

Without God

By Steven Weinberg

In his celebrated 1837 Phi Beta Kappa Oration at Harvard, titled "The American Scholar," Ralph Waldo Emerson predicted that a day would come when America would end what he called "our long apprenticeship to the learning of other lands." His prediction came true in the twentieth century, and in no area of learning more so than in science. This surely would have pleased Emerson. When he listed his heroes he would generally include Copernicus and Galileo and Newton along with Socrates and Jesus and Swedenborg. But I think that Emerson would have had mixed feelings about one consequence of the advance of science here and abroad—that it has led to a widespread weakening of religious belief. [\[1\]](#)

Emerson was hardly orthodox—according to Herman Melville, he felt "that had he lived in those days when the world was made, he might have offered some valuable suggestions"—but he was for a while a Unitarian minister, and he usually found it possible to speak favorably of the Almighty. Emerson grieved over what he saw in his own time as a weakening of belief, as opposed to mere piety and churchgoing, in America and even more so in England, though I can't say that he attributed it to the advance of science.

The idea of a conflict between science and religion has a long pedigree. According to Edward Gibbon, it was the view of the Byzantine church that "the study of nature was the surest symptom of an unbelieving mind." Perhaps the best-known portrayal of this conflict is a book published in 1896 by Cornell's first president, Andrew Dickson White, with the title *A History of the Warfare of Science with Theology in Christendom*.

In recent times there has been a reaction against talk of warfare between science and religion. White's "conflict thesis" was attacked in a 1986 paper by Bruce Lindberg and Ronald Numbers, both well-known historians of science, who pointed out many flaws in White's scholarship. The Templeton Foundation offers a large prize to those who argue that there is no conflict between science and religion. Some scientists take this line because they want to protect science education from religious fundamentalists. Stephen Jay Gould argued that there could be no conflict between science and religion, because science deals only with facts and religion only with values. This certainly was not the view held in the past by most adherents of religion, and it is a sign of the decay of belief in the supernatural that many today who call themselves religious would agree with Gould.

Let's grant that science and religion are not incompatible—there are after all some (though not many) excellent scientists, like Charles Townes and Francis Collins, who have strong religious beliefs. Still, I think that between science and religion there is, if not an incompatibility, at least what the philosopher Susan Haack has called a tension, that has been gradually weakening serious religious belief, especially in the West, where science has been most advanced. Here I would like to trace out some of the sources of this tension, and then offer a few remarks about the very difficult question raised by the consequent decline of belief, the question of how it will be possible to live without God.

1.

I do not think that the tension between science and religion is primarily a result of contradictions between scientific discoveries and specific religious doctrines. This is what chiefly concerned White, but I think he was looking in the wrong direction. Galileo remarked in his famous letter to Grand Duchess Christina that "the intention of the Holy Ghost is to teach us how to go to heaven, not how heaven goes," and this was not just his opinion; he was quoting a prince of the Church, Cardinal Baronius, the Vatican librarian. Contradictions between scripture and scientific knowledge have occurred again and again, and have generally been accommodated by the more enlightened among the religious. For instance, there are verses in both the Old and New Testament that seem to show that the earth is flat, and as noted by Copernicus (quoted by Galileo in the same letter to Christina) these verses led some early Church fathers like Lactantius to reject the Greek understanding that the earth is a sphere, but educated Christians long before the voyages of Columbus and Magellan had come to accept the spherical shape of the earth. Dante found the interior of the spherical earth a convenient place to store sinners.

What was briefly a serious issue in the early Church has today become a parody. The astrophysicist Adrian Melott of the University of Kansas, in a fight with zealots who wanted equal time for creationism in the Kansas public schools, founded an organization called FLAT (Families for Learning Accurate Theories). His society parodied creationists by demanding equal time for flat earth geography, arguing that children should be exposed to both sides of the controversy over the shape of the earth.

But if the direct conflict between scientific knowledge and specific religious beliefs has not been so important in itself, there are at least four sources of tension between science and religion that have been important.

The first source of tension arises from the fact that religion originally gained much of its strength from the observation of mysterious phenomena—thunder, earthquakes, disease—that seemed to require the intervention of some divine being. There was a nymph in every brook, and a dryad in every tree. But as time passed more and more of these mysteries have been explained in purely natural ways. Explaining this or that about the natural world does not of course rule out religious belief. But if people believe in God because no other explanation seems possible for a whole host of mysteries, and then over the years these mysteries were one by one resolved naturalistically, then a certain weakening of belief can be expected. It is no accident that the advent of widespread atheism and agnosticism among the educated in the eighteenth century followed hard upon the birth of modern science in the previous century.

From the beginning, the explanatory power of science worried those who valued religion. Plato was so horrified at the attempt of Democritus and Leucippus to explain nature in terms of atoms without reference to the gods (even though they did not get very far with this) that in Book Ten of the *Laws* he urged five years of solitary confinement for those who deny that the gods exist or that they care about humans, with death to follow if the prisoner is not reformed. Isaac Newton, offended by the naturalism of Descartes, also rejected the idea that the world could be explained without God. He argued for instance in a letter to Richard Bentley that no explanation but God could be given for the distinction we observe between bright matter, the sun and stars, and dark

matter, like the earth. This is ironic, because of course it was Newton and not Descartes who was right about the laws of motion. No one did more than Newton to make it possible to work out thoroughly nontheistic explanations of what we see in the sky, but Newton himself was not in this sense a Newtonian.

Of course, not everything has been explained, nor will it ever be. The important thing is that we have not observed anything that seems to require supernatural intervention for its explanation. There are some today who cling to the remaining gaps in our understanding (such as our ignorance about the origin of life) as evidence for God. But as time passes and more and more of these gaps are filled in, their position gives an impression of people desperately holding on to outmoded opinions.

The problem for religious belief is not just that science has explained a lot of odds and ends about the world. There is a second source of tension: that these explanations have cast increasing doubt on the special role of man, as an actor created by God to play a starring part in a great cosmic drama of sin and salvation. We have had to accept that our home, the earth, is just another planet circling the sun; our sun is just one of a hundred billion stars in a galaxy that is just one of billions of visible galaxies; and it may be that the whole expanding cloud of galaxies is just a small part of a much larger multiverse, most of whose parts are utterly inhospitable to life. As Richard Feynman has said, "The theory that it's all arranged as a stage for God to watch man's struggle for good and evil seems inadequate."

Most important so far has been the discovery by Charles Darwin and Alfred Russel Wallace that humans arose from earlier animals through natural selection acting on random heritable variations, with no need for a divine plan to explain the advent of humanity. This discovery led some, including Darwin, to lose their faith. It's not surprising that of all the discoveries of science, this is the one that continues most to disturb religious conservatives. I can imagine how disturbed they will feel in the future, when at last scientists learn how to understand human behavior in terms of the chemistry and physics of the brain, and nothing is left that needs to be explained by our having an immaterial soul.

Note that I refer here to *behavior*, not consciousness. Something purely subjective, like how we feel when we see the color red or discover a physical theory, seems so different from the objective world described by science that it is difficult to see how they can ever come together. As Colin McGinn has said in these pages:

The problem is how to integrate the conscious mind with the physical brain—how to reveal a unity beneath this apparent diversity. That problem is very hard, and I do not believe anyone has any good ideas about how to solve it.^[2]

On the other hand, both brain activity and behavior (including what we say about our feelings) are in the same world of objective phenomena, and I know of no intrinsic obstacle to their being integrated in a scientific theory, though it is clearly not going to be easy. This does not mean that we can or should forget about consciousness, and like B.F. Skinner with his pigeons concern ourselves only with behavior. We know, as well as we know anything, that our behavior is partly governed by our consciousness, so understanding behavior will necessarily require working out a

detailed correspondence between the objective and subjective. This may not tell us how one arises from the other, but at least it will confirm that there is nothing supernatural about the mind.

Some nonscientists seize on certain developments in modern physics that suggest the unpredictability of natural phenomena, such as the advent of quantum mechanics or chaos theory, as signs of a turn away from determinism, of the sort that would make an opening for divine intervention or an incorporeal soul. These theories have forced us to refine our view of determinism, but not I think in any way that has implications for human life.

A third source of tension between science and religious belief has been more important in Islam than in Christianity. Around 1100, the Sufi philosopher Abu Hamid al-Ghazzali argued against the very idea of laws of nature, on the grounds that any such law would put God's hands in chains. According to al-Ghazzali, a piece of cotton placed in a flame does not darken and smolder because of the heat of the flame, but because God wants it to darken and smolder. Laws of nature could have been reconciled with Islam, as a summary of what God usually wants to happen, but al-Ghazzali did not take that path.

Al-Ghazzali is often described as the most influential Islamic philosopher. I wish I knew enough to judge how great was the impact on Islam of his rejection of science. At any rate, science in Muslim countries, which had led the world in the ninth and tenth centuries, went into a decline in the century or two after al-Ghazzali. As a portent of this decline, in 1194 the Ulama of Córdoba burned all scientific and medical texts.

Nor has science revived in the Islamic world. There are talented scientists who have come to the West from Islamic countries and do work of great value here, among them the Pakistani Muslim physicist Abdus Mohammed Salam, who in 1979 became the first Muslim scientist to be awarded a Nobel Prize, for work he did in England and Italy. But in the past forty years I have not seen any paper in the areas of physics or astronomy that I follow that was written in an Islamic country and was worth reading. Thousands of scientific papers are turned out in these countries, and perhaps I missed something. Still, in 2002 the periodical *Nature* carried out a survey of science in Islamic countries, and found just three areas in which the Islamic world produced excellent science, all three directed toward applications rather than basic science. They were desalination, falconry, and camel breeding.

Something like al-Ghazzali's concern for God's freedom surfaced for a while in Christian Europe, but with very different results. In Paris and Canterbury in the thirteenth century there was a wave of condemnations of those teachings of Aristotle that seemed to limit the freedom of God to do things like create a vacuum or make several worlds or move the heavens in straight lines. The influence of Thomas Aquinas and Albertus Magnus saved the philosophy of Aristotle for Europe, and with it the idea of laws of nature. But although Aristotle was no longer condemned, his authority had been questioned—which was fortunate, since nothing could be built on his physics. Perhaps it was the weakening of Aristotle's authority by reactionary churchmen that opened the door to the first small steps toward finding the true laws of nature at Paris and Lisieux and Oxford in the fourteenth century.

There is a fourth source of tension between science and religion that may be the most important of all. Traditional religions generally rely on authority, whether the authority is an infallible leader, such as a prophet or a pope or an imam, or a body of sacred writings, a Bible or a Koran. Perhaps Galileo did not get into trouble solely because he was expressing views contrary to scripture, but because he was doing so independently, rather than as a theologian acting within the Church.

Of course, scientists rely on authorities, but of a very different sort. If I want to understand some fine point about the general theory of relativity, I might look up a recent paper by an expert in the field. But I would know that the expert might be wrong. One thing I probably would not do is to look up the original papers of Einstein, because today any good graduate student understands general relativity better than Einstein did. We progress. Indeed, in the form in which Einstein described his theory it is today generally regarded as only what is known in the trade as an effective field theory; that is, it is an approximation, valid for the large scales of distance for which it has been tested, but not under very cramped conditions, as in the early big bang.

We have our heroes in science, like Einstein, who was certainly the greatest physicist of the past century, but for us they are not infallible prophets. For those who in everyday life respect independence of mind and openness to contradiction, traits that Emerson admired—especially when it came to religion—the example of science casts an unfavorable light on the deference to authority of traditional religion. The world can always use heroes, but could do with fewer prophets.

The weakening of religious belief is obvious in Western Europe, but it may seem odd to talk about this happening in America. No one who expressed doubt about the existence of God could possibly be elected president of the United States. Nevertheless, though I don't have any scientific evidence on this point, on the basis of personal observation it seems to me that while many Americans fervently believe that religion is a good thing, and get quite angry when it is criticized, even those who feel this way often do not have much in the way of clear religious belief. Occasionally I have found myself talking with friends, who identify themselves with some organized religion, about what they think of life after death, or of the nature of God, or of sin. Most often I've been told that they do not know, and that the important thing is not what you believe, but how you live. I've heard this even from a Catholic priest. I applaud the sentiment, but it's quite a retreat from religious belief.

Though I can't prove it, I suspect that when Americans are asked in polls whether they believe in God or angels or heaven or hell they feel that it is a religious duty to say that they do, whatever they actually believe. And of course hardly anyone today in the West seems to have even the slightest interest in the great controversies—Arians vs. Athanasians, monophysites vs. monothelites, justification by faith or by works—that used to be taken so seriously that they set Christians at each other's throats.

I have been emphasizing religious belief here, the belief in facts about God or the afterlife, though I am well aware that this is only one aspect of the religious life, and for many not the most important part. Perhaps I emphasize belief because as a physicist I am professionally concerned with finding out what is true, not what makes us happy or good. For many people, the

important thing about their religion is not a set of beliefs but a host of other things: a set of moral principles; rules about sexual behavior, diet, observance of holy days, and so on; rituals of marriage and mourning; and the comfort of affiliation with fellow believers, which in extreme cases allows the pleasure of killing those who have different religious affiliations.

For some there is also a sort of spirituality that Emerson wrote about, and which I don't understand, often described as a sense of union with nature or with all humanity, that doesn't involve any specific beliefs about the supernatural. Spirituality is central to Buddhism, which does not call for belief in God. Even so, Buddhism has historically relied on belief in the supernatural, specifically in reincarnation. It is the desire to escape the wheel of rebirth that drives the search for enlightenment. The heroes of Buddhism are the bodhisattvas, who, having attained enlightenment, nevertheless return to life in order to show the way to a world shrouded in darkness. Perhaps in Buddhism too there has been a decline of belief. A recent book by the Dalai Lama barely mentions reincarnation, and Buddhism is now in decline in Japan, the Asian nation that has made the greatest progress in science.

The various uses of religion may keep it going for a few centuries even after the disappearance of belief in anything supernatural, but I wonder how long religion can last without a core of belief in the supernatural, when it isn't about anything external to human beings. To compare great things with small, people may go to college football games mostly because they enjoy the cheerleading and marching bands, but I doubt if they would keep going to the stadium on Saturday afternoons if the only things happening there were cheerleading and marching bands, without any actual football, so that the cheerleading and the band music were no longer about anything.

2.

It is not my purpose here to argue that the decline of religious belief is a good thing (although I think it is), or to try to talk anyone out of their religion, as eloquent recent books by Richard Dawkins, Sam Harris, and Christopher Hitchens have. So far in my life, in arguing for spending more money on scientific research and higher education, or against spending on ballistic missile defense or sending people to Mars, I think I have achieved a perfect record of never having changed anyone's mind. Rather, I want just to offer a few opinions, on the basis of no expertise whatever, for those who have already lost their religious beliefs, or who may be losing them, or fear that they will lose their beliefs, about how it is possible to live without God.

First, a warning: we had better beware of substitutes. It has often been noted that the greatest horrors of the twentieth century were perpetrated by regimes—Hitler's Germany, Stalin's Russia, Mao's China—that while rejecting some or all of the teachings of religion, copied characteristics of religion at its worst: infallible leaders, sacred writings, mass rituals, the execution of apostates, and a sense of community that justified exterminating those outside the community.

When I was an undergraduate I knew a rabbi, Will Herberg, who worried about my lack of religious faith. He warned me that we must worship God, because otherwise we would start worshipping each other. He was right about the danger, but I would suggest a different cure: we should get out of the habit of worshipping anything.

I'm not going to say that it's easy to live without God, that science is all you need. For a physicist, it is indeed a great joy to learn how we can use beautiful mathematics to understand the real world. We struggle to understand nature, building a great chain of research institutes, from the Museum of Alexandria and the House of Wisdom of Baghdad to today's CERN and Fermilab. But we know that we will never get to the bottom of things, because whatever theory unifies all observed particles and forces, we will never know why it is that that theory describes the real world and not some other theory.

Worse, the worldview of science is rather chilling. Not only do we not find any point to life laid out for us in nature, no objective basis for our moral principles, no correspondence between what we think is the moral law and the laws of nature, of the sort imagined by philosophers from Anaximander and Plato to Emerson. We even learn that the emotions that we most treasure, our love for our wives and husbands and children, are made possible by chemical processes in our brains that are what they are as a result of natural selection acting on chance mutations over millions of years. And yet we must not sink into nihilism or stifle our emotions. At our best we live on a knife-edge, between wishful thinking on one hand and, on the other, despair.

What, then, can we do? One thing that helps is humor, a quality not abundant in Emerson. Just as we laugh with sympathy but not scorn when we see a one-year-old struggling to stay erect when she takes her first steps, we can feel a sympathetic merriment at ourselves, trying to live balanced on a knife-edge. In some of Shakespeare's greatest tragedies, just when the action is about to reach an unbearable climax, the tragic heroes are confronted with some "rude mechanical" offering comic observations: a gravedigger, or a doorkeeper, or a pair of gardeners, or a man with a basket of figs. The tragedy is not lessened, but the humor puts it in perspective.

Then there are the ordinary pleasures of life, which have been despised by religious zealots, from Christian anchorites in the Egyptian deserts to today's Taliban and Mahdi Army. Visiting New England in early June, when the rhododendrons and azaleas are blazing away, reminds one how beautiful spring can be. And let's not dismiss the pleasures of the flesh. We who are not zealots can rejoice that when bread and wine are no longer sacraments, they will still be bread and wine.

There are also the pleasures brought to us by the high arts. Here I think we are going to lose something with the decline of religious belief. Much great art has arisen in the past from religious inspiration. For instance, I can't imagine the poetry of George Herbert or Henry Vaughan or Gerard Manley Hopkins being written without sincere religious belief. But nothing prevents those of us who have no religious belief from enjoying religious poetry, any more than not being English prevents Americans from enjoying the patriotic speeches in *Richard II* or *Henry V*.

We may be sad that no more great religious poetry will be written in the future. We see already that little English-language poetry written in the past few decades owes anything to belief in God, and in some cases where religion does enter, as with poets like Stevie Smith or Philip Larkin, it is the rejection of religion that provides their inspiration. But of course very great poetry can be written without religion. Shakespeare provides an example; none of his work seems to me to show the slightest hint of serious religious inspiration. Given Ariel and Prospero, we see that poets can do without angels and prophets.

I do not think we have to worry that giving up religion will lead to a moral decline. There are plenty of people without religious faith who live exemplary moral lives (as for example, me), and though religion has sometimes inspired admirable ethical standards, it has also often fostered the most hideous crimes. Anyway, belief in an omnipotent omniscient creator of the world does not in itself have any moral implications—it's still up to you to decide whether it is right to obey His commands. For instance, even someone who believes in God can feel that Abraham in the Old Testament was wrong to obey God in agreeing to sacrifice Isaac, and that Adam in *Paradise Lost* was right to disobey God and follow Eve in eating the apple, so that he could stay with her when she was driven from Eden. The young men who flew airplanes into buildings in the US or exploded bombs in crowds in London or Madrid or Tel Aviv were not just stupid in imagining that these were God's commands; even thinking that these were His commands, they were evil in obeying them.

The more we reflect on the pleasures of life, the more we miss the greatest consolation that used to be provided by religious belief: the promise that our lives will continue after death, and that in the afterlife we will meet the people we have loved. As religious belief weakens, more and more of us know that after death there is nothing. This is the thing that makes cowards of us all.

Cicero offered comfort in *De Senectute* by arguing that it was silly to fear death. After more than two thousand years his words still have not the slightest power to console us. Philip Larkin was much more convincing about the fear of death:

*This is a special way of being afraid
No trick dispels. Religion used to try,
That vast moth-eaten musical brocade
Created to pretend we never die,
And specious stuff that says No rational being
Can fear a thing it will not feel, not seeing
That this is what we fear—no sight, no sound,
No touch or taste or smell, nothing to think with,
Nothing to love or link with,
The anaesthetic from which none come round.*

Living without God isn't easy. But its very difficulty offers one other consolation—that there is a certain honor, or perhaps just a grim satisfaction, in facing up to our condition without despair and without wishful thinking—with good humor, but without God.

The New York Review of Books
Volume 55, Number 14 · September 25, 2008