



Modern Science and Traditional Thought*

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Science is disciplined observation learned by insight. Beginning with particular experience and common sense, science arrives at general and uncommon sense. In this sense every one is a scientist except that most of the time we do not proceed far enough nor do we bring discipline to much of our experience. It is commonly held that only objective experience can be the subject of scientific analysis and communication.

Thus scientific tradition is to exclude purely subjective experiences from inclusion as facts for scientific analysis. As is well known, repeatability, reproducibility, accuracy, universality etc. are the other attributes of scientific truth. Nevertheless it remains a fact that reproducible reliable subjective experiences can be communicated and evoked. The ancient Indian tradition gave great importance to this aspect of experience in the ever-continuing search to know the nature of the ultimate reality.

Ours has been a century of science. In fact scientific pursuit is a great adventure of human mind. Science, especially physical science is all consumed with the passion of building precisely computable mathematical models for various physical phenomena and processes. It certainly has succeeded to a great extent in this attempt to build its own worldview. The technical spin offs, which we reap in the process in terms of gadgets, toys or weapons, have been quite dazzling and spectacular. This in turn also created the incorrect impression in the minds of common man that the worldview offered by science is the ultimate and proven reality. In this context it is worthwhile to reassess the impact of science on our traditional thoughts and vice versa in the closing year of this century. Surprisingly, there has been an increasing awareness in recent times that the developments in the 20th century science has ultimately led to a reaffirmation of the traditional Indian thoughts as expounded in the

Upanishad doctrines.

Landing on the moon and many similar or more exciting events have been hailed as great achievements of 20th century science. Granting that these by themselves have been great technological feats without parallel in human history, they have contributed precious little to our overall understanding of the existence of the physical universe or about ourselves. On the conceptual front the progress made during this century has been on three accounts. Relativity and Quantum theory, the two main pillars of modern physics emerged in the first half while the theory of chaos i.e.; the theory of non-linear system bloomed forth in the latter half of this century. These concepts gave a serious jolt to the classical Newtonian linear mechanical worldview. Every one of these developments emphasised the role of the observer visavis the phenomenon that one is observing. A new understanding that ours is a participatory universe as against

an observational one, emerged as a consequence of this progress in theoretical physics. Let us examine some of these remarkable transformations a little more closely and try to gauge their relations with our traditional Indian thought. Albert Einstein has been a Vyasa amongst scientists. His was an incisive mind as human mind can be and he could see easily the limitations of classical approach to space and time. The result was the theory of relativity—special and general. The former gave us the idea that space and time are no longer completely independent entities but one is inseparable from the other. The universe thus happens to be the interplay of events occurring in the canvas of four-dimensional space-time continuum. In this Minkowskian view, the ideas like simultaneity, past, future etc acquire new meaning and they become very much observer dependent properties. The inter convertibility of energy and mass came out as a spectacular by product of the special theory of relativity. Also the general theory tells us that the presence of matter causes curvature in the space time continuum producing forces that cause acceleration of bodies that move through the region. It must be said here that while these new results caused a tidal wave of amazement to the thinkers in the west, every bit of these results was in tune with the traditional Indian thinking. Sev-

eral centuries ago Markandeya muni had declared that the absolute is "*Desa kala parishchinham*". Also there exist several stories in our ancient texts (*Yoga Vasishtam*) which illustrates the relativity of space and time. Of course we donot seem to have a formula for the calculation, but the concept of relativity was not alien to our thinking. Aldous Huxley, in his book *The perennial philosophy* has dealt with this point in grater detail. Very recently Paul Davis, in his book *Other worlds* states that "Commonsense notions of space, time and causality must be left behind as the realm of solid matter dissolves away into vibrating patterns of ghostly energy; even space-time itself is revealed as an ephemeral froth of worm holes and tunnels".

The revelation that the microscopic world of atoms and molecules does not follow the dynamical laws of everyday world; but they obey the bizarre laws of quantum theory, gave quite a shattering glow to the mechanistic and deterministic worldview of last century. The famous Heisenberg's uncertainty principle is another outcome of modern science. It is not in the least concerned with any inaccuracy of experimental result because of imperfect measuring devices, but it clearly shows a fundamental limit for the possibility of measuring complementary properties of an atomic system as a consequence of

wave particle dualism. Here again the role of observer becomes of paramount importance in the observation process itself. Recent developments in this respect are still more interesting.

According to Roger Penrose "*the quantum states describe a system which evolves in time according to Schrodinger equation. The mysterious thing about quantum mechanics is that things that might happen have an influence on things that happen. Probabilities do not cancel; they coexist. Each of them persists as if the other is not there.*"

In quantum physics out of many possible existing states an observer simply selects one causing the *collapse of wave function*. This means that until we make an observation we do not know what really exist *out there*; but once we observe, things are there. To quote Paul Daevies "*most revolutionary of all is the way in which quantum physics interweaves mind and matter in a subtle and holistic manner. It is here that the scientist makes the most startling claim of all; that there exists myriad of alternative realities in parallel to our own*". He also stresses the point that "*many of the features of the universe we observe can not be separated from the fact that we are alive to observe them. In fact the observer selects a tiny and remote corner of the super space which is completely uncharacteristic of the rest, an island of life among chasms of uninhabited dimensions*". This view has a total identity with the

Indian view that it is our consciousness that projects the external world. The ancient text *Vasishta Sudha* says: "Dwaithadwaitha samad bhedair Jagat nirmana leelaya Paramatma mayee sakthiradwataiva vijrimbhate". There is only one thing, that is consciousness. It is this power that becomes subject to notions of duality thereby generating the universe. These views are not only in complete agreement with the findings of quantum physics but go far beyond it.

Schrodinger goes ahead and asserts that there is only one consciousness and talks about the unity of all consciousness in his book *Mind and Matter*.

In recent times we find the development of the theory of chaos. This has put virtually an end to the linear Newtonian world of direct cause-effect relationship. The world in fact is totally nonlinear and a linear mechanistic view of world is only a crude approximation with limited validity. It has been amply demonstrated that in a nonlinear system any small action has a far flung effect in time and space. This ofcourse is the traditional Hindu view of the concept of Karma. Any karma or action has an immediate effect, but it does not stop there. When one does a time serve analysis, one gets the short term as well as the long term

effects of the action. This development has caused a paradigm shift in our thinking. The concepts of *punya* and *papa* are now regaining their meaning. Small action can make great impact in the long run. It is called the *butterfly effect* in the theory of chaos.

This now validates scientifically the concept of *dharma* which is action leading to sustainability. *Adharma* will certainly lead to disaster in due course of time. This, now is a result of hard core mathematical analysis using the theory of chaos. All these lead to the conclusion that our ancient wisdom was never at fault.