THOUGHTS OF TURBULENCE

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Turbulent Mirror : An Illustrated Guide to Chaos Theory and the Science of Wholeness, by John Briggs and F. David Peat. Harper and Row, 1989.

Once in a while, an idea, a new way of looking at nature, an insight comes up which radically alters the way people have thought about things. In the scientific world, the idea of wholeness, and the related concepts of chaos, fractals and self-similarity, promise to bring about paradigmatic shifts in scientific attitude. Of course, as the authors of this well produced volume remind us, there is nothing new in the idea of wholeness. It has been central to almost all cultures and the dynamic equilibrium of order and chaos finds mention in several ancient cosmologies. What is novel about the current reincarnation of this idea is the widespread acceptance it is finding amongst the scientists -those who have been for several centuries "under the reductionist spell".

The book is divided into three parts; Order to Chaos, The Mirror and finally Chaos to Order. The title of the book is borrowed from an ancient Chinese legend where the mirror separates the orderly everyday world from the turbulent world of chaotic images. And in the charming style of Alice being taken "Through the Looking Glass", the authors promise to take us from our seemingly orderly world to that of the mysterious and enchanting world of chaos. The poetic and aesthetic charm is certainly there; from the innumerable legends and quotations to the beautiful line drawings of Alice in a strange world. But this does not surprise -- after all, one of the authors (J. Briggs) 'holds a PhD in aesthetics and psychology .....[and] is a free-lance science writer whose articles have appeared in Omni .....'. Paradoxically, this same quality of the book also turns out to be its shortcoming as we will see later.

The authors start with a brief overview of the role of chaos and turbulence in the intellectual history of the world. Unfortunately, a definite Eurocentric bias is revealed in their survey of the mythologies of the world. This is clear from their reference to the 'Indian creator god Shiva' (pg 21). They contend that the growth of Western (read reductionist) science pushed the age old ideas of holism under the rug. Certain scientists like Poincare notwithstanding, everybody was spellbound by the reductionist spell.

Then begins the fascinating journey -- through strange attractors, feedback loops, turbulence and universality, we are led into an appreciation of what this beast chaos is. Chaos is not just complexity as supposed by the statistical mechanics of the last

century, but is a qualitatively different state from order. ⊚It is a world where the full power of nonlinear equations is ⊚manifest. And since the real world is non-linear, it is almost ⊚

self-evident that in everything, from gravity to water flow and ⊚neurophysiology to economics, there will be chaos.⊚

With a brief stopover in the centre of the mirror, where we encounter the fabulous fractal, we start our journey back from ⊚'Chaos to Order'. Here the landscape is even more bizarre; solitons, creative chaos, a new evolutionary theory, fractal nature ⊚of the creative process; these are some of the landmarks we see ⊚here. At the end of it the tired traveller (reader) is buzzing ⊚with buzz words and jargon!⊚

Undoubtedly, the authors have covered an immense range of topics. ⊚It is indeed fascinating to learn that heart attacks could be ⊚modelled using the same concepts as used to study business cycles. ⊚But the treatment is superficial and journalistic. For example, ⊚the chapter on fractals has a survey of all the fields in which ⊚this extraordinarily powerful concept is finding use. (Cosmology, ⊚weather forecasting, study of mammalian brains, the circulatory ⊚system to name a few) But not much is explained about fractals themselves. Or about the nature of time -- the temporal ordering of our universe is a perplexing problem. the authors chose to ⊚devote a whole chapter to essentially Prigogine's ideas, without ⊚placing them vis a vis more conventional ideas. For the reader who may not be very familiar with the subject, this is misleading. On the other hand, for the specialist, it is superfluous! ⊚Similar criticism can be made of their treatment of new 'radical' ideas in evolution, cosmology etc.⊚

The style of the authors, though poetic and literary, leaves much to be desired. Statements like '....lukewarm molecular chaos-formless, meaningless, sexless ....' or '....the twilight zone of ⊚alternate reality...' maybe very imaginative, but they are certainly jarring. Much more scandalous are bizarre comments like '...physicists now talk of God being left handed..' or '... ⊚number of physicists believe...' or '...cosmologists speculate...'. Who are these 'physicists, cosmologists' one may ask ? No references, no names, no specific context. This is not ⊚the best possible way to inform the lay reader; it is positively ⊚misleading and sensational. This vague style has currently become popular in pop science writing, whereby either references are not ⊚given or else a few dissenters are projected as spokespeople for ⊚the whole community. This is not to say that scientists with new, ⊚seemingly 'crazy' ideas should not be publicized. But before they ⊚are made into pop-science gurus, their ideas should be subjected ⊚to the accepted method of scientific scrutiny in the community.⊚

This is a good survey of the emerging field of holistic science. But it is not a place to learn the subject. At best, it is at the ⊚level of an Omni article. Finally, I would like to share an ⊚

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experience I recently had. A student of mine who is finishing his Masters in Physics met me and I asked him what he wants to do his ◎research in. His answer was "New Physics". Somewhat perplexed, I ◎asked him what this field was. He replied 'exciting things like the connection of Mysticism and Physics, time traveling into ◎alternate reality etc.' If this is the effect this kind of pseudo-science of the pop science variety has on a science graduate, one ◎shudders at the thought of its impact on the lay reader.◎

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