Reviews

Ancient Hindu Science: Its Transmission and Impact on World Cultures. By Alok Kumar. San Rafael, CA: Morgan & Claypool Publishers, 2019. 212 pages. Paperback $29.95; Hardcover $49.95.

Science in the modern world is an international enterprise that benefits people from all over the world; it is studied by people from all over the world, and people from all over the world contribute to it in various measures. But these global and transcultural aspects of science are recent in humanity's long history. In more ancient times, scientific minds generally explored and labored independently, with little or no knowledge of the details of what others were doing elsewhere. Nevertheless, through trade and conquest there used to be periodic interactions and sporadic intermingling of ideas and insights.

With the emergence of modern science in Western Europe in the seventeenth century and its drastic new methodology that began to bear abundant fruits, one began to think that there was neither science nor mathematics in the ancient world. This ignorance morphed into an arrogance that looked upon all ancients as barren in scientific output.

But the discovery of the writings of ancient Greek thinkers led to a further serious quest for information about the past. In the nineteenth century, a wealth of Babylonian and Egyptian science was uncovered, and soon many scientific treasures of China and India were also uncovered. Of equal interest was how those treasures were interchanged and why some of them lost their luster even where they originated.

We owe a good deal to the countless scholars and historians who pieced together much of the sciences of ancient civilizations. So was created a vast body of knowledge about the sciences that blossomed in various parts of the world. The search continues to throw new light on little known facts and distorted visions of ancient creativity.

But much of this fascinating information about ancient science lies in scholarly journals and treatises. We need other scholars to make all this accessible to the average educated reader. This slim volume accomplishes precisely that with clarity and elegance. Its author Alok Kumar is a Distinguished Professor who has a long list of scholarly publications to his credit. Besides technical science that he has practiced and taught he has also delved into the history of science and probed as a scholar into Hindu and Arab science. His vision of science is broad and universal.

The book begins with the Hindu approach to knowledge, clearly showing that the quest for truth has always been regarded in that culture with reverence, and the teacher invariably treated with respect. Every search for knowledge was done in the broader framework of understanding the nature of ultimate reality and the relevance of human consciousness that is engaged in the quest.

The book offers systematic discussions on the contributions of ancient Hindu thinkers to the number system and to geometry and trigonometry, as well as Hindu evaluations of *pi*. Here, as elsewhere, the book explains how Hindu

 ISSN 0591-2385

mathematics spread and impacted frameworks in other civilizations. In this context, what the author does not point out is that although various Hindu (Sanskrit) texts were translated into Chinese, Latin, Arabic, Persian, and European languages, there does not seem to be a single classic of another culture rendered into Sanskrit. This may explain why there are not many references to or acknowledgment of alien authors in ancient Hindu writings.

Ancient Hindu Science considers in detail Hindu astronomy with references to calendar and cosmology, as well as to the famed observatory of Ujjain (which it aptly describes as the "Greenwich of the Ancient World"). It also narrates how Hindu astronomy spread to the Middle East, China, and Europe. Other topics discussed in detail are the notions of space, time, and matter (physics), mining and metallurgy (chemistry), as well as ecology, medicine, and surgery in ancient India.

This book presents in a systematic, well-organized, and amply referenced way the entire range of contributions of ancient Hindus to science. It also traces how thoughts and insights that emerged in India were received, appreciated, and extended by thinkers in many other parts of the world, especially in Europe and America. The style and level of presentation is within reach of any educated person. The book is thus a very valuable addition to the growing literature on the subject. In his *Mathematical Thought from Ancient to Modern Times* (190) Morris Kline noted, "It is fairly certain that Hindus did not appreciate the significance of their own contribution." True or not what is fairly certain is that, aside from specialists in the field, the world does not appreciate fully the contributions to science that ancient Hindus had made. This book does much to remedy this misunderstanding.

One may wonder why the author chose to describe it Hindu science rather than Indic science: a title that this reviewer would have preferred since Jaina and Buddhist thinkers also contributed to some of these profound ideas in ancient India. But the author has explained clearly in the preface his reason for choosing his title. Although the term *Hindu* itself is of alien vintage, it has become an ethnically sensitive epithet in modern India. For many decades, now there have been movements to emphasize the Hindu roots of modern India. The modern West is not Christian, but its cultural roots are largely Christian. So it is with modern India: a modern secular democracy with roots that are decidedly Hindu. From that point of view, this book is appropriately titled.

The book is bound to enlarge the reader's understanding and vision of science as a major factor in modern global civilization.

V. V. Raman
Professor (Emeritus) of Physics and Humanities
Rochester Institute of Technology
Rochester NY
USA
vvrsps@rit.edu

-

Logos: The Mystery of How We Make Sense of the World. By Raymond Tallis. Newcastle upon Tyne: Agenda Publishing Limited, 2018. 276 pages. £25.00/$30.00. (Hardback).

Ludwig Wittgenstein once remarked that it is not *how* the world is that is astonishing, but *that* it is. Equally extraordinary is the fact that the world is intelligible to the human mind, when it might easily not have been so. This raises several fundamental metaphysical questions: if the universe is simply the product of random, irrational causes, why is it so consistent, predictable, and law-like? What explains the human mind's unique capacity to make sense of reality? Why is there such a close correspondence between the knower and the known?

The renowned medic and philosopher Raymond Tallis tackles these questions with élan in his new monograph, *Logos: The Mystery of How We Make Sense of the World*. A self-confessed atheist, Tallis admits to formerly having been inclined toward scientism. However, painfully aware as he now is of the epistemic limits of human understanding, he does not pretend to be able to explain how consciousness and matter can relate to one another—or to "solve" the mystery of *Logos* (the comprehensibility of the world). Instead, by exploring the work of philosophers, scientists, and theologians who do purport to provide answers to these questions, he offers a scintillating tour through the conceptual landscape of the contemporary debate.

The structure of the book is impeccably logical. After an introductory chapter laying out the main themes, Tallis provides a critical examination of two reductionist theories that have attempted to explain *Logos*: idealism and materialism/physicalism. Idealism holds that "the comprehended natural world is internal to the mind that comprehends it" (53). In its most extreme form, it claims that reality consists solely of minds and their ideas. Space and time are merely forms of our human experience rather than properties of things in themselves. Tallis concedes that the *measurement* of space and time are activities of the human mind, but he argues that it is surely a matter of objective fact that, for instance, the universe has a certain diameter, or that $E = mc^2$. A further problem with idealism, he argues, is that it leads ineluctably to solipsism and the "problem of other minds," and removes rather than addresses the mystery of the intelligibility of the world, because "the comprehended world is dissolved without remainder into the comprehending mind" (54). Idealism thus fails to explain the origin of a world distinct from human minds, and it does not even begin to address the problem of how it is that the mind can come to acquire knowledge of that world.

Materialism/physicalism, in contrast, claims that our minds are nothing more than the product of evolutionary processes and are therefore internal to nature. Seemingly nonphysical properties—such as minds, consciousness, and experience—are merely epiphenomena that arise out of the physical activity of the brain. Materialists are committed to the view that all will eventually be explained in terms of neural mapping or other matter-based techniques. Tallis is suspicious of the assumption that mind is an "emergent property" from matter, arguing that it does not make evolutionary sense for creatures to be conscious: in terms of survival, for instance, consciousness offers no clear selective advantage.

My problem with this part of the argument was in identifying what Tallis might understand by the term "consciousness." He is presumably not saying that "it is better to be a tree than a dog," because trees (not conscious) "survive longer than dogs" (conscious). He appears, rather, to be asserting that *self*-awareness offers no clear evolutionary advantage. Yet the mind that is self-aware (i.e., human) is more highly "developed" than the one that is not (e.g., that of a dog) and so *does* have an evolutionary advantage. Humans have the ability to survive precisely by using a mind that has much greater capacity, demonstrated in that mind's self-awareness—a self-awareness that is integral to its problem-solving ability. As Tallis points out, human cognition differs radically—not only in degree, but also in kind—from that of all other species. There is therefore some substance to his claim that the human capacity to acquire knowledge cannot be "causally eliminated" by assuming that there is a seamless continuity between it and animal sentience. He is brave to challenge such a materialist orthodoxy, and his critique echoes similar attempts by philosophers such as Thomas Nagel.

As Tallis rightly indicates, the difficulty with both the idealist and the materialist attempts to "solve" the mystery of human consciousness and knowledge is that one crucial aspect of existence is ignored or denied. In his view, neither account offers a satisfying answer to the problem of the comprehensibility of the universe. Little wonder that this "divorce between how the world looks and feels, and our scientific understanding of it comes to feel like a deep cognitive wound" (172). In the remaining chapters, he attempts to heal this "cognitive wound" by affirming the reality of a world "out there" as well as a genuine knower "in here." Our knowledge, he says, arises out of a complex relational interplay between knower and known.

So far, so good. But it is at this point that his analysis runs into more serious difficulties. He argues, for example, that an insuperable gap exists between objects and our cognition, and that this "opacity" between knower and known means that we may never fathom the reason for our ability to "make sense of things." We must remain "ontologically agnostic" about why the world is rational. The mystery of the *Logos* of the world is so impenetrable that it is impossible to answer.

Tallis insists, however, that a "supernatural" explanation must be avoided at all costs, on the grounds that it is empirically unknowable. Nevertheless, he must see that, if mind and world truly *are* open to one another, then, while being careful to uphold the objective reality of both mind and matter, it makes perfect rational sense to accord a certain causal priority to mind over matter. He concedes that, if the materialist/physicalist conception of nature were, in essence, sound, we would be hard put to account for the existence of consciousness. But it would be even harder to explain how consciousness could fathom the truth of physical reality.

Tallis would do well to engage with the work of the Christian philosopher and theologian David Bentley Hart. In his profoundly impressive book *The Experience of God: Being, Consciousness, Bliss* (New Haven and London: Yale University Press, 2013), Hart takes it as given that the mind really does acquire knowledge from what would otherwise be a succession of physical states devoid of meaning. In fact, he argues, the world becomes more intelligible to us the more we are able to abstract it into concepts. For instance, something becomes fully intelligible to us when we are able to say that we have an *idea* of it that can be grasped according

to the simplest abstract laws. This, for Hart, is the highest degree of intelligibility, and means that, while "we may or may not be Platonists in our metaphysics … we certainly must be practical idealists in our epistemology" (233). It therefore makes perfect sense that a sizeable proportion of Greek philosophers and medieval scholastics took it for granted that "the ideal dimension of things, their intrinsic intelligibility, was not only a real property of their existence but in some sense was identical with existence itself" (233). Hart's conclusion is that, if that is so, it raises the following questions, all of which lead to a necessary theological supposition:

> What… is an idea other than the product of a mind? What is a concept other than the expression of a rational intentionality? And how, therefore, could being be pure intelligibility if it were not also pure intelligence—the mind of God, so to speak? (233)

It is disappointing that Tallis, in what is an otherwise excellent book, rejects *tout court* the possibility of there being a divine underpinning to the intelligibility of the universe. This seems more like atheist prejudice than well-reasoned argument. It also suggests that he retains some sympathy with the scientism of his youth, despite his protestations to the contrary. These faults do not, however, detract overall from the fascinating story he has to tell, and his book is a thoroughly enjoyable read.

Jonathan W. Chappell
King's College London
London, UK
j.w.h.chappell@btinternet.com

-