interior dimension is more important than any outward expressions of this virtue. Aquinas acknowledges that a range of outward behaviors are associated with *religio*—vows, tithes, offerings, and so on—but he regards these as secondary. As I think is immediately obvious, this notion of religion is rather different from the one with which we are now familiar. There is no sense in which *religio* refers to systems of propositional beliefs, and no sense of different religions (plural).⁷ Between Thomas’s time and our own, *religio* has been transformed from a human virtue into a generic something, typically constituted by sets of beliefs and practices. It has also become the most common way of characterizing attitudes, beliefs, and practices concerned with the sacred or supernatural.

Aquinas’s understanding of *religio* was by no means peculiar to him. Before the seventeenth century, the word “religion” and its cognates were used relatively infrequently. Equivalents of the term are virtually nonexistent in the canonical documents of the Western religions—the Hebrew Bible, the New Testament, and the Qur’an. When the term was used in the

premodern West, it did not refer to discrete sets of beliefs and practices, but rather to something more like “inner piety,” as we have seen in the case of Aquinas, or “worship.” As a virtue associated with justice, moreover, *religio* was understood on the Aristotelian model of the virtues as the ideal middle point between two extremes—in this case, irreligion and superstition.⁸

The vocabulary of “true religion” that we encounter in the writings of some of the Church Fathers offers an instructive example. “The true religion” is suggestive of a system of beliefs that is distinguished from other such systems that are false. But careful examination of the content of these expressions reveals that early discussions about true and false religion were typically concerned not with belief, but rather worship and whether or not worship is properly directed. Tertullian (ca. 160–ca. 220) was the first Christian thinker to produce substantial writings in Latin and was also probably the first to use the expression “true religion.” But in describing Christianity as “true religion of the true god,” he is referring to genuine worship directed toward a real (rather than fictitious) God.⁹ Another erudite North African Christian writer, Lactantius (ca. 240–ca. 320), gives the first book of his *Divine Institutes* the title “*De Falsa Religione*.” Again, however, his purpose is not to demonstrate the falsity of pagan beliefs, but to show that “the religious ceremonies of the [pagan] gods are false,” which is just to say that the objects of pagan worship are false gods. His positive project, an account of true religion, was “to teach in what manner or by what sacrifice God must be worshipped.” Such rightly directed worship was for Lactantius “the duty of man, and in that one object the sum of all things and the whole course of a happy life consists.”¹⁰

Jerome’s choice of *religio* for his translation of the relatively uncommon Greek *thrēskeia* in James 1:27 similarly associates the word with cult and worship. In the English of the King James version the verse is rendered: “Pure and undefiled religion [*thrēskeia*] before God the Father is this, To visit the fatherless and widows in their affliction, and to keep himself unspotted from the world.”¹¹ The import of this passage is that the “religion” of the Christians is a form of worship that consists in charitable acts rather than rituals. Here the contrast is between religion that is “vain” (*vana*) and that which is “pure and undefiled” (*religio munda et*

immaculata).¹² In the Middle Ages this came to be regarded as equivalent to a distinction between true and false religion. The twelfth-century *Distinctiones* Abel of Peter the Chanter (d. 1197), one of the most prominent of the twelfth-century theologians at the University of Paris, makes direct reference to the passage from James, distinguishing religion that is pure and true (*munda et vera*) from that which is vain and false (*vana et falsa*).¹³ His pupil, the scholastic Radulfus Ardens, also spoke of “true religion” in this context, concluding that it consists in “the fear and love of God, and the keeping of his commandments.”¹⁴ Here again there is no sense of true and false doctrinal content.

Perhaps the most conspicuous use of the expression “true religion” among the Church Fathers came in the title of *De vera religion* (On True Religion), written by the great doctor of the Latin Church, Augustine of Hippo. In this early work Augustine follows Tertullian and Lactantius in describing true religion as rightly directed worship. As he was to relate in the *Retractions*: “I argued at great length and in many ways that true religion means the worship of the one true God.”¹⁵ It will come as no surprise that Augustine here suggests that “true religion is found only in the Catholic Church.”¹⁶ But intriguingly when writing the *Retractions* he was to state that while Christian religion is a form of true religion, it is not to be identified as the true religion. This, he reasoned, was because true religion had existed since the beginning of history and hence before the inception of Christianity.¹⁷ Augustine addressed the issue of true and false religion again in a short work, *Six Questions in Answer to the Pagans*, written between 406 and 412 and appended to a letter sent to Deogratius, a priest at Carthage. Here he rehearses the familiar stance that true and false religion relates to the object of worship: “What the true religion reprehends in the superstitious practices of the pagans is that sacrifice is offered to false gods and wicked demons.”¹⁸ But again he goes on to explain that diverse cultic forms might all be legitimate expressions of true religion, and that the outward forms of true religion might vary in different times and places: “it makes no difference that people worship with different ceremonies in accord with the different requirements of times and places, if what is worshipped is holy.” A variety of different cultural forms of worship might thus be motivated by a common underlying “religion”: “differ-

ent rites are celebrated in different peoples bound together by one and the same religion."¹⁹ If true religion could exist outside the established forms of Catholic worship, conversely, some of those who exhibited the outward forms of Catholic religion might lack "the invisible and spiritual virtue of religion."²⁰

This general understanding of religion as an inner disposition persisted into the Renaissance. The humanist philosopher and Platonist Marsilio Ficino (1433–99) thus writes of "christian religion," which is evidenced in lives oriented toward truth and goodness. "All religion," he wrote, in tones reminiscent of Augustine, "has something good in it; as long as it is directed towards God, the creator of all things, it is true Christian religion."²¹ What Ficino seems to have in mind here is the idea that Christian religion is a *Christlike* piety, with "Christian" referring to the person of Christ, rather than to a system of religion—"the Christian religion." Augustine's suggestion that true and false religion might be displayed by Christians was also reprised by the Protestant Reformer Ulrich Zwingli, who wrote in 1525 of "true and false religion as displayed by Christians."²²

It is worth mentioning at this point that, unlike English, Latin has no articles—no "a" or "the." Accordingly, when rendering expressions such as "*vera religio*" or "*christiana religio*" into English, translators had to decide on the basis of context whether to add an article or not. As we have seen, such decisions can make a crucial difference, for the connotations of "true religion" and "christian religion" are rather different from those of "*the true religion*" and "*the Christian religion*." The former can mean something like "*genuine piety*" and "*Christlike piety*" and are thus consistent with the idea of religion as an interior quality. Addition of the definite article, however, is suggestive of a system of belief. The translation history of Protestant Reformer John Calvin's classic *Institutio Christianae Religionis* (1536) gives a good indication both of the importance of the definite article and of changing understandings of religion in the seventeenth century. Calvin's work was intended as a manual for the inculcation of Christian piety, although this fact is disguised by the modern practice of rendering the title in English as *The Institutes of the Christian Religion*. The title page of the first English edition by Thomas Norton bears the more faithful "The Institution of Christian Religion" (1561).²³ The definite article is placed be-

fore "Christian" in the 1762 Glasgow edition: "The Institution of the Christian Religion." And the now familiar "Institutes" appears for the first time in John Allen's 1813 edition: "The Institutes of the Christian Religion." The modern rendering is suggestive of an entity "the Christian religion" that is constituted by its propositional contents—"the institutes." These connotations were completely absent from the original title. Calvin himself confirms this by declaring in the preface his intention "to furnish a kind of rudiments, by which those who feel some interest in religion might be trained to true godliness."²⁴

With the increasing frequency of the expressions "religion" and "the religions" from the sixteenth century onward we witness the beginning of the objectification of what was once an interior disposition. Whereas for Aquinas it was the "interior" acts of religion that held primacy, the balance now shifted decisively in favor of the exterior. This was a significant new development, the making of religion into a systematic and generic entity.²⁵ The appearance of this new conception of religion was a precondition for a relationship between science and religion. While the causes of this objectification are various, the Protestant Reformation and the rise of experimental natural philosophy were key factors, as we shall see in chapter 4.

The History of "Science"

It is instructive at this point to return to Thomas Aquinas, because when we consider what he has to say on the notion of science (*scientia*) we find an intriguing parallel to his remarks on *religio*. In an extended treatment of the virtues in the *Summa theologiae*, Aquinas observes that science (*scientia*) is a habit of mind or an "intellectual virtue."²⁶ The parallel with *religio*, then, lies in the fact that we are now used to thinking of both religion and science as systems of beliefs and practices, rather than conceiving of them primarily as personal qualities. And for us today the question of their relationship is largely determined by their respective doctrinal content and the methods through which that content is arrived at. For Aquinas, however, both *religio* and *scientia* were, in the first place, personal attributes.

We are also accustomed to think of virtues as belonging entirely within

the sphere of morality. But again, for Aquinas, a virtue is understood more generally as a "habit" that perfects the powers that individuals possess.²⁷ This conviction—that human beings have natural powers that move them toward particular ends—was related to a general approach associated with the Greek philosopher Aristotle (384–322 BC), who had taught that all natural things are moved by intrinsic tendencies toward certain goals (*telē*). For Aristotle, this teleological movement was directed to the perfection of the entity, or to the perfection of the species to which it belonged.²⁸ As it turns out, one of the natural tendencies of human beings was a movement toward knowledge. As Aristotle famously wrote in the opening lines of the *Metaphysics*, "all men by nature desire to know."²⁹ In this scheme of things, our intellectual powers are naturally directed toward the end of knowledge, and they are assisted in their movement toward knowledge by acquired intellectual virtues.

One of the great revolutions of Western thought took place in the twelfth and thirteenth centuries, when much Greek learning, including the work of Aristotle, was rediscovered. Aquinas played a pivotal role in this recovery of ancient wisdom, making Aristotle one of his chief conversation partners. He was by no means a slavish adherent of Aristotelian doctrines, but nonetheless accepted the Greek philosopher's premise that the intellectual virtues perfect our intellectual powers. Aquinas identified three such virtues—understanding (*intellectus*), science (*scientia*), and wisdom (*sapientia*).³⁰ Briefly, understanding was to do with grasping first principles, science with the derivation of truths from those first principles, and wisdom with the grasp of the highest causes, including the first cause, God.³¹ To make progress in science, then, was not to add to a body of systematic knowledge about the world, but was to become more adept at drawing "scientific" conclusions from general premises. "Science" thus understood was a mental habit that was gradually acquired through the rehearsal of logical demonstrations. In Thomas's words: "science can increase in itself by addition; thus when anyone learns several conclusions of geometry, the same specific habit of science increases in that man."³²

These connotations of *scientia* were well known in the Renaissance and persisted until at least the end of the seventeenth century. The English physician John Securis wrote in 1566 that "science is a habit" and "a dis-

position to do any thing confirmed and had by long study, exercise, and use."³³ *Scientia* is subsequently defined in Thomas Holyoake's *Dictionary* (1676) as, properly speaking, the act of the knower, and, secondarily, the thing known. This entry also stresses the classical and scholastic idea of science as "a habit of knowledge got by demonstration."³⁴ French philosopher René Descartes (1596–1650) retained some of these generic, cognitive connotations when he defined *scientia* as "the skill to solve every problem."³⁵

Yet, according to Aquinas, *scientia*, like the other intellectual virtues, was not solely concerned with rational and speculative considerations. In a significant departure from Aristotle, who had set out the basic rationale for an ethics based on virtue, Aquinas sought to integrate the intellectual virtues into a framework that included the supernatural virtues (faith, hope, and charity), "the seven gifts of the spirit," and the nine "fruits of the spirit."³⁶ While the various relations are complicated, particularly when beatitudes and vices are added to the equation, the upshot of it all is a considerable overlap of the intellectual and moral spheres. As philosopher Eleonore Stump has written, for Aquinas "all true excellence of intellect—wisdom, understanding and *scientia*—is possible only in connection with moral excellence as well." By the same token, on Aquinas's understanding, moral transgressions will have negative consequences for the capacity of the intellect to render correct judgments: "Carnal vices result in a certain culpable ignorance and mental dullness; and these in turn get in the way of understanding and *scientia*."³⁷ *Scientia*, then, was not only a personal quality, but also one that had a significant moral component.

The parallels between the virtues of *religio* and *scientia*, it must be conceded, are by no means exact. While in the Middle Ages there were no plural religions (or at least no plural religions understood as discrete sets of doctrines), there were undeniably sciences (*scientiae*), thought of as distinct and systematic bodies of knowledge.³⁸ The intellectual virtue *scientia* thus bore a particular relation to formal knowledge. On a strict definition, and following a standard reading of Aristotle's *Posterior Analytics*, a body of knowledge was regarded as scientific in the event that it had been arrived at through a process of logical demonstration.³⁹ But in practice the label "science" was extended to many forms of knowledge. The

canonical divisions of knowledge in the Middle Ages—what we now know as the seven “liberal arts” (grammar, logic, rhetoric, arithmetic, astronomy, music, geometry)—were then known as the liberal sciences.⁴⁰ The other common way of dividing intellectual territory derived from Aristotle’s classification of theoretical or speculative philosophy. In his discussion of the division and methods of the sciences, Aquinas noted that the standard classification of the seven liberal sciences did not include the Aristotelian disciplines of natural philosophy, mathematics, and theology. Accordingly, he argued that the label “science” should be given to these activities, too.⁴¹ Robert Kilwardby (ca. 1215–79), successively regent at the University of Oxford and archbishop of Canterbury, extended the label even further in his work on the origin of the sciences, identifying forty distinct *scientiae*.⁴²

The English word “science” had similar connotations. As was the case with the Latin *scientia*, the English term commonly referred to the subjects making up the seven liberal arts. In catalogs of English books published between 1475 and 1700 we encounter the natural and moral sciences, the sciences of physick (medicine), of surgery, of logic and mathematics. Broader applications of the term include accounting, architecture, geography, sailing, surveying, defense, music, and pleading in court. Less familiarly, we also encounter works on the science of angels, the science of flattery, and in one notable instance, the science of drinking, drolly designated by the author the “eighth liberal science.”⁴³ At nineteenth-century Oxford “science” still referred to elements of the philosophy curriculum.⁴⁴ The idiosyncrasies of English usage at the University of Oxford notwithstanding, the now familiar meaning of the English expression dates from the nineteenth century, when “science” began to refer almost exclusively to the natural and physical sciences.

Returning to the comparison with medieval *religio*, what we can say is that in the Middle Ages both notions have a significant interior dimension, and that what happens in the early modern period is that the balance between the interior and exterior begins to tip in favor of the latter. Over the course of the sixteenth and seventeenth centuries we will witness the beginning of a process in which the idea of religion and science as virtues or habits of mind begins to be overshadowed by the modern, systematic

entities “science” and “religion.” In the case of *scientia*, then, the interior qualities that characterized the intellectual virtue of *scientia* are transferred to methods and doctrines. The entry for “science” in the 1771 *Encyclopaedia Britannica* thus reads, in its entirety: “SCIENCE, in philosophy, denotes any doctrine, deduced from self-evident and certain principles, by a regular demonstration.”⁴⁵ The logical rigor that had once been primarily a personal characteristic now resides primarily in the corresponding body of knowledge.

The other significant difference between the virtues of *religio* and *scientia* lies in the relation of the interior and exterior elements. In the case of *religio*, the acts of worship are secondary in the sense that they are motivated by an inner piety. In the case of *scientia*, it is the rehearsal of the processes of demonstration that strengthens the relevant mental habit. Crucially, because the primary goal is the augmentation of mental habits, gained through familiarity with systematic bodies of knowledge (“the sciences”), the emphasis was less on the production of scientific knowledge than on the rehearsal of the scientific knowledge that already existed. Again, as noted earlier, this was because the “growth” of science was understood as taking place within the mind of the individual. In the present, of course, whatever vestiges of the scientific *habitus* remain in the mind of the modern scientist are directed toward the production of new scientific knowledge. In so far as they exist at all—and for the most part they have been projected outward onto experimental protocols—they are a means and not the end. Overstating the matter somewhat, in the Middle Ages scientific knowledge was an instrument for the inculcation of scientific habits of mind; now scientific habits of mind are cultivated primarily as an instrument for the production of scientific knowledge.

The atrophy of the virtues of *scientia* and *religio*, and the increasing emphasis on their exterior manifestations in the sixteenth and seventeenth centuries, will be discussed in more detail in chapter 4. But looking ahead we can say that in the physical realm virtues and powers were removed from natural objects and replaced by a notion of external law. The order of things will now be understood in terms of laws of nature—a conception that makes its first appearance in the seventeenth century—and these laws will take the place of those inherent tendencies within things

that strive for their perfection. In the moral sphere, a similar development takes place, and human virtues will be subordinated to an idea of divinely imposed laws—in this instance, moral laws. The virtues—moral and intellectual—will be understood in terms of their capacity to produce the relevant behaviors or bodies of knowledge. What drives both of these shifts is the rejection of an Aristotelian and scholastic theology, and the subsequent demise of the classical understanding of virtue will underpin the early modern transformation of the ideas of scientia and religio.

Science and Religion?

It should by now be clear that the question of the relationship between science (*scientia*) and religion (*religio*) in the Middle Ages was very different from the modern question of the relationship between science and religion. Were the question put to Thomas Aquinas, he may have said something like this: Science is an intellectual habit; religion, like the other virtues, is a moral habit.⁴⁶ There would then have been no question of conflict or agreement between science and religion because they were not the kinds of things that admitted those sorts of relations. When the question is posed in our own era, very different answers are forthcoming, for the issue of science and religion is now generally assumed to be about specific knowledge claims or, less often, about the respective processes by which knowledge is generated in these two enterprises. Between Thomas's time and our own, *religio* has been transformed from a human virtue into a generic something typically constituted by sets of beliefs and practices. *Scientia* has followed a similar course, for although it had always referred both to a form of knowledge and a habit of mind, the interior dimension has now almost entirely disappeared. During the sixteenth and seventeenth centuries, both religion and science were literally turned inside out.

Admittedly, there would have been another way of posing this question in the Middle Ages. In focusing on *religio* and *scientia* I have considered the two concepts that are the closest *linguistically* to our modern "religion" and "science." But there may be other ancient and medieval precedents of our

modern notions "religion" and "science," that have less obvious linguistic connections.⁴⁷ It might be argued, for example, that two other systematic activities lie more squarely in the genealogical ancestry of our two objects of interest, and they are theology and natural philosophy. A better way to frame the central question, it could then be suggested, would be to inquire about theology (which looks very much like a body of religious knowledge expressed propositionally) and natural philosophy (which was the name given to the systematic study of nature up until the modern period), and their relationship.⁴⁸

There is no doubt that these two notions are directly relevant to our discussion, but I have avoided mention of them up until now, first, because I have not wished to pull apart too many concepts at once and, second, because we will be encountering these two ideas and the question of how they fit into the trajectory of our modern notions of science and religion in subsequent chapters. For now, however, it is worth briefly noting that the term "theology" was not much used by Christian thinkers before the thirteenth century. The word *theologia* appears for the first time in Plato (ca. 428–348 BC), and it is Aristotle who uses it in a formal sense to refer to the most elevated of the speculative sciences.⁴⁹ Partly because of this, for the Church Fathers "theology" was often understood as referring to pagan discourse about the gods. Christian writers were more concerned with the interpretation of scripture than with "theology," and the expression "sacred doctrine" (*sacra doctrina*) reflects their understanding of the content of scripture. When the term does come into use in the later Middle Ages, there were two different senses of "theology"—one a speculative science as described by Aristotle, the other the teaching of the Christian scriptures.⁵⁰

Famously, the scholastic philosophers inquired as to whether theology (in the sense of *sacra doctrina*) was a science. This is not the place for an extended discussion of that commonplace, but the question does suggest one possible relation between science and theology—that theology is a species of the genus "science." Needless to say, this is almost completely disanalogous to any modern relationship between science and religion as we now understand them. Even so, this question affords us the opportu-

nity to revisit the relationship between virtues and the bodies of knowledge that they were associated with. In so far as theology was regarded as a science, it was understood in light of the virtue of *scientia* outlined above. In other words, theology was also understood to be, in part, a mental habit. When Aquinas asks whether sacred doctrine is one science, his affirmative answer refers to the fact that there is a single faculty or habit involved.⁵¹ His contemporary, the Franciscan theologian Bonaventure (1221–74), was to say that theological science was a habit that had as its chief end “that we become good.”⁵² The “subtle doctor,” John Duns Scotus (ca. 1265–1308), later wrote that the “science” of theology perfects the intellect and promotes the love of God: “The intellect perfected by the habit of theology apprehends God as one who should be loved.”⁵³ While these three thinkers differed from each other significantly in how they conceptualized the goals of theology, what they shared was a common conviction that theology was, to use a current expression somewhat out of context, habit forming.

As for “natural philosophy” (*physica, physiologia*), historians of science have argued for some years now that this is the closest ancient and medieval analogue to modern science, although they have become increasingly sensitive to the differences between the two activities.⁵⁴ Typically, these differences have been thought to lie in the subject matter of natural philosophy, which traditionally included such topics as God and the soul, but excluded mathematics and natural history. On both counts natural philosophy looks different from modern science. What has been less well understood, however, are the implications of the fact that natural philosophy was an integral part of philosophy. These implications are related to the fact that philosophy, as practiced in the past, was less about affirming certain doctrines or propositions than it was about pursuing a particular kind of life. Thus natural philosophy was thought to serve general philosophical goals that were themselves oriented toward securing the good life. These features of natural philosophy will be discussed in more detail in the chapter that follows. For now, however, my suggestion is that moving our attention to the alternative categories of theology and natural philosophy will not yield a substantially different view of the kinds of historical transitions that I am seeking to elucidate.

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The nineteenth-century French scholar Ernest Renan (1823–92), while probably best known for his popular and controversial *Life of Jesus* (1863), also penned the classic essay “What Is a Nation?” (1882). Here, he offers this telling remark: “Forgetting—I would go so far as to say historical error—is a crucial factor in the creation of a nation.”⁵⁵ The specific case that Renan had in mind was the reified object “*la France*.” France, he suggests, invented nationhood, and all other models of the nation were henceforth regarded as inferior imitations. But the very idea of France required the jettisoning of a burden of unwelcome historical truths. While we are all aware of the manner in which the idea of a nation involves founding myths of various kinds, and through them, the positive construction of a particular ideal, we are here reminded that founding myths also require a kind of negation—an amnesia about what came before, and a forgetting of historical realities that might challenge the integrity of our new conception. Indeed, Karl Deutsch’s similarly unflattering definition of a nation—“a group of people united by a mistaken view about the past and a hatred of their neighbours”—is not an altogether unfitting description for those who in recent times have sought to foment hostility between science and religion.⁵⁶ This first chapter has provided some reasons for thinking that the creation of the modern boundaries of these concepts has also been accompanied by a kind of historical amnesia. In the chapters to come, I hope to expose some of the myths that inform our present categories, and to offer further details of an alternative, and largely forgotten history—a history that, once called to mind, may help us reconfigure the relationship between the entities that we now call “science” and “religion.”