

## **The Science of the Self (*ātmaśāstra*):**

the reconfigurations of Vedāntic gnosis in Hindu modernities

### **Abstract**

A distinctive claim of some of the configurations of ‘modern Hinduism’ is that ancient Vedic wisdom foreshadows some contemporary scientific and technological advances, or provides a spiritual framework within which the current empirical sciences can be encompassed. I discuss some of the hermeneutic strategies employed by Swami Vivekananda, S. Radhakrishnan, Swami Prabhupada and others as part of their imaginations of Hinduism as a ‘scientific religion’ which is geared towards the spiritual perfection of humanity. Many of these figures appropriated a classical Vedāntic Hindu distinction between ‘lower’ and ‘higher’ knowledge, and mapped it onto the distinction, inflected by colonial power, between ‘western science’ and ‘Vedic/yogic wisdom’. I examine three key aspects of this mapping: the semantic ranges of ‘science’ in some western and Hindu traditions, the Orientalist milieu of colonial India in which these translations were developed, and the conceptual instabilities of the hybrid trope of ‘Hindu science’.

**Keywords:** Vedic Science, Swami Vivekananda, S. Radhakrishnan, Swami Prabhupada, Science Studies

A central theme in the academic study of Hinduism in recent decades relates to the dense negotiations between western modernity and indigenous structures of thought and practice in late colonial India. Scholars from diverse perspectives ranging from postcolonial theory, intellectual history, social anthropology, translation studies, feminism, and others have highlighted, sometimes in painstaking detail, the complex oppositions to, as well as the appropriations of, certain western frameworks in the colonial zones of contact. A crucial aspect of these east-west encounters is the employment of the vocabularies of ‘science’ by some modern Hindu figures who sought to present Vedantic wisdom as the ‘science of the self’ (*ātmavidyā*), where the spiritual truths intimated by the Sanskrit scriptures can be subjected to empirical verification. The hybrid trope of ‘Hindu science’, representing the attempts to configure Vedantic technologies of the self (*ātman*) through an appeal to the cognitive and social authority of science, however, encompasses various oppositions, overlaps, and shifts between the methodologies of western scientific empiricism and the ‘Vedic science’ of self-realization. I will discuss how the notion of Hinduism as the ‘science of the self’ was shaped by some modern Hindu figures such as Swami Vivekananda (1863–1902), Sarvepalli Radhakrishnan (1888–1975), and A.C. Bhaktivedanta Swami Prabhupada (1896–1977). I will reflect on these attempts to interweave scientific notions into Vedantic fabrics in the light of the crucial debates, from the perspectives of the history and the philosophy of science, relating to attempts to define ‘science’ and to demarcate a ‘scientific’ field of enquiry from other cognitive practices.

## *Hinduisms on the Horizons of Science*

Modern apologetic Hindu interrogations of and engagements with European worldviews sometimes involve the claim that there is a deep resonance, harmony or consilience between Hindu teachings and science, unlike the case of post-Renaissance Europe which is supposedly locked into a mortal conflict between ‘religion’ and ‘science’. As we will note throughout this essay, these historical claims are, in fact, imbricated in dense conceptual disputes over how to, or whether it is even possible to, precisely demarcate the disciplinary boundaries of ‘science’ from the cognitive-experiential-affective dimensions of ‘religion’. To begin with Newton, his ‘scientific’ work is a complex interweaving of Christian ‘metaphysical’ beliefs with a mathematical unification of celestial and terrestrial mechanics, such that his understanding of space and time is integrated with his ‘theology’ of divine action in the world.<sup>1</sup> Alerting us to the specific historicities of these terms in European contexts, P. Harrison argues that it is only from the second half of the nineteenth century that ‘science’ and ‘religion’ sometimes began to be posited as two reified entities which have existed throughout history in a state of perennial warfare. In medieval and early modern Europe, *scientia* was understood largely in terms of logical derivations within an Aristotelian cosmology, and theological wisdom (*sapientia*) was the integrative vision that would orient humanity towards the Christological eschaton. Consequently, Harrison notes that if we apply the term ‘science’ to the Greeks or to the medievals, we should keep in mind that it bears only a ‘loose genealogical relationship’ to its contemporary senses.<sup>2</sup> Later, during the seventeenth century, the term ‘natural philosophy’ encompassed our current disciplines of astronomy, geology, physics, and so on, which began to be professionalized and systematised

under the umbrella of ‘science’ as academic disciplines only after the 1850s in British universities. The current sciences themselves encompass a wide array of fields with somewhat distinctive styles of enquiry, so that there may be greater differences *between* specific sciences than *between* one science and a non-scientific discipline such as theology. As Harrison points out: ‘That cosmology and quantum physics in recent times have been grist to the mill of theologians says less about some general relationship between science and religion than it does about the proximity of these sciences to the border with theology’.<sup>3</sup> For instance, one reason why string theory as well as some other theories in high-energy physics such as cosmic inflation have become intensely debated fields in scientific circles is because these theories are being actively developed even in the lack of their empirical confirmation or experimental testability.<sup>4</sup> Therefore, approaches to the rubric of ‘science and religion’ which posit their relationships in terms of mutual harmony or straightforward conflict could be hasty generalisations based on definitions of ‘science’ and ‘religion’ which are ‘essentialist, anachronistic, or unhistorical’.<sup>5</sup>

Notwithstanding these context-sensitivities that historians of science have highlighted in recent decades, both British administrators and Christian missionaries on the Indian colonial landscape often projected their European ‘science’ as a civilising force in millieus they regarded as uniformly saturated with ‘religion’. From the perspectives of the British utilitarians, ‘science’ was one of the many signifiers of their cultural difference from the natives, and also symbolic of the ‘order’ that they sought to establish in the midst of the ‘chaos’ that they struggled to negotiate efficiently. Therefore, while the rhetoric of science was part and parcel of their mission of improvement through the networks of railways, roads, and the telegraph, they usually refused to accept Indians as their equals in matters of

scientific competence. As D. Arnold has noted, ‘Indian scientists often had a more positive reception in London, Edinburgh, Berlin or Stockholm than they received in their own country at the hands of the white scientific and medical establishment. In science, technology and medicine, denial was as important as dissemination ...’<sup>6</sup> Arnold therefore criticises the diffusionist understandings of the history of science in colonial India according to which the spread of scientific notions and technological advance took place in a largely one-directional manner in which European modernity uprooted indigenous traditions. Indian scientists such as J.C. Bose and P.C. Ray often developed patterns of complex interweaving between European science and traditional biological and medical systems, and made highly significant and internationally acclaimed contributions in the fields of physics, chemistry, and mathematics.<sup>7</sup>

For many British Christian missionaries too, the trope of ‘science’ was implicated in their visions of progress, which was to be characterised by the spiritual regeneration of the fallen Hindu soul through the light of Christianity. Scottish missionaries such as Alexander Duff (1806–1878) in Calcutta viewed western science as the rational instrument whose partial truths could free Hindus from their superstitious pasts and fatalistic beliefs, and prepare them for the reception of the fullness of Christian truth.<sup>8</sup> Given his conviction that science, the ‘record and interpretation of God’s visible handiworks’, would undermine the system of Hinduism, Duff asked missionaries joining his school to convert ‘every fact, every event, every truth, every discovery, into a means, and an occasion of illustrating or corroborating sacred verities’.<sup>9</sup> The corrosive effect that western science was projected to inflict on Hindu cognitive structures and social milieus was depicted dramatically by Sir George Trevelyan (1838–1928) in these terms: ‘The most effective spell with which to exorcise the demons of

the Hindoo mythology is physical science. A native who has taken the degree of Doctor of Medicine, or who has learnt at the [Calcutta] Presidency College all that can be taught him by a crack Cambridge Wrangler, must regard the astronomy and geography of his old religion with a contempt which will very soon include that religion itself.’<sup>10</sup> Nevertheless, matters on the ground did not always proceed smoothly, and the introduction of science produced a new generation that was sharply iconoclastic and sceptical of all religious beliefs. Currents of rationalism and free-thinking circulated amongst the Bengali intelligentsia in late nineteenth century, and figures such as Tom Paine, August Comte, and John Stuart Mill plundered for intellectual resources in developing oppositional stances against both the indigenous traditions and the Christian missionaries. Akshaykumar Datta (1820–1886), for example, argued that the Kaṇāda and the Vaiśeṣika systems of classical Indian philosophy were superior to the others for they postulated no creator God but explained all natural phenomena through the interactions between atoms. Such notions, however, were in the course of time embroidered with fanciful beliefs, and to clear through the falsities that clustered around them, Indians ‘were in want of someone to lead them. They were in need of one Bacon, one Bacon, one Bacon’.<sup>11</sup> In this vein, Ishwar Chandra Vidyasagar argued that through the study of European philosophy his students would be enabled to expose the falsities of the classical systems of Vedānta and Sāṃkhya, though this philosophy had to be not the idealism of Berkeley but the *Logic* of Mill.<sup>12</sup>

Some of these complex debates that ensued in the triangular contest between Christian missionaries, proponents of refurbished versions of Hindu thought, and anti-traditional critics of these developing Hindu modernities revolved around the theme of ‘experience’ and its location in religious universes. The emergence of missionary societies such as the Baptist

Missionary Society (1792), London Missionary Society (1795), and others was a constitutive aspect of the different strands of 'Evangelicalism' that spread through England from the middle of the eighteenth century. Though many Evangelicals were opposed to the Enlightenment's emphasis on reason and particularly the Deists' rejection of revealed religion, D.W. Bebbington argues that certain Enlightenment assumptions such as the application of the Baconian inductive method were assimilated into their theology. Not only were Evangelicals often familiar with the thought of Locke and Newton, but also a significant number of them, including John Wesley, could also talk about 'experimental religion'. This was the time when natural theology was enjoying its heyday and Evangelicals, believing that the ordered structures of the universe were the creation of God, were convinced that they could find vestiges of the divinity in the intricate designs and patterns which were harmoniously arranged by their Maker.<sup>13</sup> Their theological confidence in human reason as a pointer towards God was sometimes reflected in Christian missionaries in India who sought to provide empirical bases for the truth of Christianity, with the hope that once Hindus were compelled by the evidential force of their demonstrations, they would accept specific doctrinal claims about Christ.<sup>14</sup>

The narratives of Hindu socio-religious reform movements are structured partly by interrogations of the missionary view that the rational forces of western science would propel Hindus towards the light of saving Christian truth. The Hindu reformers often drew upon the criticisms levelled at traditional beliefs and institutions by the Christian missionaries, as well as some of the radical nonconformist views circulating in Europe, to forge distinctive strategies for confronting and eradicating what they perceived to be the excrescences of Hinduism. Much to the consternation of the missionaries, these reformers developed

arguments from European figures such as Voltaire who had excoriated the Catholic Church as a tyrannical, magical, and corrupt institution. A group of social reformers associated with Anglo-Marathi newspapers such as the *Darpan*, started by Bal Shastri Jambhekar in 1832, and the more radical *Prabhakar* in 1841, accepted the missionary arguments about the descent of Hindu society from its pristine values enshrined in the Vedas; developed the Deist view that the ‘universal religion’, freely accessible to all morally upright beings, transcended the ‘dogmatic’ bounds of Christianity; and strove for the social emancipation of the lower castes and of women.<sup>15</sup> Some decades later, in the Punjab, the Arya Samaj began to claim that ancient Vedic civilization had attained a high level of technological sophistication, and possessed electricity, steam engines, and aerial vehicles.<sup>16</sup> Thus, ‘science’ became a highly contested site of opposing constructions: while Christian missionaries could speak of the dissolutions of Hindu mythology through western empiricism, Hindu reformers countered such claims by marshalling the resources of empiricism and technology for the service of a ‘scientific’ Hinduism.

### *Hindu Modernities and the Category of ‘Experience’*

The notion of a ‘universal religion’ that would be grounded in experience and the laws of nature, opposed to clerical dogmatism and scriptural orthodoxy, and emblematic of the arrival of humanity at the next stage of spiritual advancement began to assume a pivotal role in the attempts of some Hindu modernizers to re-envision the classical Hindu scriptures in the conceptual spaces opened up by European science. By the middle of the nineteenth century, members of Debendranath Tagore’s Brahmo Samaj began to speak of the natural laws relating to religion which could be uncovered through a ‘non-sectarian’ investigation into the religions of the world.<sup>17</sup> Tagore himself had taken the decisive step of moving away from the



doctrine of Vedic infallibility, stating that in the matter of accepting Vedic and Upaniṣadic passages one had to rely on the ‘pure heart, filled with the light of intuitive knowledge’, and reject those texts which were not in accord with such a heart.<sup>18</sup> Commenting on a verse from the *Muṇḍaka Upaniṣad* I.1.5, Tagore argued that the ‘highest science’ is that through which God can be realised via intuition, and this knowledge of God is the crown of the inferior sciences such as astronomy, geology, medical science, philosophy, and so on.<sup>19</sup> Keshub Chunder Sen, who split from the sagely Tagore to form his own group in 1866, was a highly charismatic leader, and he continued to emphasise the role of inspiration, experience, and intuition in human pathways to the divine. After meeting Ramakrishna in 1875, whom he introduced into Brahmo circles, Sen began to withdraw from his earlier active involvement in social reform and claim that he had received direct messages from God.<sup>20</sup> Foregrounding ‘experience’ in Hindu universes in a lecture delivered in 1875, Sen highlighted the Hindu’s ‘spiritual perception’ in these terms: ‘The great question in which all Hindu devotees are anxiously interested is whether the soul has seen the Lord. Have you perceived Him? is what they ask each other’. Their understanding of the divine is based not on abstract ideas but on ‘direct and intuitive knowledge’: they see God ‘as a present Reality, a living Person, with the mind’s eye’.<sup>21</sup> This increasing spiritual turn was concurrent with the development of a highly eclectic ‘New Dispensation’ (*Nava Vidhan*), which Sen proclaimed in 1880 was the third dispensation after the first two dispensations of God through the Old Testament and the New Testament respectively.<sup>22</sup> The new synthesis would harmonise ‘faith’ with ‘science’, and Sen could on occasion employ scientific vocabulary to speak of the promised unity of all truths in terms of the emergent product of a chemical combination: ‘Bring hydrogen and oxygen together, they will not unite until you pass a spark of electricity through both. In the same way the mere collection of other religions will not make them unite, but the fire of heaven, the Divine inspiration, is needed to produce a combination ...’<sup>23</sup>

Sen bequeathed to subsequent developers of ‘Hindu science’ the crucial notion that Hindus are particularly sensitive to and receptive of the workings of the Spirit: ‘The subtle Hindu mind has always been distinguished for its spirituality. It penetrates the hard surface of dogmatic theology, and evolves and deals with the deeper realities of faith ... The idea of perceiving the Indwelling Spirit, far from being foreign, is eminently native to the primitive Hindu mind’.<sup>24</sup> By developing the yogic vision, the ancient Hindu seers were able to see the divine presence in natural phenomena, a spiritual insight that can be attained by anyone who seeks to develop it ‘according to strict scientific rules and under proper logical tests’.<sup>25</sup> Proclaiming an east-west concordance that would have an enduring impact on Hindu interrogations of scientific rationality, he called for England to teach India ‘hard science and fact’, and India ‘sweet poetry and sentiment’ to England.<sup>26</sup> These resonant motifs would be adopted by Swami Vivekananda, with distinctively modernised Vedāntic and yogic turns, to speak of spiritual experience as a practical and scientific method of attaining ‘superconsciousness’ (*samādhi*). Vivekananda emphasised, echoing Sen, that the great religious teachers of the world such as the Hindu sages and Christ were able to *see* the divine in the depths of their souls, and further it is possible for us too, in these times, to attain this spiritual vision. Therefore, rejecting the view that these foundational experiences have now become obsolete, he argues: ‘If there has been one experience in this world in any particular branch of knowledge, it absolutely follows that that experience has been possible millions of times before, and will be repeated eternally. Uniformity is the rigorous law of nature, what once happened can always happens’.<sup>27</sup> Like the law of physical gravitation, which is not a human construct, the spiritual laws that govern the relations between spirits and between an individual spirit and the divine too ‘were there before their discovery, and would remain even if we forgot them’.<sup>28</sup> Thus Vivekananda presented the Vedas, in his lectures to western

audiences, as a repository of the experiences (*anubhava*) of gifted individuals who are able to verify the spiritual laws enshrined in them through a direct apprehension.<sup>29</sup> For Vivekananda, the depths of the transcendental self are accessible through an inward turn that is guided through yogic practices, and it is this experiential turn, and not scriptural statements or institutional structures, that constitutes the spiritual life that is innate to the Hindu: ‘Let others talk of politics, of the glory of acquisition of immense wealth poured in by trade, of the power and spread of commercialism, of the glorious fountain of physical liberty; but these the Hindu mind does not understand and does not want to understand. Touch him on spirituality, on religion, on God, on the soul, on the infinite, on spiritual freedom, and I assure you, the lowest peasant in India is better informed on these subjects than many a so-called philosopher in other lands. I have said ... that we have yet something to teach to the world’.<sup>30</sup>

With Vivekananda, we see the term ‘science’ being employed on two distinct registers: what we might call Science<sub>EMP</sub>, which is roughly consonant with versions of sensory-based western empiricism, and Science<sub>VED</sub>, which refers to supra-sensuous Vedāntic and yogic practices of self-realization. At one level, yogic insight is said to be ‘scientific’ because in a manner similar to the process of scientific discovery, it is grounded in direct experience which is available to all human beings.<sup>31</sup> However, the ‘direct perception’ of yoga through which one demonstrates the existence of God is not everyday sensory perception but a superconscious state (*samādhi*).<sup>32</sup> Occasionally, Vivekananda could shift across the registers in a single statement: Advaita Vedanta is said to be the ‘only religion which agrees with, and even goes a little further than modern researches, both on physical and moral lines ... and that is why it appeals to modern scientists so much’.<sup>33</sup> One aspect of this agreement is the Vedāntic notion of manifestation or ‘unfolding’ of the world from Brahman as opposed to the Christian doctrine of creation: ‘Manifestation, and not creation, is the word of science today,

and the Hindu is only glad that what he has been cherishing in his bosom for ages is going to be taught in more forcible language, and with further light from the latest conclusions of science'.<sup>34</sup> This dialectic of affirming the provisional value of the empirical sciences (Science<sub>EMP</sub>) while enfolding them into a more integral Vedāntic vision (Science<sub>VED</sub>) can be noted in a lecture Vivekananda delivered to the Brooklyn Ethical Association in 1895, where he claimed that algebra, geometry, and astronomy, products of modern science, can be traced back to ancient India. He then proceeded to state that India had, however, received in return nothing but contempt from the rest of the world. Yet, Indians do not plead for mercy, for they 'trust in the eternity of truth'.<sup>35</sup> For Vivekananda, this is the higher truth of Advaitic unity which is scientific and capable of truly satisfying the human intellect: 'The salvation of Europe depends on a rationalistic religion, and Advaita – non-duality, the Oneness, the idea of the Impersonal God, – is the only religion that can have any hold on any intellectual people. It comes whenever religion seems to disappear and irreligion seems to prevail, and that is why it has taken ground in Europe and America'.<sup>36</sup> Therefore, while Orientals have much to learn from Occidentals in the empirical matters of machine-making, Occidentals who seek the truths of the self and the divine 'must sit at the feet of the Orient to learn'.<sup>37</sup>

### *The Two 'Sciences' (Vidyā) of Vedāntic Hindu Thought*

Vivekananda's appropriations of Darwinian evolution through the lens of the spiritual progress of humanity too were structured by his engagements with the levels of Science<sub>EMP</sub> and Science<sub>VED</sub>. At the former, he maintained that Vedic insights had anticipated Darwin's theory: 'The idea of evolution was to be found in the Vedas long before the Christian era; but until Darwin said it was true, it was regarded as a mere Hindu superstition'.<sup>38</sup> However,

Vivekananda also argued that Darwinian organic evolution was only a limited understanding of the truth that classical Indian yogis such as Patañjali had discovered. The key opposition lies between the non-teleological character of Darwinian evolution (Science <sub>EMP</sub>), which operates through mutation and natural selection, and the deeply teleological emphasis of Vivekananda's notions of progressive spiritual evolution (Science <sub>VED</sub>).<sup>39</sup> He highlighted this distinction in the following manner: 'The two causes of evolution advanced by the moderns, viz. sexual selection and survival of the fittest, are inadequate ... But the great ancient evolutionist, Patañjali, declares that the true secret of evolution is the manifestation of the perfection which is already in every being; that this perfection has been barred and the infinite tide behind is struggling to express itself. These struggles and competitions are but the results of our ignorance, because we do not know the proper way to unlock the gate and let the water in'.<sup>40</sup> Therefore, empirical processes such as Darwin's natural selection are only the natural means through which human beings carry out their spiritual exercises of unfolding, that is to say, 'evolving', the true self within. Further, Darwinian evolution is only one arc of the circle – the other is the process of 'involution' through which the true self had become implicated or 'involved' in worldly embodiment. Since evolution is the manifestation of what was earlier implicitly present, therefore Vivekananda claimed that if 'a Buddha is the one end of the change, the very amoeba must have been the Buddha also. If the Buddha is the evolved amoeba, the amoeba was the involved Buddha too'.<sup>41</sup> Thus the Darwinian theory is located within a Hindu worldview by being assigned to the empirical level of physical forces, which are said to be operative in the struggles of human beings to manifest their true spiritual identity through yogic control. Thereby, Darwinian evolution is identified with Patañjali's yoga and 'at the same time subordinated to it by claiming superiority for the "spiritual" Indian version'.<sup>42</sup>

Around half a century after Vivekananda, another Bengali Hindu, A.C. Bhaktivedanta Swami Prabhupada, the founder of ISKCON, elaborated this dialectic of provisionally affirming western ‘materialistic’ science, and negating it in the spiritual light of the higher Vedic science of Krishna Consciousness. His *Easy Journey to Other Planets* is a long meditation on certain discoveries of the Russians and the Americans, and their futility in providing human beings with true ‘scientific’ understanding of the inner self as a devotee of Krishna. Prabhupada begins by noting a news clip in the *Times of India* (October 27, 1959) which states that two American scientists have been awarded the Nobel Prize in Physics for their discovery of the anti-particle, and that according to their theory ‘there may exist another world, or an anti-world, built up of anti-matter ...’.<sup>43</sup> Prabhupada comments that the ‘students of theistic science’ view the real anti-matter not as the anti-particle that the scientists have recently discovered, for this is only another form of material energy, but the imperishable spirit indicated in the *Bhagavad-gītā* which states that the creative energy of Krishna is of two forms: the higher *aparā prakṛti* which produces the anti-material spiritual world, and the lower *parā prakṛti* which produces the material world.<sup>44</sup> The anti-matter mentioned in the *Bhagavad-gītā* includes the permanent, blissful, and individual conscious self (*jīva*), which is finer than all other material particles, and which the scientists have not yet discovered. However, science will be perfected when scientists are able to know ‘the qualities of the anti-material particle and liberate it from the association of non-permanent material particles. Such liberation would mark the culmination of spiritual progress’.<sup>45</sup> Therefore, the discovery of matter and anti-matter, which are only two forms of the limited *parā prakṛti*, is ‘just the beginning of the progress of science’, and western scientists should seek to discover the true source of the material and the anti-material particles.<sup>46</sup>

Prabhupada's interrogation of western science proceeds through a tentative affirmation of certain aspects of Science <sub>EMP</sub>, which he claims to have been foreshadowed in the Vedic texts. He refers to the statement of a Professor of astronomy, Boris Vorontsov-Veliano, in a Moscow news release (February 21, 1960) that there is 'an infinite number of planets in the universe inhabited by beings endowed with reason', and states that this statement confirms the verse in the *Brahma-saṁhitā* which notes that there is an infinite number of universes.<sup>47</sup> Further, one should not think that in chanting the name of Krishna, the devotees are lagging behind scientifically, because interplanetary travel has been recorded in the *Bhagavad-gītā*.<sup>48</sup> However, Science <sub>EMP</sub> is of limited value in taking individuals 'back to the Godhead', for while scientists may seek to reach the planets with spaceships, rockets, and satellites, they are unable to approach even the planets in the higher regions of the material sky, not to mention the spiritual domain of Krishna which is completely beyond the material sky.<sup>49</sup> Reflecting the Vedānticized appropriation of Darwinian evolution that we have noted earlier, Prabhupada states that through psychological changes or yogic powers, individuals can travel to the planets, because the 'gradual evolutionary progress of the material body depends on psychological changes within the mind'. Therefore, people who train the mind to turn away from the material world to the spiritual form of Krishna through devotional service will attain Krishna in the spiritual sky.<sup>50</sup> These devotees of Krishna, unlike the practitioners of gnosis (*jñāna*) or yoga who seek to move to other material planets, do not wish to reach any material planet but Krishna himself.<sup>51</sup> Nevertheless, Science <sub>EMP</sub> can serve a propaedeutic function in the spiritual quest: since 'gross materialists' do not believe in the existence of anti-material worlds and remain immersed in material energies, 'it is a good sign, therefore, that the materialistic scientists are gradually progressing towards the region of the anti-material world'.<sup>52</sup> However, Science <sub>EMP</sub> is at best a pointer towards the yoga of devotion (*bhakti*) to Kṛṣṇa, and this spiritual path is the ultimate science: 'Everything in Kṛṣṇa consciousness is

scientific. It is not bogus, whimsical, sentimental, fanatical or imaginative. It is truth, fact, reality'.<sup>53</sup>

The continuing vitality of this dialectic, where the empirical methodology of Science <sub>EMP</sub> is enfolded into its supposed fulfilment in Science <sub>VED</sub>, is indicated by its appearance in the intensely contested topic of 'Hinduism and quantum physics', where it is often claimed that an adequate interpretation of quantum theory can be supplied by the wider metaphysical horizons of Vedāntic thought. The key difference between Newtonian classical physics and quantum physics is that the state of a classical system is, in principle, measurable deterministically, whereas the state of a quantum state is completely described by a mathematical 'wave-function' which only gives the probabilities for the different values of the physical properties of the quantum entities.<sup>54</sup> The crucial point is that there are several interpretations of quantum mechanics, which produce the same experimental results, so that they differ only in their metaphysical implications.<sup>55</sup> Some idealist interpretations argue that it is human consciousness which constitutes physical reality, by 'collapsing' the wave-function to a determinate value, so that the human observer and what is being observed become co-constituting elements. Thus T. Maudlin notes that one of the most metaphysically intriguing claims relating to quantum theory is that it introduces the observer at the fundamental level of physical reality, and a radical form of this statement is that the 'participation' of the observer with the universe somehow brings the universe into being.<sup>56</sup>

Several writers on quantum physics have seized on these idealist interpretations which attribute to human consciousness the power to actualise possibilities. Thus, Amaury de Riencourt argues that there is a 'remarkable echo' of modern physics in eastern metaphysics



which speaks of the monistic vision of a deep reality.<sup>57</sup> Elaborating this view, A. Goswami argues for an interpretation of quantum physics through a ‘monistic idealism’ where the collapse of the wave-function takes place through the observation of a non-material consciousness, the quantum self (*ātman*).<sup>58</sup> N.C. Panda connects quantum theory more explicitly with classical Advaita Vedanta by arguing that at the subatomic levels dimensions we are not apprehending ultimate reality but dealing with wave-functions which are our conceptual constructions. This is why quantum physics uses the word ‘participator’ and not ‘observer’, since to some degree we construct the reality that we interact with.<sup>59</sup> Since subatomic phenomena are not ontologically basic but are products of our interactions with reality, Panda concludes: ‘Both quantum physicists and the non-dualistic philosophers of Advaita Vedānta agree on the point that the world is an illusion’.<sup>60</sup> However, having correlated Advaita with Science <sub>EMP</sub> in this manner, Panda goes on to note that theories of modern physics such as big bang explosion, relativity, quantum mechanics, and so on, are fragmentary and are not capable of offering a complete picture of the universe. Scientists should assimilate certain themes of Advaita into their theories towards a ‘synthesis of science and spirituality’ which will be a metaphysical perspective on totality. Through such a unification, they can develop an ‘integral cosmology, an integral philosophy, a total vision and a cosmic religion’.<sup>61</sup>

The theme of the integration of the Science <sub>EMP</sub> of quantum physics into the complete horizon of the Science <sub>VED</sub> of Advaita Vedanta is extensively developed also by Swami Jitatmananda. Thus, at the level of Science <sub>EMP</sub>, he states that a scientist is not ‘a detached observer but is an active participator in the very processes of his experimentation. Physics has already entered the areas of Eastern mysticism’.<sup>62</sup> Physicists are moving towards a vision of unification, of the four fundamental physical forces, and also of mind and matter by following the results of

scientific experimental results. Therefore, the vision that is emerging from modern physics resembles the classical Vedāntic notion of Brahman as the eternal basis and source of all phenomenal reality.<sup>63</sup> The Vedāntic doctrines teach that the phenomenal world is a deeply interconnected reality, so that to search for an isolated and independent entity such as an electron is a misconception (*māyā*).<sup>64</sup> However, Swami Jitatmananda emphasises that quantum physics, left to its own conceptual resources, is not able to plumb the depths of the mystery of being. The Vedāntic sages, who developed notions of space, time, causality, energy, the limitations of reason, and so on which are ‘in striking conformity with the ideas of modern physicists’, also possessed a higher intuition which goes beyond reason but does not contradict reason.<sup>65</sup> Scientists, in contrast, cannot move beyond the boundary conditions of their physical equations, for Brahman, the eternal substratum, can only be apprehended in a spiritual and mystic way.<sup>66</sup>

The two standpoints of Science <sub>EMP</sub> (whether evolution, quantum physics, and so on) and Science <sub>VED</sub> (whether Advaita Vedanta or Krishna Consciousness) employed in these arguments – with the former pointing towards the fulfilment of the latter – are modernized reconfigurations of a complex debate in classical Vedanta relating to the two ‘levels’ of truth, the lower knowledge (*parā vidyā*) and the higher knowledge (*aparā vidyā*) indicated in the *Muṇḍaka Upaniṣad* I.1.5. For Śaṅkara (c.800 CE), the principal systematizer of Advaita Vedanta, only Brahman, because it is immutable and eternal, is truly and unequivocally real. However, from the human social ‘level’, empirical distinctions, which originate in and are sustained by linguistic conventions, are accorded some measure of reality. From this empirical stance, Śaṅkara can speak of acts of devotion as leading to different results such as gradual emancipation or worldly success, for these distinct acts are ultimately directed at the highest Self (*Brahma-Sūtra-Bhāṣya* I, 1, 11). From the transcendental vantage-point, for

those who have reached the highest state of reality the apparent world does not truly exist (*Brahma-Sūtra-Bhāṣya* II, 1, 14). While Śamkara's exegesis leads him to elaborate a doctrine of the metaphysical unreality of the world, his arch-rival Rāmānuja (c. 1100 CE) develops a strong realist reading of the scriptural texts in which the substantially real world becomes a medium for the return of the human self to the Lord Viṣṇu through devotional love (*bhakti*).<sup>67</sup> For our purposes, the significance of these classical exegetical-theological debates is that the Vedāntic distinction between the 'lower' knowledge and the 'higher' knowledge is often reconfigured by writers in the 'Hinduism and Science' genre, and these are mapped onto Science<sub>EMP</sub> and Science<sub>VED</sub> respectively. Thus, Swami Vivekananda (whose Advaitic synthesis leans more towards Samkara) and Swami Prabhupada (who develops a robustly theistic form of Vedāntic Krishna-devotion) both argue that unlike western science which has produced only material advancement, Vedic science can direct human beings towards the divine and promote genuine spiritual progress.

### *The Cognitive Status of 'Vedic Science'*

The trope of 'science', then, plays a complex role in the thought of figures such as Sen, Vivekananda, Prabhupada, and others – while empirical sciences such as quantum theory, astrophysics, and others can partly illuminate Vedāntic understandings, these sciences do not have the epistemic reach of Hindu Vedāntic vision. Common to these Hindu figures is the thesis that contemporary scientific discoveries (whether the law of causation, the principle of conservation of energy, anti-matter, and so on) had already been indicated in the classical Hindu scriptures to direct human beings towards their spiritual essence. The primordially of the Hindu 'science of the self' is highlighted, for instance, in Prabhupada's statement that

Vedic knowledge is ‘an ancient science which is eternally new. Modern America has reached a stage of civilization where it is ready to ask important questions. This science, as always, is ready with answers’.<sup>68</sup> Prabhupada’s view takes us to some of the most contested epistemological debates over whether the forms of Science <sub>VED</sub> that we have highlighted are offering properly ‘scientific’ answers.

Several philosophers of science over the last five decades or so have actively debated the question of whether there are any necessary and sufficient conditions (such as, for instance, Karl Popper’s ‘falsification’) for demarcating ‘science’ from ‘pseudo-science’ or spurious scientific claims.<sup>69</sup> Whether a certain type of cognitive inquiry is classified as ‘scientific’ would depend on what sort of criteria are being employed: while on a minimalist understanding, science is the process of organising, into systematic structures, testable knowledge-claims about the world, the more metaphysically contentious question is whether or not our most advanced sciences (such as evolutionary biology, astrophysics, and quantum mechanics) provide an exhaustive enumeration of all entities which populate the universe.<sup>70</sup> A. Rosenberg defends the position called ‘scientism’ which takes physics as supplying the complete description of reality, which is that everything is made up of the basic kinds of things that are enumerated by physics.<sup>71</sup> Those who are opposed to the metaphysical naturalist position that reality consists entirely of the spatio-temporal world argue, in contrast, that attempts to ‘naturalise’ epistemology are not able to properly account for features of the mental such as intentionality, self-awareness, conceptual powers, and so on.<sup>72</sup> R. Trigg argues in this connection that the view that only those entities which can be unearthed and explored through the tools of the physical sciences are to be accorded reality is a ‘global claim going far beyond the remit of science. Those who make it have to stand outside all science and

make a judgement about its scope'.<sup>73</sup> His point is that the naturalist claim that the domain of entities that populate scientific ontology is congruent with 'reality' is a metaphysical claim *about* science which cannot be offered from *within* science.

The opposition between metaphysical naturalism and Science <sub>VED</sub>, then, is a basic disagreement over 'what there is', and over the structures of reality that our epistemic practices can discover. T. Ellis presents the former position in unequivocal terms: 'The indisputable, cumulative, practical success of the natural sciences suggests that the inference to the best explanation for such success is that physicalism is in fact true. Despite metaphysical intuitions to the contrary, consciousness appears to be a property of a very complex, physical system'.<sup>74</sup> Ellis' standpoint has an important classical Indic precursor in the views of the Cārvākas, who rejected all notions of supernatural entities, *karmic* causation, and so on, and proposed a naturalistic evolutionism in which empirical diversity is seen as the resultant of the interactions of the four basic elements with intrinsic natures (*svabhāva*).<sup>75</sup> Proponents of Science <sub>VED</sub>, in contrast, regard consciousness not as an emergent property of physical structures, but as an ontologically independent principle which has somehow (the precise explanation varies across the traditions) manifested, or become implicated, in a physical universe. Therefore, a study of Science <sub>VED</sub> would involve investigations into the conceptual structures of Vedāntic and yogic epistemic styles which try to integrate third-person objective views of the universe into more intuitive, meditative, and relational perspectives.<sup>76</sup> Developing this theme, J. Edelman writes: 'Rather than suggesting that Hindu theology or yogic perception is deficient because it cannot be falsified, one might say the sciences are deficient because they do not meet the criteria for knowledge in the Indian epistemological traditions. My point is that Hinduisms have their own epistemological

standards and criteria, and it is these standards one might use in judging the sciences, rather than merely using scientific epistemological standards to judge Hinduism'.<sup>77</sup> However, even if we sidestep the metaphysical disputes, there remains the question of what parallels Science <sub>VED</sub> might share with the methodological aspects of contemporary experimental science. After raising the question as to what one means by 'science' in ancient India, D.P. Chattopadhyaya argues that the 'only discipline that ... contains clear potentials of the modern understanding of natural science is medicine'. While other disciplines such as phonetics, etymology, and calendrical astronomy originate in Vedic ritualism, only medicine moves away from 'magico-religious therapeutics to rational therapeutics ...'<sup>78</sup> Chattopadhyaya emphasises the empirical methodology of ancient Indian Ayurvedic medicine in texts such as the *Carakasamhitā*, and notes its oppositions to the Vedic Brahmanical traditions with their reliance on scriptural authority and purity rules.<sup>79</sup> Nevertheless, he acknowledges that these medicinal texts are an amalgam of science as well as mythical-soteriological elements, which he argues were introduced by the physicians as a protective cover to provide a semblance of Vedic orthodoxy to their healing practices.<sup>80</sup> More recently, S. Engler has examined these Ayurvedic texts, and argued that while they are scientific in the sense of being based on empirical observation, they do not operate with some of the concepts associated with contemporary science such as experimentation, falsification of theories, quantification, and so on. He notes that a conceptual formation does not become 'scientific' merely because it emphasises observation as a source of knowledge and connects knowledge claims to observations; rather, the concepts should be developed through experimental verification and falsification.<sup>81</sup> Even if we argue that contemporary scientists and, say, practitioners of forms of Hindu yoga are all engaged in a dispassionate quest of objectivity, in the sense that both groups seek to explore and elaborate their distinctive visions of the 'way the world is', the latter do not usually

engage in institutionalised forms of peer review, rigorous mechanisms of experimental testing, and so on which are the procedural mechanisms of several empirical sciences.<sup>82</sup>

Therefore, in the case of configurations of modern Vedantic Hinduism which appeal to a ‘higher’ insight (*parā-vidyā*), a non-discursive form of knowing which transcends the ‘lower’ empirical sciences (*aparā-vidyā*), the conflict between Vedantic self-knowledge and scientific claims becomes particularly acute, because the methodological constraints of the latter do not admit trans-empirical entities, states, or processes. For such an instance, one can turn to Swami Vivekananda’s proposed integration of biological heredity with the reincarnation of a non-physical self: ‘Our theory is heredity coupled with reincarnation’.<sup>83</sup> Therefore, when he claimed that science is the quest for unity, and that once science reaches ‘perfect unity, it would stop from further progress, because it would reach the goal’,<sup>84</sup> the key point is the content of the ‘science’ which will have reached total explanatory scope. The claim that Vedic truths provide holistic integrations of the natural sciences can indeed conflict with some of the principles of these sciences, especially if these spiritual horizons encompass vitalism, parapsychology, astrology, and so on, whose scientific status has usually been strongly denied.

### *Hindu Spiritual Vision as a Meta-Science*

Reflecting these problems of linking Hindu doctrines too tightly with the experimental methods of current science, several recent contributors to the ‘Hinduism and Science’ debate

have instead presented Hindu thought as the integrative spiritual horizon for the empirical sciences. Christian writers on contemporary science too have grappled with the problem of affirming the cognitive independence of the empirical sciences while maintaining that these sciences should be (re)envisioned through the lens of faith in Christ. Writing specifically about Christian theology, M. Stenmark argues that there are two models through which we may view the relation between ‘science’ and ‘religion’ in terms of reconciliation: the first states that science can bring about reformulations in religion, or vice versa, in their areas of conceptual overlap, and the second that science can confirm religion, or vice versa, in these areas of contact. The first stance is developed by some theologians who claim that the traditional Christian doctrines of God have to be reconfigured, though they may disagree about the extent of revision that they propose. Regarding the second, theologians might argue that the doctrine of a creator God helps to make sense of the existence of a stable rational order that the scientific disciplines seek to investigate.<sup>85</sup> Contemporary Hindu writers have often elaborated versions of Stenmark’s second model by claiming that Science <sub>VED</sub> does not directly conflict with Science <sub>EMP</sub> but supplements (or confirms) Science <sub>EMP</sub> by placing its disjointed and conceptually incomplete disciplines on a holistic spiritual plane.<sup>86</sup> The underlying claim is that the Hindu encounters with Science <sub>EMP</sub> take place not so much at the level of its specific scientific details but its philosophical and theological implications, such that the cognitive autonomy of Science <sub>EMP</sub> is not violated.

One variation on this theme is V.V. Raman’s argument that Vedanta should be distinguished from science because while scientific enquiry is concerned with analysing empirical details of a transient world, Vedanta is aimed at the realisation (*anubhava*) of the transcendental ground of the physical universe.<sup>87</sup> Raman notes certain parallels between concepts in quantum mechanics and classical Vedantic metaphysics, for instance, between the absence of a clear-



cut distinction between the observer and the observed at the subatomic level and the Vedantic doctrine of pure consciousness. However, he argues that we should ‘resist the temptation of equating interesting conceptual parallels with ontological or epistemological equivalence’.<sup>88</sup> He suggests instead, echoing the verse in the *Muṇḍaka Upaniṣad* I.I.15, that we view the relation between the quantum dimension and the macroscopic world in terms of the Upanisadic distinction between transcendental (*parā*) truth and empirical (*aparā*) truth, the former being analogous to the wave-function before it is observed, and the latter to the wave-function after it has been measured and manipulated through observation and logic.<sup>89</sup> S. Menon argues, in an analogous fashion, that even though Hindu philosophy contains discussions related to epistemology, it is not merely a rational enterprise but a wisdom tradition grounded in the identity between knowledge (*cit*) and existence (*sat*). She sketches the relation between rational inquiry and integral insight in these terms: ‘Reason and experiments are ... not the only valid means of knowing. Depending on the domain of study, reflection, inner transformation, and ontological insights also are means of knowledge ... The Truth that was pursued demanded a means that is a blend of personal and social engagement, ecological awareness, and advanced mathematics’.<sup>90</sup>

However, given that Science<sub>VED</sub> does not proceed through the iterative sequences of experimentation, framing and testing of quantitative hypotheses, subsequent experimentation, and so on, the claim that Science<sub>VED</sub> can seamlessly subsume, without any cognitive conflicts, the content of the current sciences remains an intensely disputed matter. A fundamental problem underlying claims that Science<sub>EMP</sub> can be assimilated into the transcendental vision of Science<sub>VED</sub> is that the specific empirical details of Science<sub>EMP</sub> cannot always be fitted into the metaphysical systems of Science<sub>VED</sub>.<sup>91</sup> The *Brahma-sūtras*, a set of foundational aphorisms for all Vedantic systems, begin by stating, ‘therefore, then, the

inquiry into Brahman (the ultimate reality)' (*athāto brahma-jijñāsā*). While such a Vedantic inquiry into the ultimate is similar in some respects to that of scientists in the fields of, say, astrophysics or quantum mechanics, the Brahman indicated by the Vedantic traditions is not accessible to ordinary reason, controlled experimentation, or mathematical formulation. Again, while sciences such as physics seek to understand the temporal evolution of the cosmos through natural causation, forms of Vedānta such as Advaita view all cosmic processes as ultimately illusory appearances (*māyā*) out of the eternal ground of Brahman. Therefore, since both science and Vedantic systems are, in principle, unifying systems of knowledge, the ontological commitments in the 'unity' proposed by the former may conflict with those in the 'unity' projected by the latter.

As we have seen, a common strategy in Hindu modernisms is to 'spiritualise' the implications of Darwinian evolution, by reorienting it from its naturalistic contexts towards a transcendental goal. These Vedantic illuminations of neo-Darwinian evolution proceed by redefining the basic terms involved: the Vedantic doctrines are regarded as 'evolutionary' in the sense that they teach the progressive unfolding of natural phenomena under the guardianship of the eternal spirit, whereas Darwinian evolution is said to be anti-spiritual and limited only to the biological emergence of the species. Here is a clear statement of this move in a lecture delivered by Keshub Chunder Sen in 1877: 'Your protoplasm, your natural selection, I leave to be discussed by men like Huxley and Darwin ... But this, I believe, is indisputably true, that in the individual there is something like evolution going on unceasingly ... The animal lives in us still, and wars with incipient humanity ... But if the war goes on, the ultimate result of this protracted series of struggles will be the evolution of pure humanity'.<sup>92</sup> Similarly, though parallels are sometimes proposed between rebirth and the Darwinian transformation of species, the doctrine of *karma* and rebirth does not speak of the

organic evolution of *one* species *into* another; rather, these species are taken in the *Puranic* literature to be already existent vehicles for the transmigrating individual self. Again, the recent Hindu attempts to integrate quantum physics into Vedantic universes often rely heavily on its idealistic or subjectivist interpretations, which remain a disputed issue in scientific circles.<sup>93</sup> Part of the complexity is that while Einstein and Max Planck vigorously resisted the notion that the physical world is dependent on mind, other founding figures such as Wolfgang Pauli and Erwin Schrodinger, both of whom incidentally had been influenced by Schopenhauer, were more willing to speak of consciousness within the framework of quantum mechanics.<sup>94</sup> Nevertheless, as E.R. Scerri has noted, the view that the consciousness of the human observer ‘collapses’ the wave-function is ‘something of a minority view’ in the scientific world, and further, the consciousness in question is ordinary consciousness that operates through sensory channels, and not the deep meditative states of the higher consciousness of Indic mysticisms.<sup>95</sup>

A related question is whether these appeals to the assimilative capacity of Science <sub>VED</sub> involve a policy of ‘anything goes’ where any form of indigenous knowledge can be valorised as scientific.<sup>96</sup> According to some writers in the field of Science Studies, which often weaves together various elements of social constructivism, anti-realism, and conceptual relativism, the critique of western science is part of the recovery of ‘subjugated knowledges’ which were obscured by imperial powers, but which can today provide us with modes of encountering the world which are less dualistic, objectivist, and mechanistic, and more organic, spiritual, and holistic. Rejecting the ‘positivist’ notions of science as based on deductive logic, algorithmic templates, and so on, they seek to embed scientific practices squarely within historical, cultural, political, gendered, and (sometimes) religious perspectives. They argue that there is no transcultural essence to the enquiries and practices called ‘science’; rather, we should

adopt a conceptual egalitarianism according to which diverse ways of configuring our relations to the world are accepted as reasonable, plausible, and valid. All representations are generated by the will to power, and representations from the perspective of science, a quintessentially colonial enterprise, are grounded in the attempt to demolish local forms of Indic knowledge. Therefore, the response to ‘western’ science should be the decolonisation of Indian minds through the purging of its categories which are implicated in multiple forms of institutionalised violence. However, our discussion has indicated that figures such as Akshaykumar Datta, Vivekananda, Prabhupada and others, far from meekly succumbing to the triumphant march of a Eurocentric science, creatively engaged with its complex significances on several distinct registers. As Raman has pointed out, it is possible to reject the Eurocentric assumption that the capacity for scientific enquiry is somehow unique to Graeco-Christian cultures, without setting up a ‘Hindu science’ whose truth-claims can be validated only within Hindu contexts. Many well-known Indian scientists, such as S.N. Bose (who collaborated with Einstein), M. Saha, S. Chandrasekhar (who was awarded the Noble Prize for Physics in 1983), and others have themselves regarded certain methodologies and criteria of ‘western science’ as, in fact, trans-cultural, universal, and international.<sup>97</sup> That is, while rejecting the thesis that science is essentially a European practice, one should highlight certain epistemic cultures, in classical Hindu contexts such as Vedantic-Buddhist dialectics, intra-Vedantic dialogues, and so on, which are broadly continuous with current modes of scientific inquiry which are based on mutual engagement, rational deliberation, and public discussion between proponents of rival standpoints.<sup>98</sup> Therefore, regarding the diverse modernised Vedantic appropriations of ‘western’ science that we have discussed, the vital debate is not so much over the plausibility or adequacy of certain trans-cultural notions of truth, rationality, and objectivity, as over which worldview (Vedantic, Christian, metaphysical naturalist, and so on) supplies the proper content to these notions.

## *Conclusion*

The discourse of ‘Hindu science’ emerges towards the end of the nineteenth century at the confluences of several crisscrossing east-west currents, and is shaped both by orientalist and Christian missionary representations of Hindu otherness, and by Hindu intellectual modes of cultural self-affirmation. The privileging of ‘experience’ is a central aspect of these modern Hindu engagements with science, which seek to present Hinduism not through the foci of ritual competence (*adhikāra*), modes of worship, study of scriptures, and so on, but as a rational, anti-clerical, and contemplative way of life which is universally available. Thus, ‘Hindu science’ emerges through a reconfiguration of classical Vedantic understandings of the self, whose universality is accessible with the vocabulary of scientific empiricism, beyond the boundaries of traditional modes of exegetical training, scriptural meditation, and contemplative practice. Embodying in his person some of these currents, Swami Rama Tirtha (1873–1906) aligns, during his lectures in America, the autonomy of the Advaitin self with scientific experimentalism: ‘The word Vedanta means the ultimate science, the science of the soul, and it requires a man to approach it in the same spirit in which you approach a work on chemistry. You don’t read a work on chemistry, taking it on the authority of chemists like Lavoisier, Boyle, Reynolds, Davy and others. You take up a work on chemistry and analyse everything yourself ... So a religion that is based on authority is no religion. That alone is truth which is based upon your own authority’.<sup>99</sup> The ‘experimental basis’ of Hinduism was emphasised also by S. Radhakrishnan who argued that Vedic truths could be re-experienced and re-confirmed by individuals in the present: ‘The chief sacred scriptures of the Hindus, the Vedas register the intuitions of the perfected souls. They are not so much dogmatic dicta as transcripts from life. They record the spiritual experiences of souls strongly endowed with the

sense of reality'.<sup>100</sup> Radhakrishnan's complex understanding of the relation between spiritual experience and Vedic statements (*śruti*) seems to combine aspects of the two views of this relation outlined by A. Sharma. According to the first, the Vedas are the records of the transcendental experiences of the seers, and these experiences, which are self-certifying, are a distinct means of knowing reality. While the Vedas are the usual vehicles of apprehending the ultimate – through the three-fold means of hearing the truth (*śravaṇa*), reflecting on the truth (*manana*), and meditating on the truths (*nididhyāsana*) which are indicated in the Vedas – the ultimate can *also* be known independently of the Vedas. According to the second, while the ultimate reality is self-evident, an individual's understanding of what this reality is like remains obscured by ignorance which can only be dispelled by scriptural knowledge. Therefore, the Vedas are the sole criterion of validity of our putative experiences of the ultimate. Śaṅkara himself seems to accord primacy not to experience but to scripture, he also speaks of a living enlightened teacher (*Chāndogya Upaniṣad* 6.14.2), so that the traditions of Advaita are grounded in the continuity of transmission of truth by those who have experienced Brahman. Therefore, Sharma concludes that 'while a synchronic view of *śruti* tends to downplay the role of experience vis-a-vis scripture, a diachronic view of Advaita as a living tradition handed down from teacher to pupil—coupled with the desirability of a *realized* teacher—brings experience back into the picture'.<sup>101</sup> On the one hand, Radhakrishnan seems to suggest the first view when he draws on not only Upaniṣadic sources but also thinkers as widely varied as F.H. Bradley and Baron von Hügel in configuring his understanding of experience.<sup>102</sup> On the other hand, Radhakrishnan's appeals to 'experience', which adopt the vocabulary of Science<sub>EM</sub>, are still packaged with claims from the interpretative framework of Science<sub>VED</sub>. Thus, for Radhakrishnan, the 'experience' in question is a modern Advaitic supra-rational 'intuition' which is self-established (*svataṣṣiddha*), self-evidencing (*svasaṃvedya*), and self-luminous (*svayaṃ-prakāśa*); further, it is its own cause and its own

explanation, and is both truth-filled and truth-bearing.<sup>103</sup> Referring to ‘a tendency on the part of thought to make relative truths into absolute ones, provisional hypotheses into final statements’, Radhakrishnan claimed that scientific hypotheses are in fact abstractions which do not adequately apprehend the fullness of an integral experience which is beyond the constraints of logical proof.<sup>104</sup>

We return to a point we have highlighted on several occasions in this essay: the conceptual viability of the project of ‘Hindu science’ (which includes the significant contributions of ancient and medieval India in the fields of algebra, trigonometry, astronomy, and others) depends crucially on whether, and to what extent, the specific content of the current sciences can be encapsulated within Vedantic visions of the self.<sup>105</sup> Consider Vivekananda’s claim: ‘Knowledge is to find unity in the midst of diversity – to establish unity amongst things which appear to us to be different from one another’,<sup>106</sup> which both a scientific field such as physical cosmology and Vedantic metaphysics could accept. However, since both these disciplines are – at least potentially – totalizing systems of thought, the key question relates to the arbitration of conceptual boundary disputes that ensue when each system claims complete explanatory competence. Thus, when Sen claimed that Darwin, Huxley, Spencer, and others were ‘unconscious labourers in God’s vineyard’ who were ‘engaged in the work of unification’, not all these figures would have agreed with his conclusion that the culmination of this unification is the transcendental God-force underlying natural phenomena.<sup>107</sup> Again, the plausibility of his statement that in his New Dispensation ‘faith and reason shall be harmonised in the true science’<sup>108</sup> turns crucially on reading the ‘true science’ through his highly eclectic form of Science <sub>VED</sub>. Therefore, while certain Vedantic doctrines would count as scientific if ‘science’ is understood primarily in terms of a search for conceptual unity, a quest for metaphysical foundations, a system of knowledge acquisition that is receptive to

experiential claims, and so on, these doctrines would sharply conflict with other notions associated with contemporary science such as mathematization of natural processes, formulation of fallible hypotheses, instrument-based experimentation, and so on.

The key challenge, then, is to spell out the relations between scientific inquiry and Vedantic doctrine such that the latter illuminates the former without violating its cognitive autonomy and methodological integrity. For instance, the conflict between the non-teleological character of neo-Darwinian evolution, which operates through random genetic mutation and natural selection, and the teleological emphasis of Hindu notions of spiritual progress is often removed, as we have seen, by positing the former as a biological means which can partly assist the perfection of the latter. While neo-Darwinian evolutionary biology usually rejects matter-spirit dualisms, and argues for consciousness as an emergent property of physical structures, modern Vedantic reflections on evolutionary biology regard spirit as (ontologically or logically) independent of materiality. M. Nanda highlights this problem when she argues that some of the declarations about parallels between quantum physics and Vedantic thought ‘respect neither the integrity of physics nor the authenticity of mysticism that is at the heart of Vedānta: physics is turned into mysticism and Vedānta is made to sound as if it were chiefly concerned with understanding the material world, which it never was’.<sup>109</sup> There are extensive parallels to this vexed matter of connecting religious worldviews to the empirical sciences in Christian theological circles, where various exegetical and theological manoeuvres have been tested in the voluminous literature on the ‘Religion and Science’ debates. For instance, the Jesuit priest-scientist W.R. Stoeger claims that while certain philosophical interpretations of quantum physics can be found to be in direct conflict with Catholic theology, provided both quantum mechanics and Catholic doctrine are properly understood, there cannot be any intrinsic contradiction between them, since the results of the



sciences are to be viewed ‘as a fruit of our rationality and as an indirect reflection of the Creator in nature’.<sup>110</sup> This positive valuation of scientific enquiry reminds us that some the most important natural philosophers of the scientific revolution, such as Boyle, Leibniz, and others, were devout Christians, who sought to develop theological positions along with their philosophical understandings of the world. We find such a move to ‘layer’ divine action onto a world run by naturalistic causation in M.L. Sircar (1833–1904) who claimed, in a lecture in 1869, that the pursuit of scientific knowledge and experimental methods would not undermine religion for ‘science leads to a firm belief in the Deity and a devout attitude of mind before the great First Cause’.<sup>111</sup> As we have seen, developers of ‘Hindu science’ such as Vivekananda, Radhakrishnan, Swami Prabhupada, and others start from Vedantic perspectives which present all-encompassing views of reality, into which they seek to integrate the empirical sciences. As with all other attempts to integrate ‘science’ into ‘religion’, the enterprise of ‘Hindu science’ too remains work in progress, as its practitioners seek to infuse scientific vocabularies into Indic systems.

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<sup>1</sup> Fehige, “Introduction,” 10.

<sup>2</sup> Harrison, “‘Science’ and ‘religion’: constructing the boundaries,” 25.

<sup>3</sup> Ibid., 30.

<sup>4</sup> Dawid, *String Theory and the Scientific Method*.

<sup>5</sup> Finocchiaro, “Science, Religion, and the Historiography of the Galileo Affair: On the Undesirability of Oversimplification,” 114.

<sup>6</sup> Arnold, *Science, Technology and Medicine in Colonial India*, 212.

<sup>7</sup> D. Raina and S. Irfan Habib, “The Missing Picture: The Non-emergence of a Needhamian History of Sciences of India,” 281.

<sup>8</sup> Killingley, “Hinduism, Darwinism and evolution in late-nineteenth-century India,” 178.

<sup>9</sup> Duff, *Missions the chief end of the Christian church*, 86

<sup>10</sup> Trevelyan, *The Competition Wallah*, 305.

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- <sup>11</sup> Quoted in Raychaudhuri *Perceptions, Emotions, Sensibilities*, 56.
- <sup>12</sup> Raychaudhuri, *Perceptions, Emotions, Sensibilities*, 29–31.
- <sup>13</sup> Bebbington, *Evangelicalism in Modern Britain*, 57–59.
- <sup>14</sup> O’Hanlon, *Caste, Conflict and Ideology*, 56.
- <sup>15</sup> O’Hanlon *Caste, Conflict and Ideology*, 52.
- <sup>16</sup> Jordens, *Dayananda Sarasvati*, 70.
- <sup>17</sup> Kopf, *The Brahmo Samaj and the Shaping of the Modern Indian Mind*, 67.
- <sup>18</sup> Tagore, *The Autobiography of Maharshi Devendranath Tagore*, 75.
- <sup>19</sup> Tagore, *Brahmo Dharma*, 15,33.
- <sup>20</sup> Kopf, *The Brahmo Samaj and the Shaping of the Modern Indian Mind*, 139.
- <sup>21</sup> Sen, *Lectures in India I*, 204–206.
- <sup>22</sup> Lavan, “The Brahmo Samaj: India’s First Modern Movement for Religious Reform,” 17.
- <sup>23</sup> Damen, *Crisis and Religious Renewal in the Brahmo Samaj (1860–1884)*.
- <sup>24</sup> Sen, *Lectures in India I*, 207.
- <sup>25</sup> Brown, *Hindu Perspectives on Evolution*, 110.
- <sup>26</sup> Sen, *Lectures in India I*, 326.
- <sup>27</sup> Vivekananda, *The Complete Works*, vol.1, 126–7.
- <sup>28</sup> Vivekananda, *The Complete Works*, vol.1, 7.
- <sup>29</sup> Rambachan, *The Limits of Scripture*, 60.
- <sup>30</sup> Vivekananda, *The Complete Works*, vol.3, 148.
- <sup>31</sup> Vivekananda, *The Collected Works*, vol. 1, 125.
- <sup>32</sup> Vivekananda, *Collected Works*, vol.1, 415.
- <sup>33</sup> Vivekananda, *The Complete Works*, vol. 2, 138.
- <sup>34</sup> Vivekananda, *The Complete Works*, vol.1, 15.
- <sup>35</sup> Vivekananda, *The Complete Works*, vol. 2, 510–12.
- <sup>36</sup> Vivekananda, *The Complete Works*, vol.2, 139.
- <sup>37</sup> Vivekananda, *The Complete Works*, vol.4. 156.
- <sup>38</sup> Vivekananda, *The Complete Works*, vol.8, 25.
- <sup>39</sup> Brown, “Conciliation, Conflict, or Complementarity: Responses to Three Voices in the Hinduism and Science Discourse,” 609.
- <sup>40</sup> Vivekananda, *The Complete Works*, vol.1, 292.
- <sup>41</sup> Vivekananda, *The Complete Works*, vol.3, 407.

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- <sup>42</sup> Killingley, “Yoga-Sūtra IV, 2–3 and Vivekānanda’s Interpretation of Evolution,” 172.
- <sup>43</sup> Swami Prabhupada, *Easy Journey to other planets*, 11.
- <sup>44</sup> Swami Prabhupada, *Easy Journey*, 12–13.
- <sup>45</sup> Swami Prabhupada, *Easy Journey*, 17.
- <sup>46</sup> Swami Prabhupada, *Easy Journey*, 14.
- <sup>47</sup> Swami Prabhupada, *Easy Journey*, 33–34.
- <sup>48</sup> Swami Prabhupada, *Easy Journey*, 63.
- <sup>49</sup> Swami Prabhupada, *Easy Journey*, 30.
- <sup>50</sup> Swami Prabhupada, *Easy Journey*, 35–36.
- <sup>51</sup> Swami Prabhupada, *Easy Journey*, 81.
- <sup>52</sup> Swami Prabhupada, *Easy Journey*, 25.
- <sup>53</sup> Swami Prabhupada, *Easy Journey*, 88.
- <sup>54</sup> Shimony, “Conceptual Foundations of Quantum Mechanics,” 395.
- <sup>55</sup> Omnès, *The Interpretation of Quantum Mechanics*.
- <sup>56</sup> Maudlin, “Distilling Metaphysics from Quantum Physics,” 473.
- <sup>57</sup> De Riencourt, *The Eye of Shiva*.
- <sup>58</sup> Goswami, “Physics Within Nondual Consciousness,” 541.
- <sup>59</sup> Panda, *Māyā in Physics*, 306–307.
- <sup>60</sup> Panda, *Māyā in Physics*, 336.
- <sup>61</sup> Panda, *Māyā in Physics*, 440–41.
- <sup>62</sup> Swami Jitatmananda, *Modern Physics and Vedanta*, 2.
- <sup>63</sup> Swami Jitatmananda, *Modern Physics and Vedanta*, 7.
- <sup>64</sup> Swami Jitatmananda, *Modern Physics and Vedanta*, 33.
- <sup>65</sup> Swami Jitatmananda, *Modern Physics and Vedanta*, 77.
- <sup>66</sup> Swami Jitatmananda, *Modern Physics and Vedanta*, 108.
- <sup>67</sup> Lipner, *The Face of Truth*.
- <sup>68</sup> Swami Prabhupada, “An Ancient Science for Modern America,” 8.
- <sup>69</sup> Pigliucci and Bourdry, *Philosophy of Pseudoscience*.
- <sup>70</sup> Atkins, *On Being*, xiii.
- <sup>71</sup> Rosenberg, *The Atheist’s Guide to Reality*.
- <sup>72</sup> Smith, *Naturalism and Our Knowledge of Reality: Testing Religious Truth-Claims*.
- <sup>73</sup> Trigg, *Beyond Matter: Why Science Needs Metaphysics*, 35.

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- <sup>74</sup> Ellis, “Growing Up Amid the Religion and Science Affair: A Perspective From Indology,” 605.
- <sup>75</sup> Brown, *Hindu Perspectives on Evolution*, 24.
- <sup>76</sup> Dorman, “Hinduism and Science: The State of the South Asian Science and Religion Discourse,” 616.
- <sup>77</sup> Edelmann, ‘The Role of Hindu Theology in the Religion and Science Debate’, 636.
- <sup>78</sup> Chattopadhyaya, *Science and Society in Ancient India*, 3–4.
- <sup>79</sup> Chattopadhyaya, *Science and Society in Ancient India*, 97.
- <sup>80</sup> Chattopadhyaya, *Science and Society in Ancient India*, 372.
- <sup>81</sup> Engler, ““Science” VS. “Religion” in Classical Ayurveda,” 422–24.
- <sup>82</sup> Edelmann, *Hindu Theology and Biology*, 161–62.
- <sup>83</sup> Vivekananda, *The Complete Works*, vol.2, 441.
- <sup>84</sup> Vivekananda, *The Complete Works*, vol.1, 14.
- <sup>85</sup> Stenmark, “Ways of relating science and religion,” 282–84.
- <sup>86</sup> Panda, *Māyā in Physics*, xiv.
- <sup>87</sup> Raman, “Science and the Spiritual Vision: A Hindu Perspective,” 83–94.
- <sup>88</sup> Raman, “Quantum Mechanics and Some Hindu Perspectives,” 162.
- <sup>89</sup> Ibid., 166.
- <sup>90</sup> Menon, “Hinduism and Science,” 11.
- <sup>91</sup> Brown, “Three Historical Probes,” 442.
- <sup>92</sup> Sen, “Philosophy and Madness in Religion,” 87.
- <sup>93</sup> Mohanty, “Idealism and the Quantum Mechanics”.
- <sup>94</sup> Marin, “Mysticism’ in quantum mechanics: the forgotten controversy”.
- <sup>95</sup> Scerri, “Eastern mysticism and the alleged parallels with physics,” 689–90.
- <sup>96</sup> Brown, *Who Rules in Science? An Opinionated Guide to the Wars*.
- <sup>97</sup> Raman, “Science International (Beyond the West),” 43.
- <sup>98</sup> Ganeri, “Well-Ordered Science and Indian Epistemic Cultures: Toward a Polycentred History of Science”.
- <sup>99</sup> Dobe, *Hindu Christian Faqir*, 127.
- <sup>100</sup> Radhakrishnan, *The Hindu View of Life*, 17.
- <sup>101</sup> Sharma, “Sacred Scriptures and the Mysticism of Advaita Vedanta,” 173.
- <sup>102</sup> Halbfass, *India and Europe*, 398.
- <sup>103</sup> Radhakrishnan, *An Idealist View of Life*, 92–93.
- <sup>104</sup> Radhakrishnan, *An Idealist View of Life*, 224.

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- <sup>105</sup> Subbarayappa, “Indic Religions,” 202–205.
- <sup>106</sup> Vivekananda, *The Complete Works*, vol.5, 519.
- <sup>107</sup> Sen, *Lectures in India I*, 406.
- <sup>108</sup> Sen, *Life and Works of Brahmananda Keshav*, 389.
- <sup>109</sup> Nanda, *Prophets Facing Backward*, 108.
- <sup>110</sup> Stoeger, “Quantum Theory, Philosophy, and Theology: Is there a distinct Roman Catholic perspective?,” 170.
- <sup>111</sup> Quoted in Subbarayappa, ‘Indic Religions’, 200–201.

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