CHAPTER 1
Conflict and Independence

In 1633, at the age of 70, Galileo Galilei—the famed mathematician and scientist from Pisa—was forced on threat of excommunication and possible execution to kneel before the Inquisitors of the Roman Catholic Church. He was given a prepared statement to read aloud which disavowed the work he had done the previous two decades. Of what heinous heresy was he suspected? Simply that the earth moved around the sun each year and turned on its axis every day.

When most people consider the way science and religion—or more specifically for this book, science and Christianity—have interacted, it is this story of Galileo and the Church that is taken as the paradigm. Over the centuries Christianity had developed a geocentric worldview that included the belief that the earth was immobile at the center of the universe, and all of the celestial objects circled it. This cosmological picture was primarily informed by Aristotle's physics and Ptolemy's astronomy, but the Church could also appeal to verses in the Bible that were most naturally interpreted as supporting the earth-centered cosmos. That led to some fireworks.

Today, the popular understanding is that the Galileo episode was a straightforward conflict between science and Christianity in which the Church was more concerned with protecting its tradition and authority than with discovering the truth. As might be expected, the real story is more complicated than this. We consider it further in this chapter, along with several other episodes that illustrate the complex relationship between science and Christianity.

The aim here is not to provide a full-blown history of science and Christianity, nor is it to prescribe how these two influential enterprises in society *should* interact today. More modestly, this chapter aims to illustrate and explain some of the ways that science and Christianity have in fact interacted. Before looking at these, it will be helpful to discuss a few of the classification systems that have been used to organize the topic.

Science and Christianity: An Introduction to the Issues, First Edition. By J. B. Stump.

Questions to be addressed in this chapter:

1. What are the ways that scholars organize the relationship between science and Christianity?
2. What was the conflict between Galileo and the Church?
3. How can science and Christianity be seen as independent forms of inquiry?
4. What is the Two Books metaphor?

1. Ways that science and Christianity might be related

As long as science and Christianity have been around, people have written about them and their relationship, but systematic reflection on these topics by a community of scholars is a fairly recent phenomenon. It has only been for the last generation or so that "Science and Religion" has been a distinct academic discipline with its own journals and university degree programs. The godfather of this movement has been Ian Barbour (1923–2013). His book *Issues in Science and Religion* (1966) is a thorough overview of the relevant topics, and it set the agenda for subsequent thinkers in the field. In that book and his *Myths, Models and Paradigms* (1974), he began developing a classification system for how science and religion can be related to each other. But it was his Gifford Lectures of 1989–1990 (Barbour 1990) where this typology was defended systematically.

Barbour's four categories are conflict, independence, dialogue, and integration. The first assumes that either the scientific or the religious way of acquiring knowledge is correct, and not both; thus, they are in conflict with each other. At the other end of the spectrum—the independence thesis—science and religion are completely separate and self-contained ways of knowing; as such, they operate in different spheres, and their claims neither conflict nor agree with each other. The dialogue model assumes that science and religion do impinge on each other at certain points, such as the origin of the universe, and so they ought to recognize the insights that each brings to these questions. Finally, the integration model pushes beyond mere dialogue between distinct disciplines and tries to effect a synthesis of science and religion; this can be seen in attempts to develop a **theology** of nature or in process theology where explanations are developed that draw from both the sciences and theology.

Barbour's four-fold typology of contemporary views for how science and religion may be related

1. **Conflict:** science or religion can be victorious in their explanations, but not both
2. **Independence:** science and religion each have their own sphere of inquiry and cannot conflict
3. **Dialogue:** there is contact between science and religion at boundary questions, like the reason for the orderliness of the universe
4. **Integration:** theological doctrines and scientific theories might be integrated into one coherent model, like a theology of creation

As might be expected, other scholars reflected on Barbour's work and offered critiques and modifications to his typology. Ted Peters (1996) expanded the list of categories, identifying eight different ways that science and religion interact. Christian Berg (2004) reorganized the typology completely, believing it more useful to look at the relationship between science and religion under the dimensions of **metaphysics**, **epistemology**, and **ethics**. Stenmark (2012) suggested that we should first consider the kind of jobs science and Christianity do. If they are trying to do the same job, then they are in competition; if they do completely different jobs, then they are independent of each other; and if their jobs are different but they overlap to some extent, then there will be points of contact between science and religion.

After Barbour, it might be argued that the next most influential scholar in framing the discussion of how science and religion are related is John Hedley Brooke. His *Science and Religion: Some Historical Perspectives* (1991) derives from detailed historical research the many facets of how science and religion have been related. The conclusion of his work is that the relationship between science and religion cannot be described under one general heading. This has come to be known as the **Complexity thesis**. Another contemporary historian of science, Ronald Numbers, is convinced of the complexity thesis, but sees the need to provide some midscale generalizations or patterns that might prove helpful in organizing and understanding the vast data and literature on the subject. To this end, he describes five trends in the ongoing relationship between science and religion: naturalization, privatization, secularization, globalization, and radicalization (Numbers 2010).

These ways of carving up the conceptual territory at the intersection of science and religion are all helpful. Undoubtedly there are even more ways to get at other nuances of the relationship. For our purposes in this chapter, it will suffice to look more generally at the relationship by considering historical examples of conflict and independence. The next two chapters address examples of influence on each other.

2. Conflict

Today's accepted narrative arc of how historians have understood the relationship between science and Christianity begins with the **conflict thesis** of John William Draper and Andrew Dickson White. Draper's *History of the Conflict between Religion and Science* (1896), first published in 1874, and White's *A History of the Warfare of Science with Theology in Christendom* (1922), first published in 1896, set the tone for how scholars thought about science and Christianity in the first half of the 20th century. On this view, Christianity is cast in the role of the oppressive and stultifying stepmother who held back the young, reasonable, and progressive maiden of science and kept her from flowering throughout the **Middle Ages**. Then science finally broke free from the oppressive Church, or so the story goes, and steadily added to our accumulated knowledge and quality of life.

John William Draper (1811–1882)

A chemist and physician, Draper was one of the founders of the New York University School of Medicine. His *History of the Conflict between Religion and Science* (1896), first published in 1874, was widely read and conditioned generations of people to view science and religion as competing explanations.

Andrew Dickson White (1832–1918)

White was a professor of history and English at the University of Michigan until 1863 and then joined with Ezra Cornell to found Cornell University. White became the university's first president. He published *A History of the Warfare of Science with Theology in Christendom* (1922) in 1896, which continued Draper's interpretation.

This account found sympathetic ears during the heyday of positivism early in the 20th century, and it gained enough traction in the wider culture so that even after the demise of positivism it is still common to hear science and Christianity being pitted against each other in warlike tones. Draper's words gave voice to the feeling that many still share today:

> The history of Science is not a mere record of isolated discoveries; it is a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditionary faith and human interests on the other. (Draper 1896, vi)

That Draper's and White's historical analyses have been severely criticized by contemporary historians of science is almost beside the point. The rhetoric of this view operates more at the level of talk show discussions, and the sensationalized story plays well within the broader culture.

Of course, even within academia it is not difficult to gather evidence from the pages of history that seems to lend support to the conflict thesis. Indeed, the marquee event of the relationship between science and Christianity appears to illustrate precisely the claim of Draper: Galileo's forced recantation before the Church. The story was introduced at the beginning of the chapter, but now let's look at it more closely.

In the early 17th century, Holland was famous for its industry of grinding glass into lenses. In 1609, Galileo heard that someone there had placed just the right lenses at either end of an enclosed tube and was thereby able to magnify threefold the image of objects seen at a distance. Galileo improved the design of what would come to be called the telescope and succeeded in achieving a magnification of twenty times. In late 1609, he pointed his telescope to the heavens and made several discoveries that challenged the picture of the universe the Church had held for centuries. He wrote up these discoveries and published them in 1610 in a pamphlet portentously titled, "The Starry Messenger: Revealing great, unusual, and remarkable spectacles" (found in Drake 1957). What did he see?

First, he saw that the moon was not a perfect sphere. The prevailing view was that all objects in the celestial realm had to be perfect spheres. But Galileo's moon appeared to have mountains and craters on its surface, just like the kind

of irregularity we find in objects of the terrestrial region. Next, he reported seeing many more stars than were visible to the naked eye—ten times as many. His pamphlet included drawings of familiar constellations along with the positions of these additional stars. He also observed that the "Milky Way," which presents itself to the naked eye as a uniformly cloudy substance, is diffused into "congeries of innumerable stars grouped together in clusters" (ibid., 49). Finally, and most importantly to Galileo's mind, he saw four bright dots around the planet Jupiter. Subsequent observations showed that these were not static relative to the planet but instead orbited around Jupiter. This undermined the belief that all celestial objects orbited the earth. Whether or not Jupiter orbited the earth, here were four celestial objects—originally called "stars"—that circled another body in the heavens. Later telescopic observations would include the phases of Venus, which are predicted by the sun-centered system, and sunspots, which speak to the imperfection of another "heavenly" body.

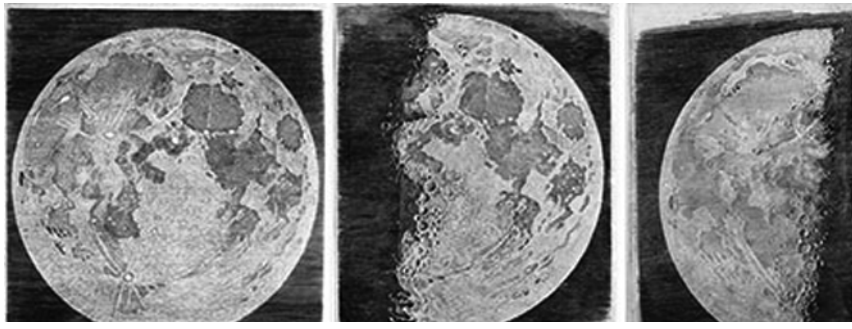

Fig. 1.1 *Three Maps of the Moon*, 1637, by Claude Mellan. These engravings show three different phases of the moon in the kind of detail made possible by the telescope. Source: Abbeville, Musée Boucher de Perthes.

The "Starry Messenger" clearly endorses the Copernican heliocentric model, but does not raise at all the theological questions that would trouble the Church. Reading the pamphlet today, it almost seems like Galileo didn't realize that his discoveries had any theological ramifications. He would soon be disabused of that idea. Over the next few years, conservative philosophers and clergy began arguing that Galileo was a heretic because he believed the earth moved while the Bible clearly indicated otherwise. Instead of engaging in a public dispute, Galileo attempted to counter these charges privately by writing long letters on the topic of the relationship of the Bible to science.

One of these letters was written in 1615 to the widow of the Grand Duke of Tuscany, Ferdinando de' Medici, one of Galileo's patrons, in whose honor Galileo named the moons of Jupiter. The letter has come to be known as the "Letter to the Grand Duchess Christina." In it Galileo argued that while the Bible indeed should be taken as infallible when understood correctly it really has very little to say about matters of astronomy. Where it does mention things like the apparent motion of the earth, we should understand this as language that was accommodated to the people of the time and place in which it was written. Perhaps that

argument by itself might have placated some, but Galileo argued in further ways that seemed to undermine the authority of scripture. He said, "I think that in discussions of physical problems we ought to begin not from the authority of scriptural passages, but from sense-experiences and necessary demonstrations" (ibid., 182). This was a direct challenge to the primacy the Church enjoyed as the caretaker of knowledge in all areas of life. The Protestant Reformation was still fresh in the minds of the Catholic Church leaders, and they were not going to let something like sense experience—let alone the sense experience delivered through a tube with lenses at either end—overturn what they knew to be true by revelation.

Galileo's letters were circulated widely, and the Church hierarchy felt that they needed to put a check on the momentum Galileo's position was gaining. In March 1616, the Congregation of the Index published a decree that declared false the idea that the earth moves. Galileo was issued a personal warning by Cardinal Robert Bellarmine (with the authority of the Inquisition) that he was not to hold or defend such a theory. Galileo was a good Catholic, believing that the Church held the fate of his eternal soul in its hands. So he complied until 1623, when Cardinal Maffeo Barberini became Pope Urban VIII. Barberini had been sympathetic to Galileo, so Galileo felt free to embark on a major project related to heliocentrism.

Geocentrism [jee-oh-**sen**-triz-um]
The doctrine that the earth is the center of the universe.

Heliocentrism [hee-lee-oh-**sen**-triz-um]
The doctrine that the sun is the center of the universe, and later that the sun is the center of the solar system.

Geokineticism [jee-oh-ki-**ne**-ti-siz-um]
The doctrine that the earth moves around the sun.

It is only fair to note that the objections against heliocentrism were not exclusively theological. There were significant difficulties for the accepted physics of the day created by the supposition that the earth moves. Why can't we feel it? Why aren't there constant massive winds? Why don't projectiles seem affected by the motion of the earth beneath them? Such questions show that a major overhaul to the general belief system was needed if heliocentrism was to be accepted. Galileo set out to describe a comprehensive worldview that incorporated the new empirical discoveries within the framework of a new physics and a way of understanding them theologically. In 1632, he published a book as a dialogue between three characters, entitled *Dialogue Concerning the Two Chief World Systems: Ptolemaic and Copernican* (Galilei 1967). Galileo argued that the book did not violate the warning he was given in 1616, saying that the book does not really defend the thesis that the earth moves but merely presents some favorable arguments that are ultimately inconclusive. The Inquisitors saw it otherwise, and Urban VIII did not come to Galileo's defense. Ultimately, he was convicted of the "vehement suspicion of heresy," forced to recant, and condemned to house arrest for the remainder of his life. The offending beliefs in particular were the

cosmological thesis that the earth moves and the methodological principle that the Bible is not a scientific authority.

Galileo's forced recantation

"I, Galileo, son of the late Vincenzo Galilei, Florentine, aged seventy years, arraigned personally before this tribunal and kneeling before you, Most Eminent and Reverend Lord Cardinals Inquisitors-General against heretical pravity throughout the entire Christian commonwealth, having before my eyes and touching with my hands the Holy Gospels, swear that I have always believed, do believe, and by God's help will in the future believe all that is held, preached, and taught by the Holy catholic and apostolic Church. But, whereas—after an injunction had been judicially intimated to me by this Holy Office to the effect that I must altogether abandon the false opinion that the Sun is the center of the world and immovable and that the Earth is not the center of the world and moves and that I must not hold, defend, or teach in any way whatsoever, verbally or in writing, the said false doctrine, and after it had been notified to me that the said doctrine was contrary to Holy Scripture—I wrote and printed a book in which I discuss this new doctrine already condemned and adduce arguments of great cogency in its favor without presenting any solution of these, I have been pronounced by the Holy Office to be vehemently suspected of heresy, that is to say of having held and believed that the Sun is the center of the world and immovable and that the Earth is not the center and moves: Therefore, desiring to remove from the minds of your Eminences, and of all faithful Christians, this vehement suspicion justly conceived against me, with sincere heart and unfeigned faith I abjure, curse, and detest the aforesaid errors and heresies…"

Galileo recited the statement and then signed it with the following:

"I, the said Galileo Galilei, have abjured, sworn, promised, and abound myself as above; and in witness of the truth thereof I have with my own hand subscribed the present document of my abjuration and recited it word for word at Rome, in the convent of the Minerva, this twenty-second day of June, 1633." (Santillana 1955, 312–313)

The scientific conclusion that the earth moves was certainly jarring to the mindset of 17th-century Christians. But perhaps more unsettling was the latter half of the charge—that the Bible should not be used as a scientific authority. It may be anachronistic to say "scientific" here, as our conception of science today is much narrower than the **natural philosophy** of the 17th century. Of course, the Bible does not contain mathematical formulas and discourses on atomic structures. But does it contain references to the natural world that are to be taken as infallible? When Joshua says that the sun stood still (Joshua 10) or the Psalmist that the Lord set the earth on its foundation and it can never be moved (Psalm 104), do these statements have implications for scientific theories? If so, there would definitely be conflict between the science of Galileo and the theology of orthodox Christianity. But the conflict goes deeper than that.

Galileo thought he was mitigating the potential conflict between his scientific theories and the Bible by adopting a hermeneutic strategy that asserts an

independence of the two. In his "Letter to the Grand Duchess Christina" he stated, "the intention of the Holy Ghost [in the role of the Bible's author] is to teach us how one goes to heaven, not how heaven goes" (Drake 1957, 186). In reality, Galileo's attempt to pull the rug out from under the conflict only intensified it. The problem resulted not because he claimed that some things in the Bible were not to be taken so literally. That is a practice that had been accepted by the Church since its inception. For example, when God is described as a rock (2 Samuel 22), no one argues for a literal interpretation. The real source of conflict between science and Christianity in this episode was that Galileo, a scientist with only lay standing in the Church, was attempting to instruct others on how the Bible should be interpreted. That was the job of the Church leaders. And that was why Galileo was a threat and had to be reprimanded.

3. Independence

At other times in the history of science and Christianity, the two sides seemed content to go about their own business without interfering with each other. Some people have tried to make this approach normative for all interactions between science and Christianity. Just as Galileo said, science is trying to figure out how the world works, while the Bible—and Christianity more generally—is concerned primarily with the salvation of souls. These are independent practices and should be kept as such. Even White's *Warfare* book seems to recognize to some extent a legitimate place for religion, so long as it doesn't try to interfere with science. In the introduction to his work he states his thesis to be:

> In all modern history, interference with science in the supposed interest of religion, no matter how conscientious such interference may have been, has resulted in the direst evils both to religion and to science, and invariably; and, on the other hand, all untrammeled scientific investigation, no matter how dangerous to religion some of its stages may have seemed for the time to be, has invariably resulted in the highest good both of religion and of science. (White 1922, viii)

White seems to say that if we just let science go about its business without interference from religion, then both science and religion will benefit. Such an approach is quite different from some of the anti-religion voices of today who call for the abolishment of religion. White claimed that the motivation for founding Cornell University was not to abolish religion but to separate it from the sectarian motivations that were too conspicuous in the other major American universities. He didn't want to have to consider, when hiring a professor of mathematics or language or chemistry, which religious sect to which he or she belonged. Such an approach, in his opinion, stymies advances in both scientific and religious knowledge. If religion would keep to its proper sphere—love of God and of neighbor—it would steadily grow stronger throughout the world (ibid., xii).

There are at least two ways we might understand science and Christianity to be independent of each other. The first is that they may both be investigating the

same topic, but they have different methods of investigating and could arrive at different sorts of answers. These answers, however, should not be seen as competing but as different ways of describing the same thing, perhaps like a chemist and an artist might describe the same painting in very different terms without contradicting each other. An extreme version of this would be the theory of **double-truth**, which is usually attributed to Averroës, one of the most important Arabic thinkers of the Middle Ages.

Averroës (1126–1198)

Averroës, also known as ibn-Rushd, lived from 1126 to 1198. He was one of the most important Arab thinkers of the Middle Ages. He was a Muslim philosopher, physician, scientist, theologian, and scholar of the Qur'an, but his influence on subsequent Christian thought was significant and warrants inclusion here. In fact, Thomas Aquinas thought Averroës wrote the finest commentaries available on the works of Aristotle and referred to him simply as the Commentator.

Averroës's concept of double-truth was an attempt to reconcile the natural learning of humans with the supernaturally revealed truth of the Qur'an. These were viewed as two different "languages," and we should not be surprised if they say different things. Apparently, some Christians in the 13th century understood Averroës to mean that two claims could both be true even if they clearly contradict one another. Averroës's actual position was more sophisticated than this, however. For him, the doctrine of double-truth meant that a claim could have different meanings at different levels of description—a literal philosophical meaning and an allegorical or figurative theological meaning. Averroës maintained that the Qur'an was written for the masses in allegorical language. So if natural philosophers discovered that the world is different from what the Qur'an seemed to be saying, he was sure the conflict was only with the apparent meaning of scripture. We can see an application of this in Christian theology in the subsequent century.

In 1210, Aristotle's works on natural philosophy were banned at the University of Paris because they were thought to contradict the teaching of scripture. By 1255, they were back on some reading lists, but authorities still attempted to ban certain ideas contained in them. One of the most prominent of these ideas was the eternality of the world. Of course, according to Christian theology, the world was created at some point in the past. But such an idea was difficult to square with the natural philosophy of the time, which was dominated by the Aristotelian understanding. (Indeed, it was not until the 20th century that the eternality of the world was seriously challenged by scientific evidence.) Could the doctrine of double-truth be used to affirm both of these? Siger of Brabant (1240–1284) was one of the vocal defenders of the Aristotelian view at the University of Paris who tried to do just that. He wanted to affirm the eternality of the world from the

scientific perspective, even though it contradicted the teachings of the Church. But the Church would have none of that. In 1270, Bishop Stephen Tempier was persuaded by the more conservative factions to condemn thirteen articles drawn from Aristotle and Averroës. The condemnation seemed to have Siger in mind specifically. If science and religion were to be kept independent, this view of double-truth would not be the way to do it. But there is another version of independence to consider.

Instead of seeing science and Christianity as independent because they have different ways of talking about the same thing, one might attempt to confine science and Christian theology to different objects of study. In the wake of Tempier's condemnations, the arts faculty at the university (which included those studying natural philosophy) attempted to circumvent conflict with the theology faculty by having each of its members swear an oath to not even consider theological questions surrounding issues like the **Trinity** or the **Incarnation**. There is a modern ring to this attempt to demarcate the boundaries of inquiry for different disciplines. In the context of the powerful Church of the Middle Ages, the conservative faction continued to push until the infamous, and even stronger, condemnations of 1277 of Bishop Tempier. The impulse to see science and theology as independent methods of inquiry was stifled, as it would be again with Galileo in the 17th century. But eventually the hegemony of the Church would be broken with respect to academic inquiry, and then the prospect for the independence would be different.

The eminent 20th-century American evolutionary biologist Stephen Jay Gould (1941–2002) defended an approach to science and religion he called **NOMA**, which is an acronym for "non-overlapping magisteria." His claim too is that religion and science are both legitimate methods of inquiry, but they should be restricted to separate spheres. The way his boundary lines were drawn in the late 20th century was that the magisterium of science is the natural world, and that of religion is values. In this view, it became illegitimate to use the Bible to correct scientists about the natural world. Gould said:

> So—and now we come to the key point—if some contradiction seems to emerge between a well-validated scientific result and a conventional reading of scripture, then we had better reconsider our exegesis, for the natural world does not lie, but words can convey many meanings, some allegorical or metaphorical … In this crucial sense, the magisteria become separate, and science holds sway over the factual character of the natural world. (1999, 21–22)

It could be charged that his theory is hopelessly idealistic and that religion and the Bible do have something to say about the way things are in the natural world, but Gould's theory is more sophisticated than sometimes presented. He admits there is contact between these two magisteria, and even that they are absolutely inseparable, while still maintaining that they are utterly different (ibid., 65–67).

Gould cites the different attitudes of two 20th-century popes on the topic of human evolution as an example of how his approach should and shouldn't work in practice. The first is the negative model: Pope Pius XII issued an encyclical in 1950 entitled *Humani generis*. In it he admits that it may be permitted for scientists to investigate the origins of the human body along the lines suggested

by evolution but that the Catholic faith obliges us to regard the human soul as an immediate creation by God (Pius XII 1950, 36). There are consequences of this position which impinge on the findings of science. Pius said:

> For the faithful cannot embrace that opinion which maintains that either after Adam there existed on this earth true men who did not take their origin through natural generation from him as from the first parent of all, or that Adam represents a certain number of first parents. Now it is in no way apparent how such an opinion can be reconciled with that which the sources of revealed truth and the documents of the Teaching Authority of the Church propose with regard to **original sin**, which proceeds from a sin actually committed by an individual Adam and which, through generation, is passed on to all and is in everyone as his own. (Pius XII 1950, 37)

It is clear that, even if Pius allows some room for scientific inquiry to proceed according to its own rules, it is the Church that gets to determine how much room science has.

The message of Pope John Paul II in 1996 seems to reverse the authority in that sphere of inquiry. He first acknowledged that since Pius's 1950 encyclical the data for evolution has become impossible to resist. Then he goes on to concede that it is science that determines the bounds of acceptable biblical interpretation:

> It is important to set proper limits to the understanding of Scripture, excluding any unseasonable [sic] interpretations which would make it mean something which it is not intended to mean. In order to mark out the limits of their own proper fields, theologians and those working on the exegesis of the Scripture need to be well informed regarding the results of the latest scientific research. (John Paul II 1996, 3)

Gould interprets John Paul's mandate of setting proper limits on biblical interpretation and theology as carving out an independent sphere for science. But for a question like the nature of human beings, it is difficult to see how these two different methods of investigation can be kept totally separate. We need a way of incorporating the insights of these two different disciplines without lapsing into the double-truth method of Averroës.

4. Two Books

Before White and Draper altered the public's perception of the relationship between science and religion by bringing the conflict metaphor to the forefront, the conversation was dominated by a different metaphor: **Two Books**. This is the idea that God has provided information or revelation to humans through two different but coordinated sources—the book of God's word (i.e., the Bible) and the book of God's world (i.e., creation). The roots of this metaphor go back to the first centuries of the Christian era to important Christian thinkers like Justin Martyr, Irenaeus of Lyons, Tertullian, and Origen. They all acknowledged God's revelation in nature in addition to revelation in scripture.

The first clear use of the metaphor might be traced to John Chrysostom (c. 347–407). He said:

> If God had given instruction by means of books, and of letters, he who knew letters would have learnt what was written, but the illiterate man would have gone away without receiving any benefit … This however cannot be said with respect to the heavens, but the Scythian, and Barbarian, and Indian, and Egyptian, and every man that walks upon the earth, shall hear this voice; for not by means of the ears, but through the sight, it reaches our understanding … Upon this volume the unlearned, as well as the wise man, shall be able to look, and wherever any one may chance to come, there looking upwards towards the heavens, he will receive a sufficient lesson from the view of them. (Homily IX.5, quoted in Hess 2003, 127–128)

Throughout the Middle Ages, the point was repeated by many Christian thinkers that, although book learning was available only to the privileged class of the literate who had access to the Bible, the "book of nature" was available to everyone. The Bible was difficult for the average person to understand, but everyone could "read" what God had written in nature. So just like St. Paul claimed in Romans 1, "all men are without excuse" because God can be known from creation (natural theology is explored in more depth in Chapter 7).

Two events helped to usher Western civilization into the modern era and turned this formula on its head. First, the Protestant Reformation (which itself was fueled by the printing press and increased rates of literacy) made the Bible more widely available to the masses in their languages. No longer was it the exclusive purview of the specialists in the Church to read and interpret the Bible. As we saw in the Galileo episode, the Church attempted to hold on to this privilege, but ultimately the spread of Protestantism made it possible for anyone to read the Bible, and of course not everyone would interpret its message in the same way. So today there are thousands of different Christian denominations.

Second, the widespread access to reading the book of nature was severely curtailed by the success of the **Scientific Revolution**. Science became a set of professionalized and specialized disciplines to which only a few could really contribute. The situation today is that there is a "priestly" class of scientists who disseminate to the masses the knowledge they have acquired about how nature works. Few of us today could observe the heavens and work out the heliocentric model of the solar system, let alone develop quantum mechanics or string theory. Just as the illiterate people of the Middle Ages were beholden to the specialists in the Church to read and interpret the book of scripture, today we must rely on the specialists in science to read and interpret the book of nature for us.

To be fair, if we are to take the interpretation of scripture seriously, we must rely on specialists in that discipline too. Understanding the original languages and cultural contexts is necessary for any responsible interpretation of the Bible. So the Two Books metaphor has become less straightforward. The problem here is

they are not just "givens" with content that is immediately apparent. Both the world and the Bible must be interpreted. This situation gives rise to more subtle connections and lines of influence between science and Christianity rather than straightforward conflict or independence. In the next chapter, we explore some of these.

Summary of main points:

1. The standard typology of how science and religion can be related is conflict, independence, dialogue, and integration.
2. Galileo's conflict with the Church stemmed not so much from his scientific discoveries as from his attempt as a layman to interpret the Bible.
3. Scientific and religious investigation could be independent because they use different methods and language to explain the same phenomena or because they investigate different phenomena.
4. God has given two sources of revelation: the natural world and the Bible.

Further reading

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- Lindberg, David C., and Ronald L. Numbers, eds. 2003. *When Science and Christianity Meet.* Chicago: University of Chicago Press. A collection of articles discussing historical case studies that exemplify the complexity of the science–Christianity relationship.
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