Science and Hinduism

with Eric R. Dorman, "Hinduism and Science: The State of the South Asian Science and Religion Discourse" and Jonathan Duquette, "'Quantum Physics and Vedanta': A Perspective from Bernard d'Espagnat's Scientific Realism"

HINDUISM AND SCIENCE: THE STATE OF THE SOUTH ASIAN SCIENCE AND RELIGION DISCOURSE

by Eric R. Dorman

Abstract. The science and religion discourse in the Western academy, though expansive, has not paid significant enough attention to South Asian views, particularly those from Hindu thought. This essay seeks to address this issue in three parts. First, I present the South Asian standpoint as it currently relates to the science and religion discourse. Second, I survey and evaluate some available literature on South Asian approaches to the science and religion discourse. Finally, I promote three possible steps forward: (1) the literature must shift from high Hindu philosophical religion to the more prevalent bhakti traditions, (2) the Indian context must be understood in its own right without metaphysical assumptions attached to the concepts of science and religion, and (3) most importantly, concepts unique to the Indian worldview, such as dharma, maya, and cit, must receive better treatment in translation in order to facilitate a more accurate exchange of ideas across cultural boundaries.

Keywords: Aurobindo; consciousness; Hinduism; Indian philosophy; quantum physics; Varadaraja V. Raman; Ravi Ravindra; religion and science; South Asia; Tagore; Vedanta; Vivekananda; worldviews; yoga

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It is important to spread the message to the world of religion that one can have a meaningful religious experience through the complex world-pictures of science, and to the world of science that one must always reconcile and respect the religious dimensions of the human spirit in whatever mode of manifestation. (Varadaraja V. Raman 2004, 399)

The burgeoning science and religion discourse has been undertaken from numerous angles, but one still remains largely absent in the academy. The dearth of rigorous material concerning South Asian traditions and

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their relation to the discussion presents both a current limitation and a prospective opportunity for the science and religion field to grow in new directions. In this essay, I aim to take advantage of the latter by drawing attention to the serious discussions of science and religion currently taking place among scholars of South Asia, especially with regard to Hindu traditions. I will discuss what work has been done, consider strengths, levy criticism and analyze shortcomings, and suggest possible directions for future research. The result will be a constructive and progressive assessment of Indian Hindu perspectives on religion and science. I hope this assessment will be useful in fostering a deeper appreciation for these perspectives among Western scholars.

The essay is organized into three sections, each of which corresponds to one of the three goals of the project. In the first section, I discuss the state of the science and religion field as it relates to South Asian traditions. It is no secret that the field is presently dominated by research and theorizing stemming from Western scientific and religious—specifically Christian—concerns. Snippets here and there have been written regarding non-Western religions—no doubt out of a desire to address pluralistic concerns—but for the most part, this has happened without full acknowledgment or understanding of the depth of these intellectual traditions. In the context of the Hindu traditions, this depth includes a distinct sense of *science*, which evolved differently over India's history than it did in Europe. The differences in history coincide with inherent differences in methodology and foundational philosophical assumptions not fully understood in most places outside of India. In particular, the high-level philosophical positions and often vague spiritual conceptualizations within integrative works by writers on South Asian traditions generate significant confusion and criticism when viewed through the eyes of Western reason. Thanks to intellectual complacency and localized ignorance, the Western academy holds a skewed view of these attempts at integration, too frequently casting them off as nonsense without taking the necessary time to fulfill its professional responsibility to consider in what sense the attempts are offered. The intent of the first section is to reframe the science and religion discussion by expanding the lens to include South Asian views of science and religion on their own terms and not merely as ancillary contributions to an already existing conversation.

The second section surveys some of the literature on South Asian dialogues on science and religion and provides a reference source for scholars. In this section, I bring to the table a number of scholars and thinkers from scientific and religious backgrounds who have begun to engage in a specifically South Asian form of the science-religion dialogue. This section illuminates the significant amount of material already at hand and will hopefully generate interest in a neglected part of the field. (I should note that regarding science, this essay focuses almost exclusively on physics

and the cognitive sciences and their relation to Hindu religious traditions, as these make up the majority of the material. However, a few works have been published on other sciences, such as ecology and biological evolution [Brown 2007; Chapple 2000; Gosling 2001; Nelson 1998; Prime 1992]).

The final section offers a set of substantive suggestions for progress within the specific subfield of South Asian religion and science as well as the field as a whole. What direction must this subfield take if it is to gain legitimacy, achieve greater exposure in the Western academy, and, most importantly, advance the dialogue? I will propose three approaches. First, the discussion must somehow make its way closer to on-the-ground science and religion. Second, scholars engaged in the science and religion dialogue must make a stronger effort to take the Indian context as legitimate in its own right. Third, and most importantly, those involved in the dialogue must make a better effort to translate South Asian worldviews into Western terms.

The overall aim of the essay is to summarize the state of the field in a way that is free from the common presumption that Indian reflection on science and religion is confined to nonacademic speculation best left to those who frequent the New Age section of your local bookstore. There is scholarly legitimacy to be found here, and it is connected to a major world tradition of religious and philosophical reflection dating back thousands of years. The exclusion of this material from the mainstream science and religion discussion limits progressive discourse.

The State of the Field

Amid conversation with colleagues, a common quip over the nature of our field is that it should be renamed from *science and religion* to *science and Christian theology*. As with any well-placed quip, an ounce of truth lies within as evidenced by the sheer dominance of Western, Christian, theologically minded material within the science and religion corpus. A quick glance through some of the seminal works in science and religion illustrates my point. Otherwise, outstanding pieces of scholarship, such as John Haught's *Science and Religion: From Conflict to Conversation* (1995), feature scarce references to Hinduism—even then typically only in a list of non-Christian traditions—and John Hedley Brooke's immensely insightful *Science and Religion: Some Historical Perspectives* (1991) makes no mention of Hinduism at all. In *Religion and Science: Historical and Contemporary Issues,* Ian Barbour (1997) at least makes an effort to include substantive reference to Hindu thought, though still only on the periphery of the main themes. More recent works on science and religion have taken a slightly more inclusive route and offered chapters for non-Christian traditions. However, this approach only reinforces a sense of imbalance within the field. For example, in the flagship volume *The Oxford Handbook to Religion*

and Science, edited by Philip Clayton (2006), 6 of the 56 chapters focus on non-Christian traditions—only one on Hinduism. While there is certainly no conspiratorial intention at play, this structuring seems to patronize non-Christian traditions and imply their tangential nature to the core of the discussion. This relegation must change in the future.

While my critique of the field's neglect of South Asian *religious* traditions is fairly straightforward, the problem of assuming a singular science is subtler. Certainly, there are solid arguments and valid schools of thought that take science—along with mathematics—as objective truths that cannot vary by culture. However, once context is added into the equation, so to speak, the idea of science loses its one dimensionality. Science itself developed differently in India than in Europe, and its relationship with religion there unfolded in a manner distinct from what we find in Western academic treatments of the history of science and religion. The most obvious example of a uniquely Indian science is Ayurveda, the Indian system of medicine that is still widely practiced today in India and the West. Even the more fundamental sciences flourished in India; some of the earliest mathematical and astronomical work on record was put forth in Vedic literature. As David Gosling admits, Indian science before modern times "lacked an organizational base and an experimental methodology (the 'Baconian' philosophy)," and yet "it was selectively very advanced in comparison to what was going on elsewhere" (2007, 48). To assume a neutral science within the science and religion dialogue is disingenuous. We must heed Brooke and Cantor's (1998, 43ff) call to consider "Whose science? Whose religion?" and expand the conversation to include not just variations of Western thought, but also Eastern knowledge traditions. I cannot elaborate on specific elements within the history of Indian science here, but the reference list features numerous sources for comprehensive coverage of Ayurveda (Engler 2003; Frawley 2000; Larson 1987; Manohar 2008; Wujastyk 2003) and other Indian sciences (Arnold 2000; Bose, Sen, and Subbarayappa 2009; Chattopadhyaya and Kumar, 1995; Gosling 1976, 2001; Gupta and Sharma 2002; Hayashi 2003; Kumar 2006; Paranjape 2008; Prakash 1999; Raman 2006; Seal 1915; Sinha 1970).

Before going on, I should address categorical issues that arise when considering the field of science and religion. The dialogue is currently framed with Western-centered definitions of both *science* and *religion*, within which traditions such as Hinduism and Indian science do not easily fit. Thus, there are two options for the future of the dialogue. We could continue to frame the discussion as it is now and create an entirely new field devoted to South Asian science and religion. Or, we could expand the reach of both terms in the field as they are presently understood to include the uniquely South Asian traditions (among many others). Clearly, I favor the latter option. Expanding the terms to be more inclusive might

be mistaken as a nod toward relativism, but such concerns need not trouble us here as they are tangential to the nub of the matter.

When I first approached this project, I took a quick glance through the standard science and religion literature (see above) and derived the assumption that the deficiency of Indian thought in the science and religion field had to do with a simple lack of material on the subject. Once I expanded my research, though, that assumption proved wildly incorrect. The problem, I discovered, lies not in the availability of material, but in its nature, its accessibility, and its less-than-comprehensive reception on the part of the Western academy. Very little work on science and religion from the Indian perspective has permeated established Western academic publishing houses. Yet, reviewing the credentials of the scholars taking part in the dialogue, I have to think a good deal of the scarcity comes from either blatant disinterest or perhaps academic discomfort with the inherent obscurity of the topic.

The tendency to drift near or over the boundary of "legitimate" academic research in the Western context has been a concern linked to Indian thought for some time. Long held assumptions of a Eurocentric worldview dismissed Indian mystical concepts as otherworldly and, thus, improper for rigorous academic discourse. While these views have faded with the maturation of the academy and the pervasion of postmodern views, the fact remains that attempting to understand a very different worldview is not within the scope of most nonspecialists. To make the situation even more vexing, science and religion discussions from the Indian angle are often compounded with equally fuzzy scientific concepts, such as consciousness, cosmogony, and loosely interpreted aspects of quantum mechanics. Within these blurry realms, there has been a strong tendency among both Indian and Western scholars to fall into the "new age trap" of *correlation* as opposed to substantive *integration*. Such was the case with arguably the most popular glance into Eastern religion and science, Fritjof Capra's *The Tao of Physics* (1975).

The question now becomes, what steps must be taken to overcome the lack of serious Indian reflection on mainstream science and religion matters? I think the most obvious step is to encourage more cross-disciplinary conversation through access to the material that is already in print. Whereas science and religion have been disengaged for some time in the West, prompting a concerted effort to evaluate their complex relationship, on the Indian side, *science* and *religion* have only relatively recently come to be viewed as distinct concepts. It is the duty of the Western academy to more fully recognize these subtle differences in worldview and cultural perception, and to affirm the legitimacy of Indian views within the field.

Survey of the South Asian Science and Religion Discourse

In order to broaden the science and religion discussion to include contributions from the South Asian angle, we must first take inventory of the present material. This section surveys relevant literature, highlights key scholars, and elaborates on key issues in an effort to serve as a thorough (though by no means exhaustive) reference source for scholars seeking to expand the field.

South Asian representation within Western academic collections. Amid the Christian dominated academic collections on science and religion, a handful of volumes have allotted room for South Asian perspectives. Several introductory essays offer an initial exposition of Hinduism and science and are, therefore, a good place for Western scholars to begin. This essay will consider three such chapters written by Sangeetha Menon (2006), Varadaraja V. Raman (2003), and Anindita Balslev (2000).

Menon's chapter "Hinduism and Science" in *The Oxford Handbook of Religion and Science* offers the most general and concise introduction to the subfield. Quoting often from the Upanishads, she gives a sufficient definition of Hinduism and introduction to Indian thought as if knowing, rightly so, that her audience had not been exposed to this material since their introductory coursework in college. Hinduism is a pluralistic religion in its most general form, a living and dynamic tradition, a "confederation of faiths" (Menon 2006, 9). This pluralism is not limited to outward tolerance, though. It includes a fundamental worldview that accepts a unitary yet multidimensional reality. She writes, "Many dimensions of Truth, many ways of knowing it, and many modes of being it, are built into the Hindu psyche" (Ibid., 11). It is, thus, a holistic tradition that does not distinguish entirely between apparently conflicting principles, such as the one and the many. The Indian unitary view on this paradox is one of the most significant differences from Western exoteric thought.

Menon also emphasizes the epistemological distinctions found in Indian thought. Through elaborate inquiry into the nature of the self, Indian traditions advocate the practice and pursuit of Truth (*satya*) through contextual knowledge. Unlike Western notions of knowledge, this conception includes external and internal knowledge equally, both being understood as necessary for discovering the innate order (*rta*) that underlies reality according to the *Rg Veda*. In other words, both objective analysis and subjective experience are "used as epistemological tools" to create an ontology with respect to rationale and "emotionale" (Menon, 2006, 17). Finally, exposing her *advaita Vedanta* leanings, Menon places Indian epistemology within the nondual theory of consciousness. There is no unitary concept that differentiates itself from the diversity of reality,

and thus, concepts of consciousness and the nature of the self illustrate the symbiotic relationship of immanence and transcendence. In the end, Menon suggests three guidelines for exploration into science and religion from the South Asian angle. We must be able to accept a worldview in which unity can be justly identified amid the diversity. We must be able to establish an "ontological meaning for any experience, its object, and its experiencer" (Ibid., 21). And, we must understand the Indian form of practice and discipline to cultivate self-exploration. The first and final guidelines, I believe, are understated and are by far the most essential for the dialogue to move forward.

In his chapter "Traditional Hinduism and Modern Science" in Ted Peters's *Bridging Science and Religion*, physicist Varadaraja V. Raman approaches Hinduism and science from a practicing scientist's point of view. He lays out several correlational aspects of Hinduism and science but does not go so far as to directly link them, instead choosing to use them as metaphors for a fuller life. Written in first person, the chapter addresses Raman's personal attempts to relate his religious tradition and his profession. Finding both dissonance and consonance in different aspects of nature, Raman begins by noting the vague creation narrative in the *Rg Veda*, which allows for a conception of reality both as beginningless and finite. He offers this view as a middle ground for the cosmogonic debate between the steady-state model and the big bang model of the universe (Raman, 2003, 187). In biogenetic terms, Raman elicits the Hindu concept of the *avatara* to serve as a model for evolution. Though on the surface it seems strange to regard Vishnu's progressive incarnations from fish to human as relevant to evolution, Raman points to a subtle reading, in which a cultural and mental evolution has taken place, leaving open the notion of progress with the tenth *avatara* still to come. (See Brown [2007] for a detailed discussion on avataric evolution.)

Like Menon, Raman emphasizes the Indian traditions' distinct understanding of knowledge. Referencing the *Samkhya* school's division of reality into the distinct yet ontologically interrelated *purusha* (universal self)/*jivatman* (individual self) and *prakrti* (matter and energy), Raman writes, "The demand for complete objectivity may be looked upon as science's attempt to picture *prakrti* without a *jivatman* (*purusa*)," something which cannot be done (2003, 191). Raman turns to Hindu concepts of consciousness to address this incompleteness, suggesting that the human being consists of material being *and* power of mind that has the ability to investigate and experience the unity among the diversity (Ibid., 193). He ends by extending a hand to other scientists of all fields and all traditions, offering to engage with them and encouraging them to consider a compromise or even a subtle integration of their science and their spirituality.

Anindita Balslev takes a more philosophical approach in her chapter "Cosmos and Consciousness: Indian Perspectives" in John Haught's *Science and Religion in Search of a Cosmic Purpose.* Following the theme of the volume, she addresses teleology and its relation to cosmology within the Indian tradition. She argues that the growing rift between Hindu teleology and scientific cosmology is due to a weakened holistic view of reality. The Cartesian divide of mind and matter has relegated the former to a secondary role at the expense of a more complete and comprehensive understanding of the universe. She writes, "To explore the question of *telos*, it seems to me that it is not enough to accumulate information about the material universe alone. We also need to direct our attention to the theme of consciousness. The primacy of consciousness, at least in the epistemic or evidential sense, is undeniable" (Balslev, 2000, 59). While not willing to go the full *advaita Vedanta* route, she grants enough primacy to consciousness to insist that though a universe without a "creator" is cognitively feasible, one without a "knower" is impossible (Ibid.).

In the face of cosmic vastness and science-based skepticism, Balslev finds comfort in the teachings of Sri Ramakrishna, who taught, in her words, that "the knowledge of the immensity of the universe and the plurality of worlds does not make the search for a religious meaning redundant. The cultivation of such a broad attitude is inspired by a holistic approach that can do justice to both religious and scientific enterprises. This way of looking at ourselves and the vast universe is surely an outstanding contribution of Indian culture" (Balslev, 2000, 65). By the end, she essentially calls scientists and hard-line materialists to account for not thinking their cosmological assumptions all the way through to their inconsistent metaphysical ends. She believes that the subtle aspects in Indian spiritual philosophy can push the field forward by helping to remove the hard boundaries that exist based on incomplete teleologies and cosmologies.

Asian-oriented science and religion collections. Stepping outside the Western academic presses, one finds a handful of edited volumes addressing the field from a predominantly Eastern angle. The first major work in this category was physicist Ravi Ravindra's *Science and Spirit* (1991), a collection of both his own articles and several from speakers at the 1988 International Conference on the Unity of the Sciences (ICUS). Written and compiled during the fading of the Cold War and the rise of globalization, *Science and Spirit* has a rather anxious and somber tone, suggesting uncertainty as to how the meeting of the worlds will play out in the near future. Ravindra writes in the introduction, "If the intellectuals, both of the East and West, do not endeavor to forge a right synthesis of science and spirituality . . . this world-wide culture will be based on a very low common denominator, amounting essentially to a lack of ethical standards and of spiritual values"

(1991, 3–4). He worries that too many esteemed scholars forget that the scientific view has its own presuppositions that are not equally shared nor understood in different cultural contexts, a concern still relevant to the discourse today. Most notably, he views the crux of the debate to be the metaphysical differences given the distinct hierarchical ordering of Ultimate Truth on one side and physical reality on the other.

Science and Spirit covers a range of topics that align aspects of several Indian traditions—including Hinduism, Buddhism, and Islam—and Western thought. Split into four main sections, the book addresses traditional religious views of both the natural world and spirituality, science as it is understood in multiple contexts, the interaction between science and spirituality, and finally how science can illuminate spiritual paths. Though there is significant repetition, Ravindra's goals are clear; many of the essential questions about the interaction of science and religion—such as, "Is modern science anti-spiritual in its attitudes, procedures, and consequences?" (Ibid., 7)—are not as simply answered once we extend the meaning of *science* and *spiritual* beyond their Western connotations. One of his own essays on yoga and physics, for example, differentiates *experience* and *experiment*—often closely linked in the Western scientific method—by arguing that while modern natural science is certainly experimental, it is "almost determinedly contra-experiential" due to its lack of comprehensive perception as understood in the yogic context (Ibid., 282).

In *Global Perspectives on Science and Spirituality*, a 2009 collection put out by the Templeton Foundation, physicist Pranab Das addresses the void of non-Western voices by editing a series of essays ranging from Hindu to Eastern Orthodox perspectives. The two essays in *Global Perspectives* specifically relating to Hinduism are from Sangeetha Menon and Makarand Paranjape.

Menon's chapter, "The Puzzle of Consciousness and Experiential Primacy," reflects on the topic of consciousness, especially as it has been discussed in light of David Chalmers's "hard problem"—the problem of explaining why we have experiences at all. Using Indian notions of the self as conscious agent, she responds with a "harder problem" that notes the innate gap between first-person experience and third-person information. She offers ideas from Indian epistemological schools, noting that they promote not only discipline of thought, but also entire lifestyles to enhance the personal experience of agency, which "has a transcognitive function" (Menon, 2009, 15).

Paranjape's chapter, "Science and Spirituality in Modern India," is an expository essay on the historical progression of science, both from within and without. He seeks to identify a foundational concept of knowledge, or *episteme*, of modern India amid its inherent diversity and proclivity for universal tolerance. Adjusting Kant's call of *sapere aude* ("dare to know"),

Paranjape ascribes to modern India the call to "dare to know anew, but do not forget the old" (2009, 50).

Finally, the last collection considered is one edited by Paranjape. Assembled from papers presented at the 2006 Project on Science and Spirituality in Modern India Conference at Jawaharlal Nehru University, *Science, Spirituality, and the Modernization of India* (Paranjape 2008) is a first-rate exemplar of the science and religion dialogue from the South Asian angle. More so than the collections above, Paranjape's volume brings clarity and precision to contemporary dialogue, addressing both the abstract traditional issues as well as on-the-ground modern Indian thought. Taking inventory of both scientific and spiritual perspectives, this volume features authors ranging from scientists to English professors, and from practicing medical doctors to business people.

Paranjape's collection also differs from others in that it emphasizes a highly evolutionary aspect to the concepts at play in integration efforts. In other words, while most science and religion work from the South Asian angle focuses on traditional concepts of knowledge and foundational worldview differences, the authors in this collection accept a more dynamic reading of Indian thought as such. An essay on evolution of consciousness by Rajni Vyas, for example, centers around Sri Aurobindo's teaching that "evolution also evolves" and so to assume a simple linear progression of ideas proves futile (Vyas 2008, 163). Unfortunately, of the three works mentioned in this part, Paranjape's volume is the most difficult to find in the West.

Monographs. Of the literally hundreds of science and religion monographs available, I found only three that contain significant South Asian material: Ravindra's *Science and the Sacred* (2002),[1] Raman's *Truth and Tension in Science and Religion* (2009), and Gosling's *Science and the Indian Tradition: When Einstein Met Tagore* (2007). While each has its limitations, these works are pointing the larger field in the right direction.

In *Truth and Tension in Science and Religion*, Raman approaches the science and religion dialogue with pluralistic and pragmatic intent. While his Indian background shows through here and there, his overall method is simply to include texts and voices from non-Western traditions into the established categories of the broader dialogue. The result is an expansive survey of the field that lacks significant depth, but offers a slightly different lens than standard texts. Through very informal but inviting prose, Raman chastises those in the field who promote conflict, noting that such a schism—real or fabricated—mutually damages both sides. Raman begins with the belief that science and religion are both expressions of the human spirit. After all, he says, we are "bi-sonant," always thinking with both our heads and our hearts (Raman, 2009, 31).

A physicist and philosopher of science himself, Raman praises science—especially its technological achievements—for its universal utility. Increased specialization and complexity, however, have led to a gap between the general population and an accurate understanding of science, clearing the way for the pseudosciences to make their pitch. Therefore, Raman calls on science educators to focus not just on experiments and facts, but on the philosophy, methods, and framework of science itself. He lays out four goals for a progressive dialogue: (1) acknowledgment of the multifarious enrichments provided by religion, (2) recognition of the positive contributions by science, (3) awareness of the possible negatives associated with modern science, and (4) exploration into how obsolete aspects of religion can be reconfigured to align with current knowledge of reality (Ibid., 47–48). Raman's inclusion of tidbits from everywhere end up making the book more of a colorful and expansive introduction to the field and less of an in-depth investigation of Indian thought and science. However, because it does offer textual examples, historical figures, and philosophers from non-Western traditions, it functions effectively as a useful supplement to the other volumes.

David L. Gosling was one of the first scholars to study science and religion in India, publishing *Science and Religion in India* in 1976, and his recent *Science and the Indian Tradition* expands his research in a compact and substantive primer for anyone entering the discourse. Through a mostly historical and sociological approach, Gosling sets out to correct the imbalance by exploring the history of science in India—as it grew from within the culture and as it disseminated from the West—and its interaction with the spiritual traditions. Running throughout the book are references to the Einstein/Tagore discussions that took place in 1930, which continually illuminate the topics Gosling brings to bear.

Science and the Indian Tradition has two notable strengths. First, it paints a rich picture of science as it has progressed and how it has been received throughout Indian history. Starting from the Vedas—through early classification schemes in the *Chandogya Upanishad*—and up to Nobel laureate in physics Chandrasekhara Venkata Raman, Gosling traces the scientific advancements of Indian culture, along the way noting the embrace of science by modern spiritual luminaries Swami Vivekananda and Sri Aurobindo. Second, Gosling provides on-the-ground data for the actual interaction of science and religion among Indian scientists. Testing a running hypothesis based on Western data, Gosling seeks to find out if science has a negative effect on religious belief in India. Based on sociological data, he finds this hypothesis to not only be incorrect, but inversely true; science often enhances scientists' spirituality (2007, 114). From these findings he derives his parting plea: "[Scientist-believers'] contributions both as scientists and as religious believers need to be taken more seriously in order to achieve a deeper and more comprehensive

understanding of the relationship between science and religion" (Ibid., 156).

Vedanta and science. While volumes could be (and have been) written on the nuances of the *Vedanta* school of Indian thought, it will suffice to describe it as a nondual system that arose in response to monistic readings of the *Upanishads* and other important Indian texts. The ultimate reality of *Vedanta* is the Absolute (*brahman*), which transcends and includes everything, including our collective self (*atman*) and our individual self (*jiva*). Within *Vedanta*, several subschools advance subtle variations on the general concept of nondualism, but for the most part, thinkers in the science and religion discourse have focused on one of two, or some vague combination of both. *Advaita Vedanta,* taught by Shankara, is the most famous of the subschools and proposes unqualified nondualism, *nirguna brahman. Vishishtadvaita Vedanta*, taught by Ramanuja, is slightly closer to popular forms of Hinduism and proposes nondualism of a qualified whole, *saguna brahman.*[2]

The reason for the prominence of *Vedanta* in the South Asian science and religion conversation is twofold. First, *Vedanta* is the high caste, intellectual tradition, which, after its presentation by the enthusiastic Vedantist Swami Vivekananda at the 1893 Parliament of World Religions in Chicago, became the first major representation of Hinduism in America. As such, it garnered early attention from Western scholars who considered it a respectable teaching over and above the "lesser" Hindu devotional traditions. In India, due to the prominence of *Vedanta* in the higher castes, the vast majority of ancient, medieval, and modern scientists have been steeped in its teachings. Notable modern Indian thinkers such as physicist/biologist Jagadish Chandra Bose, mathematician Srinivasa Aiyangar Ramanujan, and physicist Satyendra Nath Bose (for whom the boson particle is named) were heavily influenced by *advaita Vedanta* in their work (Gosling 2007, 9, 95–96).

The second reason *Vedanta* has played heavily is its apparent correlation with recent interpretations of scientific findings. As the disparate fields of science began to congeal around the turn of the twentieth century, those scientists also familiar with the nondual teachings of India began to speculate on the true nature of reality. One Bengali scientist in 1910 summed up his feelings about science as follows:

> Let us see what effects the application of science has produced on the most sacred of subjects, namely, our religious beliefs. . . . According to Spencer, behind all the natural phenomena there is the one Eternal Reality, to deny the existence of which makes the world utterly unintelligible but the attributes of which are unknown and unknowable. This assertion, which horrified the theologians of Europe as heretical, appears to closely agree with the Hindu Spiritual Idea. . . . The great scientist-philosophers of the last century, Huxley, Tyndall and Spencer, were one

and all impressed with the great mystery that underlies the phenomena of nature, and it is not too much to hope that if they were born in India they would have turned Vedantists with all their scientific knowledge. (S.C. Mukherji, quoted in Gosling 2007, 66)

Even from the Western side, early twentieth-century science brought about a shift in worldviews toward *Vedanta*. Quantum physicist Erwin Schrödinger wrote in his more reflective literature:

Looking and thinking in that manner you may suddenly come to see, in a flash, the profound rightness of the basic conviction in Vedanta: it is not possible that this unity of knowledge, feeling and choice which you call *your own* should have sprung into being from nothingness at a given moment not so long ago; rather this knowledge, feeling and choice are essentially eternal and unchangeable and numerically *one* in all men, nay in all sensitive beings. . . This, as we know, is what the Brahmins express in that sacred, mystic formula which is yet really so simple and so clear: *Tat tvam asi*, this is you. Or, again, in such words as "I am in the east and in the west, I am below and above, *I am this whole world*." (1964, 21–22 [emphasis original])

Vedanta and quantum theory. The emergence of quantum theory and its philosophical implications over the past several decades has escalated the talk of correlation between science and *Vedanta*. Particularly focusing on the concepts and subsequent experimental verification of superposition and nonseparability (nonlocality), proponents of a nondual reality—especially one with the necessary nuance of *Vedanta*—have viewed quantum theory as an empirically grounded harbinger for a more holistic, yet dynamic depiction of reality. Similar to the antireductionist response in the West, South Asian thinkers have embraced quantum theory as a reenchantment of the world. While our physical, macrocosmic world may appear static at its core, quantum mechanical stipulations at the microcosmic level show a wholly fluctuating foundation. Such a representation fits almost perfectly with *Vedanta*, especially *vishishtadvaita Vedanta*, wherein the material, macroscopic world we live in on a day-to-day basis is understood to be the manifestation of *maya*, illusion or appearance, whereas the true reality is the omnipresent *brahman*, within which the entire potential of the universe is contained.

This correlation between an Eastern system of thought and the strange world of quantum mechanics, though, has elevated two New Age favorites and created a veritable orgy of speculative literature ranging from the grossly oversimplified to the truly bizarre. Thus, the potential for genuine progressive integrative work has been overshadowed by fluff, adding to the Western academic uncertainty toward the South Asian dialogue. Nuclear physicist Manoj Kumar Pal has addressed this tendency, admitting that the philosophical aspects of quantum theory "are tidbits which are very much overvalued by the charlatans of philosophy and science" (2008, 397). Pal critiques many popular integration attempts,

both Western and Indian, for their extrapolation of superposition and nonseparability, essentially criticizing them for Whitehead's fallacy of misplaced concreteness. Referencing Schrödinger's wave equation, Pal asserts that within the microscopic realm, any sort of philosophical conjecturing must be limited to the probabilistic set of eigenvalues for a given equation and its properties. Nothing can be accurately inferred at the macroscopic level from these values (Ibid., 398). Pal then attacks the misuse of superposition, an aspect of quantum theory that posits simultaneous existence of probabilistic phenomena at multiple locations. While popularly used to prove the reality of an entity's *guna* composition as described in *Samkhya* philosophy, superposition does not merely describe the simultaneous presence of multiple characteristics. Pal notes that one's balance of *sattva, rajas,* and *tamas* is more akin to mixing different colors of paint than to quantum superposition (Ibid., 401). Lastly, philosophical speculation over the possibly observer-influenced collapse of a given wave function and the experimental verification of quantum nonseparability—more popularly known as nonlocality or entanglement—has fostered correlations between quantum mechanics and the monistic consciousness of *Vedanta*. (It should be noted that this is just one simplistic element of a nuanced interpretation of the measurement problem within quantum theory, itself just one of several interpretations. See Butterfield [2001].) According to the Upanishads, the individual consciousness, which is used to make an observation and, thus, influence the outcome, is identical with consciousness, or *brahman*. Thus, the interaction that seems nonlocal to our mundane perception is actually the pervasive *brahman* performing a mediating role, indicating a holistic reality. Pal warns against this correlation on two grounds. First, he argues that the nature of individual consciousness is not scientifically well understood enough to sustain such a foundational claim. Second, he rightly states that such a claim merges terminology that ought to remain distinct. In the Hindu context, consciousness, mind, and intelligence are quite different terms. Individual consciousness, *jivatma*, is beyond any sensual intelligence that would interact with a quantum system; to ascribe active agency to it or to the transcendent *brahman* is a conflation of terms. He writes, "Granting that quantum collapse is caused by the ultimate contact of an 'intelligent' observer with the magnified macroscopic instrumental records of microscopic events, it is not so clear why 'intelligence' has to be equated with 'consciousness.' Similarly, nonlocal action at a distance does not uniquely imply a transcendental phenomenon beyond space-time and hence the call for 'Brahman' to mediate it just does not follow very uniquely and cogently" (Pal 2008, 405–06). Finally, sticking with the *advaita Vedanta* view, Pal notes that setting up a quantum structure to support the concept of *brahman* violates, in principle, the nature of a quality-less, *nirguna brahman* (Ibid.).

Consciousness and quantum theory: Amit Goswami's idealist science. Pal does not dismiss all integrative work in the South Asian science and religion field. In particular, he lauds much-maligned physicist Amit Goswami, whose formulation of an idealist interpretation of science offers an intriguing case for discussion (Pal 2008, 478).[3] Growing up in a Brahmin family in India before training as a quantum physicist, Goswami developed a worldview very much in line with the monistic *Vedanta* schools. The central point of his argument is that if we are to integrate science and spirituality, we must break with the modern paradigm that regards matter as the foundation of reality and instead accept that the real ground of being is consciousness (Goswami 1993, 1–2). As mentioned before, this is not consciousness in the local, actively intelligent sense, but more in the Upanishadic sense. Referencing famous quantum paradoxes such as Schrödinger's cat, Goswami suggests that by shifting the paradigm from material realism to monistic idealism, the paradoxes disappear and the puzzling thought experiments make perfect sense. Regarding the cat paradox, for example, he writes,

> In the idealist resolution, it is observation by a conscious mind that resolves the alive-or-dead dichotomy. Like Platonic archetypes, coherent superpositions exist in the never-never land of a transcendent order until we collapse them, bringing them into the world of manifestation with an act of observation. In the process, we choose one facet out of two, or many, that are permitted by the Schrödinger equation; it is a limited choice, to be sure, subject to the overall probability constraint of quantum mathematics, but it is a choice nevertheless. (Goswami, 1993, 82)

Another apparent paradox derives from the mind-boggling entanglement experiments of Alan Aspect. Goswami addresses this troublesome concept of nonlocality with the existence of a transcendent consciousness acting like a fifth dimension beyond space and time in which temporality simply does not exist (Goswami, 1993, 120–21; 127).

One of Goswami's faults as a scholar is his fast and loose use of terms without adequately considering their implications. The use of the word *choice* and its other grammatical forms (see above), for example, implies an argument that Goswami is not making, at least in his early work. The *choice* being referred to in this case is not the intentional choice of an individual, which would insinuate that human beings have far more power over material reality than rigorous science allows, but the "choice" of the ontologically foundational consciousness at the core of monistic idealism. Though he attempts to avert misinterpretations with such caveats as "Remember, also, that in quantum theory, *the subject that chooses is a single, universal subject, not our personal ego 'I'*" (Goswami, 1993, 112 [emphasis original]), he fails to recognize the radical shift in worldview necessary to understand his metaphysics and, thus, haphazardly undermines his argument. I believe that the word *experience* would be a

more suitable alternative, in the sense that one experiences one reality out of the possible options given the nature of potentiality inherent within the universal consciousness.

Toward the end of each of his works, Goswami tends to shift from philosopher of science to pure theologian. He qualifies his views by admitting that "no science can verify the ultimate ontological question about consciousness as the ground of being. *That* has to be verified directly by all spiritual aspirants" (2006, 151, emphasis original). Critiques of his philosophical extrapolations aside, Goswami is a valuable source as he provides an example of someone who interprets sciences from an alternative worldview. If nothing else, this should jar us out of our complacency with certain assumptions that are themselves tied to specific worldviews.

Yoga and science. The Sanskrit word *yoga* is probably the most recognizable Indian term in the modern West. What is not well known, however, is its use as a methodology for the study of reality. Swami Vivekananda remarked that "as every science has its methods, so has every religion. Methods of attaining the end of our religion are called Yoga" (quoted in Gosling 2007, 20). The word *yoga* derives from the Sanskrit root *yuj*, literally "to yoke," and thusly, prescribes a system wherein the practitioner reins in their sensual abilities and focuses them on a particular matter. One common misperception of yogic practice is that it is, therefore, only concerned with inner experience and self-knowledge. Not so. Based in the *Samkhya* school of Indian philosophy, yoga teaches the unity of self with nature, and thus, knowledge of the self is also knowledge of nature (Ravindra 2004, 101).

Yoga's role in the South Asian science and religion field has been methodological and has been propounded mostly by physicist Ravi Ravindra, who argues that the yogic method itself is a kind of scientific approach. He writes, "The science is further extended by the principle of analogy and isomorphism between the macrocosmos and the microcosmos which is the human organism, so that self-knowledge is at the same time a knowledge of the cosmos" (Ravindra, 1991, 274). Immediately the question might be asked, what about the world beyond the self? Is that not where most science takes place? The quick answer from the spiritual side would be that one must know the self as the outside. Ravindra, however, accepts the distinction between yoga and science and seeks instead to discuss how one can use the former to enhance the latter. While both yoga and science are interested in knowledge, they have different conceptions of what *knowledge* is. The objective knowledge sought by science is useful within the objective context in which it is studied, but such an apparatus typically discounts the subjective context. The method of yoga is to perceive some object as both an object as such, and as an object within a transmaterial setting. Echoing relational epistemology, Ravindra states, "True knowledge

is obtained by participation and fusion of the knower and the object of study, and the scientist is required to become higher in order to understand higher things" (2004, 104).

The methods of yoga, according to Ravindra, have the potential to greatly advance the scientific enterprise. While modernist interpretations of science have typically been concerned with matter and energy, the rise of postmodern views of science has begun legitimately to lead South Asian scientists to consider consciousness as both a subject of study itself (Anatharaman 1996, 38) and—even more on the cutting edge of science—as a useful tool for scientific investigation. Ravindra adds:

> This has implications for any future science of higher consciousness which would hope to relate with what is real. Such a science would have to be *esoteric* . . . because it would speak of qualities which are more subtle and less obvious . . . such a science would demand and assist the preparation, integration and attunement of the body, mind and heart of the scientists so that they would be able to participate in the vision revealed by higher consciousness. (2004, 104–05 [emphasis original])

Thus, for the purposes of the South Asian field, yoga's inclusion as a methodology, even without its particularly spiritual aspects, moves the conversation toward a new perspective on how we go about doing science in the world.

Spiritual thinkers in the South Asian science and religion dialogue. While popular perception tends to regard traditional religious views as inherently antagonistic to the rise of science, several major Indian spiritual thinkers of the late nineteenth and twentieth century embraced the influx of scientific knowledge. Paranjape notes that in contrast to other colonized Asian countries, India was unique in that "spiritual leaders also played a key role in . . . modernization. What is more, many of them embraced, or at any rate welcomed, modern science" (2008, xxi). Raghuram Raju adds that several Indian leaders involved in the Independence movement—notably Bankim Chandra Chattopadhyaya, Swami Vivekananda, Aurobindo Ghose, and Sarvepalli Radhakrishnan—sought to counterbalance the materialism of Western influence with India's rich spirituality, culminating in an integrated modernization (Raju 2008, 96). For the reasons mentioned above, modern and postmodern views of science seemed to be generally homologous with long-held Indian spiritual beliefs, leading to a surge of figures who sought to work out an effective synthesis. This section will examine three such figures.

Before earning fame as the little Indian monk who introduced Hinduism to America in 1893, Swami Vivekananda (1863–1902) received a Western education in Calcutta while being a spiritual student of famed guru Sri Ramakrishna. Versed in science and deeply influenced by *advaita Vedanta*, Vivekananda understood science to "study the variations which have been

manifested by *Brahman*, and since *Brahman* is ultimately one, all branches of knowledge must finally converge" (Gosling 2007, 18). Although he passed away 3 years before Einstein would unleash special relativity, Vivekananda had a similar notion—at least on the philosophical level—of space-time linked with causality. He suggested that *maya*, the *Vedantic* concept of illusion or appearance, prevented us from truly identifying with *brahman*, the true reality, by veiling the world with appearances of gods (*ishvaras*), selves (*jivas*), the natural world (*jagat*), which are made up of the interdependence between space, time, and causality (Ibid., 19). In other words, it is not the appearances themselves that separate the perceived world from the Absolute, but an intertwined matrix of space, time, and causality. Though his views on science have gained traction in some of the Western world, he is now better known for his work toward globally inclusive spiritual enlightenment.

Sri Aurobindo (1872–1950) is one of the most complex figures in modern Indian thought. Educated in the West and a participant in early Indian nationalistic movements, he had a profound spiritual experience while serving a jail sentence and emerged with a system of integral philosophy unparalleled anywhere in the world. While his integrative literature is vast, for the purposes of this essay, I will discuss two major contributions made by Aurobindo to the South Asian science and religion dialogue. First, he epitomized the science and religion integration effort. As a key figure during the modernization and independence of India, he strongly advocated for the inclusion of science *and* spirit in any progressive worldview. He believed that the scientific reason coming from the West was immensely helpful and would prove necessary for the future. He writes that European influence compelled the Indian mind "to view everything from a new, searching and critical standpoint, and even those who seek to preserve the present or restore the past are obliged unconsciously or half-consciously to justify their endeavor from the novel point of view and by its appropriate standards of reasoning" (Ghose 1972b, 22). On the other hand, he criticized the Western worldview for its strict objectivity and materialism. Preceding the advent of feminist/relational views of science, he criticized the scientific method for its innate need to extract its object of study from its natural environment, whatever the context may be, and thereby render it incomplete (Gosling 2007, 23). In a view similar to Goswami's, he argues that while all human energy does indeed have a physical base, "The mistake made by European materialism is to suppose the basis to be everything and confuse it with the source" (Ghose 1972a, 334). Thus, Aurobindo offers India's strength of spiritual knowledge and practice to cohere with materialism to form an integral synthesis. He continues, "The source of life and energy is not material but spiritual, but

the basis, the foundation on which the life and energy stand and work, is physical" (Ibid.).

The second insight Aurobindo gave to the South Asian field was an evolutionary system wherein the cosmos as a whole reflects a divine *involution*, and the emergence of reflective consciousness in humanity allows for an integrative *evolution*. Hinduism scholar Dermot Killingley clarifies Aurobindo's terms as follows: "Aurobindo uses the word 'involution' to indicate the process whereby the Divine becomes the manifest world, reserving 'evolution' for the reverse process whereby the world, led by pioneering individuals, is brought back to the Divine. . . . Aurobindo insists that at each stage in evolution the previous stages are not left behind but taken up" (1995, 195–96). Similar to the Western view on spiritual evolution found in the works of Pierre Teilhard de Chardin, Aurobindo's system takes natural science into account and relies heavily on contemporary understandings of human psychology. Indeed, while the systems of both men see the world as being on a journey toward the divine—*Supermind* for Aurobindo and *Omega Point* for Teilhard de Chardin—the prescribed practices and methodological considerations themselves are self-organizing, that is, without divine intervention and exist entirely within the natural world (Mikes 2008, 130). The ascent through levels of consciousness toward enlightenment is immanently attainable with the right practice, which Aurobindo calls Integral Yoga. Vyas offers a concise summary of Aurobindo's relevance to the science and religion dialogue and to humanity in general: "[W]hat Sri Aurobindo conceptualized as a continuum of physical-vital-mental being is beginning to be understood as a single entity of body-mind that has enormous therapeutic potential. The culmination of understanding of the entire axis of evolution of consciousness in a person will come about when 'the matter shall reveal the face of spirit'" (2008, 167).

As the first non-Euoropean to win the Nobel Prize in literature, Rabindranath Tagore (1861–1941) earned worldwide fame as an exquisite poet and novelist, but outside his literary efforts Tagore enjoyed jaunting though general intellectual territory, earning him a high reputation among both scientists and spiritual thinkers as a global polymath. Tagore's fascination with science was evident throughout his writings, whether making general commentary about the nature of the scientific enterprise or lauding fellow Indians in their scientific pursuits. Tagore's enthusiasm for science pervades his 1930 Hibbert Lectures, later published as *The Religion of Man* (1931). Inside, he waxes poetic on science, describing it as "mysticism in the realm of material knowledge" that allows humanity to move beyond appearances, which are mere abstractions, and embrace the freedom of reason (Ibid., 189). Tagore's use of *reason*, though, was not limited to Enlightenment-inspired empiricism. It included the responsible use of subjective experience as well, as evidenced by his support for Indian

scientist Jagadish Chandra Bose. Amid much skepticism over his work on the "experience" of plants, Bose earned a glowing review from Tagore, who saw Bose's efforts as more than just curiosity, but as an attempt at integrating the sciences. Tagore writes, "European science is following the way of our philosophy. This is the way of unity. . . . Acharya Jagadis has discovered the unifying bridge between the living and the non-living with the help of electrical waves" (Tagore 1957, 107).

Reflecting on the conversations between Einstein and Tagore, one could easily perceive them to have been a debate between Western science and Eastern spirituality, but Gosling remarks that Tagore's commentary resembled later work by philosophers of science Hilary Putnam and Roger Penrose, notably the latter's view that the human brain uses coordinated and interconnected quantum events to function nonalgorithmically, resulting in intuitive knowing. Gosling remarks that this view lines up with Tagore's Hindu notion of intuitive knowledge and might be a fruitful path for a South Asian conversation on religion and science (Gosling 2007, 141–42).

Deficient areas within the South Asian science and religion discourse. Though clearly more material is available on the South Asian science and religion dialogue than one might have assumed, I must conclude this section by mentioning briefly a few areas within the subfield that lack sufficient representation. The largest gap in the literature is the lack of attention to the devotional *bhakti* schools of Hinduism, which are by far the most popular forms of Hinduism and in many ways resemble popular Western religions, making them a fruitful excursion for comparative efforts within the global science and religion discourse. Second, Indian medical science, specifically Ayurveda, needs more scholarly exposure through research and academic treatment. Amid the recent growth in validity of several complementary and alternative health practices, Ayurveda has been mostly ignored. Its elevation to medical legitimacy—though both empirical testing and broadening the Western biomedical worldview to include alternative and more holistic conceptions of health—would extend the South Asian conversation into the medical sciences and, I believe, enhance available treatments. Finally, while some work has been done on the yoga school by Ravindra and Anantharaman, I believe this discussion to be less nuanced than it potentially could be if, like studies on Ayurveda, the medical aspect were integrated into the discussion. One notable exemplar for this path is the recent piece on the neurobiology of *chakras* by Richard W. Maxwell (2009). Overall, though, there are not many significant areas within Hinduism that have not been at least mentioned in the South Asian science and religion dialogue, which just adds more befuddlement as to why so little of it is referenced in the Western literature.

Suggestions for Progress

Given what we now know about the availability and range of material on the South Asian science and religion dialogue, what steps can be taken to integrate it with the Western discourse? I propose three paths. First, within the South Asian discourse itself, the discussion must become more inclusive of on-the-ground data and address more popular forms of Hinduism. Second, the Western academy needs to better understand the Indian context on its own terms instead of applying assumed objective categories. Third, and most importantly, efforts must be made on both sides of the globe to better translate the Indian systems of thought into Western terms so as to facilitate a better understanding of these very different and highly nuanced worldviews.

Getting the South Asian science and religion discourse closer to the ground. As noted above, a great amount of South Asian science and religion literature has dealt with high religious philosophy that has been quite influential in both the formation of Indian thought itself and its diffusion across cultures. However, *advaita Vedanta* represents a fairly small amount of the Indian population and Hinduism in general. To hold up *advaita Vedanta* as the exemplar of Hinduism is akin to labeling Meister Eckhart the paragon of Christianity. The vast majority of Hindus practice some sort of devotional *bhakti* tradition. Based on his sociological work in India, David Gosling suggests that some 90% of Hindus are theists (2007, 39), and while being a theist in the infinitely pluralistic religion of Hinduism does not necessarily imply *bhakti*, it is fairly safe to say that the *bhaktins*, or at least those with some element of *bhakti* practice, significantly outnumber followers of Shankara. Not only is it by far more common than *advaita Vedanta*, but it is likely more recognizable to a Western audience whose exoteric forms are similarly devotional in nature. Research into this common ground on the religion side of the dialogue might spark a more comparative approach than appeals to postmodern views of science can provide.

Understanding the Indian context in its own right. As alluded to in the first section, the conversation as it is practiced in the Western academy has a tendency to use the terms *science* and *religion* in ways that match preconceived ideals of each. The latter term has been handled within religious circles by theorists such as Talal Asad, who argues that the very term *religion* is a Western concept that does not fit snugly when applied to traditions outside Christianity (Asad 1993). Asad's case is amplified when it comes to Hinduism. Throughout this essay, I have interchangeably applied the terms *Indian*, *South Asian*, and *Hindu* to spiritual traditions that are generally given the label *Hinduism*. Admittedly, this is problematic,

but it is evidence of the sheer impossibility of fitting Hinduism into the religion side of science and religion without taking significant nuances into consideration, notably that what the West would break up into *science*, *philosophy*, and *religion* all blend together under many versions of Hinduism. Thus, one must contextualize any discussion of Indian spiritual traditions as integrated with their scientific and philosophical aspects.

On the other side of the pairing, the term *science* also presents a problem for progressive discourse. As elaborated briefly above, Indian science differs from European science. To lump a broad swath of diverse histories under one term is simply disingenuous. While the archetypes of mathematical and physical truths may be objectively true regardless of ethnic history, the cultural contexts and worldviews within which those forms were discovered and are presently integrated differ in crucial ways. Particularly noteworthy is Gosling's finding that postmodern interpretations of science seem to have actually increased the spirituality of Indian scientists, in contrast to conventional expectations in the West (2007, 114). Such an opposing trend seems to signify a different fundamental worldview at the core of Indian scientists that does not lead to the same conclusions made by those in the West. Therefore, instead of consistently applying assumed Western preconceptions of science and religion to non-Western instantiations of the dialogue, we need to recognize that science and religion have their own unique characterizations in Indian thought. These characterizations must be considered in their own right if we are to progress the field.

Efficiently translating the Indian worldviews into Western discourse. The reason why so much Indian thought sounds otherworldly to a Western audience is because in a very important sense—though not in a pejorative one—it is. It is a genuinely distinct set of worldviews. The subtlety and unspoken assumptions of worldviews often cause them to go unconsidered when discourses move between cultures. Much of the lack of integration of South Asian thought into the Western science and religion conversation derives from difficulties associated with the translation of Indian concepts and epistemological systems into a Western setting.

The first difficulty revolves around the rendering of Indian terms and concepts into Western languages. As with any translation, some subtleties are inherently lost, but going from classical Sanskrit to modern languages unavoidably leads to tremendous erosion of meaning. Three concepts in particular stand out as problematic: *dharma*, *maya*, and *cit.*

Dharma often translates to "religion" in the English literature, and while what we consider religion mostly falls under the term, *dharma* has significantly more weight to it. *Dharma* is not just religion in the sense of one's beliefs, but also one's purpose, one's goals, and one's meaning in

the material, spiritual, and integrated world on one level, and on another level a sort of cosmic order analogous to the Vedic concept of *rta*, or innate order.

Maya, as I discussed above, is commonly translated as "illusion." However, when used in conjunction with Ultimate Reality, as is the case in *advaita Vedanta*, this translation invites the mistaken assumption that since the manifest world is illusion, it is not real. This assumption quickly slips into the incorrect notion that the material world does not matter and should shift to the back of one's mind. However, in truth, *maya*, even as illusion, is still part of the *lila*, divine play, of Ultimate Reality. Thus, a better translation of *maya* would be "appearance." Therefore, instead of forsaking the world or attempting to ignore it as illusion, one should seek to know the nature of appearance as experienced in the world. Then, following the concept of true knowledge, *vidya*, one can identify the nature of appearance as part of Ultimate Reality.

The term *cit* causes trouble in translation because it serves as just one of many words that mean "consciousness." For the purposes of this survey, rather than dive into the shades of meaning within the Sanskrit, I am more concerned with how translation of *cit* as "consciousness" has generated such hostility to the idea among so many Western commentators. In English at least, consciousness is assumed to carry with it some sort of intelligence or at minimum a kind of agency. But in most Indian schools, *cit* just is. Depending on the level of manifestation it may be considered passively or dynamically pervasive, but in either case no intentional action, divine or otherwise, is assumed.

The second difficulty arises over the subtly contrasting epistemological methods. The Western mind has built its methodology out of Enlightenment views of the objectivity of reason, resulting in immense advancement in the physical sciences and technology. Another result, though, has been the extraction of objects of study from both their own context and the inner perception of the observer. Indian epistemologies, though, function differently. Menon remarks, "What distinguishes the Indian way of thinking from what we today call the Western way of thinking is the wholesome connection present in the Hindu world between theoretical, experiential, and transcendental issues. It is also this distinguishing feature of Indian thinking that is often dismissed as 'mystic' and 'otherworldly'" (2006, 19). Before the diffusion of Western science, and still today, Indian thinkers have stressed the first- and second-person observations over the distant third-person through prescriptions of intuitive study and meditation, another widely mistranslated and misunderstood epistemological endeavor.

The Western image of Indian meditation typically involves quiet contemplation in a highly specialized setting for the purposes of achieving a higher peace, akin to certain notions of prayer. While this picture is not

entirely unfair, the practice of meditation is considered to be far more than a path to inner peace from the Indian perspective. Ravindra notes, "*Prayer* in the *West*, unlike *meditation* in the *East*, may strengthen one's faith but is not expected by anybody, intellectuals or others, to lead to any sort of *higher knowledge*" (1991, 18 [emphasis original]). Though certain esoteric schools of Christianity may argue with that notion, for the most part it stands. Meditation in the Indian context, on the other hand, is a form of deep experimentation. It is a well-honed apparatus for observing the world not just through the third-person, but through the first- and second-person as well. Raman refers to it as "the penetrating power of the mind that can fathom the ultimate nature of the complex world, reach the very ends of the universe, and mathematize the cosmos" (2003, 193). In a more poetic tone, Tagore writes:

> Though science brings our thoughts to the utmost limit of mind's territory it cannot transcend its own creation made of a harmony of logical symbols. In it the chick has come out of its shell but not out of the definition of its own chickenhood. But in India it has been said by the yogi that through an intensive process of concentration and quietude our consciousness does reach that infinity where knowledge ceases to be knowledge, subject and object become one, a state of existence that cannot be defined. (1931, 90–91)

I can already hear the scoffing from those wedded to rationalism, but if the dialogue is ever to become a truly integrative endeavor, it must stop trivializing alternative methods of epistemological inquiry that are rooted in thousands of years of careful self-examination and study of the world.

Luckily, the rise of postmodern views of science and their corresponding worldview has allowed once slandered notions of knowing to take up residence among the halls of higher academic research. Menon notes that advances in psychology and brain science have inaugurated a transition in the West from the standard objective view to the more relational view akin to the one intuited in Indian epistemology (2009, 5). Thus integration is well on its way to bringing about collective scientific progress, and the academy would do well to understand and perhaps even attempt to apply the Indian worldview to more than just these particular fields of study.

Conclusion: A Dynamic Snapshot

Now that I have reached the end of this tour through the state of the South Asian religion and science subfield, I hope to have made my case regarding the limitations of the dialogue as it is currently practiced in the West, the range of available South Asian scholarship on several key areas, and the necessary steps forward for further inclusion and integration. I have attempted to provide a dynamic snapshot of an ever-growing subject, leaving several works unmentioned and several conceptual stones unturned.

Yet without promising leads for future investigation, a scholar loses his or her purpose.

Notes

1. As this monograph is mostly a reprinting of Ravindra's articles from his edited volume *Science and Spirit*, I will not summarize it in this section. Suffice to say that the themes remain the same, though the emphasis shifts more to the personal transformative aspects of integration of science and spirituality.
2. Often *vishishtadvaita* is translated as "qualified non-dualism," connoting a subtlety different meaning than is actually conceived of in the subschool, which is a non-dualism of a qualified whole as opposed to the non-dualism of an unqualified whole found in *advaita Vedanta.*
3. Goswami's inclusion among many iffy "specialists" in the New Age film *What the Bleep Do We Know?* and his general tendency to write near the fringe of academic thought has earned him nothing but disdain from the established Western academy. However, for the South Asian field, I believe some of his ideas and interpretations to be worth bringing to the table for further progressive discussion.

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