Encounters at the Interface

by Sushil Kumar

Doubt and Certainty,
by Tony Rothman and George Sudarshan
Perseus Books, USA, 1998,
Indian Reprint by Srishti Publishers and Distributors, 2001
pp. xvi+320 Rs. 500

Tony Rothman and George Sudershan use the metaphor of Plato's Academy to choose discursive style for the book. Scholars from a variety of disciplines were drawn to it to address "fundamental issues." The mode of conducting debate within it was that of a discourse—a literary genre of "a long and distinguished tradition," "dating back to Galileo, the *Bhagwat Gita* and the *Upnishads*" (p.xii). They imagine the Academy as engaged in a discourse of scientific knowledge and its limitations: "we have witnessed a general dissatisfaction with traditional science's inability to provide a spiritual foundation for life" (p. ix). The choice of discursive style points to a linguistic dimension also. The way science is constructed generates an exclusivist orientation and promotes a confrontational approach towards other knowledge traditions: "tourists at the Academy are often surprised at the disdain physicists bear for the Academy's early director, Plato, and his most famous pupil, Aristotle, whom physicists accuse of setting back the course of science one thousand years, if not two" (p. 8).

So constructed, the world of science gets distanced from the common people who remain unaffected by it, except perhaps as consumers of its products. The scientific debates are "highly technical" in nature. The use of "extra-terrestrial vocabulary" and sharp disagreements on the nature of reality, make one feel "despondent" and, no wonder, the Theban Sphinx got hold of the "the nearest physicist at the Academy cafe and ate him" (p. 2). The authors consider it a "sensible reaction" (p. 2) on the part of the Sphinx and go on to elaborate why they think so.

The life world of science and that of the common people do not intersect. The result is that scientists do not find themselves critically positioned in relation to common people. Hence the need is to reposition science with a view to interlock it with the life world of ordinary men, their world of meaning. Such a project has to begin as an encounter at the interface of various knowledge traditions. Building bridges across two traditions — science and spirituality — is part of an emerging "new age" worldview[1]. The encounter opens science to self-scrutiny as well as to scrutiny by others. The benchmark for such scrutiny is the realization that "physics is only an incomplete description of reality and must be supplemented by other modes of perception" (p. xi) and a general realization that each domain has a zone that is known and knowable (the zone of certainty) side by side a zone of unknown and unknowable (the zone of doubt and skepticism). Every tradition has zones of doubt and certainty. What puzzles scientists, spiritualists feel certain about. The encounters result in, what the authors call "the millennium amalgam" or "muddle" (p.x). The authors pose ten questions for such an encounter and try to capture the ten debates in separate chapters under the title *Doubt and Certainty*.

For encouraging participation of non-technical and common people in the discourse, interesting literary innovations are introduced. "Each debate typically begins with an expository section to provide background, then works its way into the debate proper and somewhere along the line (usually towards the end) includes a Practical Exercise, which might be tried out in the Real World. The result is this hybrid, which sometimes strikes us as a cross between Plato's *Republic* and *1001 Nights*" (p. xii). An imperative for such participation is: "surrender pride" and go in a "state of know-nothingness", because, not only are the perspectives on the nature of reality diverse and equal, but even the cognitive categories are not clear. "Are the various viewpoints complementary or mutually exclusive? Can we produce a final theory, and if we do, does it necessarily follow that we have explained everything? By the same token, does having a working theory mean that we have understood it? What do we mean by understand? What do we mean by final? What do we mean by explain?" (p. xvi) In short, the debates are a remarkable blend of scholarship in physics with insights drawn from linguistics and history of science[2].

Is the Universe Describable? "We search for universal truths about nature and when we find them, we show that they can be deduced from deeper truths" (p. xv). The quote is from Steven Weinberg's *Dreams of a Final Theory* (1993). The idea is to focus on a "hierarchy of explanations" within reductionist approaches, such as: "emotions can be boiled down to chemistry, that chemistry in turn is a manifestation of physics and that, ultimately, all phenomena can be understood in terms of basic laws and principles" (p. xv). The authors regard reductionist descriptions of the universe as flawed. First, the empirical maps do not fit into the models. "Such models bear the same resemblance to the real system as a Tinkertoy engine bears to the real locomotive, or a Braneusi bird bears to a real one. Much is omitted. Only the

outlines remain" (p. 11). And second, the same terms (law and principle, theory and model) are used in different knowledge traditions to describe the universe while there is no agreement among these traditions on the meaning of these terms. "Everyday usage of 'theory' is for an idea whose outcome is yet undetermined, a conjecture, or for an idea contrary to evidence" (p. 12). The authors refer to Deepak Chopra's recent book, *The Seven Spiritual Laws of Success* (p. 16). Note the word 'laws' in the title. But "Einstein's theory of relativity does not refer to some arbitrary con-jectures Einstein dreamed up while smoking his pipe, which you are at liberty to reject as it pleases you" (p. 3).

At the root of this semantic contestation is the fact that, on closer examination, the boundaries among the traditions are fuzzy. From this, it is a small step "to connect quantum physics and consciousness and to interpret mystical experiences in terms of quantum mechanics" (p. 15). These modes of perceiving reality take their lead from *The Tao of Physics* (1975) which draws analogies between physics and Eastern religions. "Behind the New Age interest in mysticism is the conviction that Western science has produced a split between mind and heart and that this has done more harm than good (sic). (T)he New Agers see in modern physics — in quantum mechanics especially — a link between the spiritual and the rational" (p. 15). No doubt, the mystical experience can be empirically verified and even modeled as in science. Modes of perception can be similarly modeled. Models are like images. "(W)e approach romance in our lives, equipped with (sic) images from novels and movies" (p. 20). Do these images constitute a theory of romance? The debate ends.

Is Nature Unreasonably Mathematical? The second debate focuses on the ability of mathematics "to describe the real world." (p.22) because, as the authors say quoting Paul Dirac, "God is a mathematician of a very high order and He used very advanced mathematics in constructing the universe" (p. 23). But what is mathematics? Is it *a priori* truth? Plato thought so. Kepler is also quoted as saying, "Geometry is unique and eternal, a reflection of the mind of God. That mankind shares in it is because man is an image of God." The implication of this view is that every thing in nature corresponds to a pre-existing mathematical concept. Or, is mathematics a convention, a product of the human mind and as such a cultural product? Either way, the world does not fit mathematics "like a glove" (p. 26). There are phenomena whose description lies outside the mathematical domain. In chemical and biological phenomena for example the applicability of mathematics is limited. The debate concludes with a remark by the authors: "if God made the world to fit the mathematical world, He could have used a few lessons in tailoring" (p. 43).

The third debate, *Is the World Symmetrical*? begins with the question: why do humans "use the same cookie cutter" to surround themselves with "symmetrical constructs?" (p.45) The authors probe the issue by quoting Diasetz Suzuki from his *Zen and Japanese Culture* (tenth printing, 1993): "Symmetry inspires a notion of grace, solemnity and impressiveness, which is again the case with logical formalism or the piling up of abstract ideas" (p. 47). So defined, some of the Eastern cultures are grounded in symmetry: take the case of "spiritual symmetry, *kaivalya*" (p. 47). But asymmetry is beautiful. "The irregular New York skyline is famous for its beauty"(p. 47). Symmetry and asymmetry are embedded, not only in human creativity, but in the world of nature also. Neither of them describes the world satisfactorily. Take the example of a rose. Can we describe its formation? "Those who enjoy basking in the warm glow of the mysterious can point to the rose and say, without fear of contradiction, here is something we do not understand" (p. 67).

The question for the fourth debate is, *Why Things Happen*? The authors confront the notion of causality with that of teleology: do effects follow causes or precede them? The issue is confounded by the definition of causality as "merely statistical truths" of physical reality as "psychophysical" in nature (in line with the interpretation of quantum mechanics in which the observer of an experiment cannot be separated from the outcome of the experiment), and of effect as "meaningful coincidences" or synchronicity. The authors elaborate this: "It seems as though time, far from being an abstraction, is a concrete continuum which possesses qualities or basic conditions capable of manifesting themselves simultaneously at different places by means of *acausal* parallelism, such as we find, for instance, in the simultaneous occurrence of identical thoughts, symbols and psychic states" (p. 85, emphasis added). In other words, the occurrence of an effect can be attributed to a cause which precedes it, call it "collective unconscious" or *adrishta* as in the Vaiseshika system. Philosophers, physicists and psychologists end the debate without agreement, and with unease.

Hoping for greater clarity, they start the fifth debate, *Does Time Go Forward*? The authors say: "we tell time by such irreversible processes — the phenomena that proceed inexorably in one direction — which we term forward" (p. 95). Eggs can be scrambled but not unscrambled. Such irreversibility is at the root of differentiation between past, present and the future. "If processes were reversible (sic) we would have no right to say time goes forward" (p. 95). If processes can move backward and forward, they will be "time-symmetric" (p. 96). According to Newtonian physics "all phenomena are *reversible*. But Newtonian mechanics is found to be incompatible with the laws of thermodynamics, and the continuing debate between them, which includes such physicists as Stephen Hawkins, is mediated by the concepts of entropy and

chaos. The result is that the idea of a "clockwork universe" has finally been challenged. The principle of uncertainty has taken over. This is being interpreted and experienced in different ways. Complex systems "contain enough unpredictability (for instance in the firing of neurons in the brain) that it will behave as if free will is operative" (p .118). So is the experience of timelessness. "Lovers often speak of a 'timeless moment'" (p. 122). And the debate ends on the note that "irreversible figures alongside the reversible" (p. 125). The sixth debate seeks to go deeper into the question. The subject is, *Why is There Left and Right*? The debate begins with a proposition: "the most obvious asymmetry in the world around us is the asymmetry between left and right" (p. 128). The "bilateral symmetry" which commonly appears in nature is "deceptive." "In India, left-hand conch shells are considered so rare as to be sacred" (p. 129). Further, "crystals can be designated right or left-handed by the direction they rotate polarized light" (p.130). Not only in nature but also in fine art, the asymmetry is perplexing: "most of the portraits hanging from the wall exhibit the left cheek"(p. 133). The debate ends. But the relationship between bilateral symmetry and left-right asymmetry continues to haunt the Academy.

The seventh and eighth debates address the questions: *Is the Universe Weird*? and *Is There an Answer?* These debates focus on a possible unified theory of the universe. Quantum mechanics opens up space for directing research effort towards it. Two problems come up: how can the distinction between force and matter be abolished? And how can the forces of nature be unified? The way to get over these problems is to have conclusive experimental proof in support of symmetry as opposed to asymmetry as the organizing principle of the universe. Such an experimental triumph of symmetry will only be a step behind the blossoming of M-theory ('M' stands for mystery, magic or matrix) which will find expression through mathematics. It will then be possible to describe the universe with "the metrical symbols of the mathematician" (p. 211). Several scholars claim that the "theological potential" of such a theory is "large" (p 210). For example, it will conclusively establish "the notion of transcendence" (p. 179). The authors quote Allan Combs and Mark Hoolland from their book *Synchronicity*, (1996): "The wholeness suggested by synchronicity lies in meaningful connections of events isolated in time and space. In spite of their separation, they seem to be linked together" (p. 79). Victor Mansfield, a physicist, also harps on the same theme in his popular book *Synchronicity, Science and Soul-Making* (1995). The Sphinx when asked how it was possible for her to sometimes be a woman, sometimes a bird, and sometimes a lion, replied that the answer lay in quantum mechanics. The authors are unhappy with such flights of imagination. "(T)here seems little reason to connect it with quantum mechanics" (p. 187). "(Y)ou have to know how to get from one level to the next, from one discipline to the other. If they can't do this, is it science?" (p. 207).

The ninth debate focuses on cosmological issues: the origin of the universe and its defining characteristics. So, it is titled *How Did We Get Here*? The Academy debates the basic questions: what is the origin of the universe? Was it created from nothing? Is it flat or curved? When did time begin? In this debate, scientists are on the weakest pedestal, insofar as "cosmology differs from most other sciences in that the system under observation is unique; it cannot be reproduced"(p. 262). In cosmological discourse, the limits of science surface prominently and its boundaries with theology get blurred[3]. The new age scholars find here space for imaginative link up of science with mysticism. This is the context for the tenth and the last debate, *What Do You Mean*? The authors say that there are no "logical implications" (p. 266). of science for mysticism; the relationship is seen in terms of metaphors and analogies. They quote Steven Weinberg: "Those who seek extra-scientific messages in what they think they understand about modern physics are *digging dry wells*" (p. 269, emphasis added). But, the authors say, this does not rule out "metaphorical transcriptions or inspiration" (p. 270). flowing from research findings in physics to cultural studies. The "transposing of science to other fields by metaphor (sic) is simply the way of the world" (p. 271).

People generally associate images to music and metaphors to science, but the association is not integral to music or science. The authors are correct in their conclusion that such associations when made are big business. But this is not even the half-truth. The bigger truth probably is that the new age approach to cultural representation is also a way to escape the trap of relativism.

REFERENCES

[1]The concept of "new age" implies a new *zeitgeist*. It extols the explanatory power of cultural beliefs by situating them into the concepts of science. The result is that scientific discoveries reverberate across the cultural landscape. New age scholars like Deepak Chopra and Amit Goswami have been linking science to culture with great effect. They focus on the study of consciousness and self-awareness. The success of their efforts is evident from a large number of scientists now engaged in such studies. Such intervention into cultural processes aims at ideological production of values and beliefs.

[2] But the debates do not integrate with the post-positivist understanding of science as expressed in the writings of philosophers like Paul Feyerabend. See, his *Against Method*, New York, NY: Routledge, 1988.

[3] Cf. "The beginning seems to present insuperable difficulties unless we agree to look on it as frankly supernatural." Arthur Eddington, *The Expanding Universe*, New York, NY: Macmillan, 1933, p. 178. Also see, William Lane Craig and Quentin Smith, eds., *Theism, Atheism and Big Bang Cosmology*, Oxford: Clarendon Press, 1993.

Sushil Kumar is a Fellow at the Indian Institute of Advanced Study, Shimla