

IRAS @ 60 and the Future of Religion and Science

with Karl E. Peters, "The 'Ghosts' of IRAS Past and the Changing Cultural Context of Religion and Science"; Michael Ruse, "Why I Am an Accommodationist and Proud of It"; Nancy Ellen Abrams, "A God That Could Be Real in the New Scientific Universe"; Whitney Bauman, "Religion, Science, and Globalization: Beyond Comparative Approaches"; Zainal Abidin Bagir, "The 'Relation' between Science and Religion in the Pluralistic Landscape of Today's World"; Sarah E. Fredericks and Lea F. Schweitz, "Scholars, Amateurs, and Artists as Partners for the Future of Religion and Science"; and Willem B. Drees, "From Authority to Authenticity: IRAS and Zygon in New Contexts."

THE "GHOSTS" OF IRAS PAST AND THE CHANGING CULTURAL CONTEXT OF RELIGION AND SCIENCE

by Karl E. Peters

Abstract. Beginning with our cosmic ancestors and the 1950s ancestors of Institute on Religion in an Age of Science (IRAS, the "Ghosts"), this essay highlights the wider, post-World War II cultural context, including other science and religion organizations, in which IRAS was formed. It then considers eight challenges from today's context. From the context of science there are (1) the challenge of scale that leads us to question our place in the scheme of things and can lead to a challenge to morale concerning whether we make any difference; (2) the challenge of human variability that leads to the question whether there is a single human moral nature; and (3) the challenge of detailed explanation that leads to the question of what is the task of theology in relation to detailed scientific explanation. From the religion context there are (4) the challenge of objectivity—studying religion without practicing religion; and (5) the challenge of pluralism and the variety of cultural and religious perspectives. From the context of the growing and diverse science-and-religion enterprise, considered from the perspective of IRAS developed in the first part of this essay, there are the challenges of (6) apologetics and (7) intellectualization. Finally, from the context of our growing, worldwide consumerist culture that is contributing to the radical alteration of the planetary environment, leading to much suffering,

Karl E. Peters is Professor Emeritus of Philosophy and Religion, Rollins College, Winter Park, FL. Correspondence can be mailed at 30 Barn Door Hills Road, Granby, CT 06035, USA; e-mail: kpeters396@cox.net.

there is (8) the challenge of becoming more motivated to act for the long-term global good.

Keywords: apologetics; connectome; consumerism; dark energy; dark matter; empathy; Institute on Religion in an Age of Science; meaning; morale; morality; motivation; problem of scale

In August 2013, the Council of the Institute on Religion in an Age of Science (IRAS) decided to hold its sixtieth anniversary conference on Star Island, and to address the topic “The Future of Science and Religion in a Globalizing World.” Looking back to the beginning of IRAS in light of our world today, the following challenging Conference Statement was developed and approved by the IRAS Council.

IRAS was founded in 1954 in response to a civilization crisis: the moral and motivational resources of traditional religious and cultural practices and beliefs had proved inadequate to constrain horrid barbarity, and technoscientific progress had given rise to weapons whose use could destroy civilization. At the same time, scientific advances carried the portent of enormous improvements in the human prospect, and the human sciences seemed to promise understandings that could foster their attainment and help head off catastrophe. IRAS leaders thought that old traditions should be reformed and that the new scientific story about the world and humanity’s place in it was “good news” that could enable that reformation.

On the occasion of the 60th anniversary of IRAS (and the upcoming 50th anniversary of *Zygon: Journal of Religion and Science* in 2015), we will consider the relevance and significance of religion and of science—and of IRAS—in a world that has changed in many ways since the mid-twentieth century. (For the complete Conference Statement, see the IRAS *Orange Book* [IRAS 2014], inside front cover.)

“GHOSTS”—OUR ANCESTORS

In September 2013, with the help of a fine committee, Whitney Bauman and I began to develop the conference, invite speakers, send out a call for papers, and develop publicity. When I asked myself what my primary role should be, I began to think of myself as “the ghost of IRAS past.” My task was to review and present some of the thinking of founding IRAS leaders regarding the mission of the organization.

I felt fairly well qualified for this, because IRAS had been at the center of my own professional career since I became involved in 1972, fresh out of the joint Ph.D. program at Columbia University and Union Theological Seminary. In that program I had focused on science and religion, reading much of the available material as I developed my own version of the empirical theology of Henry Nelson Wieman. In IRAS I came to know

Ralph Wendell Burhoe, the recognized founder of the Institute, its journal *Zygon*, and to me a mentoring “father figure.”

Furthermore, since 2007, I have assisted my wife Marjorie Hall Davis, historian of IRAS, as she arranged for and oversaw the digitizing of the early IRAS archives, which were in the large archival collection of Burhoe’s papers at the Lutheran School of Theology at Chicago. My job was to label correctly over 800 digitized files, in the process of which I read some of the early thinking of IRAS leaders. So, it made sense that I could represent the ancestors of IRAS to see how their thinking related to the challenges and opportunities of today’s quite different world. It made sense that I become, in my mind at least, “the ghost of IRAS past.” However, I am only one “ghost,” and so my perspective and research capabilities (especially about historical events) are limited. I have uncovered, for me at least, some interesting new events and organizations in science and religion. However, I am aware that there is much more to be said. Two other articles are relevant to this topic, Hefner (2014) and Peters (2014).

When I think about ghosts, I think about ancestors. We can trace our ancestors back to the beginning of the universe, to the initial inflation called the Big Bang, 13.7 billion years ago. Our ancestors are the early phases of energy matter, the development of hydrogen and helium atoms that coalesced under the force of gravity to become the first stars and galaxies. Our ancestors also are succeeding generations of stars. Some, as they became massive red giants created elements such as oxygen, nitrogen, carbon, sulfur, and iron. Other still more massive stars, in a few seconds, went through a complex process of collapse and then exploded as supernovae. Out of the fantastic energy of such explosions, elements all the way to uranium (92 protons), neptunium (93 protons), and plutonium (94 protons) were formed. All the elements—from the hydrogen created out of the “big bang” to the massive elements created in supernovae—compose the “star stuff” that is part of each of us (Tyson 2010). About 4.5 billion years ago our own Sun and planetary system were formed out of a gaseous cloud of elements and simple molecules like water vapor, perhaps as the result of the shock waves from still another supernova. Some say these supernovae were our “grandparents”—grandmother and grandfather stars.

On Earth, what was created in stars coalesced to become more immediate ancestors of life such as stromatolites with cyanobacteria and simple and more complex sea creatures. About 375 million years ago, a creature evolved with front fins that were sturdy enough for walking, so that it could drag itself out of the sea upon the shore. This “fishapod” is probably an ancestor of tetrapods, four-legged amphibians that emerged in the fossil record about 363 million years ago. Tiktaalik is the name it was given, the name for “large freshwater fish” in the Inuktitut language. This fossil “fishapod” was discovered on Ellesmere Island in the Canadian Arctic in 2006 (Pennisi

2006, 33). Transitioning between water and land, it is one of our more significant ancestors.

Sixty-six million years ago, the environmental conditions for life changed dramatically. An asteroid collided with our planet leading to such a drastic change in the environment that the then dominant large reptiles (dinosaurs) went extinct. This allowed small mammals to flourish. One of these was a tree shrew that is most likely an ancestor of primates and ultimately of humans. Some more recent primates, such as the bonobos, developed complex social relationships that included caring for one another. In humans, genetic and neurological developments and the necessity of long-term infant/child care, gave rise to parental, especially maternal, love.

Robert Weston puts this evolutionary ancestry poetically:

Out of the stars in their flight, out of the dust of eternity,
here have we come, . . .

Out of the stars, rising from rocks
and the sea,
kindled by sunlight on earth,
arose life. . . .

Life from the sea, warmed by sun,
washed by rain,
life from within, giving birth,
rose to love.

This is the wonder of time;
this is the marvel of space;
out of the stars swung the earth;
life upon earth rose to love. (Weston 1993, 530)

All things are related to one another because all have a common origin in the “Big Bang.” However, as things evolved they differentiated into a variety of trajectories, only to evolve further within their specific trajectories (Kaufman 2000). Within the “primate trajectory” humans came into being, migrated more than once out of Africa, and created a “thinking sphere” surrounding planet Earth (Teilhard de Chardin [1955] 2008), a unique “symbolic species” (Deacon 1996, 1998). With symbols, humans further differentiated into a variety of cultural trajectories. The trajectory of modern Western culture stems from the ancient Hebrews, Greeks, and Romans to form the primary Western religions of Judaism and Christianity. These are often expressed theologically in terms of Platonic and Aristotelian philosophy. However, there also is a secular, naturalistic tradition stemming from philosophers such as Epicurus and Lucretius (Howlett 1980; Greenblatt 2011). This trajectory gave rise to modern science and the European Enlightenment of the seventeenth and eighteenth centuries, and also to the response of Romanticism from the late eighteenth to the mid-nineteenth century. In the nineteenth century, Western scholars

became better versed in the variety of world religious traditions, culminating in 1893 with the first Parliament of the World Religions in Chicago.

THE ORIGINS OF IRAS IN CONTEXT

In the middle of the twentieth century, a small offshoot of this complex Western religious–philosophical–scientific trajectory began to grow—searching for ways that the sciences and the world’s religions could cooperate for the good of humanity. A part of this search was carried out in the IRAS, which was formed by two parent groups. One group consisted of scientists who were members of a Committee on Science and Values of the venerable American Academy of Arts and Sciences headquartered in Boston. Astronomer Harlow Shapley was president (1949, 1958, 1960, 1963, 1966, 1967), and neurophysiologist Hudson Hoagland was secretary (1935, 1950, 1966, 1967, 1969, 1973). In 1944, Hoagland, along with his friend Steven Pincus, founded the Worcester Foundation for Experimental Biology (Eig 2014, 78–83). There Pincus and Min Chueh Chang developed the birth control pill Enovid, inspired by Margaret Sanger, financially supported by Katherine McCormick, and clinically assisted by Catholic physician John Rock. Enovid’s approval for birth control by the U.S. Food and Drug Administration was publicly accounted on May 9, 1960 (Eig 2014, 298–99). Its use socially revolutionized human sexual practice and transformed the world.

Around 1940, under Shapley and Hoagland’s leadership, the Academy began devoting meetings and conferences to elucidating what science and scholarship might reveal about what is good or evil for humans. In 1948, with the encouragement of the Academy Council, Ralph Wendell Burhoe, then executive officer, convoked a “Committee on Science and Values.” Its charter stated: “We believe that the sudden changing of man’s physical and mental climate brought about by science and technology in the last century has rendered inadequate ancient institutional structures and educational forms, and that the survival of human society depends on a re-formation of man’s world view and ethics, by grounding them in the revelations of modern science as well as on tradition and intuition” (Burhoe 1973, 59).

The second parent group consisted of leaders of a multi-faith summer conference on “The Coming Great Church” who met on Star Island, in the Isles of Shoals, off Portsmouth, New Hampshire. This conference began in the summer of 1950, led by Unitarian ministers Lyman Rutledge and Dana Greeley, by historical theologian and Methodist minister Edwin Prince Booth, and by Robert Illingworth, professor of English and drama at Clark University. The interchanges of ideas made for better understanding between leaders in various forms of Christianity and between those in Christianity and other religions. Its “purpose was not to create or establish a new denomination or promote any organic unity among those now

existing, but to provide channels of communication among them all, and cultivate personal acquaintance among their leaders. . . . The results were convincing. This proved to be an ecumenical conference of high order” (Rutledge 1968).

In 1954, these two groups came together to establish IRAS. Other individuals became involved after IRAS was formed. Some of these had published important books before and after IRAS began—Vedanta leader Swami Akilananda (1947), physicist Ian Barbour (1960), religious educator Sophia Fahs (1948), editor Jeanette Hopkins (Hopkins and Clark 1969), and historian of religion Erwin Goodenough (1955).

At the center of these and other ghosts of IRAS past stood Ralph Wendell Burhoe, the executive officer of the Academy, an attendee of the Coming Great Church conference, the organizer of the 1954 conference, founder of *Zygon*, and innovative author about science and values, theology and science, and religion’s role in human evolution (1967, 1971, 1972, 1975, 1976, 1981; see Breed 1992 for a complete intellectual biography of Burhoe). Another important ancestor was the philosopher of religion Henry Nelson Wieman. Wieman was not instrumental in the formation of the actual organization; however, his ideas influenced IRAS because in the 1950s and 1960s he was a significant dialogue partner with Burhoe.

Burhoe and Wieman had met at Columbia University, New York, in September 1952, at the thirteenth meeting of the Conference on Science, Philosophy, and Religion. This Conference had originated in 1939 in response to a call by Louis Finkelstein, president of Jewish Theological Seminary in New York. It was convened in response to the rise of totalitarianism in Europe. Its founding members and their successors sought to create a framework for the preservation of democracy and intellectual freedom through the collaboration of scholars from a wide variety of disciplines in the sciences and humanities. Because many blamed the development of “value-free” scholarship for the rise of European fascism, the Conference hoped to “synthesize traditional values and academic scholarship.” The Conference continued until 1968. After the War the topics “shifted from issues of the preservation of democracy and world peace to questions of race relations, labor relations, governmental administration, and educational policy” (Conference on Science, Philosophy, and Religion 1939–1977).

After meeting at the 1952 Conference, Burhoe (age 42) and Wieman (age 68) began a correspondence, not about another organization, but about a journal. They agreed that such a journal should not engage in apologetics or a defense of any particular religion. Rather, it should explore how the sciences and religions could work together so that humanity would not destroy itself but that the well-being of all humans could be accomplished. Wieman stated: “I am heartily in accord with the project you propose of having a journal devoted to joining the resources of science

and religion in the common endeavor to mark out the way that man must go to attain his best and avoid self-destruction” (Wieman 1952). Burhoe replied: “I envision along with you a medium for setting forth the major directives for human living in terms that are motivationally effective. Such major directives should be the product of our contemporary epistemology and cosmology, and would agree with previous directives only because such agreement might naturally ensue, not because we premise any agreement” (Burhoe 1952).

The orientation of Burhoe and Wieman as well as the Conference on Religion, Philosophy, and Science contrasts with the missions of two other significant organizations at that time, the Society for the Scientific Study of Religion (SSSR) and the American Scientific Affiliation (ASA).

The SSSR was founded in 1949 as the Committee for the Scientific Study of Religion, and became the Society for the Scientific Study of Religion in 1956. The SSSR included members who were researchers from denominational churches and academicians from departments of psychology, sociology, and other social sciences. It did not include physicists, chemists, and biologists. Ralph Burhoe himself was one of the early leaders of this society. He chaired a Committee on Research Endorsements, and in 1957 suggested that the SSSR develop a journal (and served on its publications committee.) The inaugural issue of the *Journal for the Scientific Study of Religion* (JSSR) was published in 1961 (Newman 1974, 140–41). In 1984, Burhoe was the first person to receive the SSSR’s “Distinguished Career Achievement Award” (Breed 1992, 29).

An early statement of the SSSR’s goals included bringing together social scientists and religious persons, and “inter-stimulating and inter-fertilizing the thinking of those studying religious problems.” (Newman 1974, 138). By 1961, these had evolved to the goals stated in the first issue of the society’s journal:

... encourage the study of religion through the media of their respective sciences; facilitate cooperation between groups and individuals engaging in such studies; make known as widely as possible the nature, progress and findings of their diverse studies; stimulate free and friendly intercommunication between students in the field and to this end to collaborate with other professional organizations such as the American Psychological Society, the Bureau of Research and Survey of the National Council of Churches, etc.; and publish a Journal which by serving these several ends will further free inquiry, knowledge and understanding among religions. (Newman 1974, 139)

The ASA, founded in 1942 and its journal born in 1949, is a Christian organization of scientists and people in science-related disciplines. The ASA advocates open discussion of differences within Christianity and also dialogue with mainstream science. Its fourfold platform of faith reflects the tradition of conservative Christianity:

We accept the divine inspiration, trustworthiness and authority of the Bible in matters of faith and conduct. We confess the Triune God affirmed in the Nicene and Apostles' creeds, which we accept as brief, faithful statements of Christian doctrine based upon Scripture. We believe that in creating and preserving the universe God has endowed it with contingent order and intelligibility, the basis of scientific investigation. We recognize our responsibility, as stewards of God's creation, to use science and technology for the good of humanity and the whole world. These four statements of faith spell out the distinctive character of the ASA, and we uphold them in every activity and publication of the Affiliation. (Four Pillars 2014)

The orientations of IRAS, the ASA, and the SSSR can be understood as responses to the waning influence of religion and values in the wider culture, the totalitarianism of Fascism, the horrors of Nazism, and the destruction caused by the Second World War. The ASA aimed to strengthen biblically based Christianity by taking into account the findings of contemporary science. On the Darwinian–Creationist controversy, many members came to the position of “theistic evolution.” The SSSR studied scientifically a variety of religious problems. IRAS, more constructively, sought to bring scientific knowledge and traditional values expressed in religion together with the hope of infusing the wider culture with a more humane treatment of humans. Based on thinking like that of Burhoe and Wieman, this orientation is reflected in the IRAS Constitution, written in 1954, which states that IRAS was established

to promote creative efforts leading to the formulation, in the light of contemporary knowledge, of *effective doctrines and practices for human welfare*; to formulate dynamic and positive relationships between the concepts developed by science and the *goals and hopes of humanity* expressed through religion; and to state human values in such universal and valid terms that they may be understood by all peoples, whatever their cultural background or experience, in such a way as to *provide a basis for worldwide cooperation*. (IRAS Constitution 1954, italics mine)

In the context of other endeavors to relate science and religion for the sake of human welfare, historian James Gilbert writes of IRAS: “The awareness of crisis as well as opportunity that washed in tandem waves across so many endeavors of scientists and theologians in the 1950s reached a high-water mark in a new organization, the Institute on Religion in an Age of Science.” (Gilbert 1997, 273)

THE MID-TWENTIETH CENTURY WIDER CONTEXTS OF IRAS

When I read Willem Drees' *Religion and Science in Context*, which examines how different approaches are related to particular contexts (Drees 2009), I became convinced of the importance of the wider cultural environment for our work in religion and science.

The cultural context. What was the context in the 1950s when IRAS was founded? There had been the horror of the rise of Nazi Germany, the Holocaust, and World War II, as well as the threat of communism, the Korean War, and the “Cold War” between the United States and the Soviet Union. After August 29, 1949, when the Soviet Union exploded its first atomic bomb, and after 1950 when both sides stated that they would work to develop the hydrogen bomb, the fear of nuclear attack was constant (H-Bomb Development Summary 2014). People and communities built bomb shelters. Children in school learned the drill of hiding under their desks in case of a nuclear attack. On the cover of the *Saturday Evening Post* (May 23, 1957), a Norman Rockwell painting showed a young teenage boy and girl dressed for a prom. The young man was giving a corsage to the young lady at a drug store soda fountain. A soldier sat next to them, and the “soda jerk” was happily smelling the flowers in the corsage. Above and to the right of the painting, in bold black letters was an article title: “How Will America Behave IF H-BOMBS FALL?”

Another important part of the wider cultural context was the development of a post-war domestic economy. During World War II, when so many men were in the European and Far Eastern “theaters” of war, women entered the workforce at home, replacing men at their jobs, often in support of the war industry. “Rosie the Riveter” was an icon for these women. However, after the war ended, women returned to the home and began raising the baby-boomer generation. This began increasing the demand for goods in the post-war domestic economy. The United States and other countries faced the challenge of transforming primarily a war economy to a vibrant domestic economy. There still was a booming defense industry fueled by the fears of the Cold War; yet new domestic products also needed to be developed. There were new, large suburban developments like Levittown (built by William Levitt and his company), with mass-produced homes that were subsidized by the government for returning veterans and their families. New household appliances, television sets, and automobiles contributed to the growing economy. By the mid-1950s the challenge was to maintain and enhance a high level of production and consumption—in part to show that American capitalism was superior to Soviet communism, in part to fulfill the postwar American Dream. David Halberstam writes that “after the traumatic experiences of the Depression and World War II, the American Dream was to exercise personal freedom not in social and political terms, but rather in economic ones. Eager to be part of the burgeoning middle class, young men and women opted for material well-being” (Halberstam 1993, x).

In 1955, marketing consultant Victor Lebow wrote an article in the *Journal of Retailing* about the decline in the amount that retailers were able to mark up their prices, hence lowering their income. This was due to growth in three sectors of the economy: the increasing production by

manufacturers of a wider variety of household goods along with the development of television, by which the dominant producers could advertise to a “captive audience,” the growing number of retail businesses, and the greater freedom of consumers to choose among products or not to choose any. To counter the impact of these factors on retail businesses, Lebow suggested the need for the cultural development of a “consumerist mentality”—a new form of spirituality:

Our enormously productive economy demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfactions, our ego satisfactions, in consumption. . . . The very meaning and significance of our lives today expressed in consumptive terms. . . . We need things consumed, burned up, worn out, replaced, and discarded at an ever increasing pace. We need to have people eat, drink, dress, ride, live, with ever more complicated and, therefore, constantly more expensive consumption. (Lebow 1955)

Consumption of various kinds was on the way to becoming a religious phenomenon—consumption in shopping, television programs, spectator sports, eating out, and travel vacations. For many, such activities eventually replaced going to church, as well as participation in other local voluntary associations. Regular church attendance was at a twentieth century high in the 1950s, almost 50 percent of the population. It began to decline steadily in the 1970s to about 35 percent of the population in the mid-1990s (Putnam 2001, 70–71; for more detail, see Drees 2015 [this issue]).

The scientific context. IRAS was founded in the context of major mid-century developments in science. One was the development of neo-Darwinism or the “modern synthesis” of Darwin’s theory of evolution by natural selection with Mendelian genetics in the 1930s and 1940s by people such as Ernst Mayr (1942) and George Gaylord Simpson (1944, 1945), as well as Theodosius Dobzhansky (1937), who was occasionally involved with IRAS. In the social sciences there were Erik Erikson’s stages of psycho-social child development ([1950] 1993) and B. F. Skinner’s behaviorism with its idea of operant conditioning ([1953] 1965). Skinner was a plenary speaker at the 1954 IRAS conference. Perhaps the biggest scientific breakthrough was the discovery in 1953 of the structure of DNA by Francis Crick, James Watson, Maurice Wilkins, and Rosalind Franklin (Watson [1968], 2001). However, as important as these were for the thinking of IRAS, the culturally dominant sciences were physics and chemistry, and their technologies that put people to work in a culture of materialistic growth.

The theological context. In many ways, the theological context for work in science and religion in the 1950s was as broad as the growing variety of sciences. A couple of individuals illustrate this.

Reconstructionist Jewish Rabbi Mordecai Kaplan offered the important concept of Judaism as a civilization and developed a naturalistic understanding of God (Goldsmith and Scult 1991). Martin Buber's *I and Thou* contrasted two ways that humans lived in the world—the relational, intersubjective I-Thou and the objectifying, depersonalizing I-It. The book was published in Germany in 1923 and became popular in the United States in the 1950s and 1960s (Buber [1937] 2010). Jesuit theologian Karl Rahner delineated “the experience of self-transcendence in every act of knowing and willing as pointing to the whither of human existence,” the whither being “absolute mystery” (Livingston and Fiorenza 2006, 208). Jesuit priest, paleontologist, and geologist Pierre Teilhard de Chardin provided an integration of progressive Catholic theology and evolutionary theory in *Phenomenon of Man*, first published in French the year he died, 1955 (Teilhard de Chardin [1955] 2008). American Protestant theologian Reinhold Niebuhr was a pacifist and socialist earlier in his ministerial and professorial career. Known primarily as a Christian realist, he argued that evil was persistent in human life and politics, and stressed the hypocrisy of nations and classes ([1932] 2013). He rallied people to fight Nazism and justified American anti-communist policies; yet he criticized American messianism and the American tendency to engage in self-righteous crusades (Niebuhr [1952] 2008; Bennett 2013).

For me, three theologians were important. I remember in one of my classes at Union Theological Seminary in 1965, professor Daniel Day Williams said the three greatest Protestant theologians in the early and middle twentieth century were Karl Barth, Paul Tillich, and Henry Nelson Wieman. Especially for those in the tradition of Reformed theology, the dominant figure was Barth. Barth was the primary author of the “Barmen Declaration” that protested the Nazi attempt to make Christianity into a religion of the Third Reich. His basic claim was that there is only one source of religious knowledge or revelation—namely Jesus Christ. In 1934, he challenged his colleague Emil Brunner for holding to knowledge via nature as well as through the grace of Christ with the one-word essay title *Nein (No)* (see Brunner and Barth 2002). In light of this it is not surprising that Barth held that Christian theology could not look to the sciences for truth relevant to religion.

However, Paul Tillich is known for interrelating Christianity with the wider culture. This included the growing academic interest in the study of religion in secular as well as religious institutions of higher education. Jonathan Z. Smith writes that “Tillich remains the unacknowledged theoretician of our entire enterprise” of the study and teaching of religion in North America. Tillich's thought played three crucial roles. First, his understanding of religion as an “ultimate concern” provided a suitable language for new departments of religious studies, especially at state-run colleges and universities. Second, Tillich's interest in symbol as “that which

points to” served as a legitimating vote of confidence about the worth of the academy’s longstanding discourse on symbolism. Third, his “method of correlation” between the cultural analysis (primarily in existentialist philosophy and in literature) of the crucial issues of human existence and the responses from the symbolic heritage of religion shaped a new form of academic theology, in contrast to Barth. Furthermore, his broader interest in cultural institutions inspired such fields as religion and literature, and “subsequent cultural and anthropological studies of religion” (Smith 2010, 1139). Relating religion to the wider cultural context also brought Tillich into contact with IRAS. After hearing Tillich’s lecture on “The Impact of Psychotherapy on Theological Thought” at the annual meeting of the Academy of Religion and Mental Health, Burhoe invited him to be a speaker at the 1960 Star Island Conference. Tillich had to decline because he would be in Europe, but he offered his lecture to Burhoe for use at the conference (Burhoe 1960; Tillich 1960).

Most theology in the 1950s came from Europeans. However, there was one strand of religious thinking that had its roots in American pragmatism and in naturalism. The second chapter of *Modern Christian Thought: The Twentieth Century* by James C. Livingston and Francis Schuyler Fiorenza is about “American Empirical and Naturalistic Theology.” With historical roots in the thinking of Jonathan Edwards and Ralph Waldo Emerson, and in line with the work of William James and John Dewey, empirical theology grew and flourished at the University of Chicago from the late 1890s to the 1950s. It was called the “Chicago School” and it joined an “empiricist interest in religious experience with a self-conscious commitment to the application of scientific methods to the study of religious phenomena” (Livingston and Fiorenza 2006, 34). Its most prominent theologian and philosopher of religion was Henry Nelson Wieman. More than any other theologian, Wieman saw contemporary science as a primary context for religious reflection. He affirmed that science and its technology have great power for both good and evil. To avoid evil, people must be guided toward the service of that force which creates, sustains, and fulfills human life (God). However, when this force is portrayed in supernaturalist terms as wholly transcendent of this world, its actual operation in human life is beyond the reach of inquiry. For science and technology to serve the source of good, that source must be understood in such a way as to open to rational-empirical examination. Wieman portrayed this force as the interactions among humans and aspects of the natural world that were creative of greater good—namely of expanding interdependent relationships with “felt quality” (Wieman [1946] 2008; [1958] 1991; Peters 1992). Among humans he named it creative interchange and creative communication. It was as an empirical, pragmatic theologian that Wieman was in sympathy with the thought of Ralph Burhoe and the purposes of IRAS.

CHALLENGES FROM OUR TWENTY-FIRST CENTURY CONTEXT

Since IRAS was founded in 1954, there have been major developments in the sciences, the study of religion, and our wider culture. Without trying to give an exhaustive description, I will focus on the following developments and the challenges they bring to us. From the sciences there are (1) the challenge of scale that leads us to question our place in the scheme of things and can lead to a decline in morale concerning whether we make any difference; (2) the challenge of human variability that leads to the question whether there is a single human moral nature; and (3) the challenge of detailed explanation that leads to the question about the task of theology in relation to scientific explanation. From the academic study of religions there are (4) the challenge of studying religion objectively from the outside rather than practicing religion, and (5) the challenge of pluralism coming from the variety of cultural and religious perspectives. From the growing and diverse science-and-religion enterprise, considered from the traditional perspective of IRAS developed above, there are the challenges of (6) apologetics and (7) intellectualization. Finally, in light of our growing, worldwide consumerist culture that is degrading the environment and causing much human suffering, there is (8) the challenge of motivation to take action for the greater, long-term good.

CHALLENGES FROM SCIENCE

The challenge of scale to the questions of meaning and morale. Most of our ideas about the world, values, religion, and philosophy have been based on the experiences in our everyday lives. Throughout human history, until the advent of modern technologies of observation, we have experienced only an extremely small part of the universe. Philip Hefner has said that we live in the “mid-range” (personal communication). With our particular sensory and communicative capacities, our lives grow out of our interactions with others in our nearby surroundings. Most of our ideas about the unknown world beyond our immediate experience have imaginatively used metaphors drawn from our experiences in this mid-range—our experience of rocks and trees; plants, animals, and human beings; rain, seas, and storms; sun, moon, and stars—and their dynamic relations to one another. It is not surprising that in past centuries and millennia, most of humanity’s religious reflections are based on this midrange of experience. From this experience we create imaginative visions, from demons and hells to angels and heavens, as well as of personal deities (like us). Most people today live, think, work, play, and worship in this “mid-range universe,” in which we daily live.

However, since 1800 when electromagnetic radiation was discovered, we have come to understand that there is much more to our universe than we immediately experience. Developing technologies of observation

and mathematical reasoning have opened “windows” on the infinitesimal world of quantum mechanics up to the unimaginable gigantic universe of evolutionary cosmology. On July 4, 2012 physicists at the European particle physics laboratory, CERN, reported “that they had discovered the famed Higgs boson. . . .” Working with CERN’s Large Hadron Collider (HCL) the scientists presented “evidence of the Higgs, the key to physicists’ explanation of how all fundamental particles get their mass.” This confirmed the particle “dreamed up” by theoretician Peter Higgs in 1964 (Cho 2012).

As to the very large, on January 8, 2014, the Hubble space telescope took pictures of galaxies that are 13.2 billion light years away, that is 13.2 billion years old. This is a time that Hubble astronomer Jennifer Lotz called “cosmic dawn” (“Hubble Captures” 2014). The current understanding from science is that the universe is 13.77 billion years old, and it consists of more than 70 thousand million million million (70 sextillion) stars in 100 thousand million (or 100 billion) galaxies.

This is the visible universe. However, the matter we observe, even with our new technologies, is less than one percent of the universe. According to theoretical astrophysicist Joel Primack and others, four percent of the universe consists of invisible atoms, 25 percent is cold dark matter, and 70 percent is dark energy. Even though we don’t understand what dark energy is, it is steadily increasing the rate of expansion of the universe—all the galaxies moving away from one another at an increasing rate of speed. This means that in the distant future, any intelligent, sentient life will not see the universe we see today. They will only be able to observe their own galaxy (Abrams and Primack 2011, 48–56, 81–84). What is the meaning of our lives in this vast, mostly mysterious scenario? What is our place in this amazing, tremendous scheme of things? This is the challenge to making meaning. What difference does anything we do here on Earth really make? This is the challenge to maintaining morale.

The challenge of human variability leads to the question whether there is a single human moral nature. There is evidence from history of a recognition that people are not all alike relative to morality. The caste/class system of ancient India held that there was variety in *dharma*, including different moral responsibilities for people born into different classes of society. This was given at birth and based on actions in previous lives or one’s *karma*. Christian virtue ethics observed that people were prone to a variety of vices, so that according to Dante, people occupied a variety of circles of Hell. His characterization of some inhabitants is based on the notion of retribution or “measure for measure” where the punishment fits the crime—a principle in many ancient legal systems (see Himmelfarb 1985, 75–76). In spite of this, my experience of studying Western philosophy and theology has been that all people are postulated to have essentially

the same moral capacities, often based on the philosopher/theologians' own introspective analysis and everyday observations of others (again the mid-range of experience).

The contemporary sciences, emerging in the past sixty years, challenge this universalist assumption. With the mapping of the human genome, developments in brain imaging, and correlations with the early human developmental environment, we have been able to see the bio-social roots of variety in moral capability in a more neutral manner, that is, without blaming or praising persons for the way they are morally. This has an impact on considerations of moral and legal responsibility.

One example is the variability among humans related to the capacity for empathy. Having empathy for others is an important, evolved, biological capacity that is important for morality. Neuroscientist Christian Keysers suggests that it underlies reciprocity that is culturally reinforced by variations in the "golden rule" found across cultures (Keysers 2011, 216–217). Empathy is an emotion that helps us "stand in another person's shoes" and do to them what we would do to ourselves if we were in their situation. According to Simon Baron-Cohen: "Empathy is our ability to identify what someone else is thinking or feeling and to respond to their thoughts and feelings with an appropriate emotion" (Baron-Cohen 2011, 16). There are two stages in empathy: a cognitive stage of recognition and an affective stage of response. The latter involves being able to mirror the feelings of another.

However, not all people have the same capacity for empathy. On one end of a continuum we have a psychopathic serial killer like Ted Bundy. In his twenties, between 1974 and 1978, Bundy deceitfully ingratiated himself to at least thirty young women on or near college campuses in several states, and then captured, raped, and murdered them. He once called himself "the most cold-hearted son of a bitch you'll ever meet" (http://en.wikipedia.org/wiki/Ted_Bundy).

People like Bundy have zero affective empathy for the feelings of others. However, they have cognitive empathy or the ability to understand the minds of others, so that they can easily manipulate others for their own ends. "The psychopath is aware that he is hurting someone because the 'cognitive' (recognition) element of empathy is (largely) intact, even if the 'affective' element (the emotional response to someone else's feeling) is not" (Baron-Cohen 2011, 120). On the other end of the empathy continuum, we have people like Hannah.

Hannah is a psychotherapist who has a natural gift for tuning into how others are feeling. As soon as you walk into her living room, she is already reading your face, your gait, your posture. The first thing she asks you is "How are you?" but this is no perfunctory platitude. Her intonation—even before you have taken off your coat—suggests an invitation to confide, to disclose, to share. Even if you just answer with a short phrase, your tone of

voice reveals to her your inner emotional state, and she quickly follows up your answer with “You sound a bit sad. What’s happened to upset you?” Before you know it, you are opening up to this wonderful listener. . . [who] has an unstoppable drive to empathize. (Baron-Cohen 2011, 27–28)

Between these extremes, most people fall on a continuum between 0 and 80, the possible scores on the “Empathy Quotient” (EQ) questionnaire developed by Baron-Cohen at the University of Cambridge. Anyone can take this sixty-item questionnaire at <http://psychology-tools.com/empathy-quotient/>, which will be automatically scored for you. Zero to 32 = low and includes psychopaths and people with borderline personality disorder and with narcissistic disorder, 33–52 = average range, 52–63 = above average, 64–80 = very high, and 80 = maximum. On an average most men score about 42 and most women about 47. This range of people’s empathy quotient illustrates how empathy in humans is variable. This supports my claim that there is no universal human nature for moral capability, at least for the kind of morality that is based on assessing the consequences of one’s actions and taking into account the feelings of others.

There is another type of morality based on a lawful sense of right and wrong. Some people in the autism spectrum are good examples. The above questionnaire also identifies persons with Asperger Syndrome and autism. They are not able to show empathy, and they score in the low range of the EQ scale. However many are excellent systematizers—very adept at mathematics and at seeing patterns everywhere—more than most people see. Related to this, they have a strong sense of absolute right and wrong and of fairness. (For further discussion, see Baron-Cohen 2011, 95–124).

Underlying the variation in the kinds and degree of empathy are variations in brain structure and functioning. “There is a consensus in neuroscience that at least ten interconnected brain regions are involved in empathy (and more may await discovery)” (Baron-Cohen 2011, 28). What gives rise to these brain variations? It could be severe physical trauma such as in the famous case of Phineas Gage (Damasio 1994, 4–6, 32–33). It could be maternal alcohol and/or drug abuse during pregnancy, or a trauma such as oxygen deprivation in the birthing process. There could also be variations in particular genes. In a 2009 study, Baron-Cohen and others found four genes out of sixty-eight candidates that are related to their Empathy Quotients (Chakrabarti et al. 2009; Baron-Cohen 2011, 138). The best known is the MAOA gene. This gene produces the monoamine enzyme, which regulates serotonin. The MAOA-L version of this gene, often called the “Warrior Gene,” is a factor in aggression when one is provoked (McDermott et al. 2009).

Perhaps the most important factor influencing the empathy circuit is child rearing in the first three years. Studies have shown that child abuse and the lack of nurturing, especially in situations of continual stress, actually

impairs the physical development of the brain, including circuits that are relevant for emotions and feelings such as empathy (National Scientific Council for the Developing Child 2007; Perry 2007, 2009; see also Peters 2012). However, someone with the genes and brain of a psychopath, if raised in a loving family, can turn out to be like James Fallon, who is a professor of neurology and one of the leading experts on criminals who are psychopaths. The story of how Fallon has come to know himself as being a “borderline psychopath” (Fallon 2013, 5) by understanding his own genes and brain, and his behavior in relation to his wife, children, and colleagues is told in his fascinating memoir *The Psychopath Inside*.

In my view, this variability in moral capacity challenges our understanding about how people think morally, act morally, and are responsible morally. What does it mean for each of us to be moral?

The challenge of detailed explanation. What is the task of theology in relation to detailed scientific explanation? Several years ago at an IRAS conference, I found myself wondering about the vast detail of scientific explanations in relation to theological accounts. In response to the question of how the universe came to be, I reflected that Western theologians say “God created the heavens and the earth.” Compare this with the 13.7 billion year scientific account of what has brought us into being. Which is more persuasive? I realized that—psychologically at least—the vastly more detailed scientific set of explanations was more effective than the theological account of one line or a few paragraphs.

The two previous sections that generally report what science knows about the universe and about empathy are good examples of this challenging detail. Another involves developments in brain imaging technology. Since IRAS was founded sixty years ago, several kinds of imaging technology have been invented: CT scans, magnetic resonance imaging (MRI), positron emission tomography (PET), and functional magnetic resonance imaging (fMRI). Most recently, a form of fMRI called diffusion spectrum imaging is able to track the movement of water through nerve fibers. Researchers can trace groups of neurons as they cross from one region of the brain to another in living individuals. This technology has made possible “the Human Connectome Project.”

The Human Connectome Project was begun in 2010, sponsored by the National Institutes of Health (NIH). Funding from the NIH supported the projects of two consortia of universities. One consortium, led by Washington University in St. Louis and the University of Minnesota, was funded by a \$30 million NIH grant over five years. The purpose was to build a “network map” that would shed light on the anatomical and functional connectivity within the healthy human brain. The second consortium was led by Harvard University, Massachusetts General Hospital, and UCLA. With an \$8.5 million NIH grant over three years the goal was to produce

a body of data that would facilitate research into brain disorders such as dyslexia, autism, Alzheimer's disease, and schizophrenia. "Altogether, the Human Connectome Project will lead to major advances in our understanding of what makes us uniquely human and will set the stage for future studies of abnormal brain circuits in many neurological and psychiatric disorders" (NIH 2014). Ongoing information is available on a rich NIH multimedia website.

In light of the increasing detail that the sciences bring to explain how phenomena in our world occur in a way that can be used for human welfare, what then is the task of theology? Some believe that theology offers an alternative explanation of how things come about. However, theological explanations drawn from the mid-range of human experience pale in comparison to the details of scientific explanation. This is the third challenge from the contemporary context of the sciences. Now let's turn to the challenges from the contemporary context of religion.

CHALLENGES FROM THE CONTEXT OF RELIGION

Challenges from academia—objectivity and the insider-outsider tension. The recent history of science and religion includes both people within religious communities and those from the academic and research world of the natural and social sciences as well as the humanities, including philosophy and religious studies. The issues are whether people from within faith communities can be as objective about studying their own traditions as are academicians looking at religion from the outside. And can academicians really understand what it is like to be religious unless they participate in a religious community? Religions, like the various sciences, are vital enterprises. Can the study of any religion (or science) from outside capture this vitality?

An example of the issue of objectivity and the insider-outsider tension occurred between two organizations founded in the 1950s, the SSSR and the Religion Research Association (RRA)—highlighted in an article on the history of the SSSR by sociologist William Newman. The RRA was formally organized in 1951 and was associated with the National Council of Churches. Like the SSSR, it was trying to establish a journal, and there was discussion about a merger between the two organizations, especially in regard to publications. Newman writes that "the situation is indeed ironic and is perhaps indicative of the relationships between academic social scientists and denominational researchers. In spite of the fact that for both organizations funding a journal was a problem and that many people were active and held membership in both organizations, it seems that the SSSR group let the opportunity for merger slip by. One cannot escape the impression that the academicians were overly cautious about affiliating with the churchmen" (Newman 1974, 142).

The insider-outsider tension and the challenge of objectivity exist within the more general cultural framework of religion in academia. There have been seminaries or divinity schools going back to Harvard University's founding in 1636 as well as other church-related denominational colleges and seminaries since then. However, the growth of academically "neutral" and "objective" teaching and studying of religion—from "outside"—has mushroomed during the past sixty years. In the late 1950s I attended a small liberal arts college in Wisconsin, Carroll College (founded in 1848 and affiliated with the Presbyterian Church). At that time there was one professor each for Old and New Testament, and both were Christian. Today Carroll University offers a major in religious studies that "seeks to understand the full range of human religiosity as it appears in diverse cultures, in many times and places, from ancient Greece to modern Thailand, from Christianity to Buddhism and Islam, from women in religion to religion and politics. We approach religions (and religion) from diverse disciplinary perspectives, including historical, sociological, anthropological, theological, philosophical and psychological, including cognitive studies" (Carroll University 2014).

Religion is still taught from the inside in theological schools that offer courses that are intellectually rigorous with high standards of objectivity. Nevertheless, the primary objective is to train clergy to enhance the faith of particular religious denominations. Most students and faculty are people of faith, and religious worship is as much a part of seminary life as are academic classes. In comparison, the academic study of religion approaches its subject from the outside with sympathetic understanding of various traditions, yet requiring no particular faith commitment by students or by faculty. Although many professors of religious studies practice religion in particular faith communities, others do not. I personally did not attend any church during my first ten years of college teaching. In academia, the study of religion is done with the ideals of objectivity, and one is expected to teach all kinds of religious traditions including even small cult-type movements. This is the challenge of objectivity to scholars in both theological schools and in colleges and universities.

If one looks at the people from religion who were involved in the original leadership of IRAS, most were liberal ministers. Beside scientists from academia such as Shapley and Hoagland, the IRAS leadership came from within religious communities, for example Lyman Rutledge and Dana MacLean Greeley. Booth himself was a Methodist minister, but he also was an academic, a professor of historical theology at Boston University (1938, 1951, 1964). One important exception was Erwin R. Goodenough, who became involved in IRAS in 1966 and was strictly an academic. As an historian of religion at Yale, he was a scholar of Judaism and from 1953 to 1968 wrote the thirteen-volume *Jewish Symbols in the Greco-Roman Period*.

An abridged version, edited by Jacob Neusner appeared twenty years later (Goodenough 1989).

Interestingly, at IRAS annual conferences there always have been chapel services at the beginning of the daily program, and the ordained chaplains, or lay chapel speakers, are expected to address and reflect on the theme of this academic conference. Not all people at the conference attend these services, but many do—enough to fill an historic stone chapel that seats ninety people along with a large number who sit outside “on the rocks.” Many also end the day by attending the evening candlelight service in the chapel. For one week each summer, IRAS is a hybrid organization that both studies and practices religion in relation to the sciences. It yokes these two enterprises together in theory and liturgical practice. In facing the challenge of objectivity, IRAS conferences are hybrids of insider and outsider activities.

Challenges from academia—pluralism. The statement above from the Carroll University website (2014) makes us aware of the advance of religious pluralism over the past sixty years. This is part of increasing diversity in the wider scholarly community, represented by the growth of the American Academy of Religion (AAR) from a relatively small organization in the 1950s and 1960s to what it is today. The AAR now has over 10,000 members worldwide and represents academic groups working on indigenous religions and each of the major world religions. It encompasses the disciplines of history, literature, comparative religion, philosophy, social scientific study, and the new field of the cognitive science of religion. It has ongoing working groups on Barthian, Tillichian, and empirical theology as well as newer groups on liberation, feminist, womanist (African American), and gay and lesbian theologies. There is also a new group on queer studies. A list of current AAR program units is available at https://papers.aarweb.org/program_units.

The AAR has an ongoing group on Science, Technology, and Religion, initiated by Philip Hefner in 1986 as the Science and Religion Consultation. It also has groups on religion and ecology, religion and animals, and religion and health, which include relevant sciences. At the 2014 AAR conference in San Diego, there were 38 academic sessions sponsored by several groups on various aspects of science and religion (compiled by Whitney Bauman from the AAR program book). There was also the Hospitality Event sponsored by IRAS, the Center for Theology and the Natural Sciences (CTNS), the Zygon Center for Religion and Science (ZCRS), and the Institute for the Bio-Cultural Study of Religion (IBCSR).

When IRAS was founded it was open to a variety of world religions. However, in actuality, except for Hindu Vedanta, it had few resources to cultivate non-Western traditions. Today, in academia as well as in the wider culture, there is a vast new context for the work of IRAS, a context

that includes the objective study of religion from the outside as well as a pluralism of religions and of approaches to the study of religion.

THE CONTEXT WITHIN SCIENCE AND RELIGION

Just as science has diversified and the academic study of religion has mushroomed, so the work in science-and-religion itself has grown. Some scholars consider it a “field” in its own right. One can see this growth in the number of new journals that have been founded. In the first thirty years, from 1949 to 1979, three journals were established: *Perspectives on Science and Faith*, *Journal of the American Scientific Affiliation*—1949, the *Journal for the Scientific Study of Religion (JSSR)*—1961, and *Zygon: Journal of Religion and Science*—1966. (Each of the journals in this section is listed with their first year of publication.) In the last thirty years, at least nine new journals have emerged, along with many newsletters, books of conference and symposia proceedings, and websites. There may be other journals of which I am unaware, and no doubt there will be more to come—many of them online and with open access.

The challenge of apologetics. Some of the new journals such as *Science and Christian Belief (SCB)*—1989 and *Journal of Islamic Sciences (JIS)*—2003 are similar to *Perspectives on Science and Faith*—1949 in that they focus on a particular religious tradition in relation to contemporary science. *SCB* “is a journal concerned with the interactions of science and religion, with particular reference to Christianity.” The *JIS* carries the science–religion enterprise beyond Christianity as “a journal of Islamic perspectives on science, civilization and intellectual history.” Another journal, *Theology and Science*—2003, published by the Center for Theology and the Natural Sciences, carries this expansion even further. It publishes work related to all the natural and human sciences and well as multiple religious traditions, while maintaining that it is best if each of its various writings offer work within the perspective of a particular religion. Its “approach reflects the editors’ assumption that theology, as intellectual reflection upon one’s religious tradition, should begin by expressing the fundamental commitments and worldview of a specific religious understanding, and that dialogue with science can best be pursued when such a religious understanding is given self-critical expression” (Russell and Peters 2014).

One issue that arises from working within any particular religious tradition in relation to science and the wider culture is that of apologetics. Apologetics has a distinguished history. In Christianity it goes back to early church philosophical theologians, such as Justin Martyr, who wrote his *First Apology* to the Roman emperor Antoninus Pius, his son Marcus Aurelius, and the Roman Senate. Educated as a philosopher, Justin clarified language, made careful distinctions, and argued with reasons as he

responded to charges that Christianity was irrational, atheistic, immoral, and seditious. He argued that Christianity was indeed a reasonable form of religion because it was grounded in the Logos (in Universal Reason itself that became present in Jesus). This was a form of “logos Christology” that emerged in the second century (Justin Martyr ca. 156 CE). Much work today carries forward rational apologetics by trying to find ways that the doctrines of a particular religion can make sense in the context of scientific understandings—often responding to attacks from specific scientists. Apologetics may help religious practitioners to understand their faiths in a more credible way and thereby deepen their commitment in a pluralistic world. However, this “insider” approach runs the risk of continuing to separate particular religions from one another, hence continuing ongoing tensions among religious communities. It also tends to isolate religions from the wider culture. Even though people with different religious understandings and commitments can and do work on common worldwide problems of peace, justice, and sustainably—each from their own perspectives and for their own reasons—this does not resolve the tensions among the religions themselves. That these tensions remain is what I call the challenge of apologetics.

The challenge of intellectualization. Some new journals tend to approach religion from “outside,” from the sciences. *Religion, Brain, and Behavior*—2011 and the *Journal for the Cognitive Science of Religion*—2013 carry forward work in the academic/scientific study of religion that began in 1961 with the *JSSR*. As part of the legacy of sociobiology and evolutionary psychology, these new journals make use of the biological sciences, especially neurology. Still others carry out other kinds of academic activity and seem to be more philosophical in their orientation. *Omega—Indian Journal of Science and Religion*—2002, published by the Institute of Science and Religion (ISR), “focuses on philosophy of science, scientific studies of religion, and the general academic study of religion. . . .” This is in contrast with its partner organization the Association of Science, Society and Religion (ASSR), which “focuses on how theological claims (largely Christian and Hindu, with some Buddhism to be found) relate to science” (Chicka 2012). The exclusively online journal *Science, Religion and Culture*—May 2014 focuses on “the various ways modern science—including the disciplines of physics, cosmology, biology, psychology, neuroscience, mathematics, sociology, and anthropology—support, oppose, inform, or are informed by religious, theological, and cultural perspectives.” Finally, *Philosophy, Theology, and the Sciences*—May 2014 “provides a platform for constructive and critical interactions between the natural sciences in all their varieties” and “provides the rare opportunity to examine together the truth claims found in theology, philosophy, and the

sciences, as well as the methods found in each disciplines and the meanings derived from them.”

The challenge these journals bring to us is that of “intellectualization.” The ideas themselves and how they relate to one another or not, whether some are true or not, become the focus of science and religion, so much so that our enterprise becomes only of interest to academics. Of course, all journals, including *Zygon*, expect to publish the best sound, critical, intellectual work on various subjects, as is expected of any scholarly journal. However, the danger is that the scholarly activity can become an end in itself, sometimes carried out as a means to further someone’s career or reputation—“publish or perish.” Over-intellectualization runs the risk of ignoring and becoming irrelevant for pressing social and environmental issues facing the wider culture.

Two journals hold that a goal of their publications is to reach out to the wider world. Less explicit and perhaps somewhat ambiguous about this is the *European Journal of Science and Theology (EJST)*—2005. On the one hand, this online journal focuses on “insider discourse” that helps Orthodox theologians gain a better “understanding of the new scientific discoveries and studies that may be connected by their relevance to their own field or in associated fields” as well as sharing with scientists “new insights or a more profound attempt of understanding of the results of their research work.” Yet *EJST* also reflects on the “ethical, environmental and societal implications of the work performed by scientists and technologists, intending to contribute actively to European and international debates on these issues.” More explicit is the 1979 statement of perspective authored by *Zygon*’s founding editor Burhoe and his successor Karl E. Peters, which has been published in every issue since then, usually on the inside back cover. The statement opens with: “The word *zygon* means the yoking of two entities or processes that must work together. It is related to *zygote*—meaning the union of genetic heritage from sperm and egg, a union which is vital in higher species for the continuation of advancement of life.” It concludes: “*Zygon*’s hypothesis is that, when long-evolved religious wisdom is yoked with significant, recent scientific discoveries about the world and human nature, there results credible expression of basic meaning, values, and moral convictions that provides valid and effective guidance for enhancing human life.” Immediately after the statement comes: “*Zygon* also publishes manuscripts that are critical of this perspective, as long as such papers contribute to a constructive reflection on scientific knowledge, human values, and existential meaning” (*Zygon* 1979).

The current editor, Willem B. Drees, writes about the expansive way in which this perspective is carried out:

Zygon is dedicated to the manifold interactions between the sciences and human religious and moral convictions. We seek to consider the whole range

of the sciences; cosmology and physics, biology and the neurosciences, sociology, psychology, and anthropology. We seek to be open to religious and non-religious perspectives, those rooted in the great traditions such as Judaism, Christianity, Islam, Hinduism, Buddhism, but also to religious naturalism, secular humanism, and atheism, both variants at home in the Western world and versions elsewhere on our globe. We cover ideas (theories, theologies) as well as practices. We address ethical issues and analyze the history of the differentiation between science and religion and their subsequent interactions. (*Zygon* website 2014)

The idea that I have been developing—that interrelating science and religion should not be an end in itself but that our work should be of help to the well-being of all humans on a flourishing planet—leads to our final challenge.

OUR PRESENT CULTURAL-ENVIRONMENTAL CONTEXT

The challenge of consumerism to our moral motivation as we face global long-term problems—the case of climate change and suffering. I have been suggesting that science and religion be approached in a way that the outcome of interrelating them will have a positive impact on the wider world. This results from the growing awareness that the very large context in which all people live today—and their children and grandchildren will live—is at a major turning point for our planet. According to many, we are approaching a “tipping point” for significant global climate change: “the global ecosystem . . . is approaching a planetary-scale critical transition as a result of human influence” (Barnosky et al. 2012, 52). There already are increases in drought, wildfires, and violent storms, which increase suffering among humans and other sentient life. A search of the Internet can easily find pictures of an African child dying in the 2011 drought and famine in the “Horn of Africa” (http://www.rescue.org/sites/default/files/Dadaab%20039_562_boy_somaliafamine.jpg). Or a picture of an American child sitting in the midst of his home in shambles with his drenched Teddy Bear at his feet—a result of Hurricane Katrina (https://latimesphoto.files.wordpress.com/2010/08/katrina_anniversary005.jpg).

As the warming of Earth continues, glaciers are melting, increasing the amount of water in the oceans. Further, as the seas warm they expand in volume. More water, expanded in volume, raises sea levels and threatens to submerge some Pacific island nations and many coastal areas of continents. There will be attempted mass migrations of plants, animals, and humans as well as the ongoing extinctions of many species—what some are calling the sixth mass extinction (Kolbert 2014).

Why is this happening? There is more than one reason. The one I will focus on is the context that was emerging when IRAS was founded. This was the post-World War II transition to a domestic consumerist economy,

which has resulted in a sixty-year continuous increase of the invention of new products, planned obsolescence, and now militant in-your-face advertising on our computer screens. All this culturally shapes our brain on top of the evolved human tendency of our long-ago ancestors, acquiring as much as possible in times of abundance to offset future probable scarcity. Over-consumption in times of plenty is part of our evolved biological disposition (Konner 2002, 390–91).

All this raises the most important challenge of motivation (alongside of challenges to meaning, morality, and morale). Let us recall some of the 1952 correspondence between Wieman and Burhoe, which I cited at the beginning of this essay. Wieman stated: “I am heartily in accord with the project you propose of having a journal devoted to joining the resources of science and religion in the common endeavor to mark out the way that [humanity] must go to attain [its] best and avoid self-destruction” (Wieman, 1952). Burhoe replied: “I envision along with you a medium for setting forth the major directives for human living in terms that are *motivationally effective*. Such major directives should be the product of our contemporary epistemology and cosmology, and would agree with previous directives only because such agreement might naturally ensue, not because we premise any agreement” (Burhoe 1952, italics mine).

Over the past sixty years much work in science and religion has been done in relation to the challenges of meaning and morality, for example, on science and theology as well as technology and ethics (e.g., Barbour 1990, 1992). Less has been done on issues of morale (hope) and of motivation. Partly because we are creatures who evolved biologically to be concerned for what is good for our immediate families and tribes and for a couple of generations into the future, we have not effectively addressed the problem of motivation to do what is good for the coming centuries and the entire planet.

IRAS AS THE INSTITUTE ON THE RELIGIONS, ARTS, AND SCIENCES

The title of the last section of this essay is meant to alert us to one way of responding to the challenge of motivation. (It is not a suggestion to actually change the name of IRAS). Motivation is a matter of human emotions—not only how we think but also how we feel. The various arts—ranging from religious and cultural rituals, theater, music of all kinds, dance, photographs and paintings, poetry and stories—all can affect our emotions. In my own experience, Picasso’s “Guernica” shivers me with the horrors of war. A website cartoon of the Earth weeping and graffiti of a little girl following a heart-shaped balloon to a crying Earth awakens my feelings of empathy for the planet. Paul Winter’s earth-jazz with sorrowful wolf-cries haunts my psyche. And stories can involve me with people suffering and being healed, with environments of living organisms (microbes, plants, and animals) in

self-sustaining systems being damaged by human acquisitiveness. Thomas Berry says: "It's all a question of story. . . . We are in between stories. The Old Story—the account of how the world came to be and our place in it—is not functioning properly, and we have not learned the New Story" (Berry 1978).

The new story is being told by more and more people, for example, Brian Swimme and Thomas Berry, *The Universe Story: From the Primordial Flaring Forth to the Ecozoic Era—A Celebration of the Unfolding of the Cosmos* (1994); Loyal Rue, *Everybody's Story: Wising Up to Evolution* (1999); the three-book "Universe Series," primarily but not only for children, by Jennifer Morgan and Dana Lynne Andersen (illustrator), *Born With a Bang: The Universe Tells Our Cosmic Story* (2002), *From Lava to Life: The Universe Tells Our Earth Story* (2003), and *Mammals Who Morph: The Universe Tells Our Evolution Story* (2006); and Ellen Abrams and Joel Primack, *The New Universe and the Human Future: How a Shared Cosmology Could Transform the World* (2011). Mary Evelyn Tucker produced the story in the award winning DVD *Journey of the Universe: An Epic Story of Cosmic, Earth and Human Transformation*, narrated by Brian Swimme (Tucker 2013).

Earlier I presented a brief example of this story when I wrote about the ghosts of IRAS past. We can reprise it again as follows. The interpretive key to the perspective I'll take is the first law of thermodynamics: energy-matter is neither created nor destroyed but only transformed. As it has been transformed time and again, there has evolved a trajectory from the "Big Bang" that has led to us, and each of us consists of a very small measure of what has been created along this trajectory. For example, the hydrogen created in the earliest phase of the universe is on Earth. Elements such as carbon and iron, created in stars, are in us humans. This means that we can tell the universe story in the first person plural. *It is our story*. We were in the beginning 13.7 billion years ago.

In the beginning, we were nothing—or almost nothing—an unfathomable point of singularity. Then, we began to inflate extremely rapidly. We were a "Big Bang." We became subatomic particles. As we expanded, creating space-time, our temperature lowered so that we could become atoms of hydrogen and helium. As our atoms coalesced under the influence of gravity, we became stars—galaxies of stars—countless suns igniting as we fused hydrogen to helium—giving off tremendous energy. Many stars exhausted their hydrogen fuel and died, and some massive stars gigantically exploded as supernovae, giving birth to more stars, some with planetary systems. In our star "deaths," we created elements for planetary systems such as oxygen, nitrogen, carbon, sulphur, and iron, and when we "did the supernova" we created all the elements up to uranium. As such elements, with the help of our gravity and rotation, we became Earth, 9.2 billion years after we were born in the "bang." We became molecules and then living molecules, so that eventually we emerged as life—in the

seas, on land, and in the air. We grew into dynamic ecosystems impressed within a larger planetary system. Finally, we emerged as humans—out of the inflation of energy and matter, out of the stars, out of life on Earth.

We are dependent on our sun for energy, on vast cycles of oceans and atmosphere for rain, on ecosystems of plants and animals for nourishment, and on one another for love and care. We coevolved—biology and culture—and created languages to communicate, mathematics to reason with, metaphors to imagine with, and behaviors to continue our lives through generations with the possibility of expanding love and care for all people, all living creatures, and the entire planet Earth—even as each of us is loved and cared for in return.

This is our new story. It is really *Our Story—our own 13.7 billion year birth story* that has brought us into being. Can it inspire us to have the wonder, the gratitude, the perspective, and the love, so that we will become motivated to rein in selfish acquisitions and, instead, expand our care to all humans, all life, and all the planet? If we are so motivated, I think we will find meaning for our lives, moral direction for the good of all, and morale for the hard work of creating a hopeful future.

As I wrote at the opening of this essay about ghosts, I had images in my mind of our cosmically evolved ghosts and also of ghosts in pictures of our founding IRAS leaders—sixty years ago. These leaders are dead now, but their legacies live on for the organization of IRAS and for the wider science and religion community. I now imagine the many IRAS leaders of today—represented by recent presidents who are still with us, listed in the order of their presidency from 1977 to the present along with a year of a relevant publication: Solomon Katz (1999), Philip Hefner (2010), Marj Davis (2008), Ursula Goodenough (2005), Karl Peters (2013), Chris Corbally (2012), Michael Cavanaugh (1997), John Teske (2013), Ted Laurenson (2011), Varadaraja Raman (2012), and Barbara Whittaker-Johns (2003). When IRAS celebrates its second sixtieth anniversary in 2074, all of us who are the leaders today will be ghosts. What kind of legacies will we leave to the sciences, religions, philosophies of life, the science and religion enterprise—and most important to humanity, all life, and our Earth?

NOTE

This paper was presented at the 2014 Summer Conference of the Institute for Religion in an Age of Science, “The Future of Science and Religion in a Globalizing World,” Star Island, New Hampshire, August 2–9, 2014.

REFERENCES

- Abrams, Nancy Ellen, and Joel R. Primack. 2011. *The New Universe and the Human Future: How a Shared Cosmology Could Transform the World* (The Terry Lectures Series). New Haven, CT: Yale University Press.

- Akilananda, Swami. 1947. *Hindu Psychology—Its Meaning for the West*. London: George Routledge and Sons.
- Barbour, Ian G. 1960. *Christianity and the Scientist*. New York: Association Press.
- . 1990. *Religion in an Age of Science*. San Francisco, CA: Harper One.
- . 1992. *Ethics in an Age of Technology*. San Francisco, CA: Harper One.
- Baron-Cohen, Simon. 2011. *The Science of Evil: On Empathy and the Origins of Cruelty*. New York: Basic Books.
- Barnosky, Anthony D., Elizabeth A. Hadly, Jordi Bascompte, Eric L. Berlow, James H. Brown, Mikael Fortelius, Wayne M. Getz, John Harte, Alan Hastings, Pablo A. Marquet, Neo D. Martinez, Arne Mooers, Peter Roopnarine, Geerat Vermeij, John W. Williams, Rosemary Gillespie, Justin Kitzes, Charles Marshall, Nicholas Matzke, David P. Mindell, Eloy Revilla, and Adam B. Smith. 2012. "Approaching a State Shift in Earth's Biosphere." *Nature* 486:52–58.
- Bennett, John C. 2013. "Reinhold Niebuhr." *Encyclopedia Britannica*. Available at <http://www.britannica.com/EBchecked/topic/414557/Reinhold-Niebuhr>.
- Berry, Thomas. 1978. "The New Story." *Teilhard Studies*, No. 1.
- Booth, Edwin P. 1938. *Martin Luther: Oak of Saxony*. Minneapolis, MN: Augsburg.
- . 1951. *The Greater Church of the Future*. Boston, MA: Beacon Press.
- , ed. 1964. *Religion Ponders Science* (Papers from the Institute on Religion in an Age of Science). New York: Appleton-Century-Crofts.
- Breed, David R. 1992. *Yoking Science and Religion: The Life and Thought of Ralph Wendell Burhoe*. Chicago, IL: Zygon Books.
- Brunner, Emil, and Karl Barth. 2002. *Natural Theology: Comprising Nature and Grace by Professor Dr. Emil Brunner and the Reply No! by Dr. Karl Barth*. Eugene, OR: Wipf & Stock.
- Buber, Martin. [1937] 2010. *I and Thou*. Eastford, CT: Martino Fine Books.
- Burhoe, Ralph Wendell. 1952. "Letter to Henry Nelson Wieman, November 29." Henry Nelson Wieman Archives. Special Collections/Morris Library, Southern Illinois University, Carbondale, IL.
- . 1960. "Letter to Paul Tillich." The Ralph Wendell Burhoe Archives at the Lutheran School of Theology at Chicago. January 26.
- . 1967. "Five Steps in the Evolution of Man's Knowledge of Good and Evil." *Zygon: Journal of Religion and Science* 2:77–96.
- , ed. 1971. *Science and Human Values in the 21st Century*. Philadelphia, PA: Westminster Press.
- . 1972. "Natural Selection and God." *Zygon: Journal of Religion and Science* 7:30–63.
- . 1973. "The Institute on Religion in an Age of Science: A Twenty-Year View." *Zygon: Journal of Religion and Science* 8:59–72.
- . 1975. "The Human Prospect and the 'Lord of History'." *Zygon: Journal of Religion and Science*. 10:299–375.
- . 1976. "The Source of Civilization in the Natural Selection of Coadapted Information in Genes and Culture." *Zygon: Journal of Religion and Science* 11:263–302.
- . 1981. *Toward a Scientific Theology: Essays on the Relation of Science to Religion*. Belfast, Northern Ireland: Christian Journals Limited.
- Carroll University. 2014. "The Religious Studies Program." Available at <http://www.carrollu.edu/programs/religionandphil/>.
- Cavanaugh, Michael. 1997. "Global Population Equilibrium: A Model for the Twenty-First Century." *Zygon: Journal of Religion and Science* 32:163–74.
- Chakrabarti, Bhismadev, Frank Dudbridge, Lindsey Kent, Sally Wheelwright, Grant Hill-Cawthorne, Carrie Allison, Sharmila Banerjee-Basu, and Simon Baron-Cohen. 2009. "Genes Related to Sex Steroids, Neural Growth, and Social-Emotional Behavior Are Associated with Autistic Traits, Empathy, and Asperger Syndrome." *Autism Research* 2:157–77.
- Cho, Adrian. 2012. "Higgs Boson Makes Its Debut after Decades-Long Search." *Science* 337(6091):141–143.
- Chicka, Benjamin. 2012. "Religion and Science in the Indian Context." *Patheos*. Available at <http://www.patheos.com/blogs/faithforward/2012/04/religion-and-science-in-the-indian-context/>.

- Conference on Science, Philosophy, and Religion. 1939–1977. New York: Jewish Theological Seminary. Special Collections, Record Group 5.
- Corbally, Christopher J. 2012. “Is Hiddenness Natural?” in *Studies in Science and Theology: Yearbook of the European Society for the Study of Science and Theology, 2011–2012*, 91–99. Halle-Wittenberg: Martin Luther University Press.
- Damasio, Antonio. 1994. *Descartes' Error: Emotion, Reason, and the Human Brain*. New York: Avon Books.
- Davis, Marjorie Hall. 2008. “Structures of Evil Encountered in Pastoral Counseling.” *Zygon: Journal of Religion and Science* 43:665–80.
- Deacon, Terrence W. 1996. “Why a Brain Capable of Language Evolved Only Once: Prefrontal Cortex and Symbol Learning.” *Zygon: Journal of Religion and Science* 31:635–70.
- . 1998. *The Symbolic Species: The Co-evolution of Language and the Brain*. New York: W. W. Norton.
- Dobzhansky, Theodosius. 1937. *Genetics and the Origin of Species*. New York: Columbia University Press.
- Drees, Willem B. 2009. *Religion and Science in Context: A Guide to the Debates*. Oxford: Routledge.
- . 2015. “From Authority to Authenticity: Changes in Religion and the Roles of IRAS and *Zygon*.” *Zygon: Journal of Religion and Science* 50:439–454.
- Eig, Jonathan. 2014. *The Birth of the Pill: How Four Crusaders Reinvented Sex and Launched a Revolution*. New York: W. W. Norton.
- Erikson, Erik H. (1950) 1993. *Childhood and Society*. New York: W. W. Norton.
- Fahs, Sophia L. 1948. *From Long Ago and Many Lands: Stories for Children Told Anew*. Illustrated by Cyrus Leroy Baldrige. Boston, MA: Beacon Press.
- Fallon, James. 2013. *The Psychopath Inside: A Neuroscientist's Personal Journey into the Dark Side of the Brain*. New York: Current.
- Four Pillars. 2014. American Scientific Affiliation: a Network of Christians in the Sciences. Available at <http://network.asa3.org/?ASABeliefs>.
- Gilbert, James. 1997. *Redeeming American Culture: American Religion in an Age of Science*. Chicago, IL: University of Chicago Press.
- Goldsmith, Emanuel, and Mel Scult. 1991. *Dynamic Judaism: The Essential Writings of Mordecai M. Kaplan*. New York: Fordham University Press.
- Goodenough, Erwin R. 1955. *Toward a Mature Faith*. New Haven, CT: Yale University Press.
- . 1989. *Jewish Symbols in the Greco-Roman Period* (abridged edition of a thirteen-volume work 1953–1968). Princeton, NJ: Princeton University Press.
- Goodenough, Ursula. 2005. “Reductionism and Holism, Chance and Selection, Mechanism and Mind.” *Zygon: Journal of Religion and Science* 40:369–80.
- Greenblatt, Stephen. 2011. *The Swerve: How the World Became Modern*. New York: W. W. Norton.
- H-Bomb Development Summary. 2014. Warrenton, VA: The Cold War Museum. Available at http://www.coldwar.org/articles/40s/h_bomb.asp.
- Halberstam, David. 1993. *The Fifties*. New York: Random House.
- Hefner, Philip. 2010. “Embodied Science: Recentering Religion-and-Science.” *Zygon: Journal of Religion and Science* 45:251–63.
- . 2014. “Ralph Burhoe: Reconsidering the Man and his Vision of Yoking Religion and Science.” *Zygon: Journal of Religion and Science* 49:629–41.
- Himmelfarb, Martha. 1985. *Tours of Hell: Apocalyptic Form in Jewish and Christian Literature*. Minneapolis, MN: Augsburg Fortress.
- Hoagland, Hudson. 1935. *Pacemakers in Relation to Aspects of Behavior* (Experimental biology monographs). New York: Macmillan.
- . 1950. “Consciousness and the Chemistry of Time.” In *Problems of Consciousness: Transactions of the First Conference*, edited by H. A. Abramson. New York: Josiah Macy Foundation.
- . 1966. “The Brain and the Crises in Human Values.” *Zygon: Journal of Religion and Science* 1:140–57.
- . 1967. “Ethology and Ethics—The Biology of Right and Wrong.” *Zygon: Journal of Religion and Science* 2:43–58,

- . 1969. "Biological Aspects of Aggression and Violence." *Zygon: Journal of Religion and Science* 4:206–21.
- . 1973. *Reflections on Science and Human Affairs*. Cambridge, MA: Schenkman.
- Hopkins, Jeannette, and Kenneth B. Clark. 1969. *A Relevant War against Poverty: A Study of Community Action Programs and Observable Social Change*. New York: Harper & Row.
- Howlett, Duncan. 1980. *The Critical Way in Religion*. Buffalo, NY: Prometheus.
- "Hubble Captures 13 Billion-year-old 'Cosmic Dawn'." 2014. *New York Post*. January 8.
- IRAS. 2014. *Orange Book*. Available at http://www.iras.org/uploads/1/7/15/4/17545549/iras_orange_book_2014.pdf.
- IRAS Constitution. 1954. The Institute on Religion in an Age of Science. Ralph Wendell Burhoe Archives. The Lutheran School of Theology at Chicago. November 19. See also <http://www.iras.org/mission.html>.
- Justin Martyr. ca. 156 CE. "The First Apology of Justin." *Early Christian Writings*. Available at <http://www.earlychristianwritings.com/text/justinmartyr-firstapology.html>.
- Katz, Solomon H. 1999. "Toward a New Concept of Global Morality." *Zygon: Journal of Religion and Science* 34:237–54.
- Kaufman, Gordon. 2000. *In the Beginning . . . Creativity*. Minneapolis, MN: Augsburg Fortress.
- Keyers, Christian. 2011. *The Empathic Brain: How the Discovery of Mirror Neurons Changes Our Understanding of Human Nature*. Groningen, The Netherlands: Social Brain Press.
- Kolbert, Elizabeth. 2014. *The Sixth Extinction: An Unnatural History*. New York: Henry Holt.
- Konner, Melvin. 2002. *The Tangled Wing: Biological Constraints on the Human Spirit*. New York: Henry Holt.
- Laurensen, Edwin C. 2011. "Agency, Freedom, and the Blessings of Opacity." *Zygon: Journal of Religion and Science* 46:111–20.
- Lebow, Victor. 1955. "Price Competition in 1955." *Journal of Retailing* (Spring): 5–11, 45–46.
- Livingston, James C., and Francis Schüssler Fiorenza, with Sarah Coakley and James H. Evans, Jr. 2006. *Modern Christian Thought: The Twentieth Century*. Minneapolis, MN: Fortress Press.
- Mayr, Ernst. 1942. *Systematics and the Origin of Species, from the Viewpoint of a Zoologist*. Cambridge, MA: Harvard University Press.
- McDermott, Rose, Dustin Tingley, Jonathan Dowden, Giovanni Frazzeto, and Dominic D. P. Johnson. 2009. "Monoamine Oxidase A Gene (MAOA) Predicts Behavioral Aggression Following Provocation." *Proceedings of the National Academy of Sciences* 106(7):2118–23.
- Morgan, Jennifer, and Dana Lynne Andersen (illustrator). 2002. *Born with a Bang: The Universe Tells Our Cosmic Story*. Book 1 (The Universe Series). Nevada City, CA: Dawn Publications.
- . 2003. *From Lava to Life: The Universe Tells Our Earth Story*, Book 2. Nevada City, CA: Dawn Publications.
- . 2006. *Mammals Who Morph: The Universe Tells Our Evolution Story*, Book 3. Nevada City, CA: Dawn Publications.
- National Institutes of Health (NIH). 2014. "The Human Connectome Project." *NIH Blueprint for Neuroscience Research*. Available at <http://www.neuroscienceblueprint.nih.gov/connectome/>.
- National Scientific Council for the Developing Child. 2007. "The Science of Early Childhood Development: Closing the Gap between What We Know and What We Do." Available at <http://www.cdph.ca.gov/healthinfo/healthyliving/childfamily/Documents/MO-ECCS-ScienceEarlyChildhoodDev.pdf>.
- Newman, William M. 1974. "The Society for the Scientific Study of Religion: The Development of an Academic Society." *Review of Religious Research* 15:137–51.
- Niebuhr, Reinhold. [1932] 2013. *Moral Man and Immoral Society: A Study in Ethics and Politics*. Louisville, KY: Westminster John Knox Press.
- . [1952] 2008. *The Irony of American History*. Chicago, IL: University of Chicago Press.
- Pennisi, Elizabeth. 2006. "Fossil Shows an Early Fish (Almost) out of Water." *Science* 312(5770):33.
- Perry, Bruce. 2007. *The Boy Who Was Raised as a Dog: and Other Stories from a Child Psychiatrist's Notebook—What Traumatized Children Can Teach Us About Loss, Love, and Healing*. New York: Basic Books.

- . 2009. "Examining Child Maltreatment through a Neurodevelopment Lens: Clinical Applications of the Neurosequential Model of Therapeutics." *Journal of Loss and Trauma* 14:240–55.
- Peters, Karl. 1992. "Empirical Theology in Light of Science." *Zygon: Journal of Religion and Science* 27:297–325.
- . 2012. "Human Salvation in an Evolutionary World: An Exploration in Christian Naturalism." *Zygon: Journal of Religion and Science* 47:843–69.
- . 2013. "A Christian Naturalism: Developing the Thinking of Gordon Kaufman." *Zygon: Journal of Religion and Science* 48:578–91.
- . 2014. "The Changing Cultural Context of the Institute on Religion in an Age of Science." *Zygon: Journal of Religion and Science* 49:612–28.
- Putnam, Robert D. 2001. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster.
- Raman, Varadaraja V. 2012. "Hinduism and Science: Some Reflections." *Zygon: Journal of Religion and Science* 47:549–74.
- Rue, Loyal. 1999. *Everybody's Story: Wising Up to the Epic of Evolution*. Albany: State University of New York Press.
- Russell, Robert John, and Ted Peters. 2014. "Editorial Policy." *Theology and Science*. Available at http://www.ctns.org/theology_science.html.
- Rutledge, Lyman V. 1968. "The Origins and Purposes of IRAS." Burhoe Archives, Lutheran School of Theology at Chicago.
- Shapley, Harlow. 1949. "Cosmic Science and the Social Order." *Science* 109:399–401.
- . 1958. *Of Stars and Men: Human Response to an Expanding Universe*. Westport, CT: Greenwood Press.
- , ed. 1960. *Science Ponders Religion* (Papers from the Institute on Religion in an Age of Science). New York: Appleton-Century-Crofts.
- . 1963. *The View from a Distant Star: Man's Future in the Universe*. New York: Basic Books.
- . 1966. "Life, Hope, and Cosmic Evolution." *Zygon: Journal of Religion and Science* 1:275–85.
- . 1967. *Beyond the Observatory*. New York: Scribner.
- Simpson, George Gaylord. 1944. *Tempo and Mode in Evolution*. New York: Columbia University Press.
- . 1945. *Principles of Classification and a Classification of Mammals*. New York: American Museum of Natural History.
- Skinner, B. F. (1953) 1965. *Science and Human Behavior*. New York: Simon & Schuster.
- Smith, Jonathan Z. 2010. "Tillich[']s Remains." *Journal of the American Academy of Religion* 78(4):1139–117.
- Swimme, Brian, and Thomas Berry. 1994. *The Universe Story: From the Primordial Flaring Forth to the Ecozoic Era—A Celebration of the Unfolding of the Cosmos*. San Francisco, CA: Harper-One.
- Teilhard de Chardin, Pierre. [1955] 2008. *Phenomenon of Man*. New York: Harper Perennial Modern Classics.
- Teske, John A. 2013. "From Embodied to Extended Cognition." *Zygon: Journal of Religion and Science* 48:759–87.
- Tillich, Paul. 1960. "Letter to Ralph Burhoe." The Ralph Wendell Burhoe Archives at the Lutheran School of Theology at Chicago. February 2.
- Tucker, Mary Evelyn (producer). 2013. *Journey of the Universe: An Epic Story of Cosmic, Earth and Human Transformation*—DVD. Brian Thomas Swimme (Actor), David Kennard (Director), Patsy Northcutt (Director).
- Tyson, Peter. 2010. "The Star in You." *NOVA scienceNOW*. Posted 12/2. Available at <http://www.pbs.org/wgbh/nova/space/star-in-you.html>.
- Watson, James D. [1968] 2001. *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*. New York: Touchstone.
- Weston, Robert. 1993. "Out of the Stars." *Singing the Living Tradition*. Boston, MA: Beacon Press.
- Whittaker-Johns, Barbara. 2003. "Enough is Enough." *Zygon: Journal of Religion and Science* 3:839–53.

- Wieman, Henry Nelson. [1946] 2008. *The Source of Human Good*. Eugene, OR: Wipf & Stock.
- . 1952. "Letter to Ralph Wendell Burhoe, September 16." Henry Nelson Wieman Archives, Special Collections/Morris Library, Southern Illinois University, Carbondale, IL.
- . [1958] 1991. *Man's Ultimate Commitment*. Lanham, MD: University Press of America.
- Zygon*. 1979. "Zygon's Statement of Perspective." *Zygon: Journal of Religion and Science*. Inside back cover.
- Zygon* website. 2014. "Welcome." Available at <http://www.zygonjournal.org/index.htm>.