

GALILEO GOES TO JAIL

**AND OTHER MYTHS ABOUT SCIENCE
AND RELIGION**

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**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.