GALILEO GOES TO JAIL

AND OTHER MYTHS ABOUT SCIENCE AND RELIGION

Edited by Ronald L. Numbers

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For

Keith R. Benson

and Carter,

the perfect hosts—

with appreciation from us all

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INTRODUCTION

Ronald L. Numbers

> I propose, then, to present to you this evening an outline of the great sacred struggle for the liberty of Science—a struggle which has been going on for so many centuries. A tough contest this has been! A war continued longer—with battles fiercer, with sieges more persistent, with strategy more vigorous than in any of the comparatively petty warfares of Alexander, or Cæsar, or Napoleon . . . 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 Science, and *invariably*.
>
> —Andrew Dickson White, "The Battle-Fields of Science" (1869)

> The antagonism we thus witness between Religion and Science is the continuation of a struggle that commenced when Christianity began to attain political power . . . 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.
>
> —John William Draper, *History of the Conflict between Religion and Science* (1874)

The greatest myth in the history of science and religion holds that they have been in a state of constant conflict. No one bears more responsibility for promoting this notion than two nineteenth-century American polemicists: Andrew Dickson White

(1832–1918) and John William Draper (1811–1882). White, the young president of Cornell University, became a believer in the warfare between science and religion after religious critics branded him an infidel for, as he put it, trying to create in Ithaca "[a]n asylum for *Science*—where truth shall be sought for truth's sake, not stretched or cut exactly to fit Revealed Religion." On a winter's evening in December 1869 he strode to the podium in the great hall of Cooper Union in New York City, ready to smite his enemies with history, to give them "a lesson which they will remember." In a melodramatic lecture titled "The Battle-Fields of Science" the historian surveyed "some of the hardest-fought battle-fields" of the "great war" between science and religion. He told of Giordano Bruno's being "burned alive as a monster of impiety," of Galileo's having been "tortured and humiliated as the worst of unbelievers," and much more, ending with the latest scientific martyrs, Cornell University and its beleaguered president. As White must have anticipated, his lecture sparked even more controversy, prompting, according to one observer, "instantaneous outcry and opposition." Over the next quarter century White expanded his talk into a huge two-volume work, *A History of the Warfare of Science with Theology in Christendom* (1896), widely translated and frequently reprinted down to the present. In it, as Elizabeth Cady Stanton gleefully noted, he showed "that the Bible has been the greatest block in the way of progress."[1]

Draper was equally exercised when he wrote his *History of the Conflict between Religion and Science* (1874). An accomplished physician, chemist, and historian, Draper largely excused Protestantism and Eastern Orthodoxy of crimes against science while excoriating Roman Catholicism. He did so, he wrote, "partly because its adherents compose the majority of Christendom, partly because its demands are the most pretentious, and partly because it has commonly sought to enforce those demands by the civil power." In addition to chronicling the church's age-old opposition to scientific progress, he ridiculed the recently promulgated

doctrine of papal infallibility, which he attributed to men "of sin and shame." He never publicly mentioned, however, what may have agitated him the most: his antipathy toward his own sister, Elizabeth, who had converted to Catholicism and who for a time lived with the Drapers. When one of the Draper children, eight-year-old William, lay near death, Aunt Elizabeth hid his favorite book, a Protestant devotional tract—and did not return it until after the boy had passed away. The grieving father angrily kicked her out of his house, no doubt blaming the Vatican for her un-Christian and dogmatic behavior. Draper's tale of "ferocious theologians" hounding the pioneers of science "with a Bible in one hand and a fiery fagot in the other," as one critic characterized his account, understandably provoked numerous counterattacks. The American convert to Catholicism Orestes Brownson, who described the book as "a tissue of lies from beginning to end," could scarcely contain his fury. "A thousand highway-robberies or a thousand cold-blooded murders," he fumed, "would be but a light social offence in comparison with the publication of one such book as this before us."[2]

Discussions of the relationship between "science" and "religion" originated in the early nineteenth century, when students of nature first began referring to their work as science rather than as natural philosophy (or natural history). Before that time there were occasional expressions of concern about the tension between faith and reason, but no one pitted religion against science or vice versa.[3] By the 1820s, however, books and articles featuring the phrase "science and religion" in their titles were starting to appear. One of the first, if not *the* first, English-language books with the words in their titles came out in 1823: Thomas Dick's popular *The Christian Philosopher; or, The Connection of Science and Philosophy with Religion*. By midcentury "science and religion" was becoming a literary trope, and during the 1850s and 1860s several American colleges and seminaries established professorships devoted to demonstrating (and preserving) the harmony of science and revealed religion.[4]

Although a few freethinkers, most notoriously Thomas Cooper of South Carolina College, denounced religion as "the great enemy of Science," antebellum Americans, especially the clergy, worried far more about the threat of science to orthodox Christianity than about religious barriers to science. By the middle third of the nineteenth century some observers were beginning to suspect that "every new conquest achieved by science, involved the loss of a domain to religion." Especially disturbing were scientific challenges to the first chapters of the Bible. During the three decades between about 1810 and 1840 men of science pushed successfully to replace the supernatural creation of the solar system with the nebular hypothesis, to expand the history of life on earth from 6,000 to millions of years, and to shrink Noah's flood to a regional event in the Near East. Many Christians readily adjusted their reading of the Bible to accommodate such findings, but some biblical literalists thought that the geologists of the day were taking too many liberties with God's word. The Reverend Gardiner Spring, for example, resented scientific efforts to explain creation, which he regarded as "a great *miracle,*" incapable of being accounted for scientifically. "The collision is not between the Bible & *Nature,*" he declared, "but between the Bible & *natural philosophers.*"[5]

At the time it was not uncommon for men of science to engage in biblical exegesis while denying theologians and clergymen the right to monitor science. This practice, along with the increasing marginalization of theologians from the scientific enterprise, galled Charles Hodge, the most eminent Calvinist theologian in midcentury America. Although he continued to venerate men of science who disclosed "the wonderful works of God," by the late 1850s he was growing increasingly frustrated by their tendency to treat theologians who expressed themselves on scientific subjects as "trespassers" who should mind their own business. He attributed the growing "alienation" between men of science and men of the cloth in part to the former's "as-

sumption of superiority" and their practice of stigmatizing their religious critics "as narrow-minded, bigots, old women, Bible worshippers, etc." He resented the lack of respect frequently shown to religious men, who were instructed by their scientific colleagues to quit meddling in science, while they themselves belittled religious beliefs and values. At times Hodge worried that science, devoid of religion, was becoming downright "satanic." He had no doubt that religion was in a "fight for its life against a large class of scientific men."[6]

The spread of "infidel" science—from geology and cosmogonies to biology and anthropology—caused many Christians, both conservatives and liberals, to feel under attack. According to the southern intellectual George Frederick Holmes, "The struggle between science and religion, between philosophy and faith, has been protracted through centuries; but it is only within recent years that the breach has become so open and avowed as to be declared by many to be irreconcilable." Worse yet, even the working classes were joining the fray. As one British writer noted in 1852, "Science is no longer a lifeless abstraction floating above the heads of the multitude. It has descended to earth. It mingles with men. It penetrates our mines. It enters our workshops. It speeds along with the iron courser of the rail."[7]

The debates over Charles Darwin's *On the Origin of Species* (1859), in which the British naturalist sought "to overthrow the dogma of separate creations" and extend the domain of natural law throughout the organic world, signaled a shift in emphasis. Increasingly, scientists, as they were coming to be called, expressed resentment at playing handmaiden to religion. One after another called not only for scientific freedom but also for the subordination of religion—and the rewriting of history with religion as the villain. The most infamous outburst came from the Irish physicist John Tyndall (1820–1893), who in his 1874 Belfast address as president of the British Association for the Advancement of Science thundered:

> The impregnable position of science may be described in a few words. We claim, and we shall wrest from theology, the entire domain of cosmological theory. All schemes and systems which thus infringe upon the domain of science must, *in so far as they do this,* submit to its control, and relinquish all thought of controlling it. Acting otherwise proved disastrous in the past, and it is simply fatuous to-day.

Two years later Tyndall wrote a laudatory preface to a British edition of White's *The Warfare of Science.* With such endorsements, the conflict thesis was well on its way toward becoming the historical dogma of the day, at least among intellectuals seeking freedom from religion.[8]

Historians of science have known for years that White's and Draper's accounts are more propaganda than history.[9] (An opposing myth, that Christianity alone gave birth to modern science, is disposed of in Myth 9.) Yet the message has rarely escaped the ivory tower. The secular public, if it thinks about such issues at all, *knows* that organized religion has always opposed scientific progress (witness the attacks on Galileo, Darwin, and Scopes). The religious public *knows* that science has taken the leading role in corroding faith (through naturalism and antibiblicism). As a first step toward correcting these misperceptions we must dispel the hoary myths that continue to pass as historical truths. No scientist, to our knowledge, ever lost his life because of his scientific views, though, as we shall see in Myth 7, the Italian Inquisition did incinerate the sixteenth-century Copernican Giordano Bruno for his heretical *theological* notions.

Unlike the master mythmakers White and Draper, the contributors to this volume have no obvious scientific or theological axes to grind. Nearly half, twelve of twenty-five, self-identify as agnostic or atheist (that is, unbelievers in religion). Among the remaining thirteen there are five mainstream Protestants, two evangelical Protestants, one Roman Catholic, one Jew, one Muslim, one Buddhist—and two whose beliefs fit no conventional category (including one pious Spinozist). Over half of the unbe-

lievers, including me, grew up in devout Christian homes—some as fundamentalists or evangelicals—but subsequently lost their faith. I'm not sure exactly what to make of this fact, but I suspect it tells us something about why we care so much about setting the record straight.

A final word about our use of the word *myth:* Although some of the myths we puncture may have helped to give meaning to the lives of those embracing them, we do not employ the term in its sophisticated academic sense but rather use it as done in everyday conversation—to designate a claim that is false.

MYTH 1

THAT THE RISE OF CHRISTIANITY WAS RESPONSIBLE FOR THE DEMISE OF ANCIENT SCIENCE

David C. Lindberg

[O]ne finds a combination of factors behind "the closing of the Western mind": the attack on Greek philosophy by [the apostle] Paul, the adoption of Platonism by Christian theologians and the enforcement of orthodoxy by emperors desperate to keep good order. The imposition of orthodoxy went hand in hand with a stifling of any form of independent reasoning. By the fifth century, not only has rational thought been suppressed, but there has been a substitution for it of "mystery, magic, and authority."

—Charles Freeman, *The Closing of the Western Mind: The Rise of Faith and the Fall of Reason* (2003)

One spring day in 415, as the story is told, an angry mob of Christian zealots in Alexandria, Egypt, stirred to action by the recently installed bishop, Cyril, brutally murdered the beautiful, young pagan philosopher and mathematician Hypatia. Tutored initially by her father, an accomplished mathematician and astronomer, Hypatia had gone on to write learned commentaries of her own on mathematical and philosophical texts. Her popularity and influence—and especially her defense of science against Christianity—so angered the bishop that he ordered her death. Versions of this story have been a staple of anti-Christian polemics since the early Enlightenment, when the Irish freethinker John

Toland wrote an overwrought pamphlet, the title of which tells it all: *Hypatia; or, The History of a Most Beautiful, Most Virtuous, Most Learned and in Every Way Accomplished Lady; Who Was Torn to Pieces by the Clergy of Alexandria, to Gratify the Pride, Emulation, and Cruelty of the Archbishop, Commonly but Undeservedly Titled St. Cyril* (1720). According to Edward Gibbon, author of *The History of the Decline and Fall of the Roman Empire* (1776–88), "Hypatia was torn from her chariot, stripped naked, dragged to the church, and inhumanly butchered by the hands of Peter the reader and a troop of savage and merciless fanatics: her flesh was scraped from her bones with sharp oyster-shells, and her quivering limbs were delivered to the flames." In some accounts Hypatia's murder marked the "death-blow" to ancient science and philosophy. The distinguished historian of ancient science B. L. Van der Waerden claims that "[a]fter Hypatia, Alexandrian mathematics came to an end"; in his study of ancient science, Martin Bernal uses Hypatia's death to mark "the beginning of the Christian Dark Ages."[1]

The story of Hypatia's murder is one of the most gripping in the entire history of science and religion. However, the traditional interpretation of it is pure mythology. As the Czech historian Maria Dzielska documents in a recent biography, Hypatia got caught up in a political struggle between Cyril, an ambitious and ruthless churchman eager to extend his authority, and Hypatia's friend Orestes, the imperial prefect who represented the Roman Empire. In spite of the fact that Orestes was a Christian, Cyril used his friendship with the pagan Hypatia against him and accused her of practicing magic and witchcraft. Although killed largely in the gruesome manner described above—as a mature woman of about sixty years—her death had everything to do with local politics and virtually nothing to do with science. Cyril's crusade against pagans came later. Alexandrian science and mathematics prospered for decades to come.[2]

The misleading accounts of Hypatia's death and Freeman's *Closing of the Western Mind,* quoted above, are attempts to

keep alive an old myth: the portrayal of early Christianity as a haven of anti-intellectualism, a fountainhead of antiscientific sentiment, and one of the primary agents responsible for Europe's descent into what are popularly referred to as the "dark ages." Supporting evidence is available, if not plentiful. The apostle Paul (whose influence in shaping Christian attitudes was, of course, enormous) warned the Colossians: "Be on your guard; do not let your minds be captured by hollow and delusive speculations, based on traditions of man-made teaching centered on the elements of the natural world and not on Christ." And in his first letter to the Corinthians, he admonished: "Make no mistake about this: if there is anyone among you who fancies himself wise . . . he must become a fool to gain true wisdom. For the wisdom of this world is folly in God's sight."[3]

Similar sentiments were expressed by several early church fathers, concerned to counter heresy and protect Christian doctrine from the influence of pagan philosophy. The North African Carthaginian Tertullian (ca. 160–ca. 240), a superbly educated and highly influential defender of orthodox Christian doctrine, was undoubtedly the most outspoken of these defenders of Christian orthodoxy. In his most famous utterance, he inquired:

> What indeed has Athens [meant to represent pagan scholarship] to do with Jerusalem [representing Christian religion]? What concord is there between the Academy [presumably Plato's] and the Church? What between heretics and Christians? . . . Away with all attempts to produce a mottled Christianity of Stoic, Platonic, and dialectic composition! We want no curious disputation after possessing Christ Jesus, no inquisition after enjoying the gospel! With our faith, we desire no further belief. For once we believe this, there is nothing else that we ought to believe.[4]

Tertullian's contemporary, Tatian (fl. ca. 172), a Greek-speaking Mesopotamian who made his way to Rome, inquired of the philosophers:

> What noble thing have you produced by your pursuit of philosophy? Who of your most eminent men has been free from vain boasting? . . . I could laugh at those who in the present day adhere to [Aristotle's] tenets—people who say that sublunary things are not under the care of Providence . . . Wherefore be not led away by the solemn assemblies of philosophers who are no philosophers, who dogmatize the crude fancies of the moment.[5]

Similar complaints were voiced by other critics of pagan (that is, non-Christian) learning.

But to stop here would be to present a seriously incomplete and highly misleading picture. The very writers who denounced Greek philosophy also employed its methodology and incorporated large portions of its content in their own systems of thought. From Justin Martyr (d. ca. 165) to Saint Augustine (354–430) and beyond, Christian scholars allied themselves with Greek philosophical traditions deemed congenial to Christian thought. Chief among these philosophies was Platonism (or Neoplatonism), but borrowing from Stoic, Aristotelian, and neo-Pythagorean philosophy was also common. Even the denunciations issuing from Christian pens, whether of specific philosophical positions or of philosophy in general, often reflected an impressive command of Greek and Roman philosophical traditions.

But what did these religious and philosophical traditions have to do with *science?* Was there any activity or body of knowledge at the time that can be identified as "science"? If not, then the myth, as stated, is obviously false. But let us not allow ourselves to escape so easily. In the period that we are discussing, there *were* inherited beliefs about nature—about the origins and structure of the cosmos, the motions of celestial bodies, the nature of the elements, sickness and health, the explanation of dramatic natural phenomena (thunder, lightning, eclipses, the rainbow, and the like)—and its relationship to the gods. These are the ingredients of what would develop centuries later into modern science (some were already identical to their modern counterparts); and if we are

interested in the origins of Western science they are what we must investigate. For the naming of these enterprises, historians of science have chosen a variety of expressions—"natural philosophy" and "mathematical science" being the most common. For the sake of clarity, I choose to refer to them simply as the "classical sciences"—that is, the sciences that descended from the Greek and Roman classical tradition—and to their practitioners as "scientists" or "philosopher/scientists."

As we have seen, Christian writers sometimes expressed deep hostility toward the classical sciences. Tertullian, whom we have already met, attacked pagan philosophers for their assignment of divinity to the elements and the sun, moon, planets, and stars. In the course of his argument, he vented his wrath over the vanity of the ancient Greek scientist/philosophers:

> Now pray tell me, what wisdom is there in this hankering after conjectural speculations? What proof is afforded to us . . . by the useless affectation of a scrupulous curiosity, which is tricked out with an artful show of language? It therefore served Thales of Miletus [philosopher of the 6th c. B.C.] quite right, when, star-gazing as he walked . . . , he had the mortification of falling into a well . . . His fall, therefore, is a figurative picture of the philosophers; of those, I mean, who persist in applying their studies to a vain purpose, since they indulge a stupid curiosity on natural objects.[6]

But it was an *argument* that Tertullian presented, and to a very significant degree he built it out of materials and by the use of methods drawn from the Greco-Roman philosophical tradition. He argued, for example, that the precise regularity of the orbital motions of the celestial bodies (a clear reference to the findings of Greek astronomers) bespeaks a "governing power" that rules over them; and if they are ruled over, they surely cannot be gods. He also introduced the "enlightened view of Plato" in support of the claim that the universe must have had a beginning and therefore cannot itself partake of divinity; and in this and other works he "triumphantly parades" his learning (as one

of his biographers puts it) by naming a long list of other ancient authorities.[7]

Basil of Caesarea (ca. 330–379), representing a different century and a different region of the Christian world, revealed similar attitudes toward the classical sciences. He sharply attacked philosophers and astronomers who "have wilfully and voluntarily blinded themselves to knowledge of the truth." These men, he continued, have "discovered everything, except one thing: they have not discovered the fact that God is the creator of the universe."[8] Elsewhere he inquired why we should "torment ourselves by refuting the errors, or rather the lies of the Greek philosophers, when it is sufficient to produce and compare their mutually contradictory books."[9]

But while attacking the errors of Greek science and philosophy—and what he did not find erroneous, he generally judged useless—Basil also revealed a solid mastery of their contents. He argued against Aristotle's fifth element, the quintessence; he recounted the Stoic theory of cyclic cosmological conflagration and regeneration; he applauded those who employ the laws of geometry to refute the possibility of multiple worlds (a clear endorsement of Aristotle's argument for the uniqueness of the cosmos); he derided the Pythagorean notion of music of the planetary spheres; and he proclaimed the vanity of mathematical astronomy.

Tertullian, Tatian, and Basil have thus far been portrayed as outsiders to the classical tradition, attempting to discredit and destroy what they regarded as a menace to orthodox Christianity. Certainly some of their rhetoric supports such an interpretation, as when they appealed for simple faith as an alternative to philosophical reasoning. But we need to look beyond rhetoric to actual practice; it is one thing to deride the classical sciences and the philosophical systems that undergirded them, or declare them useless, another to abandon them. Despite their derision, Tertullian, Basil, and others like them were continuously engaged in serious philosophical argumentation, borrowing from the very tradition that they despised. It is no distortion

of the evidence to see them as insiders to this tradition, attempting to formulate an alternative philosophy based on Christian principles—opposed not to the enterprise of philosophy but to specific philosophical principles that they considered erroneous and dangerous.

The most influential of the church fathers and the one who most powerfully shaped the codification of Christian attitudes toward nature was Augustine of Hippo (354–430). Like his predecessors, Augustine had serious reservations about the value of classical philosophy and science and the legitimacy of their pursuit. But his criticism was muted and qualified by an acknowledgment, in both word and deed, of legitimate uses to which knowledge of the cosmos might be put, including religious utility. In short, although Augustine did not devote himself to promotion of the sciences, neither did he fear them in their pagan versions to the degree that many of his predecessors had.

Scattered throughout Augustine's voluminous writings are worries about pagan philosophy and its scientific partner, and admonitions to Christians not to overvalue them. In his *Enchiridion,* he assured his reader that there is no need to be

> dismayed if Christians are ignorant about the properties and the number of the basic elements of nature, or about the motion, order, and deviations of the stars, the map of the heavens, the kinds and nature of animals, plants, stones, springs, rivers, and mountains . . . For the Christian, it is enough to believe that the cause of all created things . . . is . . . the goodness of the Creator.[10]

In *On Christian Doctrine,* Augustine commented on the uselessness and vanity of astronomical knowledge:

> Although the course of the moon . . . is known to many, there are only a few who know well the rising or setting or other movements of the remainder of the stars without error. Knowledge of this kind in itself, although it is not allied with any superstition, is of very little use in the treatment of the Divine Scriptures and even impedes it through fruitless study; and since it is associated with the most per-

> nicious error of vain [astrological] prediction it is more appropriate and virtuous to condemn it.[11]

And finally, in his *Confessions* he argued that "because of this disease of curiosity . . . men proceed to investigate the phenomena of nature, . . . though this knowledge is of no value to them: for they wish to know simply for the sake of knowing."[12] Knowledge for the sake of knowing is without value and, therefore, to be repudiated.

But once again this is not the whole story. Christian philosophers of the patristic period may not have valued philosophy or the sciences for their *intrinsic* value, but from this we cannot conclude that they denied the sciences all *extrinsic* value. For Augustine, knowledge of natural phenomena acquired value and legitimacy insofar as it served other, higher purposes. The most important such purpose is biblical exegesis, since ignorance of mathematics and natural history (zoology and botany) renders us incapable of grasping the literal sense of Scripture. For example, only if we are familiar with serpents will we grasp the meaning of the biblical admonition to "be as wise as serpents and as innocent as doves" (Matthew 10:16). Augustine also conceded that portions of pagan knowledge, such as history, dialectic, mathematics, the mechanical arts, and "teachings that concern the corporeal senses," contribute to the necessities of life.[13]

In his *Literal Commentary on Genesis,* where he put his own superb grasp of Greek cosmology and natural philosophy to good use, Augustine expressed dismay at the ignorance of some Christians:

> Even a non-Christian knows something about the earth, the heavens, and the other elements of this world, about the motion and orbit of the stars and even their size and relative positions, about the predictable eclipses of the sun and moon, the cycles of the years and the seasons, about the kinds of animals, shrubs, stones, and so forth, and this knowledge he holds to, as being certain from reason and experience. Now it is a disgraceful and dangerous thing for an infidel [a non-Christian] to

> hear a Christian . . . talking nonsense on these topics; and we should take all means to prevent such an embarrassing situation, in which people show up vast ignorance in a Christian and laugh it to scorn.[14]

Insofar as we require philosophical or scientific knowledge of natural phenomena—and Augustine is certain that we do—we must take them from the people who possess it: "If those who are called philosophers, especially the Platonists, have said things which are indeed true and are well accommodated to our faith, they should not be feared; rather, what they have said should be taken from them as from unjust possessors and converted to our use."[15] All truth is ultimately God's truth, even if found in the books of pagan authors; and we should seize it and use it without hesitation.

In Augustine's influential view, then, knowledge of the things of this world is not a legitimate end in itself, but as a means to other ends it is indispensable. The classical sciences must accept a subordinate position as the handmaiden of theology and religion—the temporal serving the eternal. The knowledge contained in classical sciences is not to be loved, but it may legitimately be used. This attitude toward scientific knowledge came to prevail throughout the Middle Ages and survived well into the modern period. Augustine's handmaiden science was defended explicitly and at great length, for example, by Roger Bacon in the thirteenth century, whose defense of useful knowledge contributed to his notoriety as one of the founders of experimental science.[16]

Does endowing scientific knowledge with handmaiden status constitute a serious blow against scientific progress? Are the critics of the early church right in viewing it as the opponent of genuine science? I would like to make three points in reply. (1) It is certainly true that the fathers of the early Christian church did not view support of the classical sciences as a major obligation. These sciences had low priority for the church fathers, for whom the major concerns were (quite properly) the establishment of Christian doctrine, defense of the faith, and the edifica-

tion of believers. But (2), low or medium priority was far from zero priority. Throughout the Middle Ages and well into the modern period the handmaiden formula was employed countless times to justify the investigation of nature. Indeed, some of the most celebrated achievements of the Western scientific tradition were made by religious scholars who justified their labors (at least in part) by appeal to the handmaiden formula. (3) No institution or cultural force of the patristic period offered more encouragement for the investigation of nature than did the Christian church. Contemporary pagan culture was no more favorable to disinterested speculation about the cosmos than was Christian culture. It follows that the presence of the Christian church enhanced, rather than damaged, the development of the natural sciences.

But we must not forget Tertullian and his fiery opposition to the classical sciences. Did he not represent a substantial group of outspoken opponents of the classical sciences? Not as far as the historical record reveals. One must work hard to find suitable passages from the writings of Tatian, Basil, and others in denigration of the classical philosophy. And even then their rhetoric was many decibels below that of Tertullian; moreover, their opposition was to aspects of classical tradition that had little to do with the classical sciences. Scores of church fathers and their counterparts in later centuries wrestled with aspects of classical philosophy, attempting to reconcile it with biblical teachings and orthodox Christian theology; but when it came to the classical sciences, the great majority joined Augustine: approach the classical sciences with caution; fear them if you must, but put them to work as the handmaidens of Christian philosophy and theology if you can. So, to put it bluntly, the scholars wishing to demonstrate Christian hostility toward the classical sciences built their case on Tertullian because he was their only relevant, sufficiently hostile, exhibit. It was Augustine's sympathetic voice that prevailed in the practice of the sciences from the patristic period, through the Middle Ages, and beyond.

Did Augustine practice what he preached? That he did is best illustrated in his *Literal Commentary on Genesis,* where he produced a verse-by-verse interpretation of the biblical account of creation as it appears in the first three chapters of Genesis. In the course of this work of his mature years, Augustine made copious use of the natural sciences contained in the classical tradition to explicate the creation story. Here we encounter Greco-Roman ideas about lightning, thunder, clouds, wind, rain, dew, snow, frost, storms, tides, plants and animals, matter and form, the four elements, the doctrine of natural place, seasons, time, the calendar, the planets, planetary motion, the phases of the moon, astrological influence, the soul, sensation, sound, light and shade, and number theory. For all of his worry about overvaluing the Greek scientific/philosophical tradition, Augustine and others like him applied Greco-Roman natural science with a vengeance to biblical interpretation. The sciences are not to be loved, but to be used. This attitude toward scientific knowledge was to flourish throughout the Middle Ages and well into the modern period. Were it not for this outlook, medieval Europeans would surely have had less scientific knowledge, not more.

MYTH 2

THAT THE MEDIEVAL CHRISTIAN CHURCH SUPPRESSED THE GROWTH OF SCIENCE

Michael H. Shank

> The Christian party [in the early Middle Ages] asserted that all knowledge is to be found in the Scriptures and in the traditions of the Church . . . The Church thus set herself forth as the depository and arbiter of knowledge; she was ever ready to resort to the civil power to compel obedience to her decisions. She thus took a course which determined her whole future career: she became a stumbling-block in the intellectual advancement of Europe for more than a thousand years.
>
> —John William Draper, *History of the Conflict between Religion and Science* (1874)

The myth of the medieval church's opposition to science is not likely to go away—in part because it dovetails so nicely with other cherished myths about the Middle Ages, in part because it is so easy to manufacture. Anyone who has heard of Tertullian's challenge—"What has Athens to do with Jerusalem?"—and of Galileo's appearance before the Inquisition may simply join these two points with a straight line. All one needs is the assumption, also mythical, that Galileo was condemned by a medieval church doing what it did best. (In fact, as explained in Myth 8, it was the early-modern Catholic church that censured Galileo, using a new literalist view of Scripture that would have surprised Augustine and Thomas Aquinas.)

The crude concept of the Middle Ages as a millennium of stagnation brought on by Christianity has largely disappeared among scholars familiar with the period, but it remains vigorous among popularizers of the history of science—perhaps because, instead of consulting scholarship on the subject, the more recent popularizers have relied upon their predecessors uncritically.

Consider the following claim from a book by Robert Wilson recently published by Princeton University Press. It quotes from Tertullian (ca. 160–ca. 220)

> to illustrate the point that the Christian religion developed on the basis that the Gospel was the primary source of guidance and of truth and was inviolate. This commitment to Holy Scripture was, and still is, the fundamental basis of Christianity, but there is no doubt that it was a discouragement to scientific endeavours and these languished for a thousand years after the military fall of Rome. During that time, possibly because the Gospel was based on ancient writings, other ancient works of a non-religious character, including the writings on science by the ancient Greeks, also came to be regarded as inviolate. These factors were to lead to one of the most unfortunate events in the history of Christianity and science—the trial of Galileo.[1]

Wilson's book has no footnotes: did he perhaps consult the astronomer Carl Sagan's *Cosmos* (1980), a popular predecessor of Wilson's book? This companion to the *Cosmos* film series aired by PBS ends with a timeline of individuals with astronomical associations. It is famous among medievalists for covering Greek antiquity (from Thales to Hypatia), then leaving a thousand years blank and starting again with Leonardo and Copernicus. The caption refers to the empty space as "a poignant lost opportunity for mankind."[2] The power of the myth is such that Sagan does not need to say where the blame lies. Sagan, in turn, may have taken a cue from Henry Smith Williams's *Great Astronomers* (Simon and Schuster, 1930), whose medieval chapter consists of two biblical epigraphs ascribed to an "oriental anthology" followed by several blank pages. This passive form of the myth simply assumes that the medieval answer to Tertullian's question

was that Athens had nothing to do with Jerusalem (see Myth 1). Since only Jerusalem mattered, no one bothered with Athens (or Alexandria).

In the more active form of the myth, the medieval church takes specific steps to curtail scientific inquiries: it jails Roger Bacon (ca. 1214–1294), portrayed as the most creative scientist of the era, for two, ten, fourteen, or fifteen years, depending on your web source. The assertion that Bacon was imprisoned (allegedly by the head of his own Franciscan order) first originates some eighty years after his death and has drawn skepticism on these grounds alone. Scholars who find this assertion plausible connect it with Bacon's attraction to contemporary prophecies that have nothing to do with Bacon's scientific, mathematical, or philosophical writings.[3]

Historians of science have presented much evidence against the myth, however. John Heilbron, no apologist for the Vatican, got it right when he opened his book *The Sun in the Church* with the following words: "The Roman Catholic Church gave more financial and social support to the study of astronomy for over six centuries, from the recovery of ancient learning during the late Middle Ages into the Enlightenment, than any other, and probably all, other institutions."[4] Heilbron's point can be generalized far beyond astronomy. Put succinctly, the medieval period gave birth to the university, which developed with the active support of the papacy. This unusual institution sprang up rather spontaneously around famous masters in towns like Bologna, Paris, and Oxford before 1200. By 1500, about sixty universities were scattered throughout Europe. What is the significance of this development for our myth? About 30 percent of the medieval university curriculum covered subjects and texts concerned with the natural world.[5] This was not a trivial development. The proliferation of universities between 1200 and 1500 meant that hundreds of thousands of students—a quarter million in the German universities alone from 1350 on—were exposed to science in the Greco-Arabic tradition. As the universities matured, the curriculum came

to include more works by Latin masters who developed this tradition along original lines.

If the medieval church had intended to discourage or suppress science, it certainly made a colossal mistake in tolerating—to say nothing of supporting—the university. In this new institution, Greco-Arabic science and medicine for the first time found a permanent home, one that—with various ups and downs—science has retained to this day. Dozens of universities introduced large numbers of students to Euclidean geometry, optics, the problems of generation and reproduction, the rudiments of astronomy, and arguments for the sphericity of the earth. Even students who did not complete their degrees gained an elementary familiarity with natural philosophy and the mathematical sciences and imbibed the naturalism of these disciplines. This was a cultural phenomenon of the first order, for it affected a literate elite of several hundred thousand students: in the middle of the fifteenth century, enrollments in universities in Germanic territories that have survived to this day (places like Vienna, Heidelberg, and Cologne) reached levels unmatched until the late nineteenth and early twentieth centuries.[6]

But, some would argue, weren't most students monks or priests who spent most of their time studying theology, the queen of the sciences? If all scholars were theologians, doesn't that pretty much say it all? This is another collection of myths. Most students never got close to meeting the requirements for studying theology (usually a master of arts degree). They remained in the faculties of arts, where they studied only nonreligious subjects, including logic, natural philosophy, and the mathematical sciences. In fact, as a result of quarrels between faculties, students in the arts faculty were not allowed to treat theological subjects. In short, most students had no theological or biblical studies at all.

Moreover, not all universities had a faculty of theology. Very few had one in the thirteenth century, and the newer foundations initially were not allowed to have one. By the later Middle

Ages, the papacy permitted more faculties of theology. During the Great Schism, when two popes who had excommunicated each other were competing for the allegiance of the various political rulers, they granted faculties of theology to some universities, like Vienna, that had not had one before. Even so, only a small minority of students ever studied theology, which was the smallest of the three higher faculties in the northern universities. By far the most popular advanced subject was law, which promised careers in the growing bureaucracies of both the church and the secular rulers.

As to theology being the queen of the sciences, this notion goes back to Aristotle—no Christian theologian—who meant by it that metaphysics or theology (as the "science of being") was a branch of philosophy more fundamental than either mathematics or natural philosophy (his two other theoretical "sciences"). While many medieval scholars conceded the great dignity of theology, its scientific status was contested, not least by theologians. Robert Grosseteste (d. 1253), chancellor of Oxford and bishop of Lincoln, held that, for an intellect unburdened by a physical body, theology offered a higher degree of certainty than did mathematics and natural philosophy, but for us mortals here below, mathematics yielded greater certainty.[7] Using Aristotle's criteria, the great Italian theologian and philosopher Thomas Aquinas (ca. 1225–1274) later argued that theology was a science.[8] But not everyone agreed with Aquinas. William of Ockham (ca. 1287–1347), an influential English Franciscan, *denied,* also on Aristotelian grounds, that theology was a science. He noted that the principles of a science must be better known than its conclusions. But the principles of theology are the articles of faith, which, as Ockham was fond of pointing out, often appear "false to all, or to the majority, or to the wisest."[9] Theology therefore did not qualify as a science.

Finally, most students and masters were neither priests nor monks, which required special vows. They did have clerical status, however, at least in northern universities like Paris. This was

a hard-won legal category that carried almost no formal obligations, religious or otherwise (students could marry, for example), while conferring one important privilege: the right, resented by the city folk, to be tried in a more lenient university or ecclesiastical court instead of a secular one. This status came in very handy when a student killed a townsman in a barroom brawl. (At Paris, students won this right after going on strike following just such an incident.) Although they were not the majority of the students, many of the best-known writers on natural philosophy and practitioners of the mathematical sciences of the era were churchmen or friars.

Does the myth get a new lease on life if I reveal that lectures on Aristotle's natural philosophy were forbidden at Paris in 1210 (under penalty of excommunication) and in 1215 (under no specified penalty)? It does not. While churchmen acting in their official capacities did issue these condemnations, it is misleading to say that "the Church" did so, for this seems to imply that they were valid for all of Christendom. In each case, however, the condemnations were local, issued by the bishops in a province or by a cardinal legate in relation to Paris.[10] Medieval hairsplitting, you say? Not at all: the point of this qualification is absolutely crucial. To make "the Church" the agent in cases where the condemnation is local is technically correct but highly misleading, for such injunctions affected only a minuscule fraction of the population, and usually not for long. These condemnations did not pertain to students and masters elsewhere. Early-thirteenth-century Oxford, for example, saw no prohibitions of this sort (indeed, the reception of Aristotle at Oxford was very smooth).

It is not clear that the condemnations mattered much, or for long, to people in the affected diocese (mostly that of Paris). Despite the condemnation of 1215, we know that Roger Bacon was teaching Aristotle's *Physics* at Paris in the 1240s. What is more, by 1255 Aristotle's formerly condemned natural-philosophical

treatises were *required* for the bachelor's and master's degrees in arts at Paris, as they were already or would be for most medieval universities. Keep in mind, though, that Paris was not typical: it faced many more episcopal condemnations than the average university, and for perfectly good local reasons. Most universities were not subject to this kind of interference.

What was the impact of such condemnations on the pursuit of science in medieval Europe? It was minimal, for one very simple reason: If condemnations were usually tied to one locality, students and masters were not. They could pack up and go elsewhere, and they did. Indeed, when in 1229–1231 the university of Paris went on strike on account of a conflict with local authorities, the university of Toulouse invited the Parisian students to travel south ("the second land of promise, flowing with milk and honey . . . Bacchus reigns in vineyards") and reminded them that Toulouse had no ban on Aristotle ("Those who wish to scrutinize the bosom of nature to the innermost can hear here the books of Aristotle that were forbidden at Paris").[11] Paris, the "new Athens," soon reopened thanks to the papal bull *Parens scientiarum* ("mother of the sciences"), which mostly upheld the masters' privileges against the bishop.[12]

Ah, you say, but what about 1277, when "the Church" condemned 219 academic propositions, again in Paris? This most famous of medieval condemnations attacked astrological determinism, a number of Aristotelian theses (including the impossibility of a vacuum), and such humorous or self-serving theses as "The only wise men in the world are philosophers" and "Nothing is known better by knowing theology."[13] Again, this condemnation was issued by the bishop of Paris, aided by some conservative theologians at the university; they used the occasion to clamp down on uppity philosophers and to lash out at their Aristotelian colleague, Thomas Aquinas. Ironically, a century ago the historian Pierre Duhem credited this condemnation with a very positive effect on science. He argued that it

forced philosophers to free themselves from their fondness for Aristotle's theses and to consider alternatives. For him, the date 1277 thus marked the beginning of modern (i.e., non- or anti-Aristotelian) science. Nowadays, however, historians agree that this is too great a burden for the Parisian condemnations of 1277 to bear.

A short list of accomplishments from the period suggests that the inquiry into nature did not stagnate in medieval Europe. In the late thirteenth century, William of Saint-Cloud pioneered the use of the camera obscura to view solar eclipses. In the early fourteenth century, Dietrich von Freiberg (a Dominican) solved the problem of the primary and secondary rainbows: he appealed, respectively, to one and two internal reflections inside the raindrop, which he modeled using a glass vial filled with water. Meanwhile, at Oxford, natural philosophers were applying mathematical analysis to motion, coming up with theoretical ways of measuring uniformly changing quantities. In mid-fourteenth-century Paris, Jean Buridan used impetus theory to explain projectile motion, the acceleration of free-fall, and even the unceasing rotation of the starry sphere (in the absence of resistance, God's initial impetus at creation is preserved and requires no further intervention). His younger contemporary Nicole Oresme (later a bishop) offered a nice list of arguments for the possible rotation of the earth: he concluded that no available empirical or rational evidence could determine whether or not it moved. Many more examples could be cited. Like most masters, these individuals benefited from the considerable freedom of thought allowed by the university disputation, which required that arguments pro and contra various positions be advanced and defended on rational grounds alone. It was the scholars' fellow disputants who regularly sought to give them grief; most of the time, "the Church" did not.

Between 1150 and 1500, more literate Europeans had had access to scientific materials than any of their predecessors in

earlier cultures, thanks largely to the emergence, rapid growth, and naturalistic arts curricula of the medieval universities. If the medieval church had intended to suppress the inquiry into nature, it must have been completely powerless, for it utterly failed to reach its goal.

MYTH 3

THAT MEDIEVAL CHRISTIANS TAUGHT THAT THE EARTH WAS FLAT

Lesley B. Cormack

In Christendom, the greater part of this long period [Ptolemy to Copernicus] was consumed in disputes respecting the nature of God, and in struggles for ecclesiastical power. The authority of the Fathers, and the prevailing belief that the Scriptures contain the sum of all knowledge, discouraged any investigation of Nature . . . This indifference continued until the close of the fifteenth century. Even then there was no scientific inducement. The inciting motives were altogether of a different kind. They originated in commercial rivalries, and the question of the shape of the earth was finally settled by three sailors, Columbus, Da Gama, and above all, by Ferdinand Magellan.

—John William Draper, *History of the Conflict between Religion and Science* (1874)

With the decline of Rome and the advent of the Dark Ages, geography as a science went into hibernation, from which the early Church did little to rouse it . . . Strict Biblical interpretations plus unbending patristic bigotry resulted in the theory of a flat earth with Jerusalem in its center, and the Garden of Eden somewhere up country, from which flowed the four Rivers of Paradise.

—Boise Penrose, *Travel and Discovery in the Renaissance* (1955)

A Europe-wide phenomenon of scholarly amnesia . . . afflicted the continent from AD 300 to at least 1300. During those centuries Christian faith and dogma suppressed the useful image

of the world that had been so slowly, so painfully, and so scrupulously drawn by ancient geographers.

—Daniel J. Boorstin, *The Discoverers* (1983)

Did people in the Middle Ages think that the world was flat? Certainly the writers quoted above would make us think so. As the story goes, people living in the "Dark Ages" were so ignorant (or so deceived by Catholic priests) that they believed the earth was flat. For a thousand years they lingered in ignorant obscurity, and were it not for the heroic bravery of Christopher Columbus and other explorers, they might well have continued in this ignorance for even longer. Thus, it was the innovation and courage of investors and explorers, motivated by economic goals and modern curiosity, that finally allowed us to break free from the shackles forged by the medieval Catholic church.[1]

Where does this story come from? In the nineteenth century, scholars interested in promoting a new scientific and rational view of the world claimed that ancient Greeks and Romans had understood that the world was round, but that this knowledge was suppressed by medieval churchmen. Pro-Catholic scholars responded by making the argument that medieval thinkers did know the world was round.[2] Critics, however, dismissed such opinions as mere apologetics. Why did the battle rage over this particular issue? Because a belief in the flat earth was equated with willful ignorance, while an understanding of the spherical earth was seen as a measure of modernity; the side one defended became a means of condemning or praising medieval churchmen. For scholars such as William Whewell or John Draper, therefore, Catholicism was bad (since it promoted a flat-earth view), while for Roman Catholics, Catholicism was good (since it promoted modernity). As we'll see, neither of these extremes describes the true state of affairs.[3]

This equation of rotundity with modernity also explains why nineteenth-century American historians claimed it was Columbus

and the early mercantilists who proved the earth was round and thereby ushered in modernity—and America. In fact, it was a biography of Columbus by the American author Washington Irving, the creator of "Rip Van Winkle," that introduced this idea to the world.[4]

But the reality is more complex than either of these stories. Very few people throughout the Middle Ages believed that the world was flat. Thinkers on both sides of the question were Catholics, and for them, the shape of the earth did not equate with progressive or traditionalist views. It is true that most clerics were more concerned with salvation than the shape of the earth—that was their job, after all. But God's works in nature were important to them as well. Columbus could not have proved that the world was round, because this fact was already known. Nor was he a rebellious modern—he was a good Catholic and undertook his voyage believing he was doing God's work. A transformation was taking place in fifteenth-century views of the earth, but it had more to do with a new way of mapping than with a move from flat earth to round sphere.

Scholars in antiquity developed a very clear spherical model of the earth and the heavens. Every major Greek geographical thinker, including Aristotle (384–322 B.C.), Eratosthenes (third century B.C.), and Ptolemy (second century A.D.), based his geographical and astronomical work on the theory that the earth was a sphere. Likewise, all of the major Roman commentators, including Pliny the Elder (23–79 A.D.), Pomponius Mela (first century A.D.), and Macrobius (fourth century A.D.), agreed that the earth must be round. Their conclusions were in part philosophical—a spherical universe required a sphere in the middle—but were also based on mathematical and astronomical reasoning.[5] Most famous was Aristotle's proof of the sphericity of the earth, an argument used by many thinkers in the Middle Ages and Renaissance.

If we examine the work of even early-medieval writers, we find that with few exceptions they held a spherical-earth theory.

Among the early church fathers, Augustine (354–430), Jerome (d. 420), and Ambrose (d. 420) all agreed that the earth was a sphere. Only Lactantius (early fourth century) provided a dissenting opinion, but he rejected all pagan learning since it distracted people from their real work of achieving salvation.[6]

From the seventh century to the fourteenth, every important medieval thinker concerned about the natural world stated more or less explicitly that the world was a round globe, many of them incorporating Ptolemy's astronomy and Aristotle's physics into their work. Thomas Aquinas (d. 1274), for example, followed Aristotle's proof in demonstrating that the changing positions of the constellations as one moved about on the earth's surface indicated the spherical shape of the earth. Roger Bacon (d. 1294), in his *Opus Maius* (ca. 1270), stated that the world was round, that the southern antipodes were inhabited, and that the sun's passage along the line of the ecliptic affected climates of different parts of the world. Albertus Magnus (d. 1280) agreed with Bacon's findings, while Michael Scot (d. 1234) "compared the earth, surrounded by water, to the yolk of an egg and the spheres of the universe to the layers of an onion."[7] Perhaps the most influential were Jean de Sacrobosco, whose *De Sphera* (ca. 1230) demonstrated that the earth was a globe, and Pierre d'Ailly (1350–1410), archbishop of Cambrai, whose *Imago Mundi* (written in 1410) discussed the sphericity of the earth.[8] Both of these books enjoyed great popularity; Sacrobosco's book was used as a basic textbook throughout the Middle Ages, while d'Ailly's book was read by early explorers like Columbus.

The one medieval author whose work has sometimes been interpreted to demonstrate belief in a disk-shaped rather than spherical earth is Isidore of Seville (570–636), a prolific encyclopedist and natural philosopher. Although he was explicit about the spherical shape of the universe, historians have remained divided on his portrayal of the shape of the earth itself.[9] He claimed that everyone experienced the size and heat of the sun in the same manner, which could be interpreted to mean that sunrise was

seen at the same moment by all the earth's inhabitants and that therefore the earth was flat; but the statement more likely implies that the sun's shape did not alter as it progressed around the earth. Much of his physics and astronomy can only be understood to depend on a spherical earth, as does his interpretation of lunar eclipses. While it is not necessary to insist on absolute consistency, it does seem that Isidore's cosmology is only consistent with a spherical earth.[10]

Many popular vernacular writers in the Middle Ages also supported the idea of a round earth. Jean de Mandeville's *Travels* to the Holy Land and to the Earthly Paradise beyond, written in about 1370, was one of the most widely read books in Europe from the fourteenth to the sixteenth century. Mandeville was quite explicit in stating that the world was round and navigable:

> And therefore I say sickerly that a man myght go all the world about, both above and beneath, and come again to his own country . . . And alway he should find men, lands, isles and cities and towns, as are in their countries.[11]

Likewise, Dante (1265–1321) in the *Divine Comedy* described the world as a sphere several times, claiming that the southern hemisphere was covered with a vast sea. And in "The Franklin's Tale" Chaucer (ca. 1340–1400) spoke of "This wyde world, which that men seye is round."[12]

The one medieval writer explicitly to deny the sphericity of the earth was Cosmas Indicopleustes, a sixth-century Byzantine monk who may have been influenced by contemporary Jewish and Eastern flat-earth traditions. Cosmas developed a scripturally based cosmology, with the earth as a tableland, or plateau, placed at the bottom of the universe. It is hard to know how influential he was during his lifetime. Only two copies of his treatise exist today, one of which may have been Cosmas's personal copy, and only one man in the Middle Ages is known to have read his work, Photius of Constantinople (d. 891), widely regarded as the best-read man of his age.[13] In the absence of positive evidence, we cannot use

Cosmas to argue that the Christian church suppressed knowledge of the rotundity of the earth. Cosmas's work merely indicates that the early-medieval scholarly climate was open to debates on the subject.

With the exceptions of Lactantius and Cosmas, all major scholars and many vernacular writers interested in the physical shape of the earth, from the fall of Rome to the time of Columbus, articulated the theory that the earth was round. The scholars may have been more concerned with salvation than with geography, and the vernacular writers may have displayed little interest in philosophical questions. But, with the exception of Cosmas, no medieval writer denied that the earth was spherical—and the Catholic church never took a stand on the issue.

Given this background, it would be silly to argue that Columbus proved the world was round—or even argued so. However, popular accounts continue to circulate the erroneous story that Columbus fought the prejudiced and ignorant scholars and clerics at Salamanca, the home of Spain's leading university, before convincing Queen Isabella to let him try to prove his position. Columbus's proposal—that the distance from Spain west to China was not prohibitively great and that it was shorter and safer than going around Africa—was greeted with incredulity by the group of scholars informally assembled to advise the king and queen of Spain. Since no records remain of that meeting, we must rely on reports written by Columbus's son Fernando and by Bartolemé de las Casas, a Spanish priest who wrote a history of the New World. Both tell us that the learned men at Salamanca were aware of the current debates about the size of the earth, the likelihood of inhabitants in other parts of the world, and the possibility of sailing through the torrid zone at the equator. They challenged Columbus on his claim to having knowledge superior to that of the ancients and on his ability to do what he proposed. They did not, however, deny that the earth was spherical, but rather used its sphericity in their arguments against Columbus, arguing that the round earth was larger than

Columbus claimed and that his circumnavigation would take too long to complete.[14]

When Peter Martyr praised the achievements of Columbus in his laudatory preface to *Decades of the New World* (1511), he was quick to point out that Columbus had proven the equator was passable and that there were indeed peoples and lands in those parts of the globe once thought to have been covered with water. Nowhere, however, did he mention proving the sphericity of the earth.[15] If Columbus had indeed proved the point to doubting scholars, Peter Martyr surely would have mentioned it.

Those who want to preserve Columbus as an icon for the historic moment when the world became round might appeal to the common people. After all, weren't Columbus's sailors afraid of falling off the end of the earth? No, they weren't. According to Columbus's diary, the sailors had two specific complaints. First, they expressed concern that the voyage was taking longer than Columbus had promised. Second, they were frightened that, because the wind seemed to blow constantly due west, they would be unable to make the return voyage eastward.[16]

As we have seen, there is virtually no historical evidence to support the myth of a medieval flat earth. Christian clerics neither suppressed the truth nor stifled debate on this subject. A good son of the church who believed his work was revealing God's plan, Columbus didn't prove the earth was round—he stumbled on a continent that happened to be in his way.

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