Hinduism and Science: Contemporary Considerations

with Varadaraja V. Raman, "Hinduism and Science: Some Reflections"; David L. Gosling, "Science and the Hindu Tradition: Compatibility or Conflict?"; Thomas B. Ellis, "Growing Up Amid the Religion and Science Affair: A Perspective from Indology"; C. Mackenzie Brown, "Conciliation, Conflict, or Complementarity: Responses to Three Voices in the Hinduism and Science Discourse"; Jonathan B. Edelmann, "The Role of Hindu Theology in the Religion and Science Dialogue"

CONCILIATION, CONFLICT, OR COMPLEMENTARITY: RESPONSES TO THREE VOICES IN THE HINDUISM AND SCIENCE DISCOURSE

by C. Mackenzie Brown

Abstract. This essay is a response to three review articles on two recently published books dealing with aspects of Hinduism and science: Jonathan Edelmann's *Hindu Theology and Biology: The Bhāgavata Purāṇa and Contemporary Theory*, and my own, *Hindu Perspectives on Evolution: Darwin, Dharma and Design*. The task set by the editor of *Zygon* for the three reviewers was broad: they could make specific critiques of the two books, or they could use them as starting points to engage in a broad discussion of Hinduism and science, or religion and science in general. In my response, I first provide a fairly detailed reply to David Gosling's many critiques of my book, and in the process call into question his Advaitic conciliation of Hinduism and science. Thomas Ellis's thesis of basic incompatibility between Hinduism and science is much closer to my own viewpoint. One of the main objectives of my book was to explain and illustrate this incompatibility with specific regard to Hindu and Darwinian perspectives on evolution. In this essay I provide a few examples in support of Ellis's incompatibility thesis, encompassing both epistemological and metaphysical dissonances. Finally, I reflect upon Varadaraja V. Raman's wide-ranging exposition on the all-encompassing nature of the Hindu tradition that readily accommodates both religious and scientific quests for knowledge. Raman uses the two books only as starting points for his own thoughts, without reference to my book. I confine myself, accordingly, to a brief critique of his complementarity approach to Hinduism and science, and of his radical inclusivism that enfolds basically all philosophical positions into the warm embrace of the Hindu tradition, including even the extreme antireligious materialism of the Cārvāka.

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In their responses to my book, *Hindu Perspectives on Evolution*, David L. Gosling, Thomas Ellis, and Varadaraja V. Raman present three contrasting perspectives on the relationship of Hinduism and modern science. I shall first respond at some length to the rather critical response of David L. Gosling and to his argument for reconciling science and the Hindu tradition on the basis of an Advaitic viewpoint. I will then proceed, much more briefly, to the sympathetic response of Thomas Ellis and his incompatibility thesis. And finally, I will conclude with a few observations about Varadaraja V. Raman's essay, which is not really a response to my book but rather a reiteration of many of his own views on Hinduism and science.

Gosling's Advaitic Conciliation and Other Disputed Points

The title of Gosling's response, "Science and the Hindu Tradition: Compatibility or Conflict?," clearly points to the central issue of my book: the compatibility or lack thereof between modern science and the Hindu Dharmic traditions. I focus more specifically on one aspect of modern science: evolutionary biology. But in many ways the topic of evolution, given its significance in modern biology, serves as one of the critical touchstones for assessing the extent of harmony or conflict between any contemporary religious tradition and modern science.

The word *evolution* that appears in my title, as Gosling points out, has a great variety of meanings: the various Sanskrit approximations like *pariṇāma*, diverse Hindu versions of spiritual evolution based on notions of karma and rebirth, nineteenth-century Lamarckian and Spencerian renderings, and finally organic or Darwinian evolution, including its later modifications in the Modern and Extended Syntheses. It is precisely the immense ambiguity of the term, I contend, that has obscured underlying conflicts between the frequently alleged Hindu acceptance of "evolution" and Hindu rejection of critical aspects of Darwinian theory, most specifically the mechanisms of random genetic mutation and natural selection. In addition, there is a diversity of Hindu perspectives on ancient Dharmic notions of evolution within the classical schools, long before Darwinian evolution entered into the Indian arena from the West. For these reasons, I purposely chose the wording of the title to be as inclusive as possible, to take into account the many tangled threads of Hindu evolutionary perspectives. The argument of the book depends upon clearly

demarcating and then disentangling these threads, thereby allowing for a clearer assessment of harmony or conflict when we know the meanings of the basic terms that are under discussion.

In like manner, I used the word *design* in the subtitle to convey far more than its restricted meaning as Intelligent Design, a very recent development in conservative creationist Christian circles primarily in the United States (as Gosling himself acknowledges in his response). Just as the idea of design has a long history in Western religious and philosophical thought going back at least to Plato, Hindu versions also have a lengthy record, as detailed in my chapters on Śaṅkara, Rāmānuja, and Udayana. And as in the West, India has had its full complement of design detractors—perhaps most notably Rāmānuja himself, who anticipated many of the arguments against design that we see in David Hume several centuries later. And yet Rāmānuja, like Śaṅkara, was willing to use design arguments to discredit atheistic opponents. The title of my book, including its subtitle, was thus intended to put into play the multiple meanings of evolution and the diverse traditions of design, Christian and Dharmic, in order to examine their various interactions in the colonial and postcolonial periods. Hindu intellectuals have constantly drawn upon diverse features of their classical heritage, reformulated and revised, in confronting the many challenges of modern science, including after the 1860s the special challenges posed by Darwinian theory. Such a broad analysis, I believe, demonstrates the enormous complexity of the issues involved in attempting to determine the degree of harmony or discord between Hindu and Darwinian perspectives on evolution.

In the end, I conclude that discord, if not outright conflict, best characterizes the Hindu-Darwinian discourse of the last century and a half, despite frequent protestations of harmony on the part of both Hindu insiders and sympathetic scholars of Hinduism. This was not the conclusion I expected when I initiated my researches on the topic more than ten years ago, beginning with the anti-Darwinian publications of the International Society for Krishna Consciousness (ISKCON). I assumed that ISKCON was not representative of mainstream Hinduism (whatever that may be), and believed that the less theistic, more idealist, or nondualist perspective of Advaita Vedānta would be more compatible with Darwinian evolution. And in some ways, this is certainly true. But whereas ISKCON's anti-Darwinian views are often screamingly explicit, Advaitic opposition is generally muted or concealed—at least to the casual reader—beneath an illusion of harmony. My initial expectations, I realize now, were naive, given the fundamentally nonteleological character of evolutionary theory and the deeply teleological nature of the Dharmic traditions—even of those, like Aurobindo's, that partially qualify their teleological perspective in the name of *līlā*, the divine play, however real or illusionary, that proceeds for its own sake without any extrinsic or ulterior purpose. What I did find,

and not surprisingly in retrospect, was a broad spectrum of responses to Darwinian evolution, from Vedic creationism to Vedāntic evolutionism. I could find no Hindu thinker who, even if professing an openness to Darwinian evolution, accepted it on its own terms. It was especially the idea of randomness that characterizes the Darwinian evolutionary mechanism of chance variations (what we today call genetic mutations) that was simply too big a pill to swallow.

Gosling clearly does not agree with my basic conclusion regarding the fundamental tensions I have just described. He finds my approach to be flawed by what he calls "cherry-picking." For instance, he is not comfortable with my inclusion of the theistic tradition to the extent that I do—from the *Śvetāśvatara Upaniṣad* down to the Gauḍīya Vaiṣṇavism of Swami Prabhupada and ISKCON. Regarding my use of the *Śvetāśvatara*, Gosling feels I am misled because I describe this text as "early." While I am aware that it is not the oldest of the Upaniṣads, it is certainly "early" in the Hindu tradition overall, and the renowned Upaniṣadic scholar Patrick Olivelle includes it in his volume of *The Early Upanisads*. Olivelle notes that the *Śvetāśvatara*, along with the *Kena*, *Kaṭha*, *Īśa*, and *Muṇḍaka* Upaniṣads, "exhibit strong theistic tendencies and are probably the earliest literary products of the theistic tradition, whose later literature includes the Bhagavad Gītā and the Purāṇas" (1998, 13). He dates all of these theistic Upaniṣadic texts to probably "the last few centuries BCE" (*ibid.*; see also the excellent text-critical analysis of the *Śvetāśvatara* by Signe Cohen [1998], who comes to essentially the same conclusion). While nondualism may represent, as Gosling would have it, "the overall thrust" of the Upaniṣads—although this is debatable—this would not mean that the theistic strand is insignificant, especially given the rise of the devotional (*bhakti*) movements in the early centuries of the Common Era.

I will return later to the matter of cherry-picking but first want to address some of Gosling's comments about my treatment of the classical thinkers, especially Śaṅkara. Gosling points out that Śaṅkara was mainly opposed to the Sāṃkhya for its matter-spirit dualism, a view with which I agree. But Śaṅkara had no qualms in utilizing the design argument in a tactical move to discredit Sāṃkhya on rational grounds. And his employment of the argument is leveraged quite specifically against the Sāṃkhyan doctrine of Prakṛtic ("naturalistic") evolution. Gosling also seems concerned about my use of the term *design* to translate the Sanskrit word *racanā* employed by Śaṅkara. Gosling then proceeds to quote from my book a passage from Śaṅkara's commentary on the *Brahma-Sūtras* that we both agree is important to my argument. (Incidentally, I wish to correct Gosling's statement that the translation of Śaṅkara's commentary is Thibaut's. It is mine, as I indicate in the Preface, where I also note that I sometimes provide page references to English translations for the convenience of those who

do not know Sanskrit.) In the passage Śaṅkara explicitly criticizes the Sāṃkhya for attributing the evolution of Material Nature to itself, since such a nonintelligent entity cannot transform itself without a superintending conscious agent. Gosling notes that I view Śaṅkara's design argument as significantly weakened by his appeal to scripture—and I would add by his appeal to the ultimate truth of nonduality—and thus Gosling concludes that my "muted approval for Shankara's claims represents a credible though debatable argument. . . ." I am thus not really sure what Gosling is criticizing, if anything. In any case, Śaṅkara's design argument is important as a model for Hindu intellectuals in the colonial period. At the outset we see the pioneering modernist and rationalist Rammohan Roy citing Śaṅkara's design argument in response to the incoming flood of European theological and philosophical ideas, including Deism.

I am similarly puzzled by Gosling's comments on my analysis of Rāmānuja. Gosling, after noting my claim that both Śaṅkara and Rāmānuja use the design argument against atheistic schools, takes no specific notice of Rāmānuja's actual use of the design argument, which I discuss in some detail. Instead, Gosling affirms that for Rāmānuja, Brahman is both the material and efficient cause of the universe, and that in neither case can you argue from the nature of the effect to the nature of the cause. I agree that this is Rāmānuja's view, as I make clear in my book (see pp. 49, 51–6). And I readily acknowledge that for Rāmānuja using the design argument is a tactical maneuver only.

The most impressive of all the classical thinkers who utilized the design argument is undoubtedly Udayana, whom Gosling does not mention at all. Udayana, from his theistic-atomistic perspective, and being quite aware of earlier critiques of nontheistic cosmologies, sets out the most elaborate set of rational arguments for the existence of God in the Hindu tradition as a whole. Many of his cosmoteleological and socioteleological arguments go well beyond Śaṅkara's and Rāmānuja's presentation of design. Udayana's theistic-atomistic design arguments, I also note, were taken up by Hindus in the colonial period to counter Western missionary propaganda, as seen, for instance, in the writings of Dayananda Saraswati.

Coming to the colonial period, Gosling feels I continue to cherry-pick, scouring sources looking for references to evolution. Given that my central topic was evolution, I hardly find that inappropriate. Gosling notes, in particular, that my "claim that Darwinian evolution was criticized by educated Hindus seems to be based on a single speech by a youthful Bengali addressing an audience in English." Gosling guesses that he "was a bumptious young man playing to the galleries," but this youthful Bengali was none other than Mahendralal Sircar, who was cofounder (along with the Jesuit Belgian missionary Eugene Lafont) of the Indian Association for the Cultivation of Science.

I accept Gosling's statement based on his own research that the Bengali literature of the time was either "overwhelmingly positive" toward Darwinism or indifferent. But I am left to wonder how familiar these Bengalis really were with Darwinian theory and how critical in their acceptance. Gosling notes, for instance, that in England the notion of common ancestry for human and nonhuman animals may well have been a stumbling block to the endorsement of Darwin's theory. Educated Indians, he suggests, may have had an easier time than the Victorians in accepting evolution, "since for them [the Indians] the theory of reincarnation presupposed such a belief" (1976, 15). But the Darwinian theory of common ancestry is quite different from, and in many ways, I argue, in considerable tension with, Hindu notions of karma and rebirth. The latter link together the different levels of organic beings in the Hindu equivalent of the Great Chain of Being. But the various animal forms do not evolve one into another over time. Rather they serve as different vehicles (perhaps all created at one time at the beginning of creation) to be temporarily occupied by transmigrating souls as they undergo diverse embodied experiences. This is karmic or spiritual evolution, not organic. Any suggestion that Darwinian and karmic evolution are essentially corresponding theories, or even compatible, is at best misleading. Gosling acknowledges this, at least in part, in his book, *Science and the Indian Tradition: When Einstein Met Tagore*, where he states: ". . . the same evolutionary ideas which in England had helped to drive a wedge between science and religion, when transferred to India, were seen to be consistent with the principles of Vedānta. But while this may have been true in general terms, detailed comparison between traditional Indian ideas and Western scientific concepts reveal important differences" (2007, 67).

In any case, regardless of whether other Bengalis (speaking in English or Bengali) were either indifferent to or accepting of Darwin's ideas, Sircar points to an issue that remains central to the Hinduism-evolution discourse: transmigration of souls *versus* Darwinian progressive development. And there were many other educated Hindus besides Sircar who criticized Darwinism or crucial aspects of it. Dayananda Saraswati did this directly (more on him later), but so also, in somewhat more muted or ambivalent tones, did Keshab Chandra Sen, Vivekananda, and later, Aurobindo. Their usual strategy was to disarm Darwinism by consigning it to a lower level of knowledge inferior to the higher spiritual knowledge arrived at by some kind of meditation or yogic intuition. But such a strategy merely conceals real conflicts, and then only imperfectly. Thus, Vivekananda thinks that Darwinism cannot explain the inherited characteristics and instinctive behaviors of babies (such as suckling), and Aurobindo rejects both Darwinian gradualism (however, much that may be modified today by notions of punctuated equilibrium) and the notion of common organic ancestry, insisting that different animal forms are distinct types each with

their own essential nature and not evolving one into another. All these Hindu demurrals are detailed in my book.

As for my inclusion of Dayananda Saraswati, Gosling sees this as an unfortunate choice, since Dayananda "has hardly any hermeneutical sense whatever." I fully agree with this characterization of Dayananda, but this does not lessen his importance as representing a recurrent and prominent theme in Hindu responses to modern science: the whole movement toward rediscovery of Vedic Science. While Dayananda may have "discovered" guns and other technological achievements of modern science (e.g., electricity and flying machines), in the Vedas, this was accomplished only by what Gosling correctly calls a "deeply flawed technique." But only by a similarly flawed technique was Vivekananda able to discover Darwinian evolution in the *Yoga Sūtras* of Patañjali. As Gosling notes in his response, the organization that Dayananda founded, the Arya Samaj, "appealed to a far wider range of lower-middle-class north Indians than either the Brahmo Samaj or the Ramakrishna Mission. Its anti-Western assertiveness paved the way for the contemporary Sangh Parivar." As such, Dayananda's thought is deserving of considerable attention, in my view. I agree, however, with Gosling that Vivekananda, in comparison with Dayananda, "offered a much more robust synthesis of Hindu and Western thought." I simply was not looking for only the more sophisticated thinkers of the Hindu renaissance, but rather for any thinker (including the sophisticated) who gave voice to important responses to the ideas of evolution and/or design.

Gosling also finds unacceptable my juxtaposing of Dayananda's design argument with its "classical Hindu karmic twist" and Paley's natural theology, despite my carefully distinguishing between the two. Gosling simply asserts that "[t]his kind of juxtaposition of western philosophical positions and classical Hindu ones will not do," without further explanation. But this is a puzzling claim given the tremendous impact of Western philosophical and theological literature on nineteenth-century Hindu intellectuals. The intermingling of classical and European concepts of design (and of evolution) in Hindu writings of the time is a predominant characteristic, from Rammohan to Vivekananda. Clearly simplistic juxtapositions can create the illusion of deep similarities where none exists. But if the juxtaposition involves the careful delineation of distinctions, with attention to how writers have utilized sources of inspiration from diverse traditions, classical Indian and modern European, then such juxtaposition becomes, I argue, quite illuminating of the Hindu negotiations with Western thought and their various attempts at synthesis.

Gosling's critique of my emphasis on the theistic traditions in the classical period is continued in his assessment of my analysis of the colonial and postcolonial periods. His own preference for a nontheistic perspective is clear. With regards to his own work, he states in his response that to avoid cherry-picking, he has "interpreted the work of Hindu scientists

according to the dominant Hindu philosophy of the nineteenth century, Shankara's *advaita* Vedānta. . . ." While I think that is an interesting and valid approach, I do not see it as the only one. To the extent that it is an exclusive approach, it ignores the Bhakti tradition and its many diverse representatives. Many of these latter, espousing monotheistic perspectives in response to the missionary criticism of both Hindu polytheism and nondualism (regarded disparagingly as pantheism), included Rammohan Roy and many members of the Brahmo Samaj, as well as Mahadev Govind Ranade of the Prarthana Samaj and Dayananda Saraswati. I felt it necessary to include both theistic and nontheistic thinkers in order to demonstrate the broad spectrum of Hindu responses to Darwinism, without privileging any one particular philosophical or theological point of view.

One major figure whom I wished to devote more space to was Rabindranath Tagore. I fully agree with Gosling that Tagore is of considerable interest, and I originally intended to devote a chapter to him. Word limitations imposed by the publisher, however, required that I eliminate that chapter. I had to settle for a brief discussion of some of his thoughts relevant to evolution in comparing his ideas with Aurobindo's Integrative Evolutionism. In any case, Tagore's ideas on evolution have been less influential for the ongoing Hinduism-evolution discourse than either Vivekananda's or Aurobindo's.

Gosling correctly points to the importance of subaltern views often expressed in the vernacular languages rather than in English or Sanskrit. He further notes that for those Hindu reformers who were fluent in both English and their own mother tongues (e.g., Bengali, Hindi), "what they said and wrote in these languages when addressing Hindus could be quite different from how they expressed themselves in English to Western audiences." As Dermot Killingley has pointed out, such different discourses depending upon the language used—and thus the intended audience—began as early as Rammohan Roy (1993, 43–5). But such authors are still accountable for what they write in English. One reformer I highlighted, Dayananda, was not at all knowledgeable of English, and his final edition of his *Light of Truth* in which he expounded his version of Udayana's atomistic design argument was written in Hindi. (I consulted the Hindi text [Dayananda 2002] to verify my understanding of key passages available in several English translations.) In the end, my choice of thinkers settled on those, like Dayananda and Neo-Advaitins like Vivekananda, who have set the tone for much of the contemporary Hindu-evolutionism debate.

With regard to Gosling's comments on my international survey, I did not perform chi-square testing because my sample was not random but only a "convenience sample." Thus, the underlying assumptions for chi-square testing were not met, and the results would give a very misleading impression of precision. My use of the word *occasional* to describe his references to the religious background of respondents in his own survey

was not appropriate, as he indicates, but on the key issue (for me) of percentages of Hindus, of whatever degree of religiosity, who found no conflict between their religious outlook and biological evolution is difficult if not impossible to determine from his account—perhaps due to the omission of details for the sake of brevity.

While reviewing Gosling's survey for this response, I was reminded of our different perspectives on religion and science in India by the first question on his survey: "Whereas in the West, science and religion have often been in conflict, this does not seem to have been the case in India in spite of rapid scientific development. Do you agree/disagree?" (2007, 165). The assumptions underlying this question are shared by many Neo-Advaitins like Vivekananda. But while there certainly has been conflict in the West, this conflict has been much exaggerated, as more recent scholarship has shown (e.g., Barbour 2000). And the conflict in India is often ignored. As the social historian of Indian science, Debiprasad Chattopadhyaya, observes, such conflict can already be seen in the *Śvetāśvatara Upaniṣad*: "In the clash between 'the doctrine of God' and 'the doctrine of nature' [*svabhāva*], . . . we have perhaps the earliest glimpse of the conflict between religion and science that took place in Indian history" (1991, 60). And I would argue that the conflict continues however much modern Hindu apologists attempt to appropriate, assimilate, and reconcile the two.

Ellis's Incompatibility Thesis

The conflict between "the doctrine of God" and "the doctrine of nature," this latter associated especially with the Cārvāka, brings us to the second review, by Thomas Ellis. Ellis agrees with me that Hindu philosophy/theology and modern science are basically incompatible, whether or not this is recognized by Hindus themselves and by empathetic Indologists. This incompatibility applies both to their respective metaphysics (supernaturalism *versus* naturalism) and their epistemologies (experiential-yogic-intuition *versus* inductive-deductive-empiricism).

Let me first address the issue of metaphysics. To illustrate the conflict, and given the importance that Gosling gives to Śaṅkara's Advaita in the nineteenth-century Hinduism-and-science discourse in India, it is perhaps worth noting with regards to consciousness the irreconcilability between Śaṅkara's and the Cārvāka's world view. The latter, as Ellis points out in his essay citing Dravid's view, is basically the same as that of modern science. For the Cārvāka, consciousness is simply the emergent property of material elements when appropriately conjoined in a body. The Cārvākas support this claim by the arguments that consciousness is actually seen only in bodies and not outside, and that there is no evidence for supposing that consciousness can exist independent of the body (Brown 2012, 24). Śaṅkara's refutation of this view assumes (at least for the lower, relative level

of knowledge) the usual sort of soul-body dualism. The Advaitin argues that consciousness is not an essential characteristic of the body, since it is absent in a corpse, and consciousness (soul) might pass into a new body after death (*ibid.*, 34). The force of such a refutation, to the extent that it has any force, rests on vitalistic assumptions that have been thoroughly discredited in modern biology. Many Christian theologians, such as Nancey Murphy (2006), have come to recognize the inherent problems in such a vitalistic, body-mind (or body-consciousness) dualism and argue in favor of a "non-reductive physicalism" (Post 1998).

The epistemological and methodological issues are at least as contentious as the metaphysical, and of course are interrelated. There are two epistemic problems I wish to comment on relative to Ellis's essay. The first concerns the appeal to private intuitions—such as those derived from "yogic perception"—and the impossibility of falsifying such intuitions. Swami Vivekananda, for instance, claims that the superconscious insights of yogis are infallible. He does acknowledge that not all claims of infallibility are legitimate, noting that "hysterical trances" or "mere instinct" do not reflect "genuine inspiration" (Brown 2012, 152). But how does one distinguish between these, since according to Vivekananda the intuitions of genuine inspiration cannot be externally confirmed but only self-validated? He does suggest, in at least partial awareness of the problem of self-validation, one sort of "external" criterion, for according to the Swami, genuine inspiration presupposes moral discipline (*ibid.*, 153). This criterion is explicitly rendered irrelevant by modern scientific methodology, except to the extent that researchers must be conscientious in conducting their experiments and observations, and in not falsifying their data. The peer-review process, in any case, combined with the requirement of replicability, sooner or later weeds out those researchers who do not observe these strictures.

In the case of yogic "peer review," however, practicing yogis, with regard both to spiritual truths and to knowledge of how the world works, are attempting merely to rediscover the truths of the ancient seers, with little or no openness to new empirical knowledge, or any effort to try to disconfirm their "insights." As Wilhelm Halbfass notes, the traditionalist Hindu "tendency to regard all 'sciences' (*vidyā*) as timeless, all-inclusive configurations of knowledge is incompatible with the ideas of progress and an open-ended empirical accumulation of knowledge" (1988, 186; quoted in Brown 2012, 152). He goes on to observe that the conflating of yogic experience and scientific empiricism "appeals to the modern fascination with science, but rejects its commitment to objectification and quantification. It is a device of reinterpretation and cultural self-affirmation . . ." (1988, 401; quoted in Brown 2012, 153).

The notion of cultural self-affirmation brings us to the second epistemological point: the problem of motivated perception and confirmation

bias. Undisciplined by the skepticism of the scientific method, we humans are prone to confirm what we want to believe. While what we want to believe may be true, certainly critical and skeptical approaches to such beliefs that align with our wants are called for. As Ellis points out in his essay, *bhakti* yogis, and I would add Advaita yogis, "want something more than the algorithmic machinations of an insentient universe. They want to believe that consciousness is more than an emergent property of an exhaustively material system. This is precisely where the scientific and Hindu communities become irreconcilable." Confirmation bias and motivated perception are as much in evidence in the various versions of Hindu creationism as in the varieties of Vedic evolutionism.

Ellis also notes that the various Hindu philosophical and theological conclusions are not just the result of emotionally satisfying confirmation biases, but additionally of our innate, or natural "cognitive proclivities," referring especially to the Hyperactive-Agency-Detection predilection of our brains. This proclivity, in my view, underlies the many anti-Darwinian proclamations deprecating contemporary evolutionary biologists for (supposedly) not being able to explain on purely naturalistic grounds some aspect of organic development or evolution, from the eye to cellular differentiation and speciation. Rather, the anti-Darwinians insist that there must be some intentional agent behind these processes, whether that be some sort of traditional extra-cosmic creator or an invisible, and basically undetectable, cosmic consciousness.

The imposition upon natural phenomena of an intentionalist interpretation is nicely illustrated in the Quantum Evolutionism of the contemporary, retired physicist Amit Goswami. I devote several pages in my book to critiquing Goswami's views (Brown 2012, 193–200). In his quantum mechanical explanation of genetic changes that eventually result in speciation, Goswami argues that gradually accumulating genetic mutations—individually quite likely harmful if immediately expressed one at a time as they appear in the genome over generations, but collectively beneficial to an organism if expressed together—remain suspended in a state of quantum superposition. That is, they remain unexpressed in a phenotype as they accumulate, thus preventing the harmful mutations from being eliminated by the process of natural selection. Then, when a beneficial set of such mutations has accumulated, they are ready for realization in the phenotype. At that point, they are observed by some sort of knowing Brahmanic consciousness, thereby collapsing their indeterminate state, resulting in a viable new organism or species. Goswami makes these sorts of suppositions despite the increasingly sophisticated biological explanations such as provided by the field of evolutionary development, and in the face of constant protests by physicists of the misuse of science by the purveyors of such quantum mysticism, or "quantum flapdoodle" as the Nobel laureate Murray Gell-Mann once described it (1994; see also

Stenger 1997; Kleppner 1996). It is a good example of belief perseverance even in the face of contradicting evidence, perhaps in large part because the intentionalist perspective is so cognitively natural. Science, as McCauley (2011) says, is not natural and often produces radically counterintuitive conclusions.

Raman's Problematic Inclusivism and Upanishadic NOMA Ideal

The conflict alluded to above between the naturalism of Cārvāka, on one hand, and the theistic and idealist mysticism of the orthodox Vedānta schools, on the other, leads me now to Varadaraja V. Raman's reflections on Hinduism and science. Raman is one of the more reasonable Hindu contributors to the recent Hinduism-science discourse. He is fully aware of the problematic nature of the attempt by Hindu cultural enthusiasts to scientize Vedic scriptures by reading back into them the discoveries of modern science. And as a former practicing physicist, he also takes exception to the denigration of modern science by postmodernist writers, Hindu and Western, who proclaim the relativity of all truths, thereby reducing modern science to just a local variant of "science" in general. Raman rightly calls for the recognition of the transcultural nature of modern science and its methods, however much their origins may lie in the European Enlightenment.

To emphasize the transcultural nature of science, he points to the existence of several forerunners of modern science in ancient India, beginning with Uddālaka Āruṇi, one of the sages whose teachings appear in the Upaniṣads. Raman sees the root of Indian naturalism in the Vedas, specifically in the homage given to various forces of nature like the sun, moon, water, and wind, and in the Vedic sense of cosmic and natural order. Such concerns and notions, he seems to imply, lay behind the empiricist perspective of Uddālaka, whom he regards as, quoting Debiprasad Chattopadhyaya, "the first rational natural scientist in the history of the Indian subcontinent, if not in global history." But Raman ignores Chattopadhyaya's insistence that Uddālaka is an exceptional figure in Upaniṣadic thought. Chattopadhyaya argues "that Uddalaka takes the first profoundly important and comprehensive step from pre-science to science, in which the rest of the Upaniṣadic literature is disinterested. What we have instead as the dominant trend of Upaniṣadic thought is the general tendency to disparage science in any form" (1991, 92). Chattopadhyaya notes that Upaniṣadic sages, except for Uddālaka, condemn "observation and direct perception" and allow no scope for experimentation. Uddālaka's empiricism is thus in outright conflict with the mystical idealism of the Upaniṣads in general. Chattopadhyaya observes that once the Upaniṣads came to be considered as scripture, it was held that

they cannot possibly contain inconsistencies. Thus, Uddālaka's heterodoxy had to be explained away, his teachings brought into conformity with the official view (*ibid.*, 104–5). This was accomplished via reinterpretation and distortion of his ideas by philosophers like Śaṇkara and Rāmānuja (*ibid.*, 135–44).

Raman's perspective is radically at odds with Chattopadhyaya's, but this is not apparent in Raman's essay. Raman tends to essentialize Upaniṣadic thought, seeing in it basically one perspective and ignoring any possible conflicts. For instance, he quotes the famous aphorism of Uddālaka, "Thou art That," and then continues: "Modern astrophysics tells us that we are star dust. The Upanishads tell us that we are cosmic-consciousness-dust." According to Chattopadhyaya, however, Uddālaka's aphorism when cleared of interpretive obfuscations proclaims that we are evolutes of Pure Matter (Sat).

In a similar manner, Raman quotes Chattopadhyaya regarding the Sāṃkhya as providing Indian philosophy with "the fundamental ideas of positive science" and "a theory of matter, a theory of causality, a theory of knowledge and a theory of evolutionary process." But Raman ignores what Chattopadhyaya says on the very same page as the above quotations: ". . . original Samkhya was a form of uncompromising atheism and materialism," and "it must have originally been fundamentally opposed to the orthodox or Vedic tradition which culminated in the idealistic outlook of the *Upanisads* . . ." (1959, 363).

Two of the most discussed classical Indian scientific achievements are in the fields of astronomy and medicine. Regarding Indian astronomers, Raman mentions Āryabhaṭa (fifth–sixth century CE) and Bhāskara (without indicating which of two famous astronomers of that name he means). I concur that these astronomers are worthy of our admiration, but at least in the case of Āyrabhaṭa, his theory of the axial rotation of Earth was quite heterodox and soon rejected by his own followers (Chattopadhyaya 1996, x–xii). As for the classical medical texts, the *Carakasaṃhitā* and *Suśrutasaṃhitā*, a number of scholars have pointed out the anti-Vedic, anti-Brahmanical nature of their rational-empirical teachings and "polluting" practices—such as the handling of corpses (Chattopadhyaya 1977; Meulenbeld 2001; Zysk 1991).

As I indicated earlier, I think Raman is correct in seeing the rational-empiricism that characterizes modern science as transcultural, a viewpoint supported by the achievements of the various early Indian scientists (or at least empirically minded researchers) cited by him. But I find it highly problematic to claim that such a methodological approach to the natural world is reflective of Upaniṣadic and Brahmanic orthodoxy in general. The empirical-naturalistic approach is fundamentally that of the Cārvāka or Materialist school that roundly denounced the Vedas as "incoherent prattling of rogues" and Vedic sacrifices as priestly means for exploiting

the credulous (Brown 2012, 23). The Cārvāka also rejected the Upaniṣadic notions of karma and rebirth, regarding the soul (*ātman*) as merely "the body characterized by consciousness" (*ibid.*, 24). Raman characterizes the Cārvāka as a "virulently anti-supernatural system" and aligns them with a hedonistic ethics (an unwarranted aspersion, as I briefly discuss in my book, *ibid.*). Yet Raman, with considerable broadmindedness, simply enfolds the Cārvāka perspective into "the Hindu tradition," concluding that the Cārvāka "were/are as Hindu as any other." I am utterly perplexed by such a claim.

As for biological evolution, one of the central issues of my book, Raman repeats, though more cautiously, the views he put forth in an earlier essay (2003) that I have already critiqued (Brown 2012, 192–93; Raman's essay here makes no reference to my book). He views the famous Dāśāvatāra doctrine (the Fish, Boar, Man-lion incarnations and so on of Viṣṇu) as a "mythopoeic metaphor" inevitably reminding us of Darwinian evolution. Regardless of J. B. S. Haldane's enthusiastic support of such an interpretation of the *avatāra* doctrine, there is simply no evidence that the Puranic mythopoets had any such idea as organic evolution in mind. As the ISKCON advocate Michael Cremo has noted, there is no validity to Avataric Evolutionism (as I have called it), given that the traditional narratives of the animal *avatāras* all indicate that human beings were also already in existence. Where is there any linear progression? Raman makes no mention of such problems, simply noting that many Hindus have, since Haldane, taken this as evidence that early Hindus had some sense of biological evolution. In reality, the Dāśāvatāra doctrine reflects nothing more than the common theme of a Great Chain of Being found in several parts of the world. As indicated above, the beings making up the chain represent, in the Hindu case, hierarchical forms, created perhaps all at once, for the embodiment of transmigrating souls in their spiritual evolution; the Hindu chain, like that in the West, does not suggest an evolving tree of life rooted in a common biological ancestor, but rather is staunchly opposed to such a notion. In the end, Raman concludes that Avataric Evolutionism is an "intelligent observation," even if it "may not explain anything." I agree that it explains nothing.

The Quantum Evolutionism of Amit Goswami, discussed earlier, is a much more sophisticated attempt to reconcile classical Hindu teachings with contemporary biological science. Raman briefly alludes to Goswami as "a knowledgable [*sic*] and highly regarded spokesman for Vedāntic perspectives on quantum mechanics," and comments, apparently with approbation, on a book coauthored by Goswami and Deepak Chopra. At least Raman acknowledges that "[s]ome of the assertions in the Chopra-Goswami book run counter to the current paradigm of quantum physics. . . . Professional quantum physicists are somewhat taken aback by New-Age

claims about science and are reluctant to accommodate them into mainstream science."

In his conclusion, Raman notes that religions continue to play an important role in the world today, since they "answer to some to the basic needs of humanity." I would largely agree, and so, in one sense, would Robert McCauley, who sees no threat to the persistence of religion from science. But McCauley clarifies exactly what he means: "By claiming that science poses no threat to the persistence of religion, I do *not* mean to say there are not logical conflicts between the claims of science and plenty of religious claims" (2011, 244). McCauley goes on to remind his readers of his critique of Gould's NOMA principle as an "unsustainable program," objecting specifically to Gould's assertion that "the conceptual walls between values and facts and between meanings and explanations are forever impermeable" (*ibid.*, 245).

Raman himself, in commenting upon "Upanishadic epistemology," notes that the Upaniṣads themselves, in dividing human knowledge into transcendent and mundane (*parā-vidyā* and *aparā-vidyā*), provide a model resembling NOMA. He adds: "But the Upanishadic NOMA says something more. The *parā-aparā* distinction is not about religion and science, but about human awareness at the core. It gives full credit to the many human endeavors (including science) to unravel the nature of physical reality." Taking my cue from McCauley, I think that NOMA, whether pure Gouldian or Upanishadic, is constantly complicated by the fact "that religious people, including theologians, regularly backslide" into making claims about the empirical effects of their non- or trans-empirical supernatural agents, in effect, "construing the gods or at least the consequences of their actions as empirically detectable after all" (*ibid.*). To that extent, conflict seems inevitable.

I conclude with one final observation. Raman, near the end of his essay, claims that methodological and epistemological differences between religion and science are often overlooked in religion and science discussions, with unfortunate consequences: "When these differences are ignored controversies are inevitable, for the participants in the two systems are like players playing with [the] same ball, each following the rules of a different game." I am not sure that the differences are ignored all that often; in any case, when they are recognized by Hindu writers on religion and science, scientific methodology is almost inevitably relegated to a lower level of authority, conforming more or less to the Upanishadic notion of two sciences. Raman, from a more egalitarian perspective perhaps, places the epistemological value of "a meter reading" to a scientist as equal to the sanctified authority granted by the religious to the source of inspired revelations (presumably, those of scripture or Vedāntic teachers/yogis). I would have little objection to such a perspective if the inspired revelations

refrained from claims about how the empirical world functions. The main argument of my book was to show how, when it comes to the specific area of modern, biological evolution, such lack of restraint on the part of religious thinkers invariably leads to conflict.

References

Barbour, Ian. G. 2000. *When Science Meets Religion.* New York: HarperCollins Publishers.

Brown, C. Mackenzie. 2012. *Hindu Perspectives on Evolution: Darwin, Dharma, and Design*. London: Routledge.

Chattopadhyaya, Debiprasad. 1959. *Lokāyata: A Study in Ancient Indian Materialism*. New Delhi, India: People's Publishing House.

———. 1977. *Science and Society in Ancient India*. Amsterdam: B.R. Grüner B.V.

———. 1991. *History of Science and Technology in Ancient India: Formation of the Theoretical Fundamentals of Natural Science*. Calcutta: Firma KLM Pvt., Ltd.

———. 1996. *History of Science and Technology in Ancient India: Astronomy, Science and Society*. Calcutta: Firma KLM Pvt., Ltd.

Cohen, Signe. 1998. "The Śvetāśvatara Upaniṣad Reconsidered." *Acta Orientalia* 59: 150–78.

Dayananda, Saraswati. 2002. *Satyarthaprakashah* [Hindi text], 2nd ed. Delhi: ārs ̇a Sāhitya Pracāra Draṣta.

Ellis, Thomas B. 2012. "Growing Up Amid the Religion and Science Affair: A Perspective from Indology." *Zygon: Journal of Religion & Science*. 47:589–607.

Gell-Mann, Murray. 1994. *The Quark and the Jaguar*. New York: Henry Holt and Company.

Gosling, David. 2007. *Science and the Indian Tradition: When Einstein Met Tagore*. London: Routledge.

———. 2012. "Science and the Hindu Tradition: Compatibility or Conflict?". *Zygon: Journal of Religion & Science* 47:575–88.

Killingley, Dermot. 1993. *Rammohun Roy in Hindu and Christian Tradition*. New Castle upon Tyne: Grevatt & Grevatt.

Kleppner, Daniel. 1996. "Physics and Common Nonsense." In *The Flight from Reason and Science*, eds. P. G. Gross, N. Levitt, and M. W. Lewis, 126–39. Baltimore: Johns Hopkins University Press.

McCauley, Robert N. 2011. *Why Religion Is Natural and Science Is Not*. Oxford: Oxford University Press.

Meulenbeld, G. Jan. 2001. "Reflections on the Basic Concepts of Indian Pharmacology." In *Studies on Indian Medical History*, eds. G. J. Meulenbeld, and D. Wujastyk, 1–16. Delhi: Motilal Banarsidass.

Murphy, Nancey. 2006. *Bodies and Souls, or Spirited Bodies?* Cambridge: Cambridge University Press.

Post, Stephen G. 1998. "A Moral Case for Nonreductive Physicalism." In *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature*, eds. W. S. Brown, N. Murphy, and H. N. Malony, 195–212. Minneapolis: Fortress Press.

Olivelle, Patrick. 1998. *The Early Upaniṣads: Annotated Text and Translation*. Oxford: Oxford University Press.

Raman, Varadaraja V. 2003. "Traditional Hinduism and Modern Science." In *Bridging Science and Religion*, eds. T. Peters and G. Bennett, 185–95. Minneapolis: Fortress Press.

———. 2012. "Hinduism and Science: Some Reflections." *Zygon: Journal of Religion & Science* 47:549–74.

Stenger, Victor. January/February 1997. "Quantum Quackery," *Skeptical Inquirer, Vol. 21.1*. Available online at http://www.csicop.org/si/show/quantum_quackery/.xd

Zysk, Kenneth G. 1991. *Asceticism and Healing in Ancient India: Medicine in the Buddhist Monastery*. New York: Oxford University Press.