

Book Review

***The Nature of Physical Reality* by Subhash Kak New York: Peter Lang, 1986; 153 pp.**

Book Review by Stanley Krippner

This engaging book is part of the American University Studies series. As such, it attempts to present a summary of sciences current understanding of the physical world, and to point out that humankind's questioning across the ages has had a continuity, especially concerning the problem of paradox and reality. The author, a professor of information theory at Louisiana State University, finds these same questions articulated in the Rig Veda, the Upanishads, and in Greek literature. He also observes at least two types of answers: the atomists' belief that all knowledge can be reduced to a set of concepts and particles, and the intuitionists' belief that reduction is impossible. The intuitionists hold that our understanding of the universe reflects the nature of our minds; hence the best approach is one that seeks ways to describe complex systems behavior.

Kak identifies two basic assumptions -- causality and determinism -- that have helped scientists discover order in nature. But some scientists take the position that, if carried too far, these assumptions can undercut the attempts to study human consciousness and volition. Another potential conflict is between analytic (i.e., logical, mathematical) and synthetic (i.e., observational, empirical) knowledge. Kak works through these paradoxes, taking the position that a "science of consciousness" can assist the resolution of these purported contradictions.

Kak emphasizes the importance of falsifiability in science. A theory should be expressed in a converse as well as positive manner; as a result, it should be possible to falsify the theory. If this requirement were not insisted upon, there would be no way to evaluate a theory's worth or validity. Kak then presents his notion of the "world-image" -- the embodiment of the experience of reality in a culture. These world-images are difficult to falsify, but may determine the direction that science takes in a given society.

Kak cites some elements of the Western world-image common to Judaism, Christianity, Islam, and Marxism. They are: time is uniform and absolute; space is absolute; humankind has a unique and a central position in the world; human beings alone have "minds." On the other hand, the Eastern world-image sees time and space as relative; humankind is not assigned a central position, and lower animals also have "minds." It might be added that the American Indian world-image was in basic agreement with the Eastern image. Joseph Campbell would have used the term "cultural myth" to describe these world-images, observing that understanding the nature of physical reality is a common task of cultural myths throughout the world.

Kak sketches the basic findings of contemporary physics regarding space and time, pointing out puzzles and paradoxes especially when discussing relativity theory and quantum mechanics. He then moves to astronomy, paying special attention to such puzzling phenomena as black holes and the red shift. He is fond of bringing up paradoxes (e.g., the wave and particle theories of light), then telling the reader how the paradox was resolved.

When he deals with biology, he observes serious problems for those trying to apply physics to a study of life forms. How does one reconcile the stability of biological structures with the increase of the complexity and organization of living organisms? Which came first in the origin of genetic information -- the proteins or the nucleic acids?

Kak sees the phenomenon of self-awareness as one of the most baffling puzzles of science. Computers lack self-awareness, at least at this point in time, so can be of limited assistance in studying this enigma. Kak suggests that mathematics, language and information theory can play a role in this investigation, and cites some remarkable insights for Gargya, Shakatayana and Panini, three ancient Indian philosophers who debated the origins and rules of grammar and word-meanings

From the beginning to the end of the book, Kak has come full circle. Although Western science has learned a great deal about the workings of the physical universe, many of the mysteries of human consciousness are as baffling as they were during ancient times. In 153 pages, the author has given his readers a concise picture of some of what is known about physical reality, and has provided them with questions that will leave them both wiser and more modest.