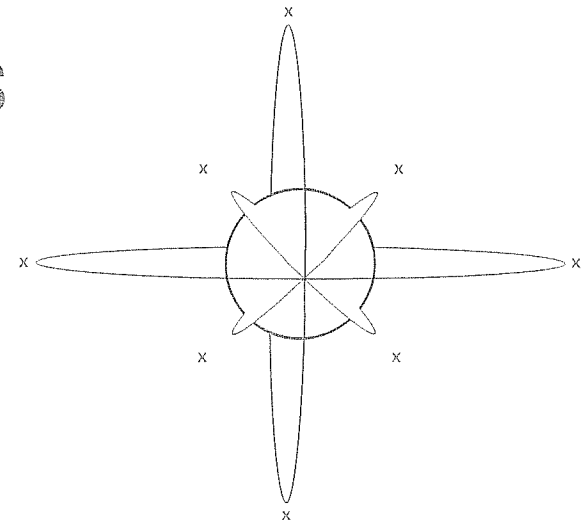


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Physics

and
Ancient Faith



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Materialism as an Anti-Religious Mythology

To begin with I will state the anti-religious myth in words that I think are quite typical of a great deal of writing on the subject.¹

“Religion is the fruit of ignorance. Ignorant people, because they do not know how the world really works or the true causes of things, have always had recourse to explanations based on mythical beings and occult forces. They attribute the unpredictability of nature to the whims of gods and spirits. One sees this in the ancient myths and legends of primitive peoples. For example, in Greek mythology, thunder and lightning were the weapons of Zeus, storms at sea were caused by the wrath of Poseidon, and volcanic activity was associated with the subterranean workshops of Hephaestus, from whose Roman name, Vulcan, the word *volcano* comes.

“But religion is not just simple ignorance. It is a form of pseudo-knowledge. True knowledge—which is to say scientific knowledge—is based on reason and experience, on testable hypotheses and repeatable experiments. Religious beliefs, on the other hand, are based on the authority of ancestors or holy men or sacred writings—in other words, on someone’s say-so. The fundamental opposition, then, between science and religion is the conflict, inherent and unresolvable, between reason and dogma.

“The defining moment in the history of science was the confrontation between Galileo and the Roman Inquisition. In this episode science and religion stood revealed in their truest and purest colors. It was the decisive contest between the two approaches to the world, the scientific and the religious, and religion lost. Its defeat proved the hollowness of religious authority’s claim to special knowledge about the world.

“Science is the rational approach to reality because it deals with things that can actually be observed. Its statements can be put to the test. Religion, by contrast, characteristically deals with entities—God, the soul, angels, devils, Heaven, and Hell—that are admitted to be invisible. Its statements, because untestable, must be ‘taken on faith.’ ‘Faith’ is nothing but the wholly arbitrary acceptance of statements for which there is no evidence, and is therefore the very antithesis of reason: it is believing without reason.

“As science has progressed, religious explanations have given way to scientific ones. No evidence of God or of the soul has been forthcoming. Rather, these fictitious entities have less and less room to hide. They were meant in the first place to fill the gaps in our knowledge of the physical world, and consequently they are being steadily and inevitably squeezed out as those gaps are systematically closed. Science is the realm of the known, while religion thrives on the ‘unknown,’ on the ‘unexplainable,’ and on ‘mysteries’—in short, on the irrational.”

It is not too hard to show that most of this fairly standard anti-religious caricature is based on misunderstandings and bad history. In the first place, it is important to emphasize that the biblical religions did not originate in pre-scientific attempts to explain natural phenomena through myth. In fact, the Bible shows almost no interest in natural phenomena. It is certainly true that biblical revelation, both Jewish and Christian, has as a central part of its message that the universe is a creation of God and reflects his infinite wisdom and power. However, the scriptural authors evince no concern with detailed questions of how or why things happen the way they do in the natural world. Their primary concern is with God’s relationship to human beings, and with human beings’ relationships to each other.

In other words, the religion of the Bible is not a nature religion. Indeed, one of the great contributions of the Bible, which helped clear the ground for the later emergence of science, was to desacralize and depersonalize the natural world. This is not to deny that the Bible is overwhelmingly supernatural in its outlook, but that supernaturalism is concentrated, so to speak, in a being who is *outside* of nature.² No more were the Sun or stars or oceans or forests the haunts of ghosts or gods, nor were they endowed with supernatural powers. They were mere things, creations of the one God.³ It is not an accident that as traditional Christian belief has weakened in Western society in the last few decades there has been a recrudescence of belief in the “occult.”

What is true of the Bible is also true of Jewish and Christian teaching since biblical times: it has been very little concerned with attempts to give religious explanations of natural phenomena. If one looks at authoritative statements of doctrine from the time of the early church fathers down through the Middle Ages

and the Renaissance, one does not find pronouncements about botany, or zoology, or astronomy, or geology. For example, the most comprehensive statement of Catholic doctrine until just recently was the *Roman Catechism*, sometimes also called the *Catechism of the Council of Trent*, published in 1566, not long before the Galileo affair. There is nothing in the *Roman Catechism* pertaining to natural phenomena at all. The same is true of the doctrines of the other branches of Christianity, and of Judaism as well.

One place where theologians did concern themselves with the natural world was in interpreting the first chapter of the Book of Genesis, often called the Hexahemeron, meaning “the six days.” Even here, however, the central doctrinal concern was not the details of how the world originated, but the fact that it was created. St. Thomas Aquinas summarized the mediaeval church’s attitude toward the Book of Genesis as follows:

With respect to the origin of the world, there is one point that is of the substance of the faith, viz. to know that it began by creation, on which all the authors in question are in agreement. But the manner and the order according to which creation took place concerns the faith only incidentally, in so far as it has been recorded in Scripture, and of these things the aforementioned authors, safeguarding the truth by their various interpretations, have reported different things.⁴

The authors to whom St. Thomas was referring were the fathers and theologians of the ancient church, and, indeed, their interpretations of the Hexahemeron varied widely. In the East, the theologians of Alexandria tended toward very allegorical and symbolic interpretations, while those of Antioch and Cappadocia tended toward strict literalism. In the West, the greatest of the fathers, St. Augustine (354–430), adopted a very non-literal approach. To take an important example, St. Augustine held that the “six days” of creation were not to be taken literally as a period of time or a temporal succession. He held, rather, that all things were produced simultaneously by God in a single instant and subsequently underwent some natural process of development. Much earlier, St. Clement (ca. 150–ca. 216), Origen (ca. 185–ca. 254), and other Alexandrians had held the same view.⁵

In commenting on this issue, St. Thomas Aquinas said that the idea of successive creation was “more common, and seems superficially to be more in accord with the letter [of Scripture],” but that St. Augustine’s idea of simultaneous creation was “more conformed to reason,” and therefore had his (St. Thomas’s) preference.⁶

This statement of St. Thomas perfectly illustrates another important point, which is that the church has always sought to give empirical reason its due.

Never (even, as we shall see, in the Galileo case) has the church insisted upon interpretations of the Bible that conflicted with what could be demonstrated from reason and experience. In his *Summa Theologiae*, St. Thomas cites the teaching of St. Augustine on the principles which should be observed in interpreting Scripture: “Augustine teaches that two points should be kept in mind when resolving such questions. First, the truth of Scripture must be held inviolably. Second, when there are different ways of explaining a Scriptural text, no particular explanation should be held so rigidly that, if convincing arguments show it to be false, anyone dare to insist that it is still the definitive sense of the text.”⁷

Indeed, St. Augustine was sometimes quite vehement on this subject, obviously provoked by statements of some of the less learned Christians of his day. In a famous passage in his book *De Genesi ad Litteram (On the Literal Meaning of Genesis)*, he wrote:

Usually 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 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 to hear a Christian, presumably giving the meaning of Holy Scripture, 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. . . . If they find a Christian mistaken in a field which they themselves know well and hear him maintaining his foolish opinions about our books, how are they going to believe our books in matters concerning the resurrection of the dead, the hope of eternal life, and the kingdom of heaven, when they think their pages are full of falsehoods on facts which they themselves have learnt from experience and the light of reason? Reckless and incompetent expounders of Holy Scripture bring untold trouble and sorrow on their wiser brethren, . . . to defend their utterly foolish and obviously untrue statements, they will try to call upon Holy Scripture, . . . although they understand neither what they say nor the things about which they make assertion.⁸

How then, given these very reasonable attitudes of such high authorities as Augustine and Aquinas, did the Catholic Church end up, in the early seventeenth century, condemning the scientific theories of Galileo? Part of the explanation, no doubt, lies with personal failings of the people involved, but it also had a lot to do with the agitated times in which Galileo lived. The church was

caught up at that time in the great conflict of Reformation and Counter Reformation. The central accusation leveled at the Catholic Church by the Protestant reformers was that her teachings and practices were a corruption of the original pure gospel found in the Scriptures. The proper way to interpret scriptural passages thus became the major bone of contention. In order to guard against Protestant ways of interpreting Scripture, the church laid down at the Council of Trent certain principles of interpretation. These moderate and sensible rules ended up being tragically misapplied in the Galileo case. Ironically, this had the effect of producing an exaggerated literalism that was a departure, as we have seen, from the church's own ancient traditions of scriptural interpretation.⁹

Whatever the historical reasons for the fateful blunder, however, the Catholic Church, even at that darkest hour in her relations with science, did not reject the idea that truths about the natural world could be known through reason, observation, and experiment. Nor did she assert that genuine scientific proofs must give way before literal interpretations of the Bible. The very head of the Roman Inquisition, Cardinal Bellarmine, wrote the following memorable words to a friend of Galileo's named Paolo Foscarini:

If there were a real proof that the Sun is in the center of the universe, . . . and that the Sun does not go round the Earth but the Earth round the Sun, then we should have to proceed with great circumspection in explaining passages of Scripture which appear to teach the contrary, and rather admit that we did not understand them than declare an opinion to be false which is proved to be true. But, as for myself, I shall not believe that there are such proofs until they are shown to me.¹⁰

As a matter of fact, such a "real proof" was not possible in Galileo's and Bellarmine's time. (Galileo believed he had such proofs, but in fact his proofs were wrong.) Bellarmine tried to avoid the conflict, but, unfortunately, he had died by the time of Galileo's second encounter with the Roman authorities.

Whatever else can be said about this lamentable episode, the following is true: the condemnation of Galileo, rather than typifying the church's attitude toward science, was manifestly an anomaly. For while the Catholic Church has never been afraid to condemn *theological* propositions—in its long history it has anathematized many hundreds of them¹¹—only in the single instance of Galileo did the Catholic Church venture to condemn a scientific theory.¹² And even in that case it refrained from doing so in its most solemn and formal way, which would have been irrevocable.

The fact is that the attitude of the church has overwhelmingly been one of friendliness to scientific inquiry. Long before Galileo, and continuing to the

present day, one can find examples in every century, not merely of church patronage of science, but of important scientific figures who were themselves monks, priests, and even bishops. It is worth mentioning some of the more outstanding examples.

Robert Grosseteste (ca. 1168–1253), bishop of Lincoln, was the founder of the "Oxford School," to which has been traced the beginning of the tradition of experimental physical science.¹³ Thomas Bradwardine (1290–1349), who became archbishop of Canterbury, was one of the first people ever to write down an equation for a physical process.¹⁴ Nicholas of Oresme (1323–1382), bishop of Lisieux, made major contributions to both mathematics and physics. He discovered how to combine exponents, and developed the use of graphs to represent mathematical functions and prove theorems about them. He showed that the apparent daily motion of the Sun about the earth could be satisfactorily explained by rotation of the earth on its axis. Oresme also made important attempts to give a quantitative description of accelerated motion, and played a major role in developing the physical concept of inertia. His work may have helped to pave the way for the ideas of Galileo and Newton.¹⁵ Nicolas of Cusa (1401–1464), a cardinal and an important figure in mediaeval philosophy, speculated not merely that Earth was in motion, as Copernicus later suggested, but far more boldly that *all* bodies, including both Earth and the Sun, were in motion in an infinite universe which had *no* center.¹⁶ (Oresme had had similar ideas.) The great Copernicus (1473–1543) was an ecclesiastic, being a canon of Frauenberg Cathedral. He was probably an ordained priest at the time of his death.¹⁷

Fr. Marin Mersenne (1588–1648) is a well-known figure in the history of mathematics, and a certain kind of prime number is named after him. Less well known is that he invented the afocal forms of the two-mirror telescope, fundamental to the modern theory of reflecting telescopes.¹⁸

The tradition of Jesuit astronomy is well known.¹⁹ A Jesuit contemporary of Galileo, Fr. Christoph Scheiner (1573–1650), made important discoveries about sunspots and the Sun's rotation on its axis, and is credited with discovering sunspots independently of Galileo.²⁰ Fr. Francesco Grimaldi (1613–1653) was a pioneer in lunar cartography, and he gave to many of the features of the lunar landscape the names by which they are called today. His published discoveries on the refraction of light preceded Newton's and he discovered both the diffraction of light and the "destructive interference" of light.²¹ Fr. Giovanni Riccioli (1598–1671) discovered the first "binary" or double star.²² Probably the greatest Jesuit astronomer was Fr. Pietro Secchi (1818–1878), one of the founders of astrophysics. He developed the first spectral classification of stars, which is the basis of that still used today; invented the meteorograph; and was the first to understand that nebulae were clouds of gas.²³ Not all priest-astronomers were Jesuits, however. A case in point is Fr. Giuseppe Piazzi

(1746–1826), director of the Palermo Observatory, who discovered the first asteroid, Ceres, in 1801.²⁴

Fr. Lazzaro Spallanzani (1729–1799) was one of the leading biologists of his day. He first interpreted the process of digestion, showing it to be a process of solution taking place by the action of gastric juices. He performed experiments that disproved the hypothesis of “spontaneous generation,” and did important research on such varied matters as fertilization in animals, respiration, regeneration, and the senses of bats. Nor was his work confined to biology. He also helped lay the foundations of modern vulcanology and meteorology.²⁵ Gregor Mendel (1822–1884), an Austrian monk, is universally honored as “the father of genetics” for his discovery of the basic laws of heredity.²⁶

Abbé Henri Breuil (1877–1962), who has been called “the father of prehistory,” was one of the leading paleontologists in the world and for decades the foremost expert on prehistoric cave paintings.²⁷ Abbé Georges Lemaître (1894–1966) was one of the originators of the Big Bang Theory, along with Alexander Friedmann.²⁸ Fr. Julius A. Nieuwland (1878–1936), a chemistry professor at Notre Dame, was a co-developer of neoprene, the first synthetic rubber-like compound.²⁹

One could also mention such significant figures in the history of mathematics as Fr. Francesco Cavalieri (1598–1647), whose ideas played a role in the development of calculus; Fr. Girolamo Saccheri (1667–1733), whose work led up to the discovery of non-Euclidean geometry; and Fr. Bernhard Bolzano (1781–1848), who helped to put the branch of mathematics called “analysis” on a rigorous footing and to clarify mathematical thinking about infinite quantities.³⁰

Obviously, had the church been hostile to science and reason, or had religious faith been incompatible with the scientific temper of mind, so many ecclesiastical figures would not have been found making major scientific discoveries. (Because it was Catholic authorities who blundered in the Galileo affair, I have given only Catholic examples here. But non-Catholic clergymen have also made important contributions to science, from Joseph Priestley (1733–1804), the discoverer of the element oxygen, who was a Protestant minister, to John Polkinghorne, a distinguished particle physicist of our own day who became an Anglican clergyman.)

Many will be surprised to learn that so many Christian clergymen have contributed so importantly to scientific discovery. The name of Gregor Mendel, of course, is familiar to most people; and those who have studied astronomy will know at least of the role of the earlier Jesuit astronomers. But on the whole, even among scientists, the larger picture of the church’s involvement with science is not well known. The one tragic episode of Galileo has therefore overshadowed all the rest and come to typify in the mind of the public, educated and uneducated alike, the relation of science and religion.

Even so, most scientific materialists would concede that to be personally religious is not to be personally hostile to science. Even if they do not always have a balanced view of the history, they do know that many of the great founders of modern science, including Copernicus, Galileo, Kepler, Newton, Ampère, Maxwell, and Kelvin, were deeply religious men. And those scientific materialists who are themselves scientists know religious believers among their own scientific colleagues. (They may have heard, too, of the recent survey which showed that roughly half of American scientists believe in a personal God who answers prayers.) However, while admitting that religious people can be and often are good scientists, the scientific materialist nevertheless is convinced that the religious outlook and the scientific outlook are fundamentally at odds. For religion involves dogma, faith, and mystery, all of which, the materialist thinks, are inimical to the scientific spirit.

In fact, the charge is not simply that dogma, faith, and mystery are unscientific, but that they are essentially contrary to reason itself. To accept a dogma, it is thought, is to put some proposition beyond the reach of reason, beyond discussion, beyond evidence, beyond curiosity or investigation.

This view of dogma as anti-rational is based on a fundamental misunderstanding of what religious dogmas are. It is thought that the basis of dogma is emotion. Consider the following passage from a recent book: “Nothing could be more antithetical to intellectual reform than an appeal *against* thoughtful scrutiny of our most hidebound mental habits— notions so ‘obviously’ true that we stopped thinking about them generations ago, and moved them into our hearts and bosoms.”³¹ The author here was not specifically discussing religious dogma, but his words well summarize what the word *dogma* means for many people. To a religious person, however, a dogma is not something that is embraced from mere hidebound habit or feeling or wishful thinking, rather it is understood to be a true proposition for which there is the best of all possible evidence, namely that its truth has been revealed by God.

The believer in religious dogmas accepts that there are *two* ways that a thing may be known to be true: either empirically, through observation, experience, and the “natural light of reason,” or through divine revelation. Accepting the one does not mean rejecting the other. In fact, in our everyday life we recognize that our knowledge does have a double source: there is what we have learned for ourselves and what we have learned from the information of others, whether teachers, friends, books, or common knowledge. Indeed, a little reflection shows that what we have actually derived from our own direct observation of the world without relying upon the word of others is but a very tiny part of everything that we do know. For a person to accept as knowledge only what he had discovered and proved for himself from direct personal experience would put his knowledge at the level of the Stone Age.

Taking something on authority, then, is not in itself irrational. On the contrary, it would be irrational never to do so. The question is when we should take something on authority, and on what kind of authority, and how far we should trust it. In the case of religious dogma, the authority is said to be God, who, it is claimed, has revealed certain truths—primarily truths about himself—to human beings. Such a claim is not in itself contrary to reason, for it is certainly hypothetically possible that there is a God and that he has revealed himself to man.

On the other hand, reason would require that before accepting religious dogmas we must have some sufficient rational grounds for believing that there is in fact a God, and that he has indeed revealed himself to man, and that this revelation truly is to be found where it is claimed to be found. And, indeed, these requirements of reason have always been admitted by the monotheistic creeds of Judaism and Christianity.

It is true that some believers, finding it difficult to give a satisfactory account of why they believe, have fallen back on the idea that belief is simply something one chooses to do, that it is its own justification, that it is a blind “leap.” This is the view called “fideism.” However, it is not the view of the traditional faiths.

If we take what is perhaps the most dogmatic faith of all, Catholicism, we find that it utterly rejects fideism, condemning it as a serious religious error. The First Vatican Council, in 1870, made the following declaration:

In order that our submission of faith be nevertheless in harmony with reason, God willed that exterior proofs of his revelation . . . should be joined to the interior helps of the Holy Spirit. . . . The assent of faith is by no means a blind impulse of the mind.³²

The same council formally condemned the proposition that “people ought to be moved to faith solely by each one’s inner experience or by personal inspiration.”³³ Rather, the council emphasized that there are objective facts and arguments in favor of true religious belief. Indeed, the council declared that the existence of God could be known with certainty *without* faith and *without* divine revelation by the “natural light of human reason.”³⁴

It might be thought that Protestantism, with its doctrine of *sola fide* (“by faith alone”), its emphasis on the inner light, and its greater distrust of human natural powers, including the “natural light of reason,” might embrace fideism. But that is incorrect. For example, in Calvin’s monumental summa of Protestant belief, *Institutes of the Christian Religion*, one of the first chapters is entitled “Rational proofs to establish the belief of the Scripture.”³⁵ Protestants, no less than Catholics, believe that faith in God is a “reasonable service,” to use a scriptural phrase.

This is not to say, of course, that very many religious believers would be able to give a precisely elaborated account of the grounds for their beliefs, with every

step rigorously justified in the manner of a mathematical proof. But, for that matter, how many people could give such an account for anything they believe? Very few. People are not, as a rule, that methodical or analytical. This does not mean that they do not have, at some level, implicit and not consciously formulated, good reasons for believing as they do. As C. K. Chesterton observed, “most people *have* a reason but cannot *give* a reason.”

It must not be thought, however, that religious faith is simply a matter of proofs and evidence.³⁶ On the contrary, the certitude of faith is claimed to be itself a gift from God, a result of what the passage quoted above called “the interior helps of the Holy Spirit.” But unless there were also “exterior proofs” of revelation, belief would not be “in harmony with reason.”

The first article of religion, of course, which must be believed before any divine revelation can be accepted, is that there is a God. As we have seen, the Catholic Church claims that this can be known with certainty by the natural light of reason. And, indeed, throughout history theologians and philosophers have furnished a wide variety of arguments for the existence of God. The basic outlines of one such argument can be found in both the Old and New Testaments. In a famous passage in his Epistle to the Romans, St. Paul asserts that, although God is in himself invisible, his “eternal power and godhead” are “from the creation of the world . . . clearly seen, being understood from the things that are made.” (Rom. 1:20) St. Paul is saying here that one may reason from the existence of an effect (in this case the existence of the world itself) to the existence of its cause (in this case God). The same argument is made by St. Irenaeus of Lyons, writing in the second century: “Creation itself reveals him that created it; and the work made is suggestive of him that made it; and the world manifests him that arranged it.”³⁷ Calvin in his *Institutes* puts the same thought in these words: “God [has] manifested himself in the formation of every part of the world, and daily presents himself to public view, in such manner, that they cannot open their eyes without being constrained to behold him.”³⁸

This basic line of argument has been refined and developed in several forms, which go by such names as the Cosmological Argument, the Argument from Contingency, and the Argument from Design. There are also arguments for the existence of God based on the existence of an objective moral order and on the nature of truth and our capacity to know it.

Beyond grounds for believing that God exists, there must be some grounds for believing that there has been a divine revelation if dogmatic religious belief is to be truly rational. Again, both Christians and Jews have an array of arguments, largely historical in nature, for the fact of revelation.

It is beyond the scope of this book to present or develop either the philosophical or the historical arguments in detail. (However, the Argument from Design is discussed at length in chapters 9 through 13, and certain of the other philosophical arguments are briefly discussed in appendix A, where I attempt to

explain some basic, traditional ideas about God and Creation.) The point that I wish to emphasize here is simply that Jewish and Christian thought have taken very seriously the importance of evidence and argument and the necessity of rational grounds for belief.

One of the common complaints against religious dogma is that it is a substitute for rational inquiry, that it puts an end to thought. However, this is not the actual experience of the Jew or Christian, for whom revealed truths are a source of light in which new things may be seen and new insights arrived at. This is well expressed by the motto of my alma mater, Columbia University: *In lumine tuo, videbimus lumen*. (“In Thy light, shall we see light.”) The ideal of Christian theology has always been summed up in St. Augustine’s phrase “*fdes quaerens intellectum*,” “faith seeking understanding,” or as he also expressed it, “I believe in order that I may understand.” (“*Credo ut intelligam*.”)

The misconception that faith is opposed to rational inquiry seems to have a lot to do with the word *mystery*. In the writings of materialists, as we shall see later, the words *mystery*, *mystery-mongering*, and *mysterianism* crop up repeatedly as bugaboos to be avoided at all costs. The idea appears to be that a mystery is something dark and off-limits, an aspect of reality that is essentially irrational and unintelligible. A mystery is thought to be, one might say, the dark shadow cast by a dogma. This is not only a misconception, but really the opposite of what a religious mystery is to a religious person. Dogmas do not shut off thought, like a wall. Rather they open to the mind vistas that are too deep and broad for our vision. A mystery is what cannot be seen, not because there is a barrier across our field of vision, but because the horizon is so far away. It is a statement not of limits, but of limitlessness.

A religious “mystery” is not a statement that reality is in itself unintelligible. On the contrary, belief in God is bound up with the idea that reality is *completely* rational and intelligible. This is akin to the scientist’s faith that his own questions about the natural world have rational and intelligible answers. This attitude of the scientist is *also* a form of faith, for the scientist is convinced in advance that the intelligible answer exists, even though he is not yet in possession of it. The fact that he is searching for the answer is proof that he does not have it, but it also attests to his unconquerable conviction that the answer, though presently not in sight, exists. The scientist knows that there is some insight, some act of understanding, which he currently lacks, that would satisfy the rational mind on the particular point he is investigating. The religious believer’s faith is an extension of this attitude: he knows that there is some insight, some act of understanding, that would constitute complete intellectual satiety, because it would be a state of complete understanding of reality. However, he realizes, being sane, that such a state of perfect understanding is not achievable by a finite mind such as his own. Rather that insight, that act of understanding, is the state

of being of a perfect and infinite mind, namely God—it is, indeed, what God *is*. In the words of the Jesuit philosopher Bernard J. F. Lonergan, God is the “unrestricted act of understanding.”³⁹

So, the complete intelligibility and rationality of reality corresponds to the existence of a supreme intelligence, a supreme reason. The last person, therefore, who would say that there is anything about the world created by God that is inherently irrational is the Jew or Christian. However, the Jew or Christian knows that he is not himself God, and therefore will never be in a state of perfect understanding about all of reality. And, in particular, he knows that he can never comprehend God as He is in Himself, since God is an infinite mind. As stated earlier, the dogmas of faith concern primarily the nature of God. And it is for that reason that they are mysterious—not because they are not intelligible in themselves, but because they are not intelligible completely *to us*. They are of course intelligible *to God*, who comprehends completely all that is real, and therefore completely comprehends his own nature.

The reason that there are mysteries is that God is infinite and our intellects are finite. Thus the divine nature is not “proportionate” to our minds, as the mediaeval theologians would put it. However, the natures of things in the physical world are certainly finite, and therefore *are* proportionate to our intellects. There is consequently no reason whatsoever that comes from Jewish or Christian belief to have any doubt that we are capable of understanding the physical world. It is for that reason religious mystery hardly touches at all upon the matters which the physicist studies. Thus the idea that religion, because it acknowledges mystery, must be the enemy of natural science is unfounded.

Now, while religious dogmas do not in fact limit the kinds of things one is able to think about, materialism obviously does. The materialist will not allow himself to contemplate the possibility that anything whatever might exist that is not completely describable by physics. That is simply a forbidden thought. It is usually not even felt to be necessary to argue against it. Admittedly, many materialists will say that forbidding one to speak of non-material entities is simply a matter of scientific “methodology.” Natural science investigates matter, they say, and so anything that might go beyond matter is outside of scientific discussion. However, it is hard to see why this should be so. For example, one can imagine investigating human psychology in a perfectly scientific way without prejudging whether the human mind is entirely explicable in terms of material processes. In any event, for most materialists it is not really only a question of methodology. The non-material is considered simply beyond the pale of rational discourse. In short, the materialist’s notion of what a dogma is, though quite unfair to religious dogma, exactly fits his own views.

One sees this materialist dogmatism displayed in every field of inquiry from the philosophy of mind, to artificial intelligence, to psychology, to biology. For

example, the former editor of *Nature*, Sir John Maddox, in his book *What Remains to Be Discovered*, describes the immense complexity of the human brain and shows how little we yet know about its neural circuitry and detailed functioning. And yet he feels entitled to conclude, “An explanation of the mind like that of the brain *must* ultimately be an explanation in terms of the way that neurons function. After all, there is nothing else on which to rest an explanation.”⁴⁰ [emphasis mine] One of the facts that is most difficult for materialism to deal with is consciousness. (Though, since it is more a philosophical problem than an issue in physics, I do not discuss it at length in this book.) The philosopher David Chalmers, in his book *The Conscious Mind*, summarizes the various materialist approaches to the problem. One is what he calls “don’t-have-a-clue materialism,” which he defines as the following view: “I don’t have a clue about consciousness. It seems utterly mysterious to me. But it must be physical, *as materialism must be true*.”⁴¹ [emphasis mine] Such a view, he finds, “is held widely, but rarely in print.” Materialists regard consciousness as at most a merely “passive” by-product of physical processes in the brain. In surveying current thinking about consciousness, the scientist and philosopher Avshalom Elitzur concluded (disapprovingly), “I think one may talk here about the dogma of passivity.”⁴²

What is most puzzling to the religious person about this materialist dogmatism is its lack of foundation. The religious dogmatist, after all, accepts certain truths as dogmas only because he believes them to have been revealed by God. But the materialist obviously cannot claim divine authority for his statement that only matter exists. On what basis, then, does the materialist’s apodictic certainty rest?

Is materialism claimed to be *self-evidently* true? If anything would appear to be self-evident it would be that there are certain things, such as ideas, concepts, and minds, which are of a different sort than material objects. If materialism were self-evidently true, one might expect it to be the common view of ordinary people, and obviously it isn’t. Is materialism definitively proven by philosophical or scientific demonstration? Are there no respectable arguments that could bring its truth into doubt in the mind of an intelligent person? If so, then how can one explain the large number of philosophers and scientists who disbelieve in materialism and bring forward arguments drawn from many considerations against it? We shall meet some of these people and some of their arguments later in this book.

As we examine some of the arguments for materialism later, we shall see that ultimately all of them are completely circular. They all seem to boil down in the end to “materialism is true, because materialism *must* be true.” The fact seems to be that the philosophy of materialism is completely fideistic in character.

Not only is materialism as it is usually encountered more fideistic than the faith of the ordinary religious believer, it is also far more narrow and intellectu-

ally confining. That is because it is essentially a negative proposition. A person who believes that there is something about the human mind that goes beyond matter has a great deal of freedom of thought in this area. How much of the human mind can be physically explained is for him an open question. He may think (like David Chalmers) that all of human behavior is entirely explicable in physical terms but that human subjective experience is not. Or he may believe (like Avshalom Elitzur) that certain aspects of human behavior also go beyond physical explanation. He may (like Chalmers) think that sensation involves a non-material aspect of the mind, or he may believe (with Aristotle) that only certain functions of the human intellect do. He may believe that some ultimate theory will encompass in one scientific framework both material and non-material realities, or he may believe that the divide between matter and spirit is fundamental.

The materialist, by contrast, is in a straitjacket of his own devising. *Nothing* is allowed by him to be beyond explanation in terms of matter and the mathematical laws that it obeys. If, therefore, he comes across some phenomenon that is hard to account for in materialist terms, he often ends up by denying its very existence. For instance, many materialist philosophers deny that there really is any such thing as subjective experience. Philosophers call this view “eliminativism.” What cannot be explained by the theory is eliminated from consideration. Some renowned philosophers, such as W. V. O. Quine, have denied that there are any mental experiences or events at all. Quine says that the existence of mental or conscious processes must be “repudiated.”⁴³ As we shall see later, there are many thinkers who, in order to escape certain anti-materialist arguments that are based on human rational powers, are willing to abandon, in effect, a belief in human rationality—including, of course, their own. Almost all materialists deny that free will exists; they deem it an “illusion.” And so it goes. Anything that stands in the way of materialism is ignored or denied. The materialist lives in a very small world, intellectually speaking. It is a universe of huge physical dimensions, but very narrow, for all that. There is no purpose in this universe. Even human acts are entirely determined by physical processes. Just as the astrologer believes that his life is controlled by the orbits of the planets, the materialist believes that his own actions and thoughts are controlled by the orbits of the electrons in his brain. Our moral or aesthetic judgments are, in the final analysis, just emotional reactions, just chemistry. Even our very “selves” are just convenient fictions; there is no real unitary self that stands behind the welter of images, impulses, drives, and thoughts flickering through our neural circuitry.⁴⁴

The believing Jew or Christian does not feel the need to be embarrassed when materialists attack religion as “anti-scientific” or irrational. For he regards his own beliefs as not less but far *more* rational than those of the materialist. He regards them as providing a fuller, more coherent, and more sensible picture

of reality. A picture in which the existence of the universe is not merely some colossal accident, in which human life has both purpose and meaning, in which ideas about truth and falsehood and good and evil are more than mere electrochemical responses in our brains, and in which the beauty, harmony, and order of the universe, which science has helped us to see more clearly than ever before, are recognized as the product of a wisdom and a reason that transcends our own.

3

Scientific Materialism and Nature

Though I have spent some time discussing them, it is not the historical prejudices of some scientific materialists that are the main subject of this book, but rather the interpretation given by materialists to what science has actually discovered in the last four centuries about the natural world. To use the political language of our day, what I wish to discuss is not the “spin” which some materialists have put on religion or history, but the spin they have put on scientific facts and theories.

Passing, then, beyond the bias and bad history which often accompanies it, one finds that scientific materialism has a case to make against religion that is based upon the discoveries of science itself. Again, let me state this case in words that might be used by a typical materialist:

THE SCIENTIFIC MATERIALIST’S VIEW OF NATURE

“The world revealed by science bears little resemblance to the world as it was portrayed by religion. Judaism and Christianity taught that the world was created by God, and that things therefore have a purpose and meaning, aside from the purposes and meanings we choose to give them. Moreover, human beings were supposed to be central to that cosmic purpose. These comforting beliefs can no longer be maintained in the face of scientific discoveries.

“The universe more and more appears to be a vast, cold, blind, and purposeless machine. For a while it appeared that some things might escape the iron grip of science and its laws—perhaps Life or Mind. But the processes of life are now known to be just chemical reactions, involving the same elements and the same basic physical laws that govern the behavior of all matter. The mind itself is, according to the overwhelming consensus of cognitive scientists, completely explicable as the performance of the biochemical