

Ancient Faith and Modern Science

- Ted Peters¹

Abstract: *Comparing science to a bird and religions to a multi-branched tree that provides safe haven and shelter for this bird, particularly during its nestling days, the author traces chronologically the vicissitudes of the complex science-religion relationship. In this long journey he discusses the contributions of scientists like Copernicus, Kepler, Galileo, Newton, and others; theologians like Luther, Calvin, Gilkey, and others; philosophers like Hume, Kant, and others; scholarly science-writers like Gould, Hawking, Davies and others. He concludes by suggesting the dialogical approach for interrelating science and religion as the most productive and healthy path to pursue for our times.*

- Editor

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Introduction

The historical monotheisms of the West — Judaism, Christianity, Islam — as well as the metaphysical mysticisms of Asia — Hinduism, Buddhism, Jainism, Taoism — trace their roots back to the ancient beginnings of their respective civilizations. Like prehistoric trees, they have grown up with recorded civil history and branched and flowered and seeded diverse progeny across the global landscape. Each has its own trunk of tradition, to be sure; yet their respective branches stretch into each other's domain and mingle. Coming to nest in the branches of these already matured religious trees in recent centuries has been a bird of prey, natural science. Like a fledgling, science in its youth was nourished

in protective religious foliage; but, then, when it had matured, science flew off for more spacious skies.

Some have tried to depict the relationship between science and religion as one of warfare, as if two armies would be armed and ready to defeat one another. Even though tension and even conflict have characterized some interactions between science and religion, this image of warfare is excessive. It is misleading. Here, with the image of the tree and the bird, I suggest a partial symbiotic relationship combined with intellectual independence. In addition, when we consider the centuries of time over which our religious traditions have developed, modern science becomes a chapter nestled within a much larger history.

“Recent developments in the different sciences are a blessing to humanity, and religion has no reason to be intimidated by them,” writes Job Kozhamthadam.² By setting the warfare model aside, we can find reasons for a complementary connection between ancient faith and modern science. Further, we can foster a dialogue between the two. Even after having left the nest a bird returns occasionally to the tree for a perch. Science should be able to find in religion a welcoming support. In the coming years dialogue will discern whether and to what extent this is workable.

In what follows, I would like to trace the development of science in the branches of one tree, the European Christian tree. Although all of what we call ‘science’ does not trace its origins to Enlightenment Europe, to be sure; yet much of what we know as ‘modern science’ was nourished by Western European culture over the last five centuries. Like a bird leaving the nest of its birth and youth, science has migrated with the winds to every continent and perched itself in every religious tree. Research laboratories in Bombay (now Mumbai) or Boston, Calcutta (now Kolkata) or Capetown, Madras (now Chennai) or Manchester, will all work with the same principles led by scientists who understand one another regardless of cultural background, political preference, or religious commitment. To gain an understanding of how modern science relates to the tree of Christian tradition may be instructive to intellectuals of differing religious traditions; and, hopefully, it may enable and enhance dialogue.

A Scientific Nest in a Christian Tree

The Christian tree had been growing in Europe for a millennium and a half before the nest of modern science would be built right in the fork between two main branches, Catholicism and Protestantism. The branching of Protestantism and the laying of the first scientific egg both took place in the same century, the sixteenth. We may identify this first egg with the first topic of what would become the scientific revolution, astronomy. Nicholas Copernicus (1473-1543) at the University of Cracow, Poland, determined he needed to reform the worldview he had inherited, the Ptolemaic worldview from ancient Greece which held that the earth is immovable and that the sun as well as the other planets orbit the earth. Relying upon his own visual observations without a telescope, plus his own mathematical calculations, in *De revolutionibus orbium caelestium* (1543) Copernicus advanced the hypothesis that the sun, not the earth, stands at the center of the universe; and the earth like the other planets revolves around the sun. This heliocentric view of the universe could not in Copernicus' own day be substantiated empirically; so during the sixteenth century it stood as a mere philosophical David against the Goliath of hellenistic Ptolemaic tradition. Copernicus' argument had not yet become compelling.

Copernicus pursued his research in a Catholic country in Catholic institutions, gaining a widespread reputation for pursuing curious matters. This reputation reached Protestant ears. Martin Luther (1483-1546) heard tales of Copernicus' new thought but apparently had no serious engagement. One offhand remark appears in 1539 - four years prior to the astronomer's major book - in Luther's Table Talk where he ponders a rumor that Copernicus believes the earth moves rather than the sun and the sky. "This would be as if somebody were riding on a cart or in a ship and imagined that he was standing still while the earth and the trees were moving.... This is what that fellow does who wishes to turn the whole of astronomy upside down." Luther added that it was the sun that stood still, not the earth, in the biblical description of Joshua fighting at Jericho (Joshua 10:12).³ This comment did not come from Luther's own authored writing but from students who took notes. Spoken in jest, it ought not be interpreted as indicating any general opposition to science.

Lutheran and Reformed theologians of the Protestant Reformation centered their attention on the role played by Holy Scripture in formulating theological commitments. Although they were literalists, they were not uncritical nor were they rigid. Luther described the Bible as the “cradle of Christ,” thereby ranking scriptural texts according to their relative value for teaching a God of grace and salvation. This hermeneutic indirectly opened scriptural interpretation to new developments in science as they describe God’s created order. “The astronomers are the experts from whom it is most convenient to get what may be discussed about these subjects [sun, moon, and stars]. For me it is enough that in those bodies, which are so elegant and necessary for our life, we recognize both the goodness of God and His power.”⁴

Science appeared during a period of church reflection on scripture. John Calvin (1509-1564) suggested that the biblical authors could tailor their renderings to fit the mind of the reader. In his Commentary on Genesis he reports that Moses adapts his discourse to common usage. When common usage changes, as it does with scientific development, such a hermeneutical insight permits and encourages expanded interpretation. The overriding concern of Luther and Calvin was to see the glory and grace of God in the beauty of creation; so any hesitancy toward science was due to a fear that dispassionate research may render invisible the divine authorship.

It is worthy of note that both Luther and Calvin distinguished between astrology and astronomy; and both rejected astrology as idolatry while celebrating astronomy as science. Luther was both amused and annoyed by the interest in astrology exhibited by his colleague, Philip Melancthon (1497-1560). The science of astronomy which measures the stars, as valuable as this is, cannot measure the divine creator of the stars. Beyond the aims to which “astronomy, medicine, and all natural science are intended,” wrote Calvin, our “mind must rise to a somewhat higher level to look upon his glory.”⁵

The interaction of Catholic Copernicus and his Lutheran supporters is complicated and a bit mysterious. By the fourth decade of the sixteenth century, Wittenberg in Germany became a podium for Copernicanism. Lutheran Reformer Andreas Osiander (1496-1552) wrote an anonymous preface to the first edition of Copernicus’ major work, *De revolutionibus*

for its 1543 publication. This preface included the infamous line: “it is not necessary that these hypotheses should be true, or even probable; but it is enough if they provide a calculus which fits the observations.” Two things strike us as significant. First, Osiander accepts hypothesis as a component to developing new ideas. Second, this work has scientific value even if not true.

Osiander supported the book’s publication, to be sure; yet it appears he feared dogmatic rejection from Roman Catholic Church authorities. Would there be a risk to acceptance in the Catholic community if endorsed by a Protestant? Just the year prior, 1542, the Inquisition had been reestablished to stamp out Lutheran influence. Might it be better to hide any connection between Copernicus and Protestantism? We can only wonder what might have been going through Osiander’s mind when deciding to remove his name from the preface to Copernicus’ book. By his feeble attempt at anonymity Osiander was seeking to avoid contaminating Copernicus’ science with a Lutheran association. Historians debate whether Copernicus himself was aware or approving of the notorious preface.

The first egg in the science nest was laid by Copernicus; but it did not hatch until warmed by Kepler, Galileo, and Newton. Copernican thinking within its own century awaited further scientific confirmation before it could attain the status of irrefutable truth that it presently enjoys in modern society. The Reformers, though dimly aware and moderately interested, were preoccupied with other theological agendas, especially scriptural interpretation and the struggle with Roman Catholicism. For both Protestants and Catholics, the Reformation and Counter Reformation became the primary lens through which any new developments could be viewed. Catholics were poised to see new developments in science as a variant on Protestant deviancy from church authority; whereas Protestants, somewhat more poised to welcome new developments, had their eyes directed toward the Holy Bible with only occasional glances toward the stars in the heavens above.

Hatching the Copernican Revolution

Gestation of Copernicus’ heliocentrism took a century. Advances in mathematical support were offered by the German Lutheran

astronomer Johannes Kepler (1571-1630). Copernicus' egg hatched with Catholic Galileo Galilei (1546-1642), who adapted the telescope to astronomy, discovered the moons orbiting Jupiter, and provided observational evidence in behalf of heliocentrism. Galileo revived the otherwise dormant attention to Copernicus. Tensions arose in Italy. Copernicus' book, *De revolutionibus*, was put on the Index in 1616. This was followed in 1633 by an order from Pope Urban VII through the Inquisition to compel Galileo to recant; and the Italian scientist remained under house arrest until his death, the year Newton was born.

Galileo supported Copernican heliocentrism with telescopic observations in his major work of 1632, *Dialogo sopra i Due Massimi Sistemi del Mondo*. This glorious natural world that is our home was created by God, to be sure. God is the first cause; thereafter the laws of nature describe the cause and effect relations. Although Galileo was a theist, by relegating God to first cause and removing God from active intervention, the seeds were sewn for the rise of deism.

With Galileo we find fledgling science for the first time seeking to fly above its religious nest. Galileo presented a declaration of independence on behalf of the scientific interpretation of nature. In a letter to Castelli in 1613, Galileo wrote: "The Holy Bible and the phenomena of nature proceed alike from the divine Word, the former as the dictate of the Holy Spirit and the latter as the observant executrix of God's commands.... Nothing physical which sense-experience sets before our eyes, or which necessary demonstrations prove to us, ought to be called in question (much less condemned) upon the testimony of biblical passages." With Galileo, the Book of Nature suddenly appeared on the same level as the Book of Scripture. Nature gained an independent status to which other truth must conform.

Some interpreters of this period of history contend that the Copernican revolution shocked European Christianity by decentering the planet earth and thereby decentering the focal status of the human being within nature. There is little or no evidence to support the claim that this change in cosmic geography shocked either Protestants or Roman Catholics. Far more serious than heliocentrism was the emerging empirical epistemology that would rely upon independent experimental knowledge and reject biblical authority; and still more important yet was

the emerging ontology of a natural world operating mechanistically without divine participation or intervention.

Nature as Clockwork

The removal of divine participation results from the rise of the image of the clock to describe the mechanical laws of nature. Oxford chemist Robert Boyle (1627-1691) sought to demonstrate divine design in the natural realm. Boyle's intention was to demonstrate the admirable workmanship which God displays in the universe. Using the cathedral clock in Strassbourg as his model, Boyle compared God's created order of nature to a finely engineered mechanism. Although designed by an intelligent designer, once running the clock would run by itself. The clock metaphor emphasizes the orderly course of the world, an autonomous machine, with which God would occasionally tinker when performing a miracle. Miracles would not, however, call into question the normal dependable order discernible to the scientist as the laws of nature.

Sir Isaac Newton (1642-1727), author of scientific works such as *Philosophiae Naturalis Principia Mathematica* (*Mathematical Principles of Natural Philosophy*) (1687), *Opticks* (1704), and *Arithmetica Universalis* (1707), explained more fully how the clock mechanism works. Newton is remembered and applauded for unifying the heavens with the earth in a single mathematizable concept of nature united by the laws of mechanics ($f=ma$) and the law of gravity. By invoking the idea that all bodies everywhere operate with mutual gravitation, he ascertained that the forces that keep the planets in their orbits must be reciprocally the squares of their distances from their centers. Newton was applying what was known about terrestrial mechanics to the heavenly bodies, thereby erasing any previously presumed gulf of difference. Derivation of such knowledge is experimental, mechanical, and mathematical.

Also likening the natural world to a well-designed clock, Newton still emphasized that it needs God as the clock maker, that is, as the first cause. In addition, the world clock also needs God for frequent adjustment and repair. Newton was a theist, believing in an active God whose *concursum* with nature performed necessary tasks such as determining the actual paths of planets in their orbits. Historians of science view this

as a mistake on Newton's part, because later research would provide a scientific explanation for actions he had thought to be divine. When asked by Napoleon in an alleged conversation about God's intervention into planetary orbits, Pierre Simon Marquis de Laplace answered, "I have no need of that hypothesis." What subsequent scientific history would carry beyond Newton is the image of nature as a universal mathematizable mechanism, dependable and discernible, with no need for divine intervention.

Although Newton is remembered as the one who defined modern science as the 'Newtonian world,' he actually wrote more on theology than on science. Newton was a person of profound Christian faith, even if he flirted at points with heterodoxy. He argued that the doctrine of the Trinity was not supported by Scripture, but apocalyptic prophecy was. Yet, even in his published scientific treatises, we find Newton asserting that space in the natural world is the divine *sensorium*; God is present to the world while allowing the world to operate according to natural law. "The true God is a living, intelligent, and powerful Being," he writes in *Principia Mathematica*; "In him are all things contained and moved; yet neither affects the other: God suffers nothing from the motion of bodies; bodies find no resistance from the omnipresence of God. It is allowed by all that the Supreme God exists necessarily; and by the same necessity he exists always and everywhere."

In his "Epitaph on Newton," Alexander Pope celebrated the giant of science this way:

Nature and Nature's laws were hid in night;
God said, Let Newton be! and all was Light.

Christian theologians — including Protestants, Roman Catholics and Orthodox - share a number of theological commitments that have nourished the growth of natural science in the modern world. First, the monotheistic commitment implies a unity and a universality to principles ordering the one world. Second, the doctrine of creation, understood as a contingent divine act - God is free and did not need to make the world the way it is let alone make the world at all! - implies that we cannot deduce the nature of the world from abstract principles; rather, we can understand this world only by observation. Third, nature is positively affirmed not only because it is a witness to the marvels and wonders of

its divine creator but also because it is beloved by God; we human beings, therefore, treasure nature. Fourth, by affirming that secular vocations are as divine as religious vocations, Luther and Calvin indirectly inspired later Puritans and others to actively pursue scientific study as a sanctified this-worldly enterprise.⁶

The clock metaphor through which we see nature as a mechanism, a closed causal nexus, could be compatible with Christian theism as long as miracles could be included. The first miracle would be God's creation of the mechanical world in the first place. The second miracle would be the resurrection of Jesus Christ and the promise of a future transformation, a future new creation. Third, it was assumed by Christian thinkers that God might intervene on occasion to exact his will within natural processes, even if this would mean violating one of the divinely appointed natural laws. Such interventions are known as miracles. A personal God could intervene in an impersonal world, and this would make living in a mechanistic world comfortable.

With philosopher David Hume (1711-1776) of Edinburgh, Scotland, however, miracles disappeared from the radarscopes of Liberal Protestants. Hume put a limiting stamp on the meaning of what it means to be rational. To be rational, from Hume forward, means to affirm that the order of nature remains exhaustively intact; this means further that miracles simply do not happen. In his "Essay on Miracles" within the larger work, *Philosophical Essays Concerning Human Understanding* (1751), Hume delimited the concept of experience to experience of what is lawful in nature. "A miracle is a violation of the laws of nature; and as a firm and unalterable experience has established these laws, the proof against a miracle, from the very nature of the fact, is as entire as any argument from experience can possibly be imagined. Nothing is esteemed a miracle if it ever happens in the common course of nature."⁷ It is experience only, says Hume, which gives authority to testimony; and it is the same experience, which assures us of the laws of nature. So Hume offers a maxim: no human testimony can have such force as to prove a miracle, and make it a just foundation for any such system of religion.

We use experience to establish the laws of nature; says this philosopher, so how could we use experience to establish the violation of

those laws? Because of this tie between experience and the ubiquity of natural law, we must eliminate miracles as something rationally knowable. Once the clock of nature is wound up and running, the mechanical principles remain intact without intervention. Nature is a machine without need of divine tinkering or repair. Without miracles, post-Humean theologians were left with only the world's original design as testimony to the divine responsibility toward nature.

Two Languages: One for the Birds and one for the Trees

The elimination of the concept of divine intervention from the world of nature by David Hume could have meant loss of all meaningful talk about God. The world could be described by scientists alone according to nature's laws alone. By the end of the eighteenth century, modern science could now fly freely above the religious trees where it had been born. No longer would talk about God interfere with empirical and rational talk about the natural world. Liberated from its roots, only the infinity of the heavens could limit science, and this is no apparent limit at all. Would scientists ever need to sweep low enough to touch the treetops, let alone earth, again?

If scientists are human beings, then, yes. Scientific reasoning is only one form of reasoning; and the other dimensions of what makes us human require attention. The kind of knowledge modern science affords us is only partial knowledge, only a part of what we need to know as fully healthy human beings.

German philosopher Immanuel Kant (1724-1804) carried Western intellectual thought beyond the impasse left by Hume. Kant said we operate with two kinds of reason: reason applying to the starry heavens above and reason applying to the moral law within. What we know as the causal law in nature - every natural event has a natural cause - is not constrained by the objective world, he says in *Critique of Pure Reason* (1781). Rather, human consciousness is so constituted that it interprets empirical observations in terms of cause and effect. Human reasoning results from a synthesis of experience with the external world plus a priori structures such as space and time that come from the human mind. Because cause and effect reasoning is limited to our understanding of the external physical world, concluded Kant, we cannot have

knowledge of the same type for three theological ideas: God, freedom, and immortality. Decisive here is that Kant split human knowing. Disciples of Kant could no longer speak of noumenal realities such as God on the same plane with phenomenal realities such as are observed by scientific research.

Scientific knowledge differs from religious knowledge; and we ought not to confuse them. God can no longer be known as we know physical objects, as one more natural cause among others. How then do we know God? Kant could justify speaking of God, freedom, and immortality by turning to the moral law within human awareness. The stern voice of conscience bespeaks a transcendent source. A sense of duty implies that we are free and that immortality is promised. In *Religion innerhalb der Grenzen der blossen Vernunft* (*Religion within the Sphere of Naked Reason*) (1793), he stressed that shouldering moral responsibility is an end in itself. Kant relied upon the moral sense within, not the testimony of miracles from without.

On the eve of the nineteenth century, Kant marked a new fork as Protestantism branched in two different directions: Conservative Protestantism and Liberal Protestantism. The conservatives continued to maintain orthodox Christian commitments, largely by ignoring Hume's skepticism. Conservatives continued to speak one language that included both God and the world; they held that God is, objectively speaking, the creator of the physical world with its natural laws and an occasional miracle worker.

Liberal Protestantism branched toward human subjectivity with Friedrich Schleiermacher (1768-1834) and Albrecht Ritschl (1822-1889) leading to the nineteenth century cultivation of a morally conscious Christianity bent on transforming society into the kingdom of God. The roles of faith and reason were reversed; rather than asking reason to provide the basis for faith, liberal Protestants said faith gives rise to its own reasoning. Instead of miracles producing faith; faith would produce miracles as a form of interpretation of otherwise natural physical events. The religious language of the liberal Protestants began to shy away from speaking of the objective world studied by science; it turned instead to the subjective sphere of consciousness, faith, and values. What we know as the distinction between right and wrong, good and evil, faith

and non-faith, became a subjective overlay superimposed on an otherwise valueless nature studied by a value free science. Liberals began to speak two languages, one for science and one for faith.

As the twentieth century opened, the two language model for relating faith and science provided Western Christians with a secure way to fasten themselves to their religious tree while the winds of scientific discovery blew beliefs around with hurricane force. Relativity theory and quantum theory in physics blew Newtonian mechanism off its foundations. Evolutionary biology and later genetic research and brain research have extended the study of the external physical world to the internal world and claimed it for nature's laws. By the time of the second Vatican Council (1962-1985), Catholics and Protestants in academic settings the world over had adopted the two language view because it permitted independent pursuit of both scientific research and theological scholarship. The split among academicians between the natural sciences and the humanities gave theology a home within the humanities. Whereas science could speak of physical facts, the humanities could speak of value and meaning in a way that theologians could converse.

What is significant about the two-language model of discourse is that it has been embraced by both scientists and theologians. Albert Einstein - remembered for his remark that "science without religion is lame and religion without science is blind" - distinguished between the language of fact and the language of value. "Science can only ascertain what is, but not what should be," he once told an audience at Princeton; "religion, on the other hand, deals only with evaluations of human thought and action." Note the use of "only" here. Each language is restricted to its respective domain.

The recently deceased president of the American Association for the Advancement of Science, anthropologist Stephen Jay Gould, advocated the two-language view. Gould argued that science and religion need not be in conflict because their teachings occupy different domains. Their respective magisteria (teaching authorities) are non-overlapping. "The net, or magisterium, of science covers the empirical realm; what is the universe made of (fact) and why does it work this way (theory). The magisterium of religion extends over questions of ultimate meaning and moral value."⁸

Perhaps the most articulate spokesperson for the two-language approach among theologians is Langdon Gilkey. The discourse of science, he says, deals only with objective or public knowing of proximate origins, whereas religion and its theological articulation deals with existential or personal knowing of ultimate origins. Science deals with what is penultimate; religion deals with what is ultimate. Science deals with what is immanent and measurable; religion deals with what is transcendent and immeasurable. Science asks “how?”, while religion asks “why?”⁹ What Gilkey wants, of course, is for one person to speak both languages, to be bilingual. The achievement of the two-language model is that, when accompanied by mutual respect, both disciplines can flower and flourish with encouragement.

Karl Rahner asks for that mutual respect. “Natural science investigates in a posteriori experience individual phenomena.... Theology has to do with the totality of reality as such, and with the ground of this reality, and its method is ultimately one of a priori questioning. Consequently, there need be no fear of conflict of competence between natural science and theology, provided that neither acts contrary to its own nature when crossing the other’s boundaries.”¹⁰

Science Flying High

Not everyone is satisfied with the two-language model. Some presume that there exists only one domain of inquiry, and only the language of science can adequately describe reality. In this case, respect for distinctively religious or theological discourse is withdrawn. The language of science either eliminates or incorporates the language of religion. What we have here is science flying high, so to speak, science dismissing the terrestrial trees from which it was first launched.

Scientific discourse that disregards theological claims comes in two forms: scientism and scientific imperialism. *Scientism*, sometimes called ‘naturalism’ or ‘scientific materialism’ or ‘secular humanism,’ aims at eliminating religious descriptions of reality entirely. Scientism, like other ‘...isms’, is an ideology, this one built upon the assumption that science provides all the knowledge that we can know. There is only one reality, the natural, and science has a monopoly on the knowledge we have

about reality. Theology, which claims to purvey knowledge about things transcendent, is thought to provide only pseudo-knowledge - that is, false impressions about non-existent fictions. Biologist Jacques Monod, for example, contends that “objective knowledge is the *only* authentic source of truth” and that modern science now replaces ancient religious explanations.¹¹

In the 1980s, physicists Stephen Hawking and the late Carl Sagan teamed up to assert that the cosmos is all there is or was or ever will be, and to assert that there was no absolute beginning at the onset of the Big Bang. Why no beginning? Had there been an absolute beginning, then time would have an edge; and beyond this edge we could dimly glimpse a transcendent reality such as a creator God. But this intimation of a reality that is transcendent is intolerable to scientism. So, by describing the cosmos as temporally self-contained, Sagan could write confidently in the introduction to Hawking’s *A Brief History of Time* about “the absence of God” on the grounds that there is “nothing for a Creator to do.”¹²

Heir to scientism is *scientific imperialism*. This is scientism in a slightly different form. Rather than eliminating theology, scientific imperialism seeks to conquer it. Rather than soaring beyond the trees, these birds try to govern the trees from their nests. Whereas scientism is atheistic; scientific imperialism concedes the existence of something divine but claims that knowledge of the divine derives from scientific research rather than religious revelation. “Science has actually advanced to the point where what were formerly religious questions can be seriously tackled...[by] the new physics,” writes Australian physicist Paul Davies. What Davies does is to demonstrate how the field of physics transcends itself, opening us in the direction of the divine reality. “I belong to a group of scientists,” he writes, “who do not subscribe to a conventional religion but nevertheless deny that the universe is a purposeless accident.... There must, it seems to me, be a deeper level of explanation. Whether one wishes to call that deeper level ‘God’ is a matter of taste and definition.”¹³ Physicist Frank Tipler goes further than Davies, actually declaring that theology should become a branch of physics.¹⁴

Trees Standing Rigidly Firm

While the scientific birds fly high, some seek to protect the religious trees. From the middle of the nineteenth century to the middle of the twentieth, Roman Catholics sought to defend the church from the assaults of scientism. Appeal to ecclesiastical authoritarianism was the defensive tactic taken up by the Vatican. Presuming a two step route to truth in which natural reason is followed by divine revelation, theological dogma claims authority over science on the grounds that it is founded on God's revelation. In 1864 Pope Pius IX promulgated *The Syllabus of Errors*, wherein item 57 stated it to be an error to think that science and philosophy could withdraw from ecclesiastical authority. The Second Vatican Council in the 1960s dropped such defenses by declaring the natural sciences to be free from ecclesiastical authority and called them "autonomous" disciplines (*Gaudium et Spes*: 59). Since Vatican II, Roman Catholics have largely embraced the two-language approach.

Among the tree defenders we find scientific creationists. Scientific creationism, sometimes called 'creation science,' is not a Protestant version of ecclesiastical authoritarianism even though it is frequently mistaken to be such. The seeds of today's scientific creationism were sewn by fundamentalists in the 1920s, to be sure; and fundamentalism appealed to biblical authority in a fashion parallel to the Roman Catholic appeal to church authority. Yet, a marked difference exists between fundamentalist authoritarianism and contemporary creation science. Today's creation scientists are willing to argue their case in the arena of science, not biblical authority. Creationists assume that biblical truth and scientific truth belong to the same domain of discourse. When there is a conflict between a scientific assertion and a religious assertion, then we allegedly have a conflict in scientific theories. The creationists argue that the book of Genesis is itself a theory which tells us how the world was physically created: God fixed the distinct kinds (species) of organisms at the point of original creation. They did not evolve. Geological and biological facts attest to biblical truth, they argue. The religious tree stands strong, and science — good science as the creationists define it — continues to support it.

Ecclesiastical authoritarianism and scientific creationism each seek strength from the tree of tradition, from deeply grounded religious roots.

Science can live peacefully among its branches, but ideologies such as scientism or scientific imperialism are not welcome.

Hypothetical Consonance

What the above models — the two language view, scientism, scientific imperialism, ecclesiastical authoritarianism, and scientific creationism — fail to sponsor is dialogue between science and theology. Even the two-language view could justify co-existence without communication. Yet, intuitively we recognize that there is but one reality; and, both science and faith share the common search for grounding in reality. “Science and religion are mutually interdependent,” writes Langdon Gilkey; “the issues of the truth of science and the truth of religion and of the relations between these sorts of truth represent fundamental concerns for each.”¹⁵ Even Stephen Jay Gould recognized this: “science and religion do not glower at each other from separate frames on opposite walls of the Museum of Mental Arts. Science and religion interdigitate in patterns of complex fingering, and at every fractal scale of self-similarity.”¹⁶ This intuitive observation that somehow science and faith should have a closer relationship opens the door toward dialogue.

The door for dialogue can be opened still further by considering another model for relating ancient faith with modern science, namely, hypothetical consonance. *Hypothetical consonance* is the name I give to the frontier that seems to be emerging beyond the two-language model. The term ‘consonance’ indicates that we are looking for those areas where there is a correspondence between what can be said scientifically about the natural world and what the theologian understands to be God’s creation. ‘Consonance’ in the strong sense means accord, harmony. Accord or harmony might be a treasure we hope to find; but we have not found it yet. Where we see ourselves now is working with consonance in a weak sense - that is, by identifying common domains of question asking. The advances in physics, especially thermodynamics and quantum theory in relation to Big Bang cosmology, for example, have in their own way raised questions about transcendent reality. “Theological discourse on the doctrine of creation must be consonant with that [scientific] account,” trumpets John Polkinghorne.¹⁷ Hypothetical consonance asks theologians to view their discipline nondogmatically. Rather than beginning from a rigid position of fixed truth, the term ‘hypothetical’ asks theologians

to subject their own assertions to further investigation and possible confirmation or disconfirmation. An openness to learning something new on the part of theologians and scientists alike is essential for hypothetical consonance to move us forward.

My own recommendation is that the model of hypothetical consonance should lead the conversation between natural science and Christian theology. Scientists are already recognizing the limits to reductionist methods and peering into the deeper questions about the nature of nature and the significance of all that is real. Theologians are mandated to speak responsibly about the natural world they claim as the creation of a loving God; and natural science has demonstrated its ability to increase our knowledge and understanding of this wondrous world. If God is the creator, then we should expect growth in our understanding of God as we grow in our understanding of the creation. Conversely, we should expect that, if the world is a creation, then it cannot be fully understood without reference to its creator.

Dialogue

The model of hypothetical consonance for relating faith and science provides a foundation for the concept of dialogue. Dialogue is a form of conversation aimed at increasing understanding; in this case, it has the potential for increasing knowledge.¹⁸ Kuruvilla Pandikattu has suggested that we think of “dialogue as a way of life,” as a comprehensive approach to the melding of cultures and theological perspectives.¹⁹

The concept of dialogue has been an important one in my own work as a scholar. I edit a journal dedicated to this concern, *Dialog, A Journal of Theology*. I have participated actively in a number of two-way dialogues over the years: dialogues among disputing factions within Christianity; inter-religious dialogue; and the dialogue between natural science and Christian faith. Based upon this experience combined with the concept of hypothetical consonance, I’ve discovered four principles of dialogue worth keeping in mind.

1. Each party to the dialogue should have a position to put forth.

2. Each party to the dialogue should begin with a disposition toward openness combined with the willingness to listen sympathetically to the position being advanced by representatives of the other tradition.

3. Genuine dialogue requires a disposition of love, love for the neighbor plus love for the truth.

4. Genuine dialogue requires sufficient time and stamina to discuss matters in depth and with thoroughness.²⁰

What dialogue with such principles in mind leads to, in the words of Robert John Russell, is “a two-way interaction between scientific and theological research programs.”²¹

Conclusion

It appears that I am suggesting two extended metaphors for framing the relationship between ancient faith and modern science. The first is the image of the ancient tree that provides safe haven for the nesting and maturing of science. The second is the image of conversation, of a single discourse with two participants engaged in dialogue. To mix the metaphors so that trees and birds talk to one another might be pushing both beyond what common sense would allow.

The second, the mandate for dialogue, provides us with a direction to follow for the near and medium range futures. The trees need not fear the birds whom they have nourished. The birds, having taken wing, need not shun an occasional visit back to their native home.

Notes

1. Ted Peters is Professor of Systematic Theology at Pacific Lutheran Theological Seminary and the Graduate Theological Union in Berkeley, California, U.S.A. He is an ordained Lutheran Pastor and editor of *Dialog, A Journal of Theology*. Along with Robert John Russell at the Center for Theology and the Natural Sciences, he is co-editor of *Theology and Science*. He is author of *GOD—The World's Future* (Fortress 2000); *Playing God? Genetic Determinism and Human Freedom* (Routledge 2002); *Science, Theology, and Ethics* (Ashgate 2002); and along with Gaymon Bennett he is co-editor of *Bridging Science and Religion* (SCM 2002).

2. Job Kozhamthadam, editor, *Contemporary Science and Religion in Dialogue* (Pune, India: ASSR Publications, 2002), p. xviii
3. Martin Luther, *Luther's Works*, edited by Jaroslav Pelikan and Helmut Lehman, 55 Volumes (Minneapolis and St. Louis: Fortress and Concordia, 1955-1986), 54:358.
4. Ibid., 1:41.
5. John Calvin, *Institutes of the Christian Religion*, tr. By Ford Lewis Battles, ed. By John McNeil, 2 Volumes (Louisville KY: Westminster/John Knox Press, 1960) I.V.2.
6. Ian Barbour, *Issues in Science and Religion* (New York: Harper, 1966), pp. 46-49.
7. David Hume, *An Inquiry Concerning Human Understanding in On Human Nature and the Understanding*, ed. By Crane Brinton and Paul Edwards (New York: Collier Macmillan, 1962), p. 119.
8. Stephen Jay Gould, *Rocks of Ages* (New York: Ballantine, 1999), p. 6.
9. Langdon Gilkey, *Creationism on Trial* (San Francisco: Harper, 1985), p. 34. "Revelation is always received and understood as the answer to the specifically religious, and not the scientific or even the philosophical, questions a man asks about his life." *Maker of Heaven and Earth* (New York: Doubleday, Anchor, 1959), p. 24n.
10. Karl Rahner, "Natural Science and Reasonable Faith," *Theological Investigations*, 22 Volumes (New York: Crossroad, 1961-1988) 21:19.
11. Jacques Monod, *Chance and Necessity* (New York: Alfred A. Knopf, 1971), p. 169.
12. Stephen Hawking, *A Brief History of Time* (New York: Bantam, 1988).
13. Paul Davies, *God and the New Physics* (New York: Simon and Schuster, 1983), p. ix.
14. Frank Tipler, *The Physics of Immortality* (New York: Doublday, 1994), p. ix.
15. Langdon Gilkey, *Nature, Reality, and the Sacred* (Minneapolis: Fortress, 1993), p. 11.
16. Gould, *Rocks of Ages*, p. 65.
17. John Polkinghorne, *The Faith of a Physicist* (Princeton: Princeton University Press, 1994), p. 73.

18. "To understand is to interpret. To interpret is to converse....Conversation in its primary form is an exploration of possibilities in the search for truth." David Tracy, *Plurality and Ambiguity* (San Francisco: Harper, 1987), p. 20.
19. Kuruvilla Pandikattu offers a constructive analysis of the life work of Bede Griffith that brings together Hinduism and Christianity along with science and religion in *Dialogue as a Way of Life* (Mumbai: Word-Life-Web & Zen Publications, 2001).
20. See, Ted Peters, *GOD—The World's Future* (Minneapolis: Fortress, 2000), pp. 353-354; and "The Science-Religion Dialogue: An Ecumenical Catalyst?" *Dialog, A Journal of Theology*, 40:3 (Fall, 2001), pp. 223-229.
21. Robert John Russell, "Introduction," *Quantum Mechanics: Scientific Perspectives on Divine Action*, edited by Robert John Russell, Philip Clayton, Kirk Wegter-McNelly, and John Polkinghorne (Vatican City State and Berkeley CA: Vatican Observatory and CTNS, 2001), p. ii.