Lecture and Discussant Text

The Intersubjective Worlds of Science and Religion

3:00-5:00 PM Friday June 1

Alan Wallace

Discussant: Alice Alldredge, Department of Ecology, Evolution and Marine Biology
Discussant: Greg Ashby, Department of Psychology
Discussant: Anita Guerrini, Department of History and Environmental Studies Program

Do you have thoughts on the Wallace lecture or discussant comments below?
Click here to post your thoughts on our online forum.

Lecture Text (©B. Alan Wallace)

In this paper I shall present a radical alternative to metaphysical realism, a view that underlies most literature on science and religion, and yet may also set science and religion in fundamental opposition to each other. Those who advocate metaphysical realism maintain that (1) the real world consists of mind-independent objects, (2) there is exactly one true and complete description of the way the world is, and (3) truth involves some sort of correspondence between an independently existent world and our descriptions of it (Putnam 1990:30). Various sorts of cultural relativism and constructivism have been advocated as alternatives to metaphysical realism, but while they have proven appealing to many philosophers, they are generally found to be inadequate by practicing scientists and theologians alike (Wilson 1998: 60-61). In this paper, I propose a third alternative that emphasizes the intersubjective nature of both scientific and religious truth-claims, one which rejects the leap of faith required for metaphysical realism and equally shuns the nihilism that is implicit in so many versions of relativism. The central theme of this intersubjective view is that science and religion express truths arrayed along a spectrum of "invariance" among diverse cognitive frameworks. All truth-claims are embedded in experience, and their validity is put to the test within the "lived world" of human experience. They are neither confirmed nor refuted in relation to some hypothetical "real, objective world" that exists independently of experience.

<u>The Trajectory of Metaphysical Realism since the Scientific Revolution</u>

Since the time of Copernicus, natural philosophers have commonly assumed there is a real, physical world that exists prior to and independent of the human mind, and they have set themselves the task of penetrating "beyond the veil" of subjective appearances to that external, objective world. Thus, the real world has been viewed as something devoid of subjective experience, and as natural philosophy evolved into modern science, many Christian theologians and scientists have believed that all *natural* phenomena can be reduced to physics, but not the soul or God. The implication here is that not only God, but human

consciousness, is somehow supernatural, or at least "unnatural." And this is precisely where scientific materialists break away from this Cartesian mind/matter dualism and insist that the human mind, soul, and consciousness can all be reduced to physics. Biologists, such as Richard Dawkins, Stephen Jay Gould, and Edward O. Wilson, are particularly vehement on this point, declaring that evolution has clearly demonstrated that non-conscious, inorganic matter evolved into primitive living organisms, some of which eventually evolved into primates, including humans. Thus, the human soul, or consciousness, is an emergent property of the human organism, and is therefore a natural phenomenon that *can* be understood solely in terms of physics, chemistry, and biology.

We shall return to the question of the emergent status of consciousness in a moment, but now let's briefly review the course of the scientific study of the external world of matter and the internal world of the mind. Throughout the centuries of ancient Greece and Rome, and on through medieval Europe, generations of astronomers turned their attention to the skies, precisely observing the appearances and relative movements of celestial bodies. Such firsthand observations provided Copernicus with the empirical basis for his heliocentric model of the universe. The even more precise observations by the Danish astronomer Tycho Brahe gave Kepler the data needed to discover the elliptical orbits of the planets. Likewise the precise observations of both celestial and terrestrial phenomena by Galileo and other early natural philosophers gave Newton the empirical basis for devising the laws of classical mechanics.

These early natural philosophers were well aware of the fact that the phenomena they were observing were not external entities in themselves, but appearances of the physical world to the human senses. But this did not deter them from taking these appearances seriously, thus establishing a science of dynamics that paved the way for the science of mechanics. Over the centuries, as progress in technology increased the precision and scope of observations and experimentation, more and more sophisticated types of explanations of physical phenomena could be devised. This same progression—from precise, increasingly sophisticated observations of physical phenomena, to theory construction—has characterized both the physical sciences and the life sciences throughout history.

The scientific treatment of mental phenomena, on the other hand, has followed a radically different historical trajectory. For centuries, philosophers have observed mental phenomena firsthand, but they have devised no sophisticated, rigorous methods comparable to those of natural philosophers for observing physical phenomena firsthand. And, unlike natural philosophers, their understanding of mental phenomena did not result in a rigorous science of "mental dynamics," or a phenomenology of the mind. They have not arrived at any consensus concerning the "mechanics" of mental phenomena, nor has their research yielded pragmatic benefits for society as a whole.

During the first three centuries since the Scientific Revolution, scientific attention was focused on external physical phenomena, while internal mental phenomena were largely ignored. When a science of the mind was finally initiated in the closing decades of the nineteenth century, psychologists did briefly devise a number of relatively crude and unsatisfactory methods for observing mental phenomena firsthand. But since the early twentieth century, introspection has been largely ignored in the field of psychology, which has tended to focus more on behavior and, more recently, brain function.

It is worth noting that by the time the science of psychology was taking its first baby steps, many physicists were confident that their understanding of the natural world was largely complete. Only details remained to be filled in. What has been the impact of this three-hundred-year failure on the part of natural scientists to attend to mental phenomena in general, and consciousness in particular, as elements of the natural world? In his classic work *The Principles of Psychology*, the American psychologist and philosopher William James presents an idea that sheds brilliant light on this issue (1890/1950: 290-91):

The subjects adhered to become real subjects, attributes adhered to real attributes, the existence adhered to real existence; whilst the subjects disregarded become imaginary subjects, the attributes disregarded erroneous attributes, and the existence disregarded an existence in no man's land, in the limbo 'where

footless fancies dwell.'... Habitually and practically we do not *count* these disregarded things as existents at all... they are not even treated as appearances; they are treated as if they were mere waste, equivalent to nothing at all.

By the late nineteenth century, natural scientists had for so long ignored the role of consciousness in the universe, they attributed to it an existence in "no man's land," which presumably played no significant role whatsoever in nature as a whole. And mental phenomena, which can be directly detected only by introspective observation, have come to be treated by many cognitive scientists as "mere waste, equivalent to nothing at all."

Contemporary cognitive scientific theories concerning the nature of the mind and its relation to the brain are not based on centuries of increasingly sophisticated introspective observations of mental phenomena. Instead of proceeding from the *dynamics* of the mind to the *mechanics* of mental processes, modern cognitive science has largely sought to bypass the dynamics of the mind and go straight to the dynamics and mechanics of the brain and behavior. As a result of the dissimilarity in the development of the physical sciences and the cognitive sciences, the modern West remains in a pre-scientific era when it comes to understanding the nature and origins of consciousness and its role in nature. There is no objective, scientific definition of consciousness and no objective, scientific means of detecting the presence, absence, or degree of consciousness in anything whatsoever, including minerals, plants, animals, human fetuses, or human adults. Scientific materialists, such as Harvard sociobiologist Edward O. Wilson, assure us that a balanced view of the universe has in no way been impaired by the dissimilarity in the development of the physical and cognitive sciences. It is only natural, they claim, that consciousness was so long ignored, for it is produced by the human brain, which is the most complex organism we know of in the whole of nature.

An unquestioned assumption in this materialist view is that all mental phenomena, including every form of consciousness, are emergent properties or functions of the brain and its physical interactions with the rest of the body and the environment. Given the scientific understanding of the history of the cosmos and the evolution of life, this conclusion seems inescapable. Where is there any scientific evidence of a non-material soul, as imagined by Descartes? As the materialist neurophilosopher Patricia Churchland comments (Houshmand et. al. 1999: 48-49):

Western cosmologists would say that we don't have any evidence whatever that there was any non-material stuff. We can see the development of life on our planet starting with amino acids, RNA, and very simple single-celled organisms that didn't have anything like awareness, and the development of multi-celled organisms, and finally organisms with nervous systems. By then you find organisms that can see and move and interact. So the conclusion seems to be that the ability to perceive and have awareness and to think, arises out of nervous systems rather than out of some force that preceded the development of nervous systems.

This would be a very informative statement if cosmologists, or any other scientists, had any means of detecting the presence of non-material stuff in the universe. But they don't. All their technological means of observation are physical instruments designed to measure physical phenomena. If scientists had observed all the physical phenomena in the universe and devised a complete explanation of them solely in terms of matter, they could indirectly infer that there is no non-material stuff in the universe. But they haven't. And even though we know perfectly well—on the basis of non-scientific, subjective awareness—that consciousness exists in the natural world, there are no scientific means of detecting consciousness. In other words, there is no strictly scientific evidence for the existence of consciousness or any other subjective mental phenomena at all!

Is Consciousness an Emergent Property of Matter?

Given the historical lack of parity between the scientific study of physical and mental phenomena, by the twentieth century, what conclusion could cognitive scientists draw except that the

mind is a mere epiphenomenon of the brain? They were trapped in an ideological straightjacket that seemed to allow them no alternative to scientific materialism other than to revert to the prescientific speculations of Descartes. And that is simply unacceptable. Modern advances in the neurosciences have made it abundantly clear that there are very specific correlations between mental processes and brain functions. More than a century ago, William James proposed three feasible theories to account for such correlations: (1) the brain produces thoughts, as an electric circuit produces light; (2) the brain releases, or permits, mental events, as the trigger of a cross-bow releases an arrow by removing the obstacle that holds the string; and (3) the brain transmits thoughts, as light hits a prism, thereby transmitting a surprising spectrum of colors (1989: 85-86). Among these various theories, the latter two allow for the continuity of consciousness beyond death. James, who believed in the third theory, hypothesized (1989: 87),

when finally a brain stops acting altogether, or decays, that special stream of consciousness which it subserved will vanish entirely from this natural world. But the sphere of being that supplied the consciousness would still be intact; and in that more real world with which, even whilst here, it was continuous, the consciousness might, in ways unknown to us, continue still.

If the brain simply permits or transmits mental events, making it more a conduit than a producer, James speculated that the stream of consciousness may be (1) a different type of phenomenon than the brain, which (2) interacts with the brain while we are alive, (3) which absorbs and retains the identity, personality, and memories constitutive in this interaction, and (4) which can continue to go on without the brain. Remarkably, empirical neuroscientific research thus far is compatible *with all three hypotheses* proposed by James, but the neuroscientific community on the whole has *chosen* to consider only the first hypothesis, which is the only one compatible with the principles of scientific materialism. Thus, instead of letting empirical evidence guide scientific theorizing, a metaphysical dogma is predetermining what kinds of theories can even be considered, and therefore, what kinds of empirical research are to be promoted.

James approached the question of the origins of human consciousness from a scientific perspective, free of the ideological constraints of scientific materialism. Fifteen hundred years earlier, Augustine approached this same question from the perspective of scriptural authority. After careful Biblical research, he presented the following four hypotheses: (1) an individual's soul derives from those of one's parents, (2) individual souls are newly created from individual conditions at the time of conception, (3) souls exist elsewhere and are sent by God to inhabit human bodies, and (4) souls descend to the level of human existence by their own choice (Augustine 391/1937: Bk. III, Chs. 20-21). After asserting that all these hypotheses may be consonant with the Christian faith, he declared, "It is fitting that no one of the four be affirmed without good reason" (Ibid: 379). This subject, he claimed, had not been studied sufficiently by Christians to be able to decide the issue, or if it had, such writings had not come into his hands. While he suspected that individual souls are created due to individual conditions present at the time of conception, he acknowledged that, as far as he knew, the truth of this hypothesis had not been demonstrated. Instead of seeking compelling empirical evidence concerning the origins of consciousness, the Christian tradition has drawn its conclusions concerning this issue on purely doctrinal grounds. But, according to Augustine, it is an error to mistake mere conjecture for knowledge.

The hypothesis that all conscious states emerge from complex configurations of matter is so widely accepted among contemporary cognitive scientists that it is commonly treated as if it were an empirically confirmed scientific fact. This is a prime example of what historian Daniel J. Boorstin refers to an "illusion of knowledge," and such conflation of assumption and fact, he says, has throughout history acted as the principal obstacle to discovery (1985: xv). In a similar vein, the Nobel Prize-winning physicist Murry Gell-Mann comments, "In my field an important new idea…almost always includes a negative statement, that some previously accepted principle is unnecessary intellectual baggage and it is now necessary to jettison that baggage" (Genz 1999: 310).

Is it so outlandish or unscientific to consider that states of consciousness originate essentially

from prior states of consciousness? When considering the origins of the universe, MIT physicist Alan Guth speculates that perhaps our universe is not a singular event, but is more like a biological process of cell division. In that case, the universe may never have started and will almost certainly never stop. This eternally self-reproducing universe could even explain in a natural way where our universe came from: its parent universe. Guth presents the analogy of coming across a new species of rabbit in the forest. If you had to figure out where it came from, you could speculate that it spontaneously emerged out of a random configuration of molecules or was created by some other mysterious cosmic event. But the more plausible explanation is that the rabbit was produced by other rabbits. The same inference, he suggests, may be applied to the origination of our known universe (Cole 2001: 185). This same notion could also be applied to the origination of known states of consciousness. It is perfectly feasible that all known human states of consciousness originated from a more fundamental realm, or realms, of consciousness, rather than insisting that they emerged out of a random configuration of molecules.

Descartes set forth a "cogito-centric" hypothesis that all mental processes and all possible bodily correlates "revolve around" a supernatural, immortal soul that was infused by God into the human organism and that functions autonomously from matter. Contemporary scientific materialism, on the other hand, has replaced this discredited notion with its "neuro-centric" hypothesis that all mental processes "revolve around" the brain. But this view not only leaves unanswered, but obstructs empirical scientific inquiry, into many crucial features of the mind/body problem. With its fixation on the brain as the source of all mental phenomena, it impedes understanding of the complex ways in which subjective mental states influence brain states and the rest of the body. In order for scientific inquiry to progress in illuminating the relation between subjective mental events and objective neural events, it is necessary to treat both as equally "real," arising as interdependently related events, with neither playing an absolutely primary role.

What Is the Matter with Scientific Materialism?

The scientific view of the universe is based on human perceptions, refined and extended with the aid of technology. Great lengths are taken to ensure that scientific observations are truly objective, free of subjective biases. At the same time, scientific theories and models are themselves products of the human imagination. So what is the relation between our perceptions of the world and imagination? Cognitive neuroscience informs us that the capacities in the brain that are related to perception are largely the same as those related to imagination. Thus, perception, including scientific observations, is essentially sensori-motor constrained imagination. In the words of neuroscientist Francisco Varela, "Perception is demonstrably constrained and shaped by the concurrent higher cognitive memories, expectations, and preparation for action…what is endogenous (self-activated memories and predispositions, for example) and hence the manifestation of the imaginary dimensions, are always a part of perception" (Varela in press). The same is said of the distinction between perception and dreaming: the primary difference is that the former is constrained by stimuli from the external environment, whereas the latter is not (LaBerge and Rheingold 1990).

What, then, is the nature of this "real, external, material world," which constrains perception and which physics ostensibly describes? Modern physics has its historical roots in the fundamental hypothesis of the Ionian thinker Democritus in the fourth century B.C.E., namely, that the real world consists essentially of atoms in space. Nobel Prize-winning physicist Richard Feynman presents the basic belief of scientific materialism when he declares, "there is nothing that living things do that cannot be understood from the point of view that they are mode of atoms acting according to the laws of physics" (1963: 1-9). What is the current understanding of the nature of these atoms, or the elementary particles that constitute all the matter in the universe? All particles of matter and energy are now believed to consist of oscillations of immaterial, abstract quantities, known as "fields," existing in empty space. Steven Weinberg, another Nobel laureate in physics, comments, "In the physicist's recipe for the world, the list of ingredients no longer includes particles. Matter thus loses its central role in physics. All that is left are principles of symmetry" (Cole 1999).

What has become of "real matter," existing independently of the human mind in the objective

universe? Like the God of Moses being reduced to the abstraction of contemporary deism, the matter of Democritus seems also to have been reduced to a conceptual abstraction in contemporary physics. What is the real ideological commitment of scientific materialists? Is it to matter as "oscillations of immaterial, abstract quantities in empty space"? Or is it to "principles of symmetry"? I would argue that the real ideological commitment of scientific materialists is not to matter itself, but to the methods of the natural sciences, which they believe provide us with our only knowledge of the real world. This is a form of dogma, by which I mean a coherent, universally applied worldview consisting of a collection of beliefs and attitudes that call for a person's intellectual and emotional allegiance. A dogma, therefore, has a power over individuals and communities that is far greater than the power of mere facts and fact-related theories. Indeed, a dogma may prevail despite the most obvious contrary evidence, and commitment to a dogma may grow all the more zealous when obstacles are met. Thus, dogmatists often appear to be incapable of learning from any kind of experience that is not authorized by the dictates of their creed (Feyerabend 1994b). There are many factors that contribute to such allegiance to a dogma, including personal, social, political, and economic concerns. These influenced the Roman Catholic Church at the time of Galileo, and they now influence the dominant institutions of scientific materialism, such as the public educational system in the United States.

Apart from a dogmatic allegiance to scientific materialism, are there any compelling grounds for believing that oscillations of immaterial mathematical constructs or principles of symmetry exist in the objective world, independent of the human mind that conceives them? Since all measurements entail interactions of the system of measurement and the phenomena being measured, we never have any direct access to an objective world existing independently of all measurements. Werner Heisenberg comments in this regard, "What we observe is not nature in itself but nature exposed to our method of questioning" (Heisenberg 1962: 58). Einstein comments in a similar vein, "on principle, it is quite wrong to try founding a theory on observable magnitudes alone. In reality the very opposite happens. It is the theory which decides what we can observe" (Heisenberg 1971: 63).

Much as the principles of Newtonian mechanics are based on the presumed existence of absolute space and time, so are the principles of scientific materialism based on the presumed existence of a real, objective, physical universe that is reconstituted in our heads, based upon sensory input and the self-assembly of concepts. But Edward O. Wilson, who strongly supports this view (maintaining that only madmen and a few misguided philosophers reject it), acknowledges that there is no body of external objective truth by which scientific theories can be corroborated (1998: 59). Werner Heisenberg, Max Born, and other physicists who took an instrumental role in formulating quantum mechanics came to the conclusion that it is futile to attribute existence to that which cannot be known even in principle. Let us bear this principle in mind as we consider that all scientific measurements are made within the context of the intersubjective world of practicing scientists. Likewise, all scientific theories are formulated in the minds of scientists, and they are tested by observations and experiments within the intersubjective world of scientists. And this specialized intersubjective world is a subset of the intersubjective world of humanity as a whole. Without in any way detracting from the value or validity of scientific knowledge, it appears that little, if anything, is lost by acknowledging that science illuminates facets of *the world of experience*, not *the world independent of experience*. As soon as this point is accepted, it becomes obvious that science is not the only, or even the best, means of exploring all aspects of this world. But then it was never designed to do so.

The Intersubjective Spectrum of Truths

The roots of the scientific exclusion of subjective phenomena from nature are to be found in the aspiration of early natural philosophers, many of whom were also theologians, to view the universe from a God's-eye perspective, which implied to them a purely objective perspective. This was their strategy for coming to know the mind of the Creator by way of His Creation. The problem with this approach, however, is that the objective world, independent of experience, is just as removed from scientists as God is to theologians.

The pioneers of the Scientific Revolution were influenced, of course, not only by the Judeo-Christian

tradition, but by ancient Greek philosophers, such as Democritus and Aristotle. And this does indeed seem to be a reasonable assumption. What accounts for the commonality of experience among difference subjects, if not an independent, external, physical world? On the other hand, what are the grounds for concluding that the world that exists independently of the human mind consists solely of a kind of stuff that corresponds to our human concepts of matter? If consciousness is as fundamental to the universe as are space-time and mass-energy, then the world independent of the human mind may be comprised of both subjective and objective phenomena. Or it may transcend human concepts altogether, including those of subject and object, mind and matter, and even existence and non-existence.

If one considers this alternative hypothesis, subjective experience need no longer be banned from the natural world, and the scientific taboo against the firsthand exploration of consciousness and its relation to the objective world may be discarded. This move also encourages us to reappraise our categories of "subjective" versus "objective," and of "convention" versus "reality." In the words of Harvard philosopher Hilary Putnam, "What is factual and what is conventional is a matter of degree; we cannot say, 'These and these elements of the world are the raw facts; the rest is convention, or a mixture of these raw facts with convention'" (1990: 28). The existence of a concrete object like a tree, he argues, is also a matter of convention; and our observation of a tree is possible only in dependence on a conceptual scheme. The reason for this is that "elements of what we call 'language' or 'mind' *penetrate so deeply into what we call 'reality' that the very project of representing ourselves as being 'mappers' of something 'language-independent' is fatally compromised from the very start*" (1990: 28).

The very distinction between the terms "subjective" and "objective" is itself embedded in a conceptual framework, and there is no way to justify the assertion that any truth-claim is purely objective or purely subjective. For example, the assertion that the pizzas I bake are the tastiest ones in town may be objectively true for one person—myself. Perhaps another example of a similarly localized truth is the statement that all the points made in this paper are perfectly clear and utterly compelling. The truth of such claims may be limited to one subject! Moving along the spectrum of intersubjective truths, other claims may be valid solely within the context of a single family, a community, a nation, an ethnic group, or a species. The validity of such statements is tested not with respect to an objective reality, independent of all experience, but with respect to the concentric rings of intersubjective experience. None of these assertions is purely subjective or purely objective, but there is a gradation in terms of their invariance across multiple, cognitive frames of reference. Some statements may be valid only locally, in terms of specific individuals or societies at a certain time and place; while others may be more universally valid, in the sense that they are true for a broad range of individuals and even species. Errors commonly arise when one assumes that a statement that is true for one limited frame of cognitive reference is equally true outside that context.

One truth that *is* invariable across all perceptual frames of reference is that perceived objects exist in relation to the perceptual faculties by which they are apprehended. For example, perceived colors exist in relation to the visual faculty that sees them, and perceived sounds exist relative to the auditory faculty that hears them. There is no reason to believe that such perceptual phenomena exist in the objective world, independent of all sense perception. Nevertheless, in our intersubjective world of experience, multiple subjects may apprehend colors and sounds in similar ways, which allows for true statements to be made about them that are independent of any specific subject. Another truth that is invariable across all cognitive frames of reference is that conceptual objects exist in relation to the conceptual faculties and frameworks by which they are apprehended. However, when these concepts are reified, we may be led to believe that they exist in the objective world, independent of any thinking mind or conceptual framework. This theory does not reduce all concepts to mere artifacts of specific individuals or societies. As Hilary Putnam comments, "the stars are indeed independent of our minds in the sense of being causally independent; we did not make the stars...The fact that there is no one metaphysically privileged description of the universe does not mean that the universe depends on our minds" (1991:407).

The Pursuit of the Universal Truths

Scientists and religious people alike make truth-claims based on extraordinary experiences that may be

accessed by only a select group of highly trained individuals, yet they maintain these truths are universal, throughout space and time and for all possible subjects. For example, when probing the quantum mechanical nature of elementary particles, the relativistic curvature of space-time, or the multiple dimensions of string theory, physicists must resort to pure mathematics. The more physicists probe into the nature of phenomena existing in external space, the more they describe them in terms of quantitative abstractions that are experienced in the internal space of the mind. When they try to explain their insights to non-mathematicians, they can do so only roughly and by using metaphors. Likewise, the more contemplatives probe into the nature of phenomena existing in the internal space of the mind, the more they describe them in terms of qualitative abstractions, which also exist in the internal space of the mind. In their writings one finds theories of multiple dimensions of consciousness (Wallace 1998: 90-93; Gunaratana 1985: 49-141), but when they try to explain their insights to non-contemplatives, they must also resort to metaphors, which convey only rough approximations of their discoveries.

The language of mathematicians is untranslatable into any other language, and the same is true of the language of contemplatives. Although one mathematical system may be translated into the equations of another system, none can be translated into the experiences or concepts of the general lay public. The same is true of contemplative writings. In some cases one contemplative system may translate well into the language of another, but a sophisticated contemplative theory can never be adequately translated into the language of common, everyday experiences and ideas. The only way one can truly understand mathematics is by practicing it, not just reading about it; and the same is true of contemplation. The chief difference between mathematical and contemplative discourse is that non-contemplatives can easily draw the conclusion that they are thoroughly fathoming contemplative writings, when in fact they are reducing such accounts to their own, more prosaic experiences and ideas. Here is one more case of an illusion of knowledge, for the contemplatives are using ordinary language in extraordinary ways, and only an experienced contemplative knows the referents of the words and phrases used in contemplative writings. Non-contemplatives reduce those ideas to experiences that are familiar to them, but in so doing, they give themselves the false impression that they have fathomed what the contemplatives were writing about.

Steven Katz, a contemporary scholar of comparative mysticism, for example, insists that experienced contemplatives are in no better a position to evaluate their experiences than are non-contemplatives (1983: 5). This notion is just as implausible as the idea that a non-mathematician could evaluate the relation between Heisenberg's matrix equations and Schrödinger's wave equation describing quantum mechanical phenomena. But the misconception that one can evaluate contemplative truth-claims solely on the basis of reading books about mysticism is widespread both among scholars and the lay public. Edward O. Wilson, for example, falls into this trap when he suggests that all mystical experiences are basically the same, and that they have all yielded no insights whatsoever into the nature of reality (1998: 260 & 46). Scientists and scholars who try to evaluate one or more contemplative system without acquiring any contemplative experience of their own are thus confined to the echo chambers of their own preconceptions.

A fundamental problem facing both mathematicians and contemplatives is the ineffability of their insights to outsiders. In this regard, three types of ineffability may be posited. First, something may be deemed ineffable if it lies outside of anyone's experience. The objective world with all its contents, existing independently of all experience, fits that description (Wallace 1996: 75-78). Secondly, that which lies within the scope of one person's experience is ineffable to those who lack that experience or anything like it. This is true of many mathematical and contemplative insights. Thirdly, an insight may transcend all concepts, so even if one has experienced it directly, it may not be verbally conveyed to anyone, regardless of the range of their experience. A prime example of such an ineffable experience is that of pure, conceptually unstructured consciousness, which figures prominently in many contemplative traditions of the world (Forman 1990a; Wallace 1998: 243-248; Wallace 2000: 112-120).

This brings us back to the status of consciousness in nature, and a kind of hierarchy among the physical sciences, life sciences, and cognitive sciences. By probing the nature of inorganic phenomena, one may

fathom all the laws of physics, but knowledge of physics alone has not predicted or explained the emergence of life in the universe. By probing the nature of organic phenomena, using all the tools of the physical and life sciences, one may discover the laws of physics and biology, but they alone have not predicted or explained the emergence of consciousness in the universe. Continuing along this spectrum, by probing the nature of the mind and its relation to the brain, using all the tools of the physical sciences, life sciences, and cognitive sciences, one may discover the laws of physics, biology, and psychology. But they have not predicted or explained the possibility of pure consciousness that transcends all conceptual constructs, including those of subject and object. Modern science has no way of testing the hypothesis of pure consciousness or its implications. Indeed, as mentioned previously, there is presently no scientific definition of consciousness of any sort; there are no scientific means of objectively measuring consciousness; and there is no scientific knowledge of the necessary and sufficient causes for its emergence. However, the fact that we presently lack a science of consciousness does not necessarily mean that no other civilization, either in our own cultural past or elsewhere, is equally deficient. Indeed, many contemplatives, from the West and the East, have claimed knowledge of pure consciousness; and many have asserted that such insight yields knowledge the nature of reality as a whole (Butler 1967: 49; Wallace 1999: 176).

Evaluating Scientific and Religious Truth-claims

This brings us to the crucial problem of evaluating both scientific and religious truth-claims. When it comes to scientific and mathematical assertions about the nature of reality, a certain degree of consensus has been established as to how to evaluate such claims. But there is no such consensus regarding the alleged discoveries of contemplatives of different religious traditions. Are contemplative writings simply creations of over-active imaginations, or are they based on authentic, personal experiences? At first glance, it may seem that the difference between scientific and contemplative claims is that the former can be verified by third-person criteria, whereas the latter cannot. But upon closer inspection, this distinction does not hold in such a straightforward way.

Ever since the early days of the Royal Society of London, scientific discoveries, which ostensibly occur in the "public domain" of third-person experience, have been corroborated or repudiated by select groups of professional scientists who share a great deal of assumptions and expertise. The validity of sophisticated scientific discoveries has never been established on the basis on the experiences or ideas of the general public. Rather, subsets of the scientific community form their own elite, intersubjective groups who alone can authoritatively judge the value of their peers' theories and discoveries.

Unlike scientific discoveries that may be witnessed firsthand by multiple "third persons" in an intersubjective domain of experience, the verification or refutation of a mathematical proof is a private, first-person event. The external manifestation of a sophisticated mathematical proof is unintelligible to the non-mathematician, so the evaluation of its validity is confined to professional mathematicians. Who is in a position to judge whether a student of mathematics has in fact understood a particular proof? This may not be done by a fellow student, let along a layperson, who represents a third-person perspective, nor can the student rely entirely on his or her own first-person judgment. Rather, the level of the student's understanding must be judged by a competent mathematician, serving in the role of mentor. Only if this mentor has already fathomed the proof in question can he or she authoritatively judge whether the student has done so. In this regard, mathematical discoveries are comparable to contemplative insights. According to many contemplative traditions, the student enters into formal training and regularly reports his or her experiential insights to a competent mentor, who then evaluates them and guides the student to yet deeper insights. Advanced contemplatives, on the other hand, may claim to have gained specific insights into certain facets of reality, and their claims are then subjected to sophisticated peer-review by other senior contemplatives of their tradition.

Once a mathematical theorem has logically proven to be internally consistent, one may move on to empirical criteria for evaluating whether or not it accurately describes or predicts certain phenomena in nature. There are also pragmatic criteria for evaluating such a theorem, testing whether it is useful for

creating new technologies. Empirical and pragmatic criteria are also used in evaluating contemplative theories and practices. Empirically, one observes whether or not they correspond to or predict the types of experiences that emerge in the course of training. Pragmatically, one tests their usefulness in terms of their practical benefits in the life of the contemplative and those with whom he or she engages. The benefits are of course not technological in nature. Rather, they have to do with the attenuation of vices, the growth of virtues, and the enhancement of one's own and others' wellbeing, especially of the kind early Christianity called *eudaimonia*, or a "truth-given joy."

Contemplative experience is, of course, only one facet of religious experience at large. For some religious traditions it is regarded as being of central importance, while for others it is marginal or even absent altogether. How is one more generally to evaluate the truth-claims made by scientists and religious people? Such truth-claims may be based on one or more of three foundations. First, some scientific and religious assertions are purely dogmatic in nature, which is to say that they cannot be confirmed or refuted solely on the basis of logic or experience. The metaphysical principles of scientific materialism and religious claims based solely on divine authority fit into that category, and it is primarily these claims that form the basis of heated debate between believers of these different scientific and religious ideologies (Wallace 2000: 21-37). Second are truth-claims that are based on logical reasoning, and these are subject to rational analysis. Third are truth-claims based on firsthand experience, be it scientific or religious.

William Christian, a scholar of religion, comments that in the context of inter-religious dialogue, as long as one is reporting on religious beliefs, speakers can be informative "when they define or explain doctrines of their traditions, but not when they are asserting them" (Christian 1972: 88). This same criterion should apply to advocates of the principles of scientific materialism when addressing audiences adhering to other belief systems. This is especially pertinent in institutions of public education, in which the articles of faith of scientific materialism are commonly conflated with scientific fact. Even Edward O. Wilson, who so ardently embraces scientific materialism, acknowledges that it "is a metaphysical world view, and a minority one at that, shared by only a few scientists and philosophers. It cannot be proved with logic from first principles or grounded in any definitive set of empirical tests" (Wilson 1998: 9). Nevertheless, advocates of this quasi-religious ideology commonly insist with impunity that their students in the American public education system accept its veracity, not only as a set of working hypotheses, but as established scientific fact. Proponents of other religious belief systems, in stark contrast, are strictly prohibited from promoting their beliefs in American public schools, let alone presenting them as scientifically verified truths. The tenets of scientific materialism or any other metaphysical creed may indeed be rationally accepted as working hypotheses, as long as they are not repudiated either by empirical evidence or logic. But one must not expect others to adopt one's own working hypotheses simply because one finds them very compelling and compatible with scientific evidence or with religious scriptures.

William Christian does acknowledge that adherents of a religion may make informative utterances about their own experiences "if they are relevant" (Christian 1972: 88-89; Wallace 1998: 6). This leaves open the possibility that religious people may speak informatively of their own experiences; and such reports may be taken seriously by others who do not share their religious beliefs. In an inter-religious setting or in a science/religion dialogue, should religious people be confined to making truth-claims only on the basis of their *own* personal experience? May they not make such assertions on the basis of the experience of other religious people, even if they are no longer living? Such an allowance is obviously made for scientists and mathematicians—none of them are confined to making assertions based solely on their own personal experience. Progress in science and mathematics would grind to a halt if that were the case.

There is evidently no simple formula for evaluating truth-claims among the various religions and sciences, but there is one guiding principle that may be helpful, and that is to be on the constant lookout for illusions of knowledge, the conflation of assumptions with genuine knowledge. On this basis, one may evaluate a wide range of scientific and religious truth-claims rationally, empirically, and pragmatically. Regarding both scientific and religious theories and practices, we may first ask whether

they are internally consistent. Then, what subjective and objective phenomena do they explain and predict? Finally, how does the adoption of those theories and practices affect the lives of individuals, societies, and their relation with the rest of the world?

If the fundamental aim of both science and religion is to reveal truths that enhance the wellbeing of humanity, what are the strengths and weaknesses of each of these fields of inquiry, and how might they complement each other? When we raise such questions, the discord between science and religion may be give way to a collaborative pursuit of truth in the service of humanity. I believe this strategy accords with the spirit of empiricism proposed by William James when he wrote (1909/1977: 142):

Let empiricism once become associated with religion, as hitherto, through some strange misunderstanding, it has been associated with irreligion, and I believe that a new era of religion as well as philosophy will be ready to begin... I fully believe that such an empiricism is a more natural ally than dialectics ever were, or can be, of the religious life.

Bibliography

Augustine. (391/1937) *The Free Choice of the Will*, trans. Francis E. Tourscher. Philadelphia: The Peter Reilly Co.

Boorstin, Daniel J. (1985) *The Discoverers: A History of Man's Search to Know His World and Himself*. New York: Vintage Books.

Butler, Dom Cuthbert. (1967) *Western Mysticism: The Teaching of Augustine, Gregory and Bernard on Contemplation and the Contemplative Life*. 3rd ed., with "Afterthoughts" by Prof. David Knowles. London: Constable & Co.

Christian, William A. (1972) *Oppositions of Religious Doctrines: A Study in the Logic of Dialogue among Religions*. London: Macmillan Press Ltd.

Cole, K. C. (1999) "In Patterns, Not Particles, Physicists Trust" in *Los Angeles Times*, March 4, 1999.

———(2001). *The Hole in the Universe: How Scientists Peered over the Edge of Emptiness and Found Everything*. New York: Harcourt, Inc. 2001.

Feyerabend, Paul. (1994b) "Quantum theory and our view of the world" in Jan Hilgevoord, ed. *Physics and Our View of the World*. Cambridge: Cambridge University Press, pp. 149-168.

Feynman, Richard P., R. B. Leighton, & M. Sands, eds. (1963) *The Feynman Lectures in Physics*. Reading, Mass.: Addison-Wesley Publishing Co.

Forman, Robert K. C., ed. (1990a) *The Problem of Pure Consciousness: Mysticism and Philosophy.* New York: Oxford University Press.

Genz, Henning. (1999) *Nothingness: The Science of Empty Space*. Cambridge, Mass.: Perseus Books.

Gunaratana, Henepola. (1985) *The Path of Serenity and Insight: An Explanation of the Buddhist Jhanas.* Columbia, Missouri: South Asia Books.

Heisenberg, Werner. (1962) *Physics and Philosophy: The Revolution in Modern Science*. New York: Harper and Row.

———(1971) *Physics and Beyond: Encounters and Conversations*. New York: Harper and Row.

Houshmand, Zara, et. al., eds. (1999) *Consciousness at the Crossroads: Conversations with the Dalai Lama on Brain Science and Buddhism*. Ithaca, NY: Snow Lion Publications.

James, William. (1890/1950) *The Principles of Psychology.* New York: Dover Publications.

———(1909/1977) *A Pluralistic Universe*. Cambridge, MA: Harvard University Press.

———(1989) *Essays in Religion and Morality*. Cambridge. Mass.: Harvard University Press.

Katz, Steven T. (1983) "The 'Conservative' Character of Mystical Experience"

in Steven T. Katz, ed. *Mysticism and Religious Traditions*. Oxford: Oxford University Press.

LaBerge, Stephen and Howard Rheingold. (1990) *Exploring the World of Lucid Dreaming*. New York: Ballantine.

Putnam, Hilary. (1990) *Realism with a Human Face*, ed. James Conant. Cambridge, MA: Harvard Univ. Press.

———(1991) "Replies and Comments," *Erkenntnis* Vol. 34., No. 3.

Varela, Francisco, J. (in press) "Imagining: Embodiment, phenomenology, and transformation" in B. Alan Wallace, ed. *Buddhism and Science: Breaking New Ground*. New York: Columbia University Press.

Wallace, B. Alan. (1996) *Choosing Reality: A Buddhist View of Physics and the Mind.* Ithaca, NY: Snow Lion.

———(1998) *The Bridge of Quiescence: Experiencing Tibetan BuddhistMeditation*. Chicago: Open Court.

———(1999) "The Buddhist Tradition of */amatha*: Methods for Refining and Examining Consciousness." *Journal of Consciousness Studies*, **6**, No. 2-3, 1999. pp. 175-187.

———(2000) *The Taboo of Subjectivity: Toward a New Science of Consciousness*. New York: Oxford University Press.

Wilson, E. O. (1998) *Consilience: The Unity of Knowledge.* New York: Alfred A. Knopf.

Top of Page

Commentary: Alice Alldredge

Thank you, Jim for inviting me to be a discussant for the Templeton lecture series. I am especially honored to comment on Dr. Wallace's very insightful talk. I am a biologist, and there is no doubt at all that scientific investigations by myself and my colleagues are guided by overarching worldviews, even

dogmas. Those worldviews determine the kinds of questions we ask, and, as importantly, the interpretation of the scientific results we obtain. Dr. Wallace has pointed out a worldview, namely that scientists believe they are seeking to objectively describe an independently existent universe, that is so fundamental that most of us are not even aware of our assumptions regarding it. Worldviews blind scientists to alternative explanations and cause them to ignore anomalies, or in the case of consciousness, whole realms of potential investigation, further exacerbating the inherent subjectivity of scientific inquiry.

I was very intrigued by Dr. Wallace's comment that the real ideological commitment of scientific materialists is to the methods of the natural sciences, because I think here is a place where science and religion converge on a point that might provide some common ground between them. The methods sections of scientific papers are really recipes for conducting experiments or making observations. Supposedly anyone who follows the recipe described in the paper will come up with the same or nearly the same results as the original investigator. In other words the results are repeatable. The great contemplative traditions of the world's religions also have recipes yielding repeatable results. Those recipes describe methods for training the mind until it is one pointed and can effortlessly remain focused on one object and methods for investigating bare experience, including consciousness. While the techniques for becoming concentrated and the subjects of contemplation vary greatly across contemplative traditions, the outcomes are surprisingly similar. That the subjective experiences of probably millions of contemplatives across very diverse cultural and religious frameworks over a time span of over 2000 years of human history should yield similar truth-claims is extremely compelling repeatability to me as a scientist. Obviously there is something there worth paying attention to. In short, I don't think that methodology necessarily has to separate science and certain aspects of religious experience. There are enough similarities that common ground could be found. I think it is ignorance of contemplative methodologies and as Dr. Wallace points out, ignorance of their own subjectivity, that has led to some of the arrogance and close- mindedness of scientific materialists.

Finally, I'd like to comment on motivation. The pursuit of truth-claims by scientists are motivated by aspects of normal waking consciousness, things like curiosity, the thrill of discovery, the awe of nature, the seeking of fame or respect, or the satisfaction of solving a puzzle. These are common subjective experiences that all humans can understand and relate to. But the pursuit of truth-claims by religious contemplatives can sometimes be so profound as to be transformative. In fact the motivation of the pursuit is to be transformed. A student in one of my seminars ran across an interesting web site (The Archives of Scientists' Transcendent Experiences), where scientists are invited to anonymously describe their own transcendent personal experiences. It is interesting to note that a number of these individuals changed their scientific pursuits or abandoned them altogether after having those experiences. I suspect that one outcome of the development of a Science of Consciousness based partially on contemplative methodologies would be that, for many investigators, the scientific pursuit itself would loose all meaning in the face of the ineffable experience of pure consciousness.

Top of Page

Commentary: Greg Ashby

I am a cognitive neuroscientist, and although I do not study consciousness, like many of my colleagues I am deeply interested in the topic. I agree with almost all of Professor Wallace's comments. Scientists have no more claim to truth than any other group of scholars. Science is not about discovering truths, or even scientific facts. It is even possible to argue that there is no such thing as a scientific fact. For

example, consider a statement that is widely accepted as fact, such as “the earth is round”. This statement is not really a fact because a sphere is only a model of the earth’s shape. It does not describe the shape exactly. The earth has many bumps and valleys not found on a sphere, and apparently the earth also has a slight pear-shape. As another example, consider the statement “the sun rises in the east”. Of course, each morning the sun actually first appears in a slightly different location, and it doesn’t really even rise, since a more accurate description is that the earth revolves around the sun. “The sun rises in the east” is a crude model that describes certain empirical phenomena. It is a poor model if we wish to send a probe through space to intersect the sun, but it is fine if we wish to build our home so that our kitchen receives morning light.

The business of science is to build new models, test those models against empirical observation, and ultimately to replace them with newer models that are even more accurate and powerful. All current scientific models are wrong, in the sense that none of them perfectly account for all known empirical observation. Seen in this way, scientific models are just tools. A good model can be used to organize and simplify huge empirical data sets, and to suggest new and interesting experiments to run. As a professional scientist, my job is to build state-of-the-art tools, but for many tasks, simpler and less accurate tools often suffice. So for most of us, rather than resort to a more accurate model derived, for example, from relativity theory, a crude and simple model like “the sun rises in the east” is perfectly adequate.

As Professor Wallace noted, there has been no real scientific study of consciousness. This is not because of lack of interest. Rather, it is because a scientific model is valuable only if it can be tested and improved, and unfortunately, no one has been able to figure out a good way to study consciousness. Within just the last couple of years, however, this story has begun to change, largely because of many recent exciting discoveries in neuroscience and neuropsychology. Of course, Professor Wallace also made it clear that the term “consciousness” covers such a wide range of phenomena and subjective experience that we don’t even have a rigorous scientific definition of the term. As a result, the recent work on consciousness within the field of cognitive neuroscience has been restricted to the less ambitious (but still difficult) problem of understanding the neural basis of conscious awareness; that is, of how we can be aware of our existence and of the world around us.

An early insight into this problem came from a model that assumed conscious awareness requires a form of short-term or working memory. To be aware that I am speaking as a discussant to you requires that I have some memory that allows me to link events that occurred during the last few seconds and minutes, with those that are happening now. Without this ability, I would perceive the world only as a series of disconnected photographs.

Fortunately, much recent work firmly establishes that the neural locus of our short-term working memory is within the prefrontal cortex, which is the massive brain area above and behind the forehead. This model of working memory has inspired some recent interesting speculations about the neural basis of conscious awareness. Perhaps most influential of these was the proposal of Francis Crick (of DNA fame) and Christof Koch that we can only be aware of activity in brain areas that project directly to prefrontal cortex (Crick & Koch, 1990, 1995, 1998). If cells in some Area A send projections (i.e., axons) directly into prefrontal cortex, then it is possible that a pattern of brain activity in Area A could be transferred directly into our working memory and thereby into our conscious awareness. But if an Area B projects to Area A but not to prefrontal cortex, then activity in Area B will be transformed by Area A before reaching prefrontal cortex and our conscious awareness. Many areas of the brain do not project directly to prefrontal cortex, so the Crick-Koch model predicts that we are unaware of much of the activity in which our brain is engaged. Included in this list are most of the brain areas thought to mediate our emotions, as well as those areas thought to enable us to learn complex motor skills, such as playing tennis or golf (i.e., muscle memory). As such, the Crick-Koch model explains why we often have poor awareness of our emotional states and of exactly how we were finally able to avoid that awful slice on the golf course.

My goal today is not to promote the Crick-Koch model of conscious awareness. After all, this model is

surely wrong. By this time next year, or the year after, we will certainly have a better model. I mention the Crick-Koch model because, to my mind, it illustrates why it is such an exciting time to be working in the field of cognitive neuroscience. All the recent advances that have been made are allowing us finally to begin investigating a variety of fascinating topics, like consciousness, which historically have been outside of the scientific domain. Such topics have been long discussed within the fields of philosophy and religion, and for this reason, I welcome future opportunities, such as these, to engage in constructive dialogue with scholars who might follow a very different approach to model building.

References

Crick, F. & Koch, C. (1990). Towards a neurobiological theory of consciousness. *Seminars in Neuroscience, 2*, 2263-275.

Crick, F. & Koch, C. (1995). Are we aware of neural activity in primary visual cortex? *Nature, 375*, 121-123.

Crick, F. & Koch, C. (1998). Consciousness and neuroscience. *Cerebral Cortex, 8*, 97-107.

Top of Page

Commentary: Anita Guerrini

As a historian of seventeenth and eighteenth century science, I found much to agree with and welcome in Alan Wallace's thoughtful paper. In my research I have looked at a lot of discarded belief systems, so I do not find it difficult to believe that modern science is another belief system based on a particular dogma. What I'd like to do in the time allotted to me is to go back in time and look at the intellectual world before science and religion became separate realms; what was the nature of belief in 1700? Although Alan Wallace rightly states that the world view we associate with modernity – materialism, reductionism, etc – is a result of the scientific revolution of that era, there was a period of time in the late seventeenth and early eighteenth centuries when old and new beliefs, faith and reason, science and religion, existed side by side and were not, by most people, seen as incompatible belief systems. Mind and matter interpenetrated, but no one quite knew how.

The most famous man in Europe in 1700 may well have been Isaac Newton, and this may have been the last time (maybe Darwin qualifies) that a man of science held that honor. Newton exemplifies that (to us) paradoxical relationship between science and religion. We know of Newton as the inaugurator of the modern era, the founder of a new physics, the man who mathematized nature. All of Europe knew of his magisterial work, the *Principia*, published in 1687, which revolutionized our view of nature. This was so even though few people read it, or understood it; not only was it written in Latin, but it was filled with complex equations. Even John Locke, not an intellectual lightweight, admitted he could not work out the equations. So it would seem that, like now, the general public accepted the truth of science on trust, and that Newton was a kind of 17th century Steven Weinberg, whom everyone knows is a genius because you can't understand a thing he writes. Well, not quite. Newton's *Principia* was immediately followed by a large number of popularizations of various degrees of complexity; by the 1770s we even had Newton for the nursery, with "Tom Telescope." Unlike, today, I think, there was a large public which knew about natural philosophy; it was not yet a closed realm. Given the amount of satire of science which existed in the early 18th century, we can assume that for most literate people, Newton was a household word. (think of Gulliver's Travels)

In the General Scholium of the *Principia,* which Newton added to the second edition in 1713, he referred to the universe as the "sensorium of God": in other words, the universe, Newtonian physics, all of it, was a thought in the mind of God. We might dismiss this as an aberration, but it was central, as

Alan suggested, to Newton's thought. The concept of gravity – rightly referred to as "occult" by his critics – had no cause; it was not a mechanical concept. To Newton, the cause was obvious: he did not write over a million words on religion for exercise. He wrote another million words on alchemy, and it is in the mystical realm of alchemy that he found the essential connection between matter and spirit. Alchemy was an example of a contemplative practice, in which wisdom was achieved only at the end of long spiritual examination, and in which only the adept can accomplish its goals of the transmutation of matter. But Newton did not publish these millions of words, he hid them away, and it is only through the diligence of scholars that we now can see the whole of his thought. Of course, why he didn't publish any of this is an interesting question in itself.

In this era, all of natural philosophy was one; there were no disciplines in the modern sense. So it is not surprising that Newton's ideas quickly became of interest to medical men, particularly those who looked at mental phenomena. How could Newtonian physics explain the mind-body connection? The conventional explanation of nervous function was hydraulic: nerves were like blood vessels. Gravity , an immaterial force, brought in a whole new realm of causation, and although no one quite figured out how this applied to the explanation of consciousness, there were plenty who tried. The nature of the mind and consciousness was much debated, particularly with reference to the definition of insanity. Was insanity a disturbance of the mind, of the brain, or of the soul? Swift's Gulliver plays with this debate, as Gulliver finds his supposedly objective sense impressions distorted, in Lilliput and Brobdignag, his admiration of science damaged (with the ridiculous scientists of Laputa and Lagado), even the very essence of his humanity questioned by the Houyhnhms. George Cheyne, a well-respected physician in the 1720s and 30s, claimed that madness was a mixture of material and spiritual causes, and only by restoring both the soul (via mysticism) and the body (via diet) could the whole self be found again.

There was still a realm of possibility in the early years of the eighteenth century that the truths of science and religion could be reconciled. This possibility seems since to have been lost, although the dialogue initiated by this series gives hope that it might be regained. Alan Wallace has given us one way in which we might do this.

Top of Page