The State of Science-and-Religion Scholarship at the Turn of the Century

Wesley J. Wildman
Boston University

In this keynote address to the 2000 Science and Religion Colloquium, the author not only describes and assesses the state of religion-and-science scholarship at the turn of the century but also proposes a new approach for guiding it into the new century. After surveying the multi-faceted terrain of recent research and identifying significant areas of current activity, Dr. Wildman forwards three theses regarding the future of religion-and-science scholarship. Such scholarship should make itself intelligible to the general public by avoiding methodological debates, employ multi-disciplinary resources in approaching research questions, and adopt a problem-oriented framework in handling complex, contemporary problems.

Introduction

In approaching the preparation of this address, I felt something like my oldest child on one occasion when he had gathered enough cash to make a Lego purchase and was studying a catalog. So many choices! And only so much money! In my case the precious commodity is time, which constrains the many appealing choices I have when approaching an address on the state of science-and-religion scholarship at the turn of the century. Well, Sam purchased a Crystal Scavenger Lego set and I made my decision, too. But I cannot resist the temptation to describe some of the delightful options, if only to underline the fact that there is nothing definitive about the approach I have chosen.

I will not give a formal history of the development of what some call a "discipline" of religion and science, though the journals, standard works, textbooks, funding, institutes, and degree programs are important signs that this is happening.

I will not give a systematic review of recent literature, though—or perhaps because—there is a vast amount of it in an enormously colorful array of themes.

I will not describe the state of play in religion-and-science scholarship in sociological terms, which would involve dwelling on the diverse groups that structure and define the research and teaching, the funding flow outwards from agencies that invest in the research, and the views universities hold toward interdisciplinary research of this kind.

I will not give a comprehensive survey of the territory of religion-and-science research, though I will mention a few examples of the fascinating work being done in many parts of the world on a host of topics.

Each of these approaches has its own special charm, but I shall proceed in another way. I intend to interpret the task of this address in a forward-looking way, which I take to have three aspects.

- "Looking around." I will begin with an unsystematic, incomplete, impressionistic "taking in" of the religion-and-science landscape, paying attention to both the research and teaching dimensions of scholarship.
- "Getting oriented." I will then give a critical assessment of this landscape in an attempt to identify significant landmarks and to indicate regions of activity that I think are peripheral or transient.
- "Moving forward." I will conclude with an argument on behalf of a way of thinking about the importance and usefulness of reli-

gion-and-science scholarship, a perspective that I believe is capable of guiding future scholarship in fruitful directions.

Looking around

I begin, then, with an attempt to describe the mass of interdisciplinary work in religion and science. I will take established disciplines as the principle of organization. Note that there is no possibility of completeness regarding either the nine disciplinary headings I have chosen or the three facets of each of the nine that I shall mention. A line of inclusion has to be drawn when the object of description is as rich as interdisciplinary work in religion and science. Note, too, that both theoretical and practical questions are entangled in every phase of this overview. That is why there is no separate category for ethics or metaphysics; they recur throughout.

The modern scientific approach to analysis of historical materials has been the single most important contribution to new understandings of religious phenomena.

I begin with the three disciplinary perspectives that have been most important historically. I do this partly because they are the oldest areas and partly to compensate for their neglect in most summaries of science-and-religion work.

Historical sciences

The modern scientific approach to analysis of historical materials has been the single most important contribution to new understandings of religious phenomena. Here are but three facets of this contribution with a few examples under each heading.

Historical studies of sacred scriptures: The last three hundred years of historical Jesus research is the direct consequence of emerging historical techniques. As new tools are developed for the historical critics' toolbox, new possibilities for trying to understand the figure of Jesus are discerned and exploited.

In many cases, the study of sacred scriptures has been inspiration for inventing or enhancing techniques of historical criticism. This was the case with the development of redaction criticism associated with the study of Judaism's Pentateuch or Christianity's Synoptic Gospels.

Far earlier than these developments in a number of traditions was the ongoing evaluation of the historical reliability of sacred scriptures. As an example, this sort of evaluation was a crucial component in South Asian philosophical debates within and beyond Hinduism about ways of knowing (*pramana* theory). Then as now, the scriptural and revelatory component of human knowledge is a weighty consideration in how religious traditions are to have a voice in public debate and also in issues of religious-cultural pluralism.

Origins and development of religious groups: Historical studies have defined the scholarly and to some extent the popular understanding of the birth and subsequent transformation of religious traditions. The story of how one of the many revolutionary Jewish reform movements led by one of the many Galilean Messiah figures became the official religion of the Roman religion is easy to tell incorrectly if distorting anachronistic, projective tendencies are not checked. Careful historical work has allowed for a relatively accurate portrayal.

The rise of anti-Judaism within Christianity and then anti-Semitism within medieval European societies has been analyzed to great effect thanks to scholarly historical methods. In light of the consequences of anti-Semitism, it might be argued that the historical sciences have made no greater contribution to the self-understanding of Western peoples than the tracing of the development of anti-Semitism, thereby raising consciousness and challenging its continuation.

Historical studies have also been vital for understanding the complex transformations that attend the migration of ideas and religious

people. Consider the changes that accompanied the movement of Buddhism from South Asia into China and elsewhere in East Asia, the steady breakdown of tribal religions under the weight of large-scale organized religions, or the transfigurations of Islam as it spreads through Asia and Africa.

History of episodes in the relations of science and religion: The historical sciences have also made direct contributions to the understanding of episodes in the relations of the natural sciences and religion. The infamous Galileo episode is much misunderstood, but careful historical work has produced a balanced account of what happened. Likewise, Darwin's ideas and their reception have been clarified greatly thanks to patient historical scholarship. The influence of Einstein's metaphysical and theological convictions on his work in physics has been thoroughly documented. The ways that science itself serves what seems to be a religious or spiritual function for scientists such as Descartes and Faraday is now being investigated. And this is but the tip of a vast iceberg of existing and potential historical work.

Social sciences

In the last 150 years, the newly identified social sciences have been some of the most important allies of the historical sciences in transforming and deepening the understanding of religion. Examples of the contributions of three social sciences follow.

Anthropology: Thanks to anthropologists and their skilled observations of human cultural life, new perspectives have been gained on every kind of religious practice. The function of religious symbols and rituals has been analyzed to great effect, initiation rites have been described and related to developmental psychology, and the problems of describing and classifying religiously important social arrangements such as marriage or family have been amply documented.

Sociology: Building on anthropological data, the sociology of religion has been able to formulate theories of the origins of religious groups, of the mutual influence of religion and social organization, and of the complex linkage between ethical systems and religious practices. The sociology of knowledge, in particular, has met with great success in analyzing the function of religious ideas and practices in stabilizing and ordering human social life.

Economics: Beginning in the last third of the nineteenth century, the relations between religious commitments and economic interests have been analyzed with intriguing results. We have learned that religion plays a role in economies—regardless of our self-consciousness about this influence—and also that religion frequently serves economic interests.

Philosophy

The oldest of the sciences, philosophy has been the domain of attempts to think carefully about the world, spawning one specialization after another when the time is ripe. Leaving aside the role of philosophy in general, which in many cultures and thinkers is difficult to distinguish clearly from theology, philosophical specializations have made important contributions to the contemporary scholarly understanding of religion.

Philosophy of science: The philosophy of science has led to careful comparative analysis of social practices and conceptual patterns within the sciences and in religious thought. This methodological self-awareness has been the precondition for serious advance in debates about what is possible by way of relationships between religious and scientific activities. The philosophy of science has also made substantive contributions in the form of theories of causation and agency; these sorts of reflection decisively condition what can be said about themes such as divine action and the relation between the various disciplines of human inquiry.

Philosophy of logic: The philosophy of logic has permitted arguments about the existence of God to be studied using the formal languages of various logical systems and with a sophisticated awareness of presuppositions built into the use of formal arguments, presuppositions that express representations of the complex argumentative processes of human rationality. The need to grapple with arguments for the existence of God such as the

ontological argument also has stimulated developments in logic, particularly modal logic, and in the interpretation of elements of formal logical systems.

Philosophy of religion: The philosophy of religion has made possible the systematic comparison of religious ideas and practices. This is no small feat because informal, impressionistic comparison is ubiquitous and hard to refine and improve. This advance has only been possible through the philosophy of religion's organization of the vast waves of data flowing from the study of religion.

Physics

I now move beyond these three classic disciplinary areas toward more clearly contemporary areas of interaction between the sciences and religion. Beginning with the most obviously mono-disciplinary area (physics), I shall consider in turn the biological sciences, the cognitive sciences, medicine, and ecology—each more interdisciplinary in character than its predecessor.

Physical cosmology: Boundary questions are questions prompted by scientific theories and discoveries but unanswerable within current science. The boundary questions associated with physical cosmology have been profound. Scientists have puzzled over these questions and pushed science to the limit in attempts to gain insight into them. The Big Bang theory even had some scientists convinced that a divine creation was a plausible explanation. Subsequent scientists showed that early scientific shock and religious enthusiasm about the Big Bang were both premature. There are now many speculative quantum cosmologies that make the Big Bang in one way or another not unique, thereby relaxing the tension that made the Big Bang seem so consonant with creation when it was first described.

Theological discussions of creation and eschatology have profited greatly from developments in physical cosmology. Big Bang cosmology in any of its versions conditions what theologies can plausibly say about the beginning and ending of the cosmos. Some theologies strive to formulate interpretations of creation and cosmology that are neutral to the details of physical cosmology by stressing the theme of dependence of the cosmos on God and steering a wide path around anything that might be construed as a prediction that future science could falsify. Even in these cases, however, current physical cosmology constrains what is said in negative fashion.

Other boundary questions have emerged. The fine-tuning of the cosmos is one that has provoked the most interest by defenders of religious commitments to divine creation. But the deepest questions may have to do with what science discovers about the metaphysical structure of the cosmos in terms of its constituents (wave functions? packets of probability?) and the laws of nature. These are ontological questions with significance for philosophical and theological interpretations of the deep structure of reality.

The philosophy of science has made substantive contributions in the form of theories of causation and agency; these sorts of reflection decisively condition what can be said about themes such as divine action and the relation between the various disciplines of human inquiry.

Quantum mechanics: This field has been slower than physical cosmology to impact theological reflection—and early responses were sometimes unsteady. This is partly because the general public works with largely classical scientific intuitions about the physics of the world, and it is these intuitions that are most commonly found among religious thinkers. It is also because there is still no consensus about the most adequate philosophical interpretation of the eerily accurate mathematical formalization of quantum me-

chanics. Under such circumstances, it is difficult for theologians to say very much. Lines of inference from quantum mechanics to theological themes always run through the metaphysical categories stabilized by consensus around the philosophical interpretation of the mathematical framework, consensus that is lacking, so far.

In a few circles, however, the religious interest in quantum mechanics has been pronounced. Taoism and Buddhism have been especially responsive to quantum physics because of its suggestion that the apparently unquestionably real world of ordinary experience is in fact quite misleading. Theistic religions sometimes have seen in quantum mechanics promise for articulating traditional beliefs about human freedom and non-miraculous divine action.

Complexity theory: Complexity theory is complex, which makes it difficult. But there is obviously something breathtaking about an intellectual venture that tries to show how complex organisms and processes can emerge in a drawn-out evolutionary process from the basic constituents and processes of the natural world. This catalyzes today an ancient debate about naturalism and supernaturalism, but for the first time in a way that is tractable for the sciences. That means proponents of supernaturalism can complain that naturalism is mistaken but that they can do nothing (short of gaining political control to suppress scientific research) to stop the investigations of complexity that promise or threaten to explain how plants and animals and people and ecosystems and civilizations emerge from the chaos of the early universe. Religious reactionaries opposed to scientific research have always lost when science has had tractable territory and progressive research programs with which to plow the ground.

The research programs of complexity theory are bold, to be sure, but there are several areas in which they threaten to overreach. The most obvious of these is consciousness, whose ontologically unique character is usually baldly neglected by scientists who content themselves with seeking physical correlations for conscious states while boldly writing books that purport to "explain" consciousness. The multidisciplinary area of consciousness studies seeks to correct this painful failure of intellectual propriety by bringing religious experts together with all manner of philosophers and scientists to address the issue. Another challenging area for ongoing research in complexity theory arises from within complexity theory itself in the form of attempts to give mathematical characterizations of intelligent design. This new research program has not yet proven itself in any detailed cases and may lapse eventually to the status of reactionary religious reformulation of the scientifically disreputable creation science. With time, however, intelligent design may produce challenging case studies that force changes in scientific research programs.

The theological interpretation of divine action has been heavily impacted by complexity theory. For example, there are now advocates of non-miraculous divine action through the means of whole-part constraint or top-down causation, which are modes of activity suggested by mathematical models of complex systems. Complexity theory has also directly impacted the philosophical understanding of emergence, which is vital for religious interpretations of human beings and the rest of the natural world, as well as for what it means theologically for God to have made the world the way it seems to be.

Biological sciences

Evolutionary theory: Leaving aside the culturally painful conflict of evolutionary theory and creation science, which is chiefly a North American phenomenon, there are many more constructive ways in which evolutionary theory has entered the science-and-religion dialogue. Theistic religions have struggled with the moral nature of a God who is supposed to have made the world in the way evolutionary theory suggests, a world in which mass death is essential for emergent complexity. Likewise, the idea of divine providence in all theistic religions has been challenged by the role of chance in the evolutionary process. On the other hand, scriptural and theological themes surrounding continuous cre-

ation and the immanence of God have been infused with new meaning in some religious circles because of evolutionary theory.

Human genome initiative: The documentation of the human genetic structure has received massive media attention for good reason: the research brings to the fore both the conception of human nature and a series of ethical challenges to do with responsible use of this knowledge. Religious thinking is heavily impacted by these developments because it is religious traditions above all that historically have formed human self-interpretations. Now it seems that scientific knowledge of human beings promises to bring the future evolution of the human species under significant human control, for good or ill. Are human beings ready for such fabulous powers of self-determination? Many religious traditions seem to warn against human pretensions to such god-like powers yet most sacred scriptures understand human beings to be specially blessed among creatures of the earth with the responsibility borne of knowledge. The road ahead appears to be a rocky one, and one whose safe travel will demand the very best of both religious and scientific wisdom.

Biotechnology: If the Human Genome Initiative has challenged conceptions of human nature in philosophical generality, then emerging biotechnologies, including those made possible by the Human Genome Initiative, have the same effect in concrete specificity. While many of these technologies are consonant with the traditional commitments of some religions to the sacredness of life, some challenge them. It is hard to complain about the health benefits of biotechnologies, but human ears growing on the backs of mice, artificially produced sheets of human skin for sale, and the enormous wastage of life involved in cloning all demand an explicit taking stock of exactly how far religions and societies are prepared to go. Making such decisions on the basis of former expectations about what is natural seems to be a mistake, yet the ethical criteria of "any means so long as the ends are good" does not seem right, either. Religious reflection and social debate have a long way to go in seeking a rational response to these new technologies.

Cognitive sciences

Neurophysiology: One of the leading contributors to the interdisciplinary adventures of cognitive science is neurophysiology. In one way or another, every religion has recognized that human bodies mediate the realm of spirit. The neurosciences sharpen this impression of mediation to the point that asserting the independence from the brain of any mental or spiritual function is no longer plausible. The neurosciences may not be able to explain the ontologically spectacular first-person quality of consciousness, but they have surely established that the brain is the seat of the soul. This is of enormous significance to the interpretation of religious experience, a theme of fundamental importance to most branches of all religions. It also has a bearing on the origin of religion itself, on the formation of personality type and religious preference, and on the question of the embodiment of soul or spirit. It is early days in this area of science-religion dialogue.

Linguistics: Linguistics understood broadly has been vital to the generation of the subtle theories of language that now exist. These theories are beginning to be used as resources for the interpretation of religious language, which is one of the most complex types of language use. Far more work is needed in this area but religious symbols and symbol systems promise to become fruitful objects of study in the years ahead.

Artificial intelligence: With the creation of machines whose programming allows them to act in ways that are similar to human behavior, questions about the limits and meaning of human selfhood are placed in sharp focus. Religious perspectives on human personhood are drawn into this picture and they are struggling to accommodate the new suggestions from AI research about what being a person means. AI also raises the question of human uniqueness, which in different ways has been a traditional affirmation of all of the major religions. Machines whose behavior is sophisticated enough to demand treatment as persons are a long way off but the philosophical and theological questions are already here.

Medicine

Spirituality and health: While east and south Asian traditions of medical treatment have always attended to the whole person, medical research in the West has only recently begun to pay attention to the relations between spirituality and health. Various dimensions of mind-body interaction are now well documented, from the relaxation response and the placebo effect, to the health advantages of religious people and the effects of meditation and prayer. The question of causation remains a subject of vigorous debate, but there is little serious doubt about the correlations. Here is one area in which religious wisdom has challenged a western scientific bias with some degree of success.

New medical therapies: New therapeutic possibilities promise previously unimaginable control over genetically inherited disease. Refined technologies have transformed care at the beginning and end of life. Life spans are increasing and new treatments for old diseases are constantly being invented. Wheth-er a person dies from cancer now depends more than anything else on access to good medical care—and the state of cancer research is changing so quickly that good medical care promises to make most types of cancer treatable before too many years have passed.

Apart from the problem of equal access to expensive medical care, no religious groups seem to be complaining about these medical advances. In other areas, however, things are morally more ambiguous. For example, xenotransplantation reframes conceptions of human nature because of its violation of traditional natural-law categories: a hybrid pig-human organ harvested from a pig and implanted in a human being is a problematic scenario for some religious people. The risks of disease associated with xenotransplantation techniques also remain difficult factors to assess responsibly, thus raising the specter of over-competitive scientists unleashing devastating retroviruses among human beings.

End-of-life care: Life after death, dementia and human identity, physician-assisted suicide and the sanctity of life—all of these issues and others like them confront traditional religious perspectives on growing old and dying. How do religious traditions take their bearings in a high-tech world in which the reach of medicine far exceeds the human moral grasp?

Ecology

Global ecology dialogue: Religion has played a significant role in facilitating public policy change in ecological issues in everything from the African tree-planting movement to Christian affirmations of the sanctity of nature. Moreover, religious commitments to justice have played important roles in assessing responsibility for ecological damage and repair. Religious forms of naturalism have been as important in these processes as have traditional religions. And because of the potential influence of religious groups over the imagination of religious adherents, religion will remain relevant to the global ecology dialogue for the foreseeable future.

Sustainability: Religion has also been a key factor in catalyzing a moral commitment to sustainability in energy policy and resource use. Yet the apocalyptic or other-worldly mindsets of some religious groups complicates work toward sustainability undertaken by others. This is one area where the religion-science dialogue can assist by helping religious groups to clarify and perhaps qualify traditional commitments to the primacy of the spiritual realm or to the inevitability of a new world to come.

The Big Bang theory even had some scientists convinced that a divine creation was a plausible explanation. Subsequent scientists showed that early scientific shock and religious enthusiasm about the Big Bang were both premature.

Crisis management: Ecological crises look to be on the increase, so crisis management will become an increasingly important concern in the years ahead. Religious views of distributive justice profoundly affect analysis of ecological crisis management and tend to balance the generic social preference for the haves over the have-nots with a commitment to the poor. In this case the science-religion dialogue involves in part mediating a prophetic vision of justice to the wider society. A world of ecological crises from rising sea levels due to global warming to unwanted side-effects of nuclear power and nuclear waste disposal promises to sponsor a view of the natural order as potentially hostile to human life, and thus as needing to be tamed through technology. Yet tribal religious perspectives speak more loudly and clearly here than the world religions: the problem is not nature but the way human beings choose to live. Can this insight of tribal religions play a role in keeping the science-and-religion dialogue focused on real options for the transformation of social policy so as to minimize ecological crises and maximize sustainability?

The neurosciences may not be able to explain the ontologically spectacular first-person quality of consciousness, but they have surely established that the brain is the seat of the soul. This is of enormous significance to the interpretation of religious experience.

Miscellaneous

In concluding this quick description of work in the religion-and-science field, I need some sort of miscellany to capture other themes that do not fit easily elsewhere. I am always pleased when the complexity of a reality being described forces a neat descriptive approach to collapse under the weight of its own pretensions; that is certainly the case here. Even with this miscellany, however, there is the problem of what to include within it, and I shall abide by my arbitrary limitation to three sub-themes. This does have one virtue, however: satisfying the requirement of a clear endpoint to this survey.

Pedagogy: There is evidently increasing interest not only in inspiring people to teach religion-and-science classes but in helping them to do it well. The John Templeton Foundation's cooperation with Berkeley's Center for Theology and the Natural Sciences in running a science-and-religion course program is the best example of this. This program has sparked controversy in the press, due to the perception that a private foundation is buying attention to an idiosyncratic "discipline" in colleges. But its value for those interested in science-and-religion teaching is unquestionable. Doctoral studies in science-and-religion are also expanding and becoming more sophisticated. Boston University, for example, offers even-handed training at the doctoral level in the sciences and humanities together with lab placements, innovative science literacy and religion literacy classes, and an array of interdisciplinary courses.

Method: Debates over method continue to be prevalent in the core science-and-religion literature and beyond, because people remain deeply concerned with demarcating domains of science and religion. I take this to be an extension of the human fascination with how we know, but the sense of urgency surrounding the issue derives from wider cultural issues. To understand the epistemology and method of the various sciences and the various sorts of religious inquiry is to gain a basis for debate over social processes, including who should be given a share of the precious social commodity of authority to speak on controversial subjects. Questions of comparative method are complicated by methodological diversity among the sciences, debates within philosophy and history of science over the methods implemented in actual scientific practices, and challenges from science stud-

ies to the effect that scientific "knowledge" is socially constructed and constrained like all other knowledge. Similar methodological chaos reigns among theologians and religious studies specialists. The core literature on method in science and religion is usually sensitive to this array of debates and thus tends to contain fairly sophisticated discussions.

Public interest: From New Age spirituality's embrace of popular science to richer journalistic coverage, the general public is more interested than ever in the interface of religion and science. This makes the area more attractive to some thinkers and less attractive to others! In my view of the relations between intellectual work and the wider society, scholars are obligated to assist the general public in achieving a rich view of the object of their interest, attacking oversimplification and supporting scholarly attempts to relate ongoing research to the public's practical interests. I think that the religion-and-science community has done a remarkably good job of discharging this responsibility over the years, especially with the cross-section of the public that is involved with organized religious communities. As time passes, it becomes more important to be able to work effectively with the media and new segments of the general public. Several initiatives aim to address this need, from the newly formed Science and Religion News Service to a variety of public lectures and popular videos.

Getting oriented

Describing anything is already to orient oneself to it in some ways because description involves decisions about what to omit and how to conceptualize whatever is mentioned. But orientation also involves identifying what is more or less important, fruitful, or promising. I make three remarks under this heading.

Richness of activity

Enormous variety of topics: The richness of activity at the interface of religion and science is most evident with regard to topics. An enormous number of research topics require input from both religious thinkers and one or more sciences. These topics divide roughly into the practical (ethics, social policy) and the theoretical (metaphysics, method). The list furnished in the "Looking Around" section above just scratches the surface; it is quite an amazing array of issues.

Enormous variety of approaches to each topic: Religious perspectives vary and interpretations of science vary, too. So when one considers any complex topic the variety of relevant approaches is itself quite large. Consider xenotransplantation, for example. The scientific debates cover everything from techniques to estimating the probability of encountering a retrovirus that could spread through the human population. Likewise, religious groups have quite different views of the limits and appropriate uses of such technologies. And the ethical considerations are complex and hotly debated, too, extending all the way into legal questions, public policy strategies, and stakeholder involvement. Only if all of these disciplines are involved in appropriate ways can a coordinated solution to the theoretical and practical challenges of xenotransplantation be developed. And the diversity is even greater in relation to other issues, such as the recent research on the impact of climate change on large cities, which involves all of the above specialties plus engineers, doctors, public sanitation experts, transportation specialists, and others.

Enormous variety of vocational entry points: People move into interdisciplinary work from any of the sciences, from any number of humanities disciplines, from an effort to make sense of a compelling personal experience that seems to require analysis from multiple disciplinary perspectives, or simply from a passionate concern about a problem that involves both the sciences and the religions. This means that the science-religion dialogue has a staggeringly rich array of interesting and curious people from many backgrounds. That can make dialogue extremely frustrating at times because such different people understand issues differently, judge the feasibility of research approaches in diverse ways, and make widely varying assumptions about what is plausible. By the same token,

the diversity of vocational background makes coffee breaks and dinner conversations at science-and-religion events some of the most fascinating you'll find anywhere.

Ambiguity of activity

Occasional ignorance and arrogance: The description of diversity entails a number of difficulties within the science-religion dialogue. To begin with, participants are sometimes simultaneously ignorant and arrogant. I vividly remember an astonishing conversation with a well-known physicist whose ignorance of theological and philosophical matters was painfully obvious to humanists but who both assumed that expertise in a science automatically conferred authority in theology and philosophy and also evidently saw no reason to examine whether this assumption was justified. Interestingly, humanists these days tend to be more deferential toward scientists, perhaps because of the cultural hegemony enjoyed by science. It was not always so, however, and history books are rife with parallel examples of arrogance on the part of theologians and philosophers. This unfortunate conjunction of ignorance and arrogance is not found among the most experienced people involved in science-religion dialogue these days. Where it exists, it appears to be an understandable side-effect of extending habits of a home discipline into a new field and complicated by a lack of respect for disciplines less well understood than one's own. All would do well to avoid this difficulty.

Variation in skill levels: Another ambiguity in the science-religion dialogue is related to the first: those involved vary in both skill set and skill level. In most disciplines there is heavy social resistance to low-skill and low-quality work. In the science-and-religion field, by contrast, the situation is sometimes less demanding, creating the impression that "anyone can do this stuff." Similarly, in some areas and at some times, there are few signs of progressiveness in research, enthusiasm is often supported uncritically, and the dialogue environment is not highly competitive, so the usual social demands for scholarly excellence are weakened.

Neglect of core literature: The stress laid by many on a core science-religion literature is intended to address these problems. The "reinventing the wheel" syndrome is ever near both in method and in many key areas of dialogue. From time to time articles and books are published that exhibit an alarming neglect of the core literature. Standards are high among the most experienced science-and-religion scholars and improving elsewhere, even as the number of people involved increases rapidly. Knowledge of the core literature is crucial for maintaining solid standards and establishing a basis for discussion among diverse scholars.

Pervasive characteristics of activity

One-sided treatment of religions and sciences: Certain characteristics of the mainstream science-religion dialogue are pervasive. Most obviously, Western Christian interests have driven the dialogue for the most part. Religions other than Christianity and cultures beyond the West, however, have every bit as much to gain and lose at the interface with the sciences. This blind spot has been overcome in some areas better then others: ecology, cognitive science, and consciousness studies are the areas in which cross-cultural perspectives are most even-handed. Note that certain sciences also tend to be marginalized in the religion-science dialogue. Zoology and Veterinary Medicine are perhaps the most prominent among the neglected sciences, such is our casualness about nonhuman animals.

Too much method and yet not enough: The core religion-and-science literature pays a lot of attention to questions of method, sometimes to the point of obsession and sometimes to the neglect of content issues. Meanwhile, popular science-religion literature takes stands on method questions as if there were no extant debate over methodology (see recent books by Stephen Jay Gould and Edward O. Wilson, for example) and much actual research neglects methodological questions altogether. This pervasive feature of the science-religion area makes for a rather odd situation, with too much methodological discussion in some respects and not enough in others.

Fundamental importance of research questions: Another pervasive characteristic is thoroughly positive: almost all of the examples given above are cutting-edge questions of extreme importance to human self-understanding, to social policy and ethics, or to both at once. Science and religion are making simultaneous contributions to vital issues.

Moving forward

A scientist speaks out

Not so long ago, Lawrence M. Krauss, chairman of the physics department at Case Western Reserve University, wrote an opinion column for the back page of the *Chronicle of Higher Education*. Krauss argued that the recent enthusiasm for religion-and-science teaching and research attempts to bring the scientific and the spiritual aspects of human experience together, and that this attempt is misbegotten, its "results" intellectually vacuous. Religion and science have distinct domains; they should be respected for what they are while on their home turf, and incursions of one into the other should be resisted because they are essentially different and unmixable kinds of activities. He says:

> Science deals with ideas that are falsifiable. Religion deals with matters of faith. It is of vital importance for both fields that they stick to their separate turfs. In principle, they have virtually nothing in common. Whenever organized religion has attempted to dictate scientific ideas, from Copernicus and Galileo to Darwin, it has risked being proved wrong, and thus has diminished its intellectual standing.[1]

I have sympathy with this viewpoint when the question of relations between science and religion is posed in the abstract. The scientific and religious "attitudes", for want of a better word, do indeed seem to be different from one another to the point of being decisively distinguishable. Yet generalizations can mislead, particularly when they are so much neater than the reality they intend to describe. And Krauss's abstract statement of what counts as meaningful relations between science and religion is much too neat. Any amount of attention to the relevant details—even the cursory survey of research above—would suggest that Krauss has neglected to test his generalization against the relevant data.

Now, Krauss is a fine scientist and, in recent years, a hot-selling popular science writer and an interesting commentator on public policy matters bearing on science. But if you are going to go beyond social policy commentary, as Krauss did in this article, and attempt to resolve a complex methodological question without any trace of a reference to the existing literature on the subject, there is a good chance that you will slip up, no matter how intelligent and perceptive you might be.

Western Christian interests have driven the dialogue for the most part. Religions other than Christianity and cultures beyond the West, however, have every bit as much to gain and lose at the interface with the sciences.

And slip up Professor Krauss did. In spite of my sympathy for his view of meaningful relationships between religion and science in the abstract—the literature calls its variants the "two-worlds", "two-languages", "separation" or "independence" models—the sheer volume of productive and intelligible scholarly activity in the science-religion area convinces me that Krauss's abstraction holds good only in special circumstances. The independence-of-domains thesis applies in some aspects of the relations between religion and science but by no means in every aspect.

This may be an example of what I earlier called the "reinventing the wheel" syndrome, with Krauss trying to make an interesting point without the benefit of thorough knowledge of the intricate debate surrounding the issue he wants to address. Fine; important pronouncements of respected scientists in the

current era deserve the public's attention, at least to some extent. But Krauss's insight and the error of careless generalization associated with it are seen rather often—in recent years perhaps most notably in Stephen Jay Gould's *Rocks of Ages*, a strident defense of the independence thesis. This is a rather worrying trend and leads me to the first of three theses that I wish to advance as guides for moving into the coming years of scholarly work at the interface of religion and science.

Thesis I

Public understanding of religion-and-science is vital, but it is consistently stymied in this context by lack of understanding of inevitably subtle issues. A new approach is needed. Since public debate will rarely achieve much sensitivity to scholarly refinements, this new approach to understanding and speaking about scholarly religion-and-science work should be readily understandable and should sidestep methodological debates.

Importance of public understanding: The kinds of issues to which religion and science make joint contributions are important and often involve the public interest, particularly when the issues have social policy dimensions. The public determines social attitudes toward religion and toward science, and also influences political decisions about research funding and focus. Moreover, the spiritual questions that puzzle most people, whether members of formal religious groups or not, are impacted by research at the interface of religion and science. The science-religion dialogue needs to be responsible toward the general public in an effort to create fair-minded attitudes, to foster rational policy formation, and to connect ordinary people up with potentially helpful resources for their own spiritual journeys.

New approach is needed: Old approaches to conveying the significance of the religion-and-science dialogue for the general public are not working. They tend to be stymied by culture wars, such as the evolution-versus-creationism conflict, the risky-technology-versus-tried-and-tested-tradition conflict, and the who-holds-the-cultural-prestige conflict, each of which drives people towards vain attempts to insulate religion and science from each other. Getting beyond the distortion caused by these conflicts requires grasping distinctions and concepts that are too difficult for the average person—and evidently even many seasoned scholars—to understand without significant education focused specifically on the science-religion dialogue. A new approach to public understanding of science and religion is indeed needed.

Sidestep method: One constraint on new approaches to the public understanding of the science-religion field is that proposals must not be too complex for public debate in the mainstream media. Methodological issues are complex in just the wrong way for media discussion and public consumption. Focusing on methodology produces points of view that are too difficult to convey to the press, too difficult for the public to understand, or too abstracted from the obvious ways in which science and religion work together. Method should be downplayed, and the search should proceed for other ways to improve public understanding of science and religion.

Thesis II

In the current era, almost all of the interesting research questions must be approached using resources from multiple disciplines.

Complexity of contemporary problems: A basic fact determines the approach I recommend. Contemporary problems, whether theoretical or practical, are too complex for individual disciplines. It is complexity that drives the need for multidisciplinary approaches in ecology, biotechnology, cognitive science, philosophical anthropology, and even in theology.

Inevitability of multidisciplinarity: Multidisciplinarity, therefore, is inevitable. To respond to this inevitability, new kinds of training are needed, and new ways of imagining relationships among university departments. Without a relevant response to this inevitability, the problems will remain unresolved through the neglect or failure to win consensus vital for transformation of public policy.

Difficulty of multidisciplinarity: It is challenging to master even one discipline, let alone

two. Colleges and universities need to begin training people in multiple disciplines earlier in life and with solid guidance. Genuinely difficult tasks often tempt one to take shortcuts, which is why people say that multidisciplinary approaches drive down standards. But the timelessly definitive character of this maxim assumes that training patterns stay as they are currently, and that the true multidisciplinary intellectuals must always be essentially self-taught. I think that multidisciplinary skills can be cultivated through a suitably conceived educational process. The past does not set the terms for the future in every respect; imaginative pedagogy and public communication can make a decisive difference.

Old approaches to conveying the significance of the religion-and-science dialogue tend to be stymied by culture wars, such as the evolution-versus-creationism conflict, the risky-technology-versus-tried-and-tested-tradition conflict, and the who-holds-the-cultural-prestige conflict, each of which drives people towards vain attempts to insulate religion and science from each other.

Thesis III

The new approach to understanding and speaking about scholarly work in the religion-and-science field should adopt a problem-oriented framework, stressing the need for interdisciplinary strategies for handling the complexity of contemporary problems.

Problem-oriented approach: A problem-oriented approach bypasses Krauss's legitimate concerns. Everyone, Krauss included, I expect, would admit that many problems require input of various kinds from many disciplines and social constituencies, including religion and theology, on the one hand, and the sciences, on the other. This approach also has the considerable virtue of making best sense of what is actually happening in religion-and-science scholarship. Of course, this approach is not limited to religion-and-science but is an entire attitude to real-life problem-solving that seeks a closer relation between theory and practice.

Philosophical basis for problem-oriented approach: This approach is useful for simplifying and increasing effectiveness of discourse in the public square and it is descriptively more adequate to the actual kinds of research being conducted, but these are far from the only reasons to adopt it. Biologically grounded philosophical theories of inquiry begin from the adaptive fit between the conundrums faced by animals and their ability to solve those problems effectively. This is especially true of human beings who are preeminently problem-solvers. The philosophical position commonly called pragmatism, so far from affirming crass utilitarianism, enshrines this biological interpretation of human beings in a unitary theory of inquiry (one world, one way of knowing). The problem-solving conception of relations between disciplines, including religious reflection and the sciences, can draw solid support from pragmatism.

Cash value of this approach: In following this approach, one learns to think of science and religion not in terms of dialogue between disciplinary centers, but in terms of joint work on common projects with a variety of disciplines called upon as needed. The assumption that religion and science should work together obviates the need to make the case for cooperation; attention turns away from fights over disciplinary privilege and intellectual turf (with which Krauss and Gould concern themselves), to the far more important challenges, whether they be practical or theoretical in character, whether they be matters of profound curiosity about the world or threats to the vitality of the eco-

sphere and the very survival of the human species. To be sure, one can pick up methodological debates as points of curiosity at some point along the way, nuancing the views of Professors Krauss and Gould with insights from the core religion-and-science literature, if so desired. But these methodological questions need not be settled before all manner of problems can be tackled head-on, cooperatively and creatively.

In short, this problem-oriented approach to religion and science changes the way it is discussed in the public square; it bypasses turf conflicts that squander energy better spent on dealing with urgent problems, it transforms the vision of how to educate children and research students, and it stresses the relevance of the intellectual life for practical affairs. And it does all of this at a time when intellectuals can no longer afford to stay in their ivory tower of mono-disciplinary security.

Every power—including those powers that derive from expertise in science and religion—must be bent to address the challenges now bearing down. The past, present, and future of the religion-and-science field are pointed in a most promising way toward just such a transformation in self-understanding.

Works cited:

Gould, Stephen Jay. *Rocks of Ages: Science and Religion in the Fullness of Life.* New York: Ballentine, 1999.

Krauss, Lawrence M. "Point of View. An Article of Faith: Science and Religion Don't Mix." *Chronicle of Higher Education* (26 Nov. 1999).

Wilson, Edward O. *Conailience: The Unity of Knowledge.* New York: Vintage Books, 1999.

Endnotes:

1. Text available online, at <http://erebus.phys.cwru.edu/~krauss/14a08801.htm>

Wesley J. Wildman is Associate Professor of Theology and Ethics at Boston University. Born and raised in Australia, Dr. Wildman received his B.A. from Flinders University, his B.D. from the University of Sydney, and his Ph.D. from the Graduate Theological Union. Dr. Wildman's research and teaching interests are in contemporary Christian theology, philosophy of religion, and religion and science. He is editor (with W. Mark Richardson) of Religion and Science: History, Method, Dialogue *(Routledge, 1996) and author of* Fidelity with Plausibility: Modest Christologies in the Twentieth Century *(SUNY 1998). Dr. Wildman is ordained in the Uniting Church of Australia (a union of Methodist, Presbyterian, and Congregational denominations) and has served churches in Sydney and in Piedmont, California. He was involved from 1996-2000 in the Crosscultural Comparative Religious Ideas Project, based at Boston University, and is a member of the ongoing research group for the Divine Action Project, sponsored by the Vatican Observatory and the Center for Theology and Natural Sciences in Berkeley. In Boston University's Graduate School, Dr. Wildman directs three doctoral programs: in Christian Theology, in Comparative Theology, and in Science, Philosophy, and Religion.*

This paper was the keynote address for the Science and Religion Colloquium at Boston University, 27 April 2000, sponsored jointly by the New England Faith & Science Exchange and the Boston Theological Institute.