

THE CONTOURS OF AN EMERGING TERRITORY:
IMPRESSIONS OF TWENTY YEARS OF *ZYGNON*:
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by Karl E. Peters

Abstract. While the general territory mapped by the founders of the Center for Advanced Study in Religion and Science and *Zygnon* remains the same, how one delineates the contours of this territory depends partly on personal histories and on whether one is a theologian, a scientist, a scholar of religious studies, or a philosopher. However, the pluralism in the CASIRAS-*Zygnon* community can be placed in a more comprehensive, evolutionary framework, in which the different approaches exert cultural selection pressures on each other. The most important selection pressure is having to make scholarly work usable by nonscholars seeking meaning for their lives in a scientific age.

Last September, when Phil Hefner asked me to speak at the twentieth anniversary celebration of the Center for Advanced Study in Religion and Science and *Zygnon*, I agreed thinking that some projects I was working on then would provide material for this talk. These projects did not develop as I expected and so I could not use them. At the end of November I told Phil, "I honestly don't know what I'm going to do." He replied, "Why don't you just give us some of your impressions on *Zygnon's* twenty years?" I said that I thought I could do that, but when he asked for a title I could not give him one. Then he suggested that we call it "The Contours of an Emerging Territory: Impressions of Twenty Years of *Zygnon*." For this suggestion I want to thank Phil, because this title alone has been very fruitful in helping me formulate what I want to say. The fact that he suggested such a fruitful title leads me to think that Phil himself should have presented his own paper on this subject. I am sure it would have been thoughtful and thought provoking.

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What I want to say will go as follows: First, the general territory of science and religion that the founders of CASIRAS and *Zygon* mapped out twenty years ago seems to me to remain much the same; our basic objectives have not changed. However, how one delineates the contours of this territory depends in some measure on the personal histories of individuals and on whether one is a member of a particular intellectual community with its own history, namely whether one is a theologian, a scientist, a scholar of religious studies, or a philosopher. After discussing this, I will suggest that the various concerns and approaches of people from these different communities can be accounted for if we adopt a general evolutionary perspective. One important feature of this evolutionary framework is that it regards theologians, scientists, scholars of religious studies, and philosophers as exerting vicarious, cultural selection pressures on one another in attempts to achieve syntheses in science and religion. Next, I will give examples of some problems that thinkers in each community should probably address if they take each other seriously. Finally, I will suggest that the most important cultural selection pressure or demand on our enterprise is that we be able to transmit our work to people outside the scholarly community, in order to help them see how their lives can be meaningful in a scientific age.

Before I get into this, a word of warning. To illustrate my points, I am going to use some members of CASIRAS and the *Zygon* community, including myself, as examples. I know I can be accurate in reporting my own personal history and views in science and religion. I hope that others I use as examples will recognize themselves when I mention how I locate their work on my map of the territory of science and religion.

THE TERRITORY MAPPED BY THE FOUNDERS OF ZYGON

In preparing for this talk I read the inaugural editorial in the first issue of *Zygon*. As I read it I thought, "This is it; it contains practically everything I could say." So, if you do not care for the rest of my remarks, simply reflect on the following opening page and a half from the first thing ever published in *Zygon*, for these paragraphs give a clear picture of the territory that *Zygon* and its sponsoring organizations are trying to map.

Zygon, the Greek term for anything which joins two bodies, especially the yoking or harnessing of a team which must effectively pull together, is a symbol for this journal whose aim is to reunite the split team, values and knowledge, where co-ordination is essential for a viable dynamics of human culture.

We respond to the growing fears that the widening chasm in twentieth-century culture between values and knowledge, or good and truth, or religion and science, is disruptive if not lethal for human destiny. In this split, the

traditional faiths and philosophies, which once informed people of what is of most sacred concern for them, have lost their credibility and hence their power. Yet human fulfilment or salvation in the age of science requires not less but more insight and conviction concerning life's basic values and moral requirements.

Zygon has rich connotations in the sciences, where it supplies the biological term *zygote*, designating the union of the two gametes or complementary halves of the genetic code essential for the continuation and advancement of life. Here we have the image of two sets of different blueprints for life, each from an ancient lineage. And it is only by their effective yoking that a new generation or a more effective pattern of life can emerge. At the same time, *zygon* has symbolized in religion the union between humans and the ultimate reality on which their lives depend, as in the Christian "for my yoke [*zygon* in the Greek New Testament] is easy [good]," or as in the Sanskrit and Hindu cognate *yoga*, meaning union of self with the universal reality.

Ordinarily, in the evolution of human cultures, beliefs and practices about humanity's most sacred concerns necessarily have been integrated with the concurrent general beliefs and practices—the sciences (philosophies, world views, myths) and technologies. Disruption by historical changes of this integration between basic values and science, or between sacred and secular knowledge, automatically brings about pressures for new adaptations of one or the other or both to reintegrate the organization of the culture. Failure to reintegrate satisfactorily has spelled the death of cultures or civilizations.

One might say that because of its radical mutations the cultural "gamete" from father science has not yet found any corresponding gamete from mother religion with which it can unite to form a working new culture for future civilization. A valid union may require mutations or reformations in religious belief systems, or further mutations in scientific belief systems, or both. The journal *Zygon* is established as a workshop for those seeking ways to unite, in full integrity, the sciences with what people hold to be their sacred values, their religion (Burhoe & Tapp 1966b, 1-2).

I like that. I think even Ralph Burhoe still likes it, although no doubt he would modify it if given the chance, since he always tries to find better ways of stating things.¹ Nonetheless, as it is, this inaugural statement gives us an excellent general picture of the territory CASIRAS and *Zygon* are trying to map.

However, I now want to suggest that how the contours of this territory or parts of it are delineated depends in large part upon the concerns and approaches of persons in different communities—and even on the life histories of individuals. The communities I will consider are those of the theologians, the scientists, the scholars in religious studies, and the philosophers. All these communities are represented by people in CASIRAS and in the pages of *Zygon*.

But first, to illustrate how a person's own life history may influence the way he or she approaches this general territory of science and religion, let me take a few moments to reflect on my own twentieth anniversary in science and religion.

MY TWENTIETH ANNIVERSARY IN SCIENCE AND RELIGION

Twenty years ago I was a graduate student in the joint Ph.D. program at Columbia University and Union Theological Seminary in New York City. I had grown up in a liberal Presbyterian home and, along with my parents, was very active in the church. While in high school, partly due to the influence of my local minister and his wife, I decided to become a Christian minister. In college I became an active evangelical Christian. At McCormick Theological Seminary, studying for the ministry, I developed my thinking along the lines of John Calvin's reformation theology and the twentieth-century neoorthodoxy of Karl Barth. I graduated from McCormick in 1964. Two years later, as I studied for my Ph.D. in philosophy of religion at Union-Columbia, I came to the conclusion that I was an atheist.

What happened? My problem was largely conceptual. The Christianity in which I had been socialized and educated taught me, among other things, that God was at work in the world, present all the time everywhere, carrying out divine purposes. But if God was so present, one should be able to observe God working. One should be able not just to point to God's presence in remarkable and unique historical events or in religious ritual and experience. One should be able to observe God active in our everyday lives.

What I was seeking then was to be empirical in my theology and in my religious life. About a year later I realized that this was a reflection of my having grown up with a father who was a mechanical engineer, and hence scientific and practical in his approach to things, and with an educational system that was heavily influenced by the American pragmatist philosopher John Dewey. However, the reformed-neoorthodox theology I had learned in seminary conceived of God as a *being*; it also used *personal* language based on human introspection and interpersonal relations to talk about the nature and work of God. With this theology I could talk about observing the effects of God's activity, but I could not talk about observing *God-working*.

At the same time, in 1966, as I was concluding that I was an atheist, I made the decision to devote my doctoral studies to science and religion. I did this because I still wanted to do theology but not the kind of more traditional Protestant theology that no longer was credible to me. I believed then that, if theology was going to be credible to me and perhaps to others like me, it had to be done in relation to the empirical sciences. This is because the empirical sciences have dominated American culture and because so many of us have been raised and educated under their general influence. For me that influence came down to the dictum "seeing is believing."

So, in September 1966 I went to see one of my Columbia University professors, Joseph Blau. Blau told me that, if I was interested in science and religion, I should read two things that had just been published. The first was Ian Barbour's *Issues in Science and Religion* (1966) and the second was *Zygon: Journal of Religion and Science*. Blau said that *Zygon's* editor, Ralph Burhoe, "was a good man." That was the first time I had ever heard of Ralph, and Blau's evaluation was more than sufficient to encourage my interest. Thus, my beginnings in seeking to do theology in the light of the sciences coincided with the beginnings of *Zygon* and of CASTS/CASIRAS—the two institutions we are celebrating here today.

I have said I became an atheist because of conceptual problems: using traditional theological language I could not talk in a way that I could observe God working in the world. My problem was that I thought then of God as some kind of being, and I could not observe a being called God always at work everywhere. Also, I could not observe a *personal* being. Personal categories such as will, thinking, planning, freedom, and love are of course hard to observe outside us because they are usually something we first experience within us. What I was looking for was a more objective way of defining what I meant by the word *God*.

My intellectual conversion to theism came when, under the influence of the American pragmatist Charles Sanders Pierce, I tried to define the abstract term *God* as a type of *event*. In a paper written for Professor Daniel Day Williams, I defined *God* as a "grace-type event," and further defined grace as something good happening to us beyond our control. In response to that paper, Williams asked me, "Have you ever read Henry Nelson Wieman?" I replied, "No." He said, "You should, you sound just like him."

When I began reading Wieman's books, I found a person who had thought exactly what I wanted to think, only much better and years before. And, because Wieman defined *God* in such nonpersonal and process terms as the "creative event," "creative process," and "creative interchange," I acquired an understanding of God that allowed me to speak meaningfully of observing God working in the world and also that allowed me to become intimately related to God, to experience "at-onement." This is because Wieman defines God not as the being who creates the world but as the process of creation itself (e.g., Wieman 1946; 1958). In these terms, using Wieman's concept of God, I wrote my Ph.D. dissertation titled "The Concept of God and the Method of Science: Exploring the Possibility of a Scientific Theology."

I did not realize it at the time, but looking back I now know that, by resolving my atheism in terms of Wieman's conception of God as the

creative process, I was coming again into contact with *Zygon*. Guess who is the most published author in the first year of *Zygon*'s publication, 1966? Henry Nelson Wieman.

Wieman's understanding of God as the creative process continues to set my own professional agenda. My goal is to understand the process of creation as best I can, with the awareness that, in understanding this process, I am gaining knowledge of God, am experiencing God at work in the world, and am able to participate in this divine activity insofar as I, too, am creative.

Today, however, I largely follow the theological thinking of Ralph Wendell Burhoe (e.g., 1981), whose evolutionary theology seems to me to hold more promise conceptually than some of the details of Wieman's thought. Both men, who knew each other well, share common assumptions about the nature of theology—namely that it be empirical in its epistemology and that it stress the presence of God at work in daily life. Because of this, I share with both Burhoe and Wieman the assumptions that emphasize the naturalistic rather than the supernaturalistic aspects of religious thought.

So much for me. In reviewing some of my own intellectual history in relation to this twentieth anniversary of CASIRAS-*Zygon*, I already have anticipated the first of the four different communities I will talk about next. In what follows I hope to show you that theologians, scientists, scholars in religious studies, and philosophers approach the yoking together of science and religion differently; hence, the contours of the general territory appear to be different, depending on which approach one takes.

CONTOURS OF SCIENCE AND RELIGION FROM THE PERSPECTIVES OF DIFFERENT INTELLECTUAL COMMUNITIES

The theological community. I represent a small number of theologians who attempt to speak to those whose thinking is imbedded in the empirical-naturalistic world view of science. Most of these theologians are outside existing churches or in the modernist wing of the churches.

However, other theologians stand more centrally within a particular religious tradition. They assume the meaningfulness of the basic features of that tradition, and then they relate that tradition to modern science. These are the liberals or creative conservatives. I suspect that most of them did not have the kind of crisis of faith I had, which took me away not only from a particular church but away from organized religion altogether. And if they did have such a crisis, they now stand firmly within and participate actively in an historical religious community: in their communities they can say, for example, "we Christians" or "we Jews," or "we Lutherans," "we Presbyterians," or "we Catholics"—

and have some sense of a tradition of belief and practice they continue to affirm.

A nice statement that fits this liberal or creative-conservative view (in contrast to the modernist position I described myself as holding) is contained in the March, 1966, issue of *Zygon*, in the statement of the prospectus calling for a conference on "A Reconsideration of the Relation of Theology to the Sciences." This conference produced the articles and commentaries in the first issue of *Zygon*.

By "theology," we mean those critical, intellectual attempts to understand and reform beliefs and practices of a given religious community. . . . No religion can remain vital unless its beliefs and practices speak to people's major concerns, and speak to them with credibility. The contemporary sciences provide a rich lode of reliable knowledge about humanity's nature, destiny, and cosmic setting. Theologies which take this knowledge seriously might vitalize their religions and find themselves moving toward greater consensus (Burhoe & Tapp 1966a, 11).

What kind of maps do these people have of science and religion? How do they view the territory? Like others they have the general view of scientific knowledge and religious insights fitting together. But it is clear from listening to them and from reading their writings that the basic features of their religious tradition, the problems they address and the ideas and practices they use, remain intact even as they suggest reformulations of religious ideas and practices in light of scientific knowledge.

A good example of one who does this very well is Arthur Peacocke. His book *Creation and the World of Science* (1979b) is an excellent example of how a Christian theologian, who also is a top-flight scientist, effectively uses scientific knowledge in reformulating such doctrines as God the creator and the incarnation of God.

However, after reading Peacocke's book, I was left with the question of why I should accept Peacocke's understanding that God is a personal God. Of course, Peacocke does not take this concept anthropomorphically. Instead he regards the notion of a personal God as a functional notion that suggests an agent who, like human agents, intentionally directs the creative process (Peacocke 1984, 73-78). Also, Peacocke uses the concept of a personal God metaphorically. For example, in the chapter in *Creation and the World of Science* entitled "Chance and the Life Game" he gives a fine analysis of chance and necessity in evolution according to the latest theory of nonequilibrium thermodynamics. Then he develops the theological metaphor that God is a composer-conductor of a cosmic symphony—developing in the created world all the possibilities of existence (Peacocke 1979a, 315-20).

What needs to be examined further, however, is the validity or appropriateness of such models and metaphors which suggest that

God is a personal being. Such an idea seems to reflect an allegiance to a particular religious tradition. Here is something not given up in the relating of science and theology—even though many scientists and a few naturalistic theologians (such as myself) are not happy with it.

This is not to say that no one in established religious communities is grappling with such problems. George Riggan and Hefner are theologians operating within their respective Christian traditions; yet, each in his own way speaks and writes in a manner that is more open to reformulating such fundamental theological concepts as that of a personal God.

The scientific community. The scientific community is extremely diverse, but in spite of this diversity there seem to be two underlying assumptions shared by most scientists—especially the physical and biological scientists. First, the universe is all that can be investigated and written about. Second, describing and explaining the universe is best done in nonpersonal terms. Scientists do not usually appeal to terms like “will,” “love,” and “self-conscious planning” in their explanations of the workings of the universe, unless they are talking about human beings. Vitalism or personalism is simply not popular among the vast majority of scientists.

These basic assumptions of naturalism and nonpersonalism seem to influence many scientists’ ways of delineating the contours of the territory of science and religion. Scientists writing in *Zygon* most often focus on questions of human nature, on humanity’s relation to the rest of nature, and on the relation between facts and values. They are reluctant to deal with some of the concerns of greatest interest to the theologian, for example, the transcendence and nature of God. Of course, this is for good reason, because, as these issues usually are formulated, they take the scientist beyond his naturalistic and materialistic framework. They are not a part of the scientist’s map of the territory.

An excellent example of this is the work on cosmic evolution by the astrophysicist Eric Chaisson. Few others in the world today are as actively attempting a synthetic vision of things as is Chaisson. He is trying systematically and scientifically to unify cosmic, biological, and cultural evolution—even to the point of now building on the work of Ilya Prigogine and others in mathematizing evolution.

Chaisson even does this in a way that for some is religiously meaningful; for example, he writes that the relation of humans to the cosmos is a warm and friendly one, because we are made of the stuff of the stars and because we are children of the universe (1979, 39). But all this is still couched in naturalistic and even materialistic terms. Our relation to the

universe as our parent, our interconnectedness to all things, is not because we are the children of a loving and judging personal God but because we are reconstructions of the energy-matter that has been present since the beginning of time.

Chaisson, the scientist, has a map of science and religion in which the contours of the territory look somewhat different from the way they look to a theologian like Peacocke, even though as scientists they share much in common. And one would find the same fundamental difference if one looked at other scientists published in *Zygon*, such as J. Bronowski, Bernard Davis, E. O. Wilson, Edwin Land, Paul MacLean, Jerre Levy, Richard Alexander, Garrett Hardin, George Pugh, and probably Solomon Katz.

A possible exception to this might be Eugene d'Aquili, for d'Aquili's work as a psychiatrist with people having religious experiences takes him into that which transcends ordinary, baseline human experience, into experiences that may be regarded as supernatural and even the supernatural as personally conceived (1982). But d'Aquili's own work is open ended as to the ontological significance of such experiences (d'Aquili & Laughlin 1975, 55-57). If some types of experience he writes about are significant in that they tell us about the nature of reality and not just about the functioning of a person's brain and the state of a person's mind, then the two assumptions of modern science as they are usually conceived—naturalism and nonpersonalism—would be challenged.

The community of scholars in religious studies. When *Zygon* was founded twenty years ago, a new group of professional academics was emerging in religion, leading to the establishment of departments of religious studies, even in major state universities. These departments are staffed not by theologians teaching a particular theological tradition or doing theology, although some theologians have migrated into religious studies programs. Rather they are staffed by people trained in the methods of history, literary criticism, philosophy, and the social sciences.

The primary task of these scholars is not to espouse a religious faith; it is not to reformulate religious traditions in light of contemporary understandings; it is not to determine the adequacy of religious ideas and practices. Rather, it is simply to understand the religions of the world in all their diversity as they change through time. If such scholars were to address questions of relating religion and science, they would be, like John Bowker, interested in religious thought and practice as data for our discussions. And like Bowker they remind us that we must be true to the data of religions as they actually exist.

Further, many of these scholars, both in religious studies and in the social sciences, are willing to see religion scientifically, that is, to use scientific methods and analysis in attempting to understand religion. A good example of such a study is the current work in science and religion of Sol Katz, which analyzes the relation between the concept of a "high God" who is active and a supporter of morality, on the one hand, and the degree of cooperation in tribal societies, on the other. Such a study might lend some scientific confirmation to Ralph Burhoe's hypothesis that religion is a civilizing agent, functioning to help human beings move beyond kin-group loyalties to cooperative, even at times sacrificial, behavior in a larger society.

But note the one thing such scientific studies of religion, as well as other types of religious studies, do not do. They do not consider the question of the "objective" truth of religious beliefs. And they do not try to resolve the issues between personalistic theologians and naturalistic scientists. While the concept of a high God, for example, may be true in that it is part of a meaningful belief system of a particular society, a belief system that has survival value, we still do not know whether there is a reality external to the human society that matches the description of the high God. This problem has led the philosopher Michael Ruse, in his characteristic good humored but still serious way, to raise the question: "Is God Just a Figment of Sol Katz's Imagination?"² That is, is God only a human social construct that has functional significance for a particular society, or is God an external reality to some extent independent of our concepts (our models and metaphors)? However, answering such questions is not usually part of the conceptual maps of scholars and social scientists in religious studies. How one might answer such questions is the concern of the fourth community to which I now turn.

The community of philosophers. Ruse is a member of this community; he and other philosophers, especially philosophers of religion, are concerned with questions such as the reality of God and how one gains the answers to such questions. In traditional philosophical language, they are concerned with questions of ontology (the nature of reality including ultimate reality) and epistemology (the theory of knowledge and the methods of inquiry by which one comes to know what one knows).

The problems of theory of knowledge and methodology do not seem to be of primary concern either to scientists or to many theologians. Scientists seem to be quite happy with the general rational-empirical form of their inquiry, even though they may debate particular procedures. Theologians who stand in a tradition likewise do not often raise

methodological considerations, or, if they do, they do so in terms of their own tradition. Beginning with some of the fundamental ideas of their faith, which remain relatively unquestioned, they rationally work out the relations between their basic beliefs and the modern world. However, philosophers and philosophers of religion are plagued by the kind of question Ruse asks. In the last six years, my experience as editor of *Zygon* has been that it is the philosophers much more than the scientists or theologians who submit articles on epistemological and methodological issues.

This is part of the more general point I have been making. As editor, I have been struck time and again with the differences between the concerns and approaches of theologians, scientists, scholars of religious studies, and philosophers. While almost all who are published or try to be published in *Zygon* are interested in building constructive relations between contemporary scientific knowledge and basic human values, between science and religion, how they approach this general objective reveals that they see different contours in looking at the science and religion territory.

Responding to pluralism in the CASIRAS-*Zygon* community, What do we do with this diversity of approaches, these different maps with their different ways of illuminating the contours of the territory of science and religion? The very fact of pluralism within the community of scientists and scholars working in relation to *Zygon* evokes at least three responses.

One response is to be humble in our enterprise. Even if we share the same overall objective, no one person can claim to have the complete map of the total territory. A second response encouraged by these different approaches is to engage in teamwork. This means that it is important to foster the growth of organizations such as CASIRAS and its cousin IRAS and to develop journals such as *Zygon*.

But there is a third, more intellectual response that is possible. The differences in approaches we have outlined force us to move toward a higher level of conceptualization—to a more distant but at the same time more comprehensive view of the territory, to see if we can include all these different viewpoints and ways of mapping science and religion in a more comprehensive understanding. I suggest that we can account for the diversity even within the CASIRAS-*Zygon* community in the same way that we account for the diversity in human culture on earth, for the diversity of life on our planet, and for the diversity in the universe—namely by adopting an evolutionary framework.

Within this framework we can see the different maps or approaches to science and religion as cultural subspecies and as new variations or recombinations of thinking. These recombinations cannot help but

depend upon the personal histories of individuals and on the communities in which we stand. Just as in biological evolution genetic recombination takes place within the constraints of the existing DNA within each parent so, in our cultural *zygon* or recombining to form new patterns of thought integrating science and religion, each of us depends on the thought patterns and practices we have inherited. We cannot do otherwise. But this kind of picture is exactly what one expects; and, by recognizing it, we can place our own work in CASIRAS and *Zygon* within the larger picture of evolution in our world and in the universe.

I think it is the genius of Burhoe's evolutionary approach to science and religion that it allows us to have this kind of self-understanding. Both in terms of his analysis of religion as a culturally evolving phenomenon and in terms of his theology that identifies God *functionally* with evolution's natural selection, Burhoe develops the kind of map of the contours of our science and religion territory that provides a framework for the other maps we have been discussing. This is why I think that evolutionary theory must remain central in our thinking as CASIRAS and *Zygon* move into their next twenty years.

CULTURAL SELECTION PRESSURES ON CASIRAS-ZYGON

This higher level, evolutionary map may be especially helpful in a particular way. Besides the concepts of inheritance and variation, a key concept in a Darwinian type of evolutionary theory is that of natural selection. I suggest that the different approaches to science and religion I have discussed provide intellectual environments for each other and thereby exert *cultural* selection pressure on one another. They function in our intellectual exchange with one another as, in Donald Campbell's words, "vicarious selectors" (1977).

Both Campbell and Burhoe develop the notion of vicarious selectors—Campbell in his William James lectures at Harvard University (1977) and Burhoe in his *Zygon* article "Natural Selection and God" (1972, 49-55). Both suggest, as do many others, that the human ability to use language, to develop conceptual models of natural processes, and to imagine and predict future outcomes offers a buffer against biological natural selection. While in biological evolution selection pressure is exerted on living organisms, so that some reproduce more successfully than others, in cultural evolution vicarious selectors exert pressure on human concepts and practices, weeding out variations that are ineffective before they and people holding them are tested against the external world. Thus, with vicarious selectors it is less likely that living beings will be selected against; rather it is thoughts and actions that can be judged to be false or immoral and thereby discontinued.

What I suggest is that in CASIRAS and in *Zygon* the diversity of viewpoints, of ways of mapping the science and religion relationship, can function as vicarious selectors on each other, because each provides sets of concerns that must be taken into account by the others if there is to be a genuine yoking together of science and religion. Therefore, as we seek to bring the four communities and their different ways of mapping science and religion together, each faces particular problems in relation to the others. Let me briefly give a few examples of problems each community faces if it takes the concerns of the others seriously.

SOME PROBLEMS—SELECTION PRESSURES—EACH COMMUNITY FACES

Problems for theologians. When theologians take the other communities seriously, two problems arise. First, how does one establish the truth of the idea of a personal god? Philosophers call theologians to consider their own theory of knowledge and to offer some rational justification for it. Scientists, who so successfully use nonpersonal models in their maps of things, do not understand personalistic maps. Theologians who continue to be personalistic in their religious thinking are thereby called on to explain why a personal model of God can be used.

Second, how does one relate creation to salvation? In much of our science and religion dialogue, we have dealt with change in the universe in terms of a concept of continual creation. This fits with scientific pictures of change in terms of nonequilibrium thermodynamics and in terms of biological and cultural evolution. But many religions both East and West suggest that the fundamental human problem is not just building on the past; instead it is returning from a state of ignorance or sin to a state of right relationship with the ultimate reality behind, in, and through the universe. The fact that science often sees things in terms of creation exerts vicarious selection pressure on theologians to see if they can reformulate doctrines of salvation, redemption, or enlightenment in terms of re-creation.

Problems for scientists. At the same time it seems to me that the scientists among us face certain selection pressures if they are meaningfully to yoke together their science with religion. For example, in reverse of the point I just made, scientists need to consider whether or not something is radically wrong with human beings, whether there is a fundamental human disorientation that affects all our thinking, acting, and experiencing. Religious traditions in Christianity and Buddhism, for example, have as central to their understanding of the human situation concepts of sin and ignorance. In both cases the religious quest is to move out of a state of sin or ignorance to the proper

relationship with the ultimate source of all existence. Only then can thinking and acting be done in the proper manner. It seems to me that scientists, if they are to speak meaningfully to many religionists, must take into account that there may be some fundamental dis-ease that must be cured before science and the fruits of science can fully benefit rather than disrupt and perhaps even destroy humanity.

A second problem scientists face in relation to the theological, religious-studies, and philosophical communities is what to do with subjectivity and quality. The success of science in the last few centuries has largely been due to its ability to develop methods that lead to shared agreement regarding the validity of theories—to “objectivity.” A part of this has been the application of the “language of mathematics” to empirical phenomena, and hence the building of quantitative maps of our world.

But for a few thousand years religion and philosophy have built up a body of wisdom based on introspective, interpersonal, and qualitative experience. It is out of such experience that personal concepts such as will, freedom, consciousness, and love arise. And these ideas have served human living well for periods of time much longer than the three or four centuries of modern science and its way of looking at things. These well-winnowed ideas, it seems to me, exert selection pressure on scientists to come to terms with the subjective and qualitative and to take them seriously, even as they might attempt to explain them scientifically.

Third, there are selection pressures within science itself. Because contemporary science consists of many communities, each mapping a portion of the physical, biological, and cultural universe, I suggest that the variety of sciences exert selection pressures on any scientist who seeks a coherent picture of things. In particular, scientists in CASIRAS and writing for *Zygon* should pay attention to, as some are doing, the interfaces between the nonliving and living, and between organic life and culture. Peacocke’s nonequilibrium thermodynamics of life’s evolution and E. O. Wilson’s sociobiology of human behavior are two attempts to do this. But more needs to be done.

Problems for scholars in religious studies. All the approaches to science and religion we have been discussing are subject to the general selection pressure of portraying reality as adequately as possible with human thought. But this pressure is felt acutely in religious studies—where the primary task is to be true to the data of religion. This leads to two problems.

First, since most of the scholarly study of religion has originated in Western culture, the problem arises how to understand other religious cul-

tures without forcing the categories of either Western religion or Western science on them. Murray Wax in a recent *Zygon* article, for example, suggests that, even though we all know what religion is in our everyday experience, when we try to formulate a clear concept for careful study of the world's religions, we find it almost impossible to develop a concept that applies universally to all cultures. In particular such traditional Western distinctions as natural and supernatural or sacred and profane may distort the data of the religions we are trying to understand (Wax 1984). Thus the data of existing religious thought and practice exert cultural selection pressure on any of our attempts to understand religion scientifically.

Second, can the scientific study of religion, which tries to formulate propositions about religious thought and practice that apply universally, deal adequately with unique religious founders? In *Issues in Science and Religion* Barbour outlines the problem of trying to represent events that are ideographic (or individual, unique, and unrepeatable) in terms of a scientific nomothetic approach which seeks to portray what is recurring and lawlike (Barbour 1966, 194-98). Religious traditions often regard themselves as unique. This exerts vicarious selection pressure of the data of religion on social scientists in religious studies. Can, for example, Anthony Wallace's revitalization model of religion adequately account for significant uniqueness in the founders of particular religions? It does seem to provide a model that allows us to see the pattern and the conditions under which new religious movements are likely to emerge (Wallace 1966; Katz 1974, 130-34). But by itself the model does not tell us what specific new religious syntheses to expect; hence, it seems to me that this social scientific theory needs to be supplemented with the kind of specific information that only an historian of religion or of culture might give. But historians, who have tended toward an ideographic approach, and social scientists, who generally take a nomothetic approach, do not often come together. Indeed, other than Erwin Goodenough (1967), we have had no historians of religion represented in the pages of *Zygon*.

Problems for philosophers. Finally, philosophers face selection pressures from the other three areas to revive philosophical metaphysics or the constructing of world views. In the twentieth century, philosophers have tended to stress the analytical and critical tasks of their discipline. But those philosophers who wish to engage in yoking science and religion together must, it seems to me, move from language analysis and critical philosophy to constructive philosophy (for example, developing new understandings of human nature based on knowledge from other types of inquiry) and to metaphysics—traditionally two major tasks of philosophy.

A MOST IMPORTANT CULTURAL SELECTION PRESSURE

I have been suggesting that, in an evolutionary framework, the different ways of mapping the science-religion universe exert vicarious selection pressures on each other. But there is a much more important selection pressure on our enterprise. If we ignore it, we will be caught in the web of high-level scholarly discourse that fails to speak to average human beings. Our most critical challenge for the Center for *Advanced Study in Religion and Science* and for the *scholarly* journal *Zygon* is to find a way to meet the selection pressure of ordinary human beings who are trying to discover how their own lives can be meaningful and significant, and of societies who are trying to cope with one another in our pluralistic world.

The original vision of both the Center at Meadville/Lombard Theological School (CASTS) and of its organizational successor CASIRAS included the educating of practitioners of religion—clergy who could take the scholarship in *Zygon*, for example, and use it to communicate how one can live meaningfully in a scientific age. Although senior ministers such as Don Harrington and Malcolm Sutherland have done that and although CASIRAS still offers courses for M.Div. students through the Chicago Cluster of Theological Schools at the Lutheran School of Theology at Chicago, we still have achieved only limited success in translating our scholarly work for use by the average individual. But if we fail to keep this part of the original vision in mind as something that is absolutely necessary, human life itself—the everyday living of people—will select against our whole enterprise. Our science and religion scholarship will continue to exist only for a few thousand people who read *Zygon* and the books we write. It will then continue only as a very small and isolated cultural subspecies, always threatened by extinction—unless we find ways to transmit it into the minds and hearts of ordinary citizens of our world.

To make this transmission, our work must indeed speak to people in their everyday lives. We are faced, it seems to me, with the same problem I faced when I graduated from theological seminary and discovered that I could not see God at work in the world. My particular theological concepts were selected against because they did not fulfill what they promised and because they were of no use to me in making sense of my life and my relation to God. For me personally, an evolutionary process theology, along the lines of that of Wieman and Burhoe, has allowed me to make sense of my own life; and it is for this real-life reason—even more than for the more abstract, vicarious selectors of scholarship of which I have been speaking—that I now expound a naturalistic evolutionary theology.

Please do not misunderstand me. I am not suggesting that each one of you has to achieve my current resolution of the question of the meaning of life. But I am suggesting that each of us needs to come clear to one another regarding just how our own work in religion and science is personally meaningful to us, regarding just how it helps us actually to live better.³ We all must meet the selection pressure of living a fulfilling life; if our work in science and religion does not help us do this, it is worthless. It fails its most important test, and we will not be able to effectively transmit our scholarly work to the average person.

RESPONDING ONCE MORE TO PLURALISM

However, I suspect that, if we do show how our work is so meaningful, each of us will achieve and express such a personal synthesis in his or her own way. Even if we all think together in some kind of overarching evolutionary framework, participating in a significant new phase of cultural evolution on planet Earth, how we look at our own lives—how we map our own territories and our life journeys—will reflect the backgrounds from which we come.

This pluralism even within our own science and religion community should not be seen negatively but positively. For one thing, it may help us speak to a wider variety of ordinary people. Further, our different ways of mapping the details of the territory of science and religion suggests that we should not be isolated individuals but that we should be complementary parts of a community. And we should not forget that this community does share a common goal—in the words of the first *Zygon* editorial the goal of “seeking ways to unite, in full integrity, the sciences with what people hold to be their sacred values, their religion.” Finally, and perhaps most important, our pluralism reminds us that it is not the map but the process of map making that is most significant. It is not a particular set of scientific concepts but the doing of science that is important. It is not the thinking about religion but being religious that is important. In the evolutionary framework that I have been suggesting, continually making new intellectual trials in science and religion, and subjecting them to rigorous interdisciplinary, critical judgments is one way of being both scientific and religious.

For me, and I hope for you, the most wonderful thing about what we are doing is that we are a living community of people attempting to be both scientific and religious. Being scientific and religious together is perhaps the most significant *zygon*, the most important kind of yoking we can do. For twenty years CASIRAS and the journal *Zygon* have been trying to yoke science and religion together as a team to advance the welfare of human beings on our planet. We have achieved some but not

complete intellectual success in this venture. But in another way we have been highly successful, and we will continue to be successful insofar as we continue a lively community of persons working together—a community represented by the two institutions whose twentieth anniversary we are celebrating, the Center of Advanced Study in Religion and Science and *Zygon: Journal of Religion and Science*, and also represented by the Institute on Religion in an Age of Science and by other similar organizations. From my own perspective, by continuing to be scientific and religious together, by working to create new syntheses of scientific and religious thought, by making trials at reforming religious thought and practice for those who live in a scientific age and then testing those trials against the vicarious selectors of the different approaches in our enterprise—by doing these things we are engaged in a new and significant revitalization movement of human culture; we are participating in the divine creativity, God-working, that continually creates and recreates the universe, life, human societies, and ourselves.

NOTES

1. I wish to thank Ralph Burhoe for heartily concurring with my representing this important statement about *Zygon* in our current style that uses gender inclusive language.

2. This issue was raised by Ruse at the thirty-second annual Star Island conference of the Institute on Religion in an Age of Science, "Can Scientific Understanding of Religion Clarify the Route to World Peace?" 27 July-3 August 1985.

3. In the discussion following the presentation of this paper, Ron Engle pointed out that, in focusing on a meaningful life for the individual, I had neglected another important concern of *Zygon*, namely that of morality, especially of social groups and institutions. The reason why I did not bring this to light reflects more my own personal quest for meaning than the comprehensive concerns of the journal. To be more complete, one should say that *Zygon* is concerned with a variety of issues, including not only questions of meaning and purpose but also questions of the foundations of personal and social morality, and of how to motivate both individuals and societies to live lives consistent with the ultimate source and determiner of all existence.

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