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SCIENCE AND FAITH

A New Introduction

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CHAPTER 1

Is Faith Opposed to Science?

When we hear the words science and faith we immediately think of the stormy history of their relationship. But faith's encounter with science is not one of unceasing warfare. Keeping in mind that by "faith" this book means belief in the personal, responsive God of the Abrahamic religious traditions (Judaism, Christianity, and Islam), here again are the three main ways in which people who take science seriously relate it to the world of faith:

1. *Conflict:* Science and faith are opposed and irreconcilable.
2. *Contrast*: Science and faith are distinct, but they are not opposed to each other. No conflict can exist between faith and science since they each respond to radically different questions. There is no real competition between them, so there can be no real conflict.
3. *Convergence*: Science and faith are distinct because they ask different kinds of questions, but they may still interact fruitfully. Convergence tries to move beyond both conflict and contrast to a richer and more nuanced perspective, one that allows ample room for an ongoing conversation between science and faith. It focuses especially on the theological implications of the new cosmic story sketched in the introduction.

Let us now examine each approach in more detail.

CONFLICT

Many educated people today have no doubt that faith is irreconcilable with science. For instance, Jerry Coyne, an evolutionist at the University of Chicago, believes that Charles Darwin's theory of evolution has demolished the idea of God once and for all. Contemporary best-selling authors Richard Dawkins, Sam Harris, Christopher Hitchens, and Daniel Dennett, known as the "New Atheists," agree. If you are a scientist, they declare, you cannot honestly believe in God. If you still believe in God in the age of science you are simply foolish. Faith, these skeptics insist, is "belief without evidence." You cannot demonstrate the truth of faith scientifically, so get rid of it. People of faith can provide no factual "evidence" of God's existence. Neither the five senses nor scientific instruments have ever detected the slightest trace of God. Faith is mere fiction and theology a waste of time.[1]

According to the conflict position, both historical investigation and philosophical reflection demonstrate that faith is opposed to science. Historically, simply recall the Catholic Church's prosecution of Galileo in the seventeenth century for teaching that the Earth revolves around the sun. And look at the opposition by Christians and Muslims to Darwin's evolutionary theory even today. Since so many believers in God have resisted the findings of astronomy, physics, and biology, how can one avoid the conclusion that faith is inherently hostile to science?

Philosophically, according to conflict, the problem is that beliefs about God are experimentally untestable. They do not lend themselves to the rigors of public examination, whereas science has to submit its ideas to open criticism and ongoing experimentation. If careful observation shows a scientific hypothesis to be mistaken, scientists willingly modify or discard it and try out new ones. Faith, on the other hand, makes itself immune to the demand for revision.

People of faith, conflict complains, keep on trusting in God no matter how little evidence there is to support this trust. Regardless of how chaotic and troubled the world is and how much suffering and death occur, the faithful still cling to their God. In the face of enormous

suffering and evil, instead of renouncing their faith in God as reasonable people should, Jews recite the words of Job (13:15): "See, he will kill me: I have no hope; but I will defend my ways to his face." After Jesus's execution, his followers ended up trusting in God even more than before. Today, Muslims all over the world trust unconditionally in Allah no matter how many setbacks and horrors they suffer. To this intransigence, conflict responds, If there is nothing that can conceivably invalidate your faith, then looking for evidence to support it is completely irrelevant. How utterly opposed faith is to the spirit of science!

The conflict position holds that that faith is unreasonable because it can provide no evidence of God, scientific or otherwise. In this book conflict is exemplified by "scientific skepticism," the belief that science contradicts faith. Scientific skeptics, such as the New Atheists, are people who insist that faith in God has no basis in observable reality. Faith, they claim, is rooted in fantasy, whereas science is based on observable, empirically available data. Faith is highly emotional and subjective, whereas science is dispassionate, impersonal, and objective. Consequently there must exist an insuperable mutual hostility between science and faith.

The remaining chapters of this book examine numerous expressions of the conflict approach. However, scientific skeptics are not alone in insisting that faith clashes with science. Many devout religious believers also think science, at least at times, contradicts their beliefs. They are opposed, especially, to the Darwinian theory of evolution. About half of the Christians in the United States, for example, maintain that "secular science" like that of Darwin should be rejected whenever it seems to contradict the letter of scripture. Christian opponents of evolution are known as "creationists." If you ever visit the new Creation Museum in Kentucky you will notice that each display highlights the opposition between what the exhibits label "biblical science" on the one hand and "secular science," especially evolutionary biology, on the other. For creationists, Darwin is wrong and the Bible is right. Chapter 3 considers the topic of evolution and faith in much more detail. For now it is enough to observe the strong sense of oppo-

sition to evolutionary science that exists in large sectors of the religious community.

Nevertheless, in this book conflict refers not to religious opposition to science but to the claims of the "scientific skeptics." These are scientists and scientifically educated people who believe that science is the *only* reliable road to truth—a belief known as "scientism"—and that the natural world available to science is literally all there is. This belief is often referred to as "scientific naturalism" and sometimes as "scientific materialism." Scientism and scientific naturalism are the main components of what this book calls "conflict."

Conflict rules out the existence of God because it finds no scientific evidence for the existence of anything beyond the natural world. Many atheists, of course, reject the idea of God for reasons other than its apparent incompatibility with science. To some, the idea of God seems morally and emotionally repugnant. However, intellectually speaking, the foundation of most serious contemporary atheism is an amalgam of scientism and scientific naturalism. Today many academics and journalists are committed to the conflict position. They assume, often without argument, that science cannot be reconciled with faith and theology. (By theology, once again, this book means the large body of reflection and speculation on the meaning of faith in God by Jewish, Christian, and Muslim thinkers.)

CONTRAST

Other highly educated people, including scientists and theologians, see no contradiction whatsoever between faith and science. Each, they maintain, is valid within its own clearly defined sphere of interest. Hence neither can be judged by the cognitive standards of the other. In other words, there is contrast but not opposition between the two. Science and faith have completely different interests and employ distinct methods of inquiry. So it makes no sense to place one in competition with the other.

Why then do so many people today still have the impression that faith and theology are irreconcilable with science? According to contrast, it is because they are confused about the respective roles of each. This confusion has been around since the beginning of the scientific revolution in the sixteenth and seventeenth centuries. In the early modern period, the word science was not yet in use, and even today philosophers are still trying to clarify the meaning of scientific method. In any case, the church's failure to distinguish carefully between theological beliefs and the experimental methods of science led to the unfortunate condemnation of Galileo by ecclesiastical officials in 1633. Confusion still exists today when people of faith express distrust of modern science and when scientific skeptics assume that theology is an obsolete form of science that must now be thrown out. Those who approach this discussion from the contrast perspective claim that the New Atheists, especially Richard Dawkins, mistakenly assume that the idea of God is a scientific hypothesis and as a result wrongly conclude that only modern scientific method can decide whether or not God exists.[2] In fact, according to the contrast view, the awareness of God comes to people of faith through a completely different kind of experience from that of sensation or scientific observation.

To avoid conflict, therefore, contrast requires that both scientists and people of faith stick to their own turf. The fundamental principle of contrast is simple: *Keep faith and science separate!* To compare or oppose them to each other leads only to needless complication.[3] Distinct sets of claims can be opposed to each other, after all, only if they are competing for the same goal. To contrast, however, science and theology are playing different "games" by respectively different sets of rules. So it makes no sense to place them in competition with or opposition to each other. Science is concerned with the physical *causes* of events in the natural world. Theology asks about the ultimate *meaning* of the world and human existence. Science solves physical problems, whereas theology points toward the divine mystery that encompasses and gives existence and purpose to the world. Science asks *how* things came to be and how they work; theology asks *why* the

world exists at all and whether it has a kind of importance that science cannot comprehend.

By sharply segregating science from faith and theology, therefore, contrast seeks to avoid the confusion that leads to conflict. It respects both science and theology as independent modes of inquiry. Theology is not cut out to do science, and science cannot settle the question of God's existence or the nature of ultimate reality. Why not? Simply because scientific method by definition leaves out all questions about meaning, purpose, values, and God. Science strictly speaking is not "wired" to provide commentary on the ultimate origin, destiny, or meaning of things. Whenever scientists hold forth on such issues—as they often do—contrast points out that they are doing so not as scientists but as philosophers and even propagandists.

Among the latter, according to the defenders of contrast, are scientific skeptics who, like the rest of us, usually carry with them belief systems or worldviews of their own, even though they seldom admit it. Their belief system is not theism, but scientism. Scientism, contrast emphasizes, is not the same thing as science. Science is a fruitful method of learning some important things about the physical world, but there are other ways of knowing as well. Contrast is completely open to science, but it rejects scientism's confusion of science with the unscientific *belief* that science is the only reliable way to find truth.

Contrast points out that devotees of scientism not only place absolute trust in scientific method but that they also seek to gain followers through their own version of missionary activity. Today this solicitation flourishes in college and university classrooms as well as in high-profile journals and Internet blogs. Contrast finds the most unembarrassed flaunting of scientism in the writings of the New Atheists whom you will meet occasionally in these pages. The New Atheists, however, are not alone. Many educated people trust in science almost as though, like the gods of religions, it will bring salvation in the form of deliverance from the original sin of prescientific ignorance.

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Contrast claims that the proponents of scientism contradict themselves. Followers of scientism are unable to demonstrate by way of scientific experimentation the truth of their own fundamental assumption that science is the only reliable road to truth. Devotees of scientism *believe* unconditionally and passionately in the power of science to clear up all confusion about the world. Yet they cannot justify this belief scientifically. Scientism tells us to take nothing on faith, and yet it takes faith to make a commitment to scientism. Clearly then, scientism is logically self-contradictory. Reasonable people, contrast maintains, are obliged by logic to reject it.

Contrast, therefore, forcefully reminds readers that it is not science, but scientism, that conflicts with faith and theology. Contrast persistently advises us that it is not science, but scientism, that has emptied modern culture of its religious depth. Science is not to blame. So contrast cautions us to be alert to the ways in which the conflict approach—embraced by contemporary scientific skeptics—labels as "science" what is really a mixture of science, scientism, and scientific naturalism.

Contrast views the marriage of science with scientism as a misbegotten union that can at times unfortunately turn people of faith against science altogether. This is a point of interest for anyone interested in science education, which most informed people now agree is generally quite poor, especially in the United States. From contrast's point of view, the New Atheists and many other scientific skeptics ironically promote scientific ignorance by arbitrarily declaring that science goes best with atheism. Since 80 to 90 percent of U.S. citizens believe in God, such a message is hardly likely to muster much support. Contrast emphasizes, therefore, that science is neutral on the question of God. Science simply does not ask about God, ultimate meaning, or moral values. Therefore, it has nothing to say about them. Contrast's persistent plea: Keep science and faith separate!

CONVERGENCE

Our third approach, convergence, maintains that contrast may be an important first step toward clarity, but it still fails to satisfy those who seek a more coherent picture of reality. The human urge to unify knowledge is too powerful to suppress indefinitely. Contrast, therefore, may help us think lucidly about both science and faith, but it leads our conversation to a frustrating standoff.[4] Doesn't the new cosmic story of a 13.7 billion-year-old universe have theological consequences? Don't the breakthrough ideas of Charles Darwin, Albert Einstein, Georges Lemaître, Edwin Hubble, Stephen Hawking, Francis Crick, and other scientific discoverers have any relevance to faith and theology?

Convergence insists that they do. It refuses to leave the world divided indefinitely into separate spheres of inquiry as defined by contrast. It agrees with contrast that science and faith are each concerned with different kinds of questions. However, convergence claims that theology and scientific knowledge cannot be walled up in completely separate compartments of the human mind and culture indefinitely. New discoveries in cosmology, geology, biology, and neuroscience do have implications for faith and theology. A mature faith, according to convergence, is willing to make adjustments, and theology must change and grow as new discoveries reshape our understanding of nature. History shows that theologies have often, if not always, undergone wholesome transformation in the wake of new scientific understanding.

Convergence looks for an open-ended conversation between scientists and theologians. The word convergence as used here implies that a fully satisfactory synthesis of science and theology has not yet occurred. The ongoing conversation between science and theology is never fully finished. Convergence seeks to avoid a facile marriage of the two, but it allows for interaction and dialogue between them. It forbids both conflation and mutual isolation. Convergence insists on preserving the differences between science and faith, but it also seeks to clarify their relationship. It proposes that scientific understanding of the world can broaden the horizon of one's religious faith, and that the

perspective of faith can deepen one's understanding of the meaning of scientific discoveries.

Convergence, therefore, is especially interested in exploring the theological significance of what this book is calling the "new cosmic story" outlined briefly in the introduction. Convergence doesn't try to prove God's existence from science, but it does look for deeper meaning in our still fresh scientific realization that life evolves and the universe is still coming into being. Convergence does not attempt to shore up faith's claims by appealing to specific patches of scientific evidence. However, it cannot help asking what the new cosmic story might *mean* for people of faith.

The theistic faith traditions characteristically strive to instill in their followers a special way of looking at the world. Rooted in the story of Abraham, who was called into a new future by a promising God, the prophetic faith traditions (Judaism, Christianity, and Islam) all forbid despair and cosmic pessimism. They think of genuine faith as accompanied by hope, a confidence that undreamed-of possibilities are latent even in the most desperate of situations. In the age of science, authentic faith is a steadfast conviction that the future is open and that an incalculable fulfillment awaits not only human beings but also the entire cosmos.

Does such a hopeful point of view contradict science? Not according to convergence. At first sight, faith's hopeful state of mind may seem incompatible with the "realism" of science. However, as the reader will discover, the convergence approach in each of the following chapters argues that there is a remarkable accord between a faith perspective shaped by a sense of reality's promise and the character of the universe as depicted by contemporary cosmology. The entire long quest by science for increasing coherence and intelligibility is completely consistent with the theme of hope that underlies Abrahamic theology. This, at least, is how convergence sees it.

Perhaps the most prominent exemplar of convergence is the renowned paleontologist and Jesuit priest, Pierre Teilhard de Chardin (1881–1955). Teilhard, writing in the early to mid-twentieth century,

was one of the first scientists to observe that evolutionary biology, geology, and cosmology together provide an exciting new picture of a still emerging universe, and that this picture can enrich and renew religious faith. He was among the first scientists to realize that the whole universe is a *story* rather than a fixed state. At the same time, he argued that a mature faith and theology can open our minds to levels of meaning in the cosmic story that conventional science cannot reach.

Theology, convergence points out, can provide no scientific information, nor can science generate theological systems. Taken together, however, science and theology can contribute to a fresh, intellectually plausible and morally exciting vision of what's going on in the universe. Teilhard did not look to science to validate his religious beliefs, nor did he conflate science with faith. He thought, however, that faith and theology need to take seriously what science is now telling us about the universe we live in. Science, he argued, can deepen our understanding of God, just as an appropriate understanding of God can add a dimension of depth and meaning to the discoveries of science.[5] Teilhard, therefore, provides much of the inspiration for the convergence position as it responds to each of this book's topics.

Finally, convergence argues not only that scientific discoveries raise important issues for faith and theological inquiry but also that central theological teachings are inherently supportive of scientific inquiry. Faith and scripture have no special insights to dish out about the physical characteristics of the universe. Faith's inherent support for science in no way involves the endorsement of any particular scientific hypothesis or theory. Rather, faith's support of science goes much deeper: faith and theology can justify a scientist's spontaneous belief that the universe is *intelligible*.

How so? At the roots of any good scientist's restless desire to make sense of things lies an undeniable confidence that the world makes sense and that truth is always worth seeking. Faith and theology, according to convergence, add support to the entire scientific enterprise by preparing our minds for the adventure of scientific discovery and truth seeking. They can shore up the fundamental trust that is

needed to undertake scientific inquiry. Einstein himself acknowledged that science has to reach outside of itself to find the motivation to pursue the truth consistently. Science is dependent, he said, on a kind of religious faith:

> Science can only be created by those who are thoroughly imbued with the aspiration toward truth and understanding. This source of feeling, however, springs from the sphere of religion. To this there also belongs the faith in the possibility that the regulations valid for the world of existence are rational, that is, comprehensible to reason. I cannot conceive of a genuine scientist without that profound faith.[6]

Convergence does not claim that a scientist has to believe in God to be a good scientist. It affirms only that faith in God is supportive of, and provides the deepest and most reasonable justification of, the *trust* that a scientific mind needs if it is to persist in the often difficult struggle for understanding and truth. Whether the scientist believes in God or not, scientific inquiry requires of the scientist a robust faith that nature is lawful, predictable, and intelligible. Even a scientific skeptic, as Einstein illustrates, has to trust that nature, though often surprising, is never capricious. Doing science requires a confident expectation that the scientific search can lead to deeper understanding down the road. This confidence is essential to both launching and sticking with the scientific adventure. In its belief that nature's coherence is ultimately grounded in an infinite divine wisdom, meaning, and truth, theology provides an entirely reasonable foundation for the trust needed by every good scientist.

In summary, then, convergence makes two main points. First, scientific discoveries can expand and enrich our sense of God. And second, faith's sense of an inexhaustible meaning and truth underlying the universe provides a soft breeze that bears the sails of a scientific mind ever onward toward further discoveries. A good scientist, in other words, can easily be a devout person of faith. Convergence acknowledges that our minds are never large enough to take in the whole hori-

zon of being at any given moment. Yet it holds that faith can stir the scientist to press onward—beyond the narrowness of current understanding—in search of ever more breadth and depth. Faith and theology can quietly energize the enterprise of scientific discovery. Scientists can be people of faith, in other words, because their various disciplines thrive on the conviction that the world they are exploring does make sense. Abandoning oneself to such trust does not lead one into conflict with science, according to convergence, but instead prepares a human mind for the great journey of scientific discovery.

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CHAPTER 12

What If Extraterrestrials Exist?

CONFLICT

The discovery of extraterrestrial intelligence (ETI), should it ever occur, would mark the end of the Abrahamic faith traditions. The narrowly provincial God of Judaism, Christianity, and Islam would seem so small as to be unworthy of worship. If ETI exists, our own human sense of being exceptionally important in the universe would be ruined. The belief by Jews, Christians, and Muslims that they have been specially chosen by God would no longer make any sense. Intelligent beings from other planets in the universe could never understand terrestrial theological jargon. It is unlikely that extraterrestrials (ETs) would even ask the silly questions humans do about the meaning of life or the purpose of the universe. Thus there would be no need for religious illusions. The contemporary scientific search for extraterrestrial intelligence (SETI) can flourish best in the cultural atmosphere of scientific naturalism. There is a fundamental conflict between the adventurous spirit of SETI and the stay-at-home smugness of Abrahamic religious traditions.

CONTRAST

Theologians, contrary to what you have just heard from our conflict opponents, have long entertained the idea of the existence of extraterrestrial intelligent beings and "worlds." Such realms exist not only in "heaven" (the angelic hosts) but in "the heavens" as well.[1]

Indeed, some theologians even in the Middle Ages assumed that intelligent beings existed on the moon and many places in addition to Earth. Since we already believe that God has created spiritual beings other than humans, it would hardly be shocking to us if scientific explorers eventually find other intelligent beings in the physical universe. Consequently, it would not significantly alter our understanding of God's creativity, love, and providence if we find that ETI exists. To be frank, if SETI meets with success it will hardly make any difference to a faith and theology that are already tuned in to the infinite creative extravagance of God.

So contrast in no way rules out the existence of ETI. The existence of other "civilizations" in our Big Bang universe (or, if it exists, a multiverse) is completely consistent with the infinite and inexhaustible resourcefulness of the God of Abraham. Nevertheless, it is probably a waste of time even to speculate about an actual theological conversation between us and ETs. Given the enormous distances that separate our planet from any other possible intelligent civilizations, it is doubtful that much of an encounter is going to take place for a long time. And if and when it does, communication along the electromagnetic spectrum will be maddeningly slow. Even in the neighborhood of our own galaxy whole lifetimes would go by while initial greetings are being exchanged. So the topic of ETI seems an unnecessary distraction to theology as we understand it.

CONVERGENCE

The discovery of an extraterrestrial world of living and intelligent beings elsewhere in our universe would, to say the least, be a most interesting new stimulus to theology. Reflecting on even the remotest prospect of eventual "contact" with ETI—whether it ever occurs or not—is a wholesomely expansive exercise for theology. And it seems appropriate even now to respond to the claims the conflict position makes that contact with ETI would spell the end of faith and theology.

These are the relevant questions:

1. If we ever encounter ETI, what would happen to the notion of God?
2. Would our own sense of significance in the universe be diminished?
3. What would be the implications for the three Abrahamic traditions that identify themselves as specially chosen, as people set apart (the question of religious particularity)?
4. Would our own faith traditions and theologies make any sense to intelligent beings from other planets?
5. What implications would the discovery of other intelligent beings have on the large question of cosmic purpose?
6. And can faith and theology provide us with a conceptual framework that would be hospitable to, and perhaps even enthusiastic about, the prospect of meeting up with ETI?

We shall say only a few words about the first three of these questions and devote a bit more attention to the latter three.

What Would Happen to the *Notion* of God?

An encounter with alternative intelligent worlds would be yet another great occasion for theology to benefit from the discoveries of cosmology and enlarge its sense of God and divine creativity. But contact with ETI would also provide an opportunity for theology to display the unifying power of radical monotheism. Any intelligent communities in this universe outside of the Earth's would obviously be grounded in the same creative principle that our terrestrial monotheisms worship as the source of all things "visible and invisible." Our monotheism (belief in only one God) implies that all things, all forms of life, all peoples, and all worlds have a common origin and destiny in the one God who creates and encompasses all beings impartially.

Abrahamic monotheism is still the surest ground we have for embracing anything in creation that may at first seem alien to us.[2] To learn to love what God loves is the vocation and the constant struggle to which our prophets have already called us. Of course, tribalism and ethnic hatred, as well as disregard for nonhuman forms of life, still tragically persist here on Earth. However, this is so only because monothe-

ism, which emphasizes the ontological unity underlying all diversity, still has too tenuous a hold on human awareness. Unfortunately, many people on our small planet do not yet *really* believe in the ultimate unity of all beings even here in our own world. The discovery of other intelligent worlds would be a powerful new incentive to radicalize monotheistic faith and confirm the fundamental unity of the cosmos.

Viewed theologically, all galaxies and all universes are rooted in an ultimate unity of being. So our space travels could never bring us into an encounter with anything completely alien to us. Theology's relevance to SETI lies most fundamentally in its conviction that all possible worlds have a common origin in the one God. And by virtue of the omnipresence of this one God, we too would have an extended home in all possible worlds to which we might eventually travel.[3]

Furthermore, we agree with contrast that the fundamental unity of all beings implied in the notion of divine creativity would tend, by its very nature, to unfold in an unlimited *diversity* of ways, and possibly a multitude of different "worlds" as implied by the idea of a multiverse. In the *Summa Theologica* Thomas Aquinas poses the childlike question as to why God created so many different kinds of beings. He answers that the endless multiplicity and diversity of creatures exist so that what is lacking in one thing as far as expressing the infinity of God is concerned can be supplied by something else, and what is lacking in the latter can be expressed by something else, and so on.[4] Diversity in creation, in other words, is appropriate precisely because of the nature of an infinitely resourceful creator. Our belief that the infinity of God has already become partially manifested in the extravagant multiplicity of nonliving and living beings on our own planet should already have prepared our minds and hearts for a disclosure of even richer diversity elsewhere—and in ways completely unfamiliar to us now. Perhaps there is no better way for religious people to prepare themselves for "exo-theology" than by developing here and now an "eco-theology" deeply appreciative of the revelatory richness of the variety of life forms on our planet.[5]

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Would Our Own Sense of Significance Be Diminished?

Would knowledge of the existence of more intelligent and perhaps more ethically developed beings elsewhere undermine our self-esteem, thus making our faith traditions seem woefully provincial and unduly anthropocentric in convincing their devotees that they are somehow special? What would be the theological implications of an extended "Copernican Principle," one whereby Earth's intelligent occupants would be shown to be just one more "average" population in a universe comprising countless intelligent worlds?

In the first place, we can be confident that it is biologically inconceivable that there would be other *humans* anywhere else in the universe; so our uniqueness as a species is virtually guaranteed in any case. "Of men elsewhere, and beyond, there will be none forever," writes the evolutionist Loren Eiseley. Natural selection has brought *Homo sapiens* into the universe along genetically specific roads that will "never be retraced" biologically.[6]

Second, and more to the point, however, according to the great teachers of Islam, Judaism, and Christianity, we express our own unique human dignity and value not by looking for signs of our mental or ethical superiority over other forms of life but by following a path of service and even self-sacrifice with respect to the whole of life, wherever it may be present. Authentic existence, as Buddhism also makes clear, consists of our capacity for compassion rather than the urge toward competition. The meaning of our existence consists in part of the opportunity to donate our lives and moral efforts to something larger, more important and more enduring than ourselves. Thus, it is inconceivable that the eventual encounter with beings that may in some ways be our superiors would ever render such instruction obsolete.

What Would Be the Implications for the Abrahamic Traditions (the Question of Religious Particularity)?

Perhaps, though, contact with ETI would be the occasion of heightened anguish to those faiths that believe they have received special election and revelation from God. Wouldn't an encounter with

other forms of personal, free, and responsible beings put considerable strain on the credibility of faith traditions that claim the status of being "a people set apart"?

The claim of special election might possibly undergo some stress after "contact." One response, of course, would be to treat ETs as potential subjects of conversion, in which case contact would simply provide new fields for missionary activity. Mary Russell conjures up such an approach—together with its potential hazards—in her interesting science fiction novel, *The Sparrow*.[7]

However, in the context of Abrahamic faith, the idea of special election is even now being divested of the connotations of rank and privilege that it might formerly have suggested. Election, the sense of being specially called or set apart by God, must be understood essentially as a vocation to serve the cause of life and justice rather than lifting us out of our fundamental relatedness to the entire cosmic community of beings. Christians, for example, will recall that Jesus's own sense of being called by God did not prevent him from taking on the status of a slave and of being subjected to the most humiliating destiny available during his lifetime, that of crucifixion (Phil 2). The God of justice espoused by the prophetic traditions requires a radical inclusiveness, a full embrace of the alien and marginalized. This inclusiveness would be open to ETs and supportive of the adventures of many intelligent worlds. Contact, once again, would require not an abandonment but instead a fuller appropriation of the central teachings and practice of the faith.

What seems to be universally applicable in the Abrahamic faith traditions is the ideal of hospitality, of embracing strangers, an ideal that beckons and challenges, no matter how much it has been ignored in practice. The history of our traditions is ambiguous at best in meeting this challenge, but historically the encounter of people of faith with those of alien cultures and practices has often led to the enrichment rather than the dissolution of their faith and theologies. Consequently we anticipate that in the far distant future, if interstellar travel ever occurs, contact with extraterrestrial "cultures" will provide fresh challenges and opportunities for growth.

Would Our Faith Traditions and Theologies Make Sense to Intelligent Beings from Other Planets?

This brings us, however, to a fourth and perhaps more interesting question for theology as it hypothetically prepares for contact. Would the "Others" (let us use this designation rather than "aliens") be able to make any sense at all of our own religious life and thought? And should we expect that other intelligent beings would practice anything like what we call religions? Let us put aside once again the sobering probability that, because of the enormous distances they would have to traverse, any messages flowing back and forth at the speed of light would not add up to many exchanges in the course of a single human lifetime, nor would they extend very far beyond our own cosmic neighborhood. For example, if you sent a message from one edge of the Milky Way galaxy to the other edge, it would take 200,000 years to get a reply. However, let us suppose that we shall eventually be given the opportunity of prolonged conversation with other beings who impress us as being both alive and intelligent. What must their own kind of life and intelligence be like in order to allow us to share with them in a meaningful way our own deepest hopes, including ideas about "God" or "salvation"? What are some of the marks that any other conceivable instances of intelligent life in this universe would have to possess in order for us to be able to converse with them about our own religious beliefs and that might also open us up to an understanding of theirs, if they have any?

In contemplating such questions we are reminded of just how much our earthly religions borrow, in the way of both content and expression, from the unique natural features of our own planet. We may assume that religions in other worlds would be idiosyncratically shaped by their own natural environments. Our own persistent religious metaphors are inseparable from the experience of *Earth's* own characteristics: rotation from day to night; the exposure to sun and moon; the existence of deserts, oceans, rivers and streams, clouds, rain, storms and whirlwinds, grass and trees, blood and breath, soil and sexuality, maternity, paternity, sisterhood and brotherhood. Think of how prominently our experience of trees, for example, shapes religious

imagery: the tree of life, the tree of "knowledge of good and evil," the Bodhi tree of Buddha's enlightenment, the tree of the cross, the cedars of Lebanon. Think of how the occurrence of seeds sprouting to life out of Earth's topsoil has given us the highly significant religious metaphor of "resurrection." And the notion of "spirit," now ironically employed to refer to what is unearthly, comes from the Latin *spiritus* (in Hebrew *ruach* and in Greek *pneuma*), a notion that originally meant the "breath of life" and that, as we now realize, requires the existence of Earth's enlivening atmosphere as its physical basis. Imagine what our religions would be like, Thomas Berry asks, if we lived on something like a lunar landscape.[8] Wouldn't extraterrestrial ecologies breed other extraordinary blendings of land, life, and religious meaning? And wouldn't we have a very difficult time connecting with them?

Difficult, perhaps, though not impossible. Yet in order to conceive of how we might be able to engage in anything like theological conversation with cosmic Others we need first to clarify our terms. What exactly do we mean by *life*, by *intelligence*, and by *religion*?

First, *life*. As we observed in chapter 6, what allows us to identify living beings as "alive" at all, and thus lets us distinguish them from nonliving things or processes, is that they share with us humans the trait of *striving* to achieve some goal, and therefore the possibility of failing or succeeding.[9] We suggest, then, that human persons are interested in the possibility of life elsewhere in the universe in great measure because we sense that we share something special with all other striving, struggling beings. We feel a kinship with all other struggling beings who participate in the drama of life, a connection that we do not have with inanimate things. And so, if we ever encountered life on other worlds we would call it alive (regardless of its chemical makeup) only if we recognized that it participates with us in a kind of dramatic striving that risks the possibility of failure. Of course, in our search for life elsewhere we would also be on the lookout for such qualities as the transgenerational sharing of information that we find in the genetic flow of life here on Earth. We would look for open, self-organizing systems that pump energy out of their environment and so maintain themselves at a high level of complexity far from thermodynamic equi-

librium. But we would also look for beings that need to "exert" themselves in some degree even to maintain their organic identity against the continual threat of being dissolved into their inanimate surroundings. Life elsewhere as well as here, in other words, could be identified as such only if it conforms in some way to what Michael Polanyi calls "the logic of achievement." How this understanding of life bears upon the question of whether ETs are religious will become clear shortly.[10]

Next, what do we mean by *intelligent* life, the special set of features for which SETI professes to be looking, and which we confidently think we could identify if we ever stumbled across it? First of all, if we find intelligent *life*, then it must be manifested in some sort of *striving*; and, second, if it is *intelligent* life, it must be the kind of striving that we associate with *a desire to understand and know*. If the desire for insight and truth is absent then there may be life—sentient and even conscious life—but not intelligent life. Any being that is not somehow striving to achieve some goal, even if this goal is simply that of surviving, is not alive; and any being whose striving does not include the search for insight and truth is not intelligent, at least in the sense that we humans minimally understand the term. SETI already tacitly assumes such a notion of "intelligence" when it searches the heavens for electromagnetic signals that only a technologically sophisticated, and similarly insight-seeking and truth-desiring source is sending out.[11]

Finally, what do we mean by *religion*? Let us understand by "religion" a specific kind of striving also. Before religion is anything else it is a manifestation of *life*, a specific kind of human life, striving toward a goal. Underneath all of its extravagant symbolic, ritualistic, doctrinal, ethical, and institutional foliage, religion is an expression of life—of intelligent life—striving, exploring, and hoping. Religion, we suggest, is intelligent life at perhaps its most intense level of striving.

The whole terrestrial religious endeavor may be thought of as a kind of "route finding," a quest for pathways that promise to carry us through the most intractable limits on life.[12] Even from our perch here on Earth, therefore, can we not identify at least some of the most severe limits that *all* other forms of intelligent life would inevitably have to face along with us? And in identifying these limits, would we

not be placing ourselves and the Others within a common theological circle, one that would allow conversation with them in spite of wide ecological differences?

If the Others possess anything like what we call intelligent life we can reasonably expect to discover that extraterrestrials at least have the *capacity* for a religious mode of venturing. Since any possible Others we would ever encounter will be inhabitants of the same Big Bang universe that we belong to, the general features of this cosmos as made known to us by our terrestrial sciences will presumably also apply to them. We must expect to find, then, that any living, sentient, and intelligent beings will be subject to the transience and perishability characteristic of all things stationed on the slopes of entropy. They too would be subject to transience and eventual perishing. They, like us, would be subject to the threat of failure, and eventual nonbeing, that every living finite being has to confront.

We may conclude, then, that since all living and intelligent beings would experience the same basic physical limits on life that we do, a meaningful exchange about religious route finding through these limits could conceivably occur. For these Others, if they are truly striving centers, would also be in search of ways to transcend the limits on their particular forms of life. And if they are truly intelligent they would have an awareness of their possible nonbeing. They might even have, in other words, what theologian Paul Tillich calls "existential anxiety." Anxiety, the awareness of finitude, drives intelligent life to find a courage that can conquer the threat of nonbeing. In our human experience it is the quest for courage in the face of nonbeing that leads many of us to seek the foundational support of religious faith, and in some cases to an understanding of "God" as the source of courage to continue life's striving in the face of fate, death, guilt, and meaninglessness.[13] If any Others "out there" are alive and intelligent, it would not be surprising that they too need courage. If so, they would be no less potentially religious than we are.

What Implications Would the Discovery of Other Intelligent Beings Have on the Question of Cosmic Purpose?

Whether the universe has any "point" or "purpose" to it is a question that religions must always be concerned about, perhaps above all else. Religions, including our Abrahamic faith traditions, can put up with all kinds of particular scientific ideas as long as they do not contradict the sense that the whole of things is meaningful. They can survive the news that Earth is not the center of the universe, that humans are descended from simian ancestors, and that the universe is 14 billion years old. What they cannot put up with, however, is the suspicion that the whole of things is pointless.[14]

It is worth asking, therefore, how SETI might bear on the question of cosmic purpose and, by implication, on the meaning and mission of our own lives. Any serious theological reflection on cosmology takes the question of purpose to be both unavoidable and central. Generally speaking, *purpose* means the process of realizing a value. Consequently, to say that the universe has a purpose would be to imply that it is oriented toward the realization of something intrinsically good or valuable. Cosmic purpose does not have to imply a particular *telos* or end. Purpose is not identical with a predetermined plan or design, both of which tend to close off the future in a suffocating way. All we need in order to affirm cosmic purpose is an awareness that something of undeniable importance is going on in the universe, and that it is doing so in a way that is tied essentially and not just accidentally to the whole of the cosmos.

Accordingly, it would seem relevant to our understanding of what this universe is all about that we try to find out whether intelligent life is abundantly distributed throughout the cosmos, or, for that matter, whether it exists only here on Earth. Certainly the existence of ETI would force us to reexamine the claim by evolutionists such as Jacques Monod, Stephen Jay Gould, Richard Dawkins, and many others that life and intelligence are the results of utterly improbable, purely random statistical aberrations in an overwhelmingly lifeless and mindless universe. In this respect SETI would seem to have theological importance.

After all, *intelligence itself* is the most indubitable instance we have of intrinsic value. If you find yourself doubting or denying what we have

just said, it is only because *you* are now at this moment spontaneously acknowledging the *value* of your own intelligence. It is impossible for you consistently to deny the intrinsic importance of your intelligence. By issuing judgments about the truth-status of the assertions we have just made, you have already demonstrated how deeply you treasure your own mind and its capacity to understand, criticize and know.

Now if what we have just said is correct—and you really can't doubt it without proving our point—then the existence of even one instance, or one planetary outpost, of intelligence in this vast universe might be enough to make the whole story that leads up to its existence a purposeful one, especially since that large cosmic story is inseparable from the emergence of intelligent life. With the help of physics and astrophysics you now understand how intricately your own intelligence is connected to the 14 billion-year cosmic story and to the physical features of the universe. So to assert that the universe is inherently purposeless seems arbitrary at best. To argue in complete seriousness that the cosmos is ultimately unintelligible, or even to entertain doubts about the purposiveness of this patently mind-bearing universe, would at this point in our scientific understanding of the cosmos seem to sabotage the very mind that is making such an assertion. An essentially mindless universe would be a purposeless one, but a universe in which intelligent life is an essential rather than accidental property could hardly be called purposeless. And so, any future discovery that instances of intelligence occur abundantly in the universe could not help but place the burden of proof upon those who see no intrinsic connection between mind and the rest of nature.

Can Faith and Theology Provide Us with a Framework That Would Be Hospitable to, and Enthusiastic about, Meeting Up with ETI?

Theology is typically more responsive than predictive. Of course, a few prophetic voices can read the signs of the times and issue appropriate warnings about what is to come. But, by and large, theology, undertaken as it is by finite and shortsighted humans, seldom accurately anticipates, much less prepares us for the crises that occur in

connection with unprecedented events in human history or new discoveries in the realm of science. Indeed, most of the theological content of the dominant traditions comes from reaction to crises rather than anticipation of them. Undoubtedly, then, the shape theology would take on if we ever do encounter ETI cannot be accurately predicted here and now, but must await the event itself.

However, we suggest that the cosmic vision of Teilhard de Chardin as well as the process theology based on concepts of the philosopher Alfred North Whitehead are both already inherently open to being developed into a "theology after contact." Not the least of the reasons for their adaptability is that they have already enthusiastically embraced the Darwinian portrait of life as well as the notion that the entire universe is still coming into being. Although Teilhard reflected only occasionally on the possibility of ETI, keeping most of his speculation firmly anchored to our planet, the general thrust of his visionary writings is cosmic in scope. As such, the urge toward increasing complexity and consciousness, so evident to Teilhard in his surveys of the history of life on Earth, could also be a trend, he speculated, throughout the cosmos. For this famous Jesuit paleontologist (1881–1955), the "point" or purpose of the universe has something to do with the emergence and intensification of "complexity-consciousness." As physical complexity increases in the universe, Teilhard observes, so does consciousness. But, as he also acknowledges, the cosmic evolution of consciousness is still far from being finished. Here on Earth the envelope of "thought," which he called the "noosphere," is clothing our own planet in something like a "brain," and it is not inconceivable to him that parallel worlds of consciousness are evolving elsewhere.

Hence, it would not be difficult to graft onto Teilhard's open-ended story of increasing complexity-consciousness other instances of intelligent life that we may eventually find or that may find us. Theologically speaking, the whole universe is on an evolutionary journey into the mystery of God while God seeks to become increasingly more incarnate in the universe. Conceivably such an encounter of God and creation could take place on many planets throughout the

universe as they burst forth into life, consciousness, freedom, and eventually the capacity for charity.[15]

Finally, contemporary "process theology," with its vision of cosmic purpose, is also expansive enough to accommodate the discovery of ETI. For the process philosopher Alfred North Whitehead and his theological followers, the purpose of the cosmos consists of its aim toward the intensification of beauty.[16] Because, at least for Whitehead, beauty is an intrinsic value, any process that leads toward its establishment could be called "teleological," at least in a loose sense. "Beauty," in Whitehead's thought, means the "harmony of contrasts" or the "ordering of novelty," many diverse instances of which have appeared in the evolution of the cosmos and in the emergence of life, mind, and culture in our terrestrial setting.

Intelligent life, however, is only one instance of cosmic beauty. We really have no idea of the many forms the cosmic aim toward bringing about beauty might assume within the totality of the universe. Perhaps, then, SETI has set its goals too narrowly for theology. What we call intelligent life might turn out to be too trivial a notion to capture what is already "out there," or the incalculable cosmic outcomes that may yet occur in the future of this unfinished universe (or multiverse). The notion of "beauty," however, is encompassing enough to anticipate a wide variety of cosmic evolutionary outcomes. As we explore the universe we should ask not only about the meaning of intelligence, but also about what the existence of beauty implies as far as the essential character of the whole universe is concerned. It is clear that the universe has always been dissatisfied with the monotony of the status quo, and so it has produced innumerable instances of ordered novelty. Perhaps the aim toward beauty, then, is enough to endow the universe with purpose—although it is not necessary for us to add that we would not be able to arrive at such a conclusion unless there were also intelligent subjects capable of enjoying it.