NASCENT WISDOM AND THE RELEVANCE OF MODERN PHYSICS

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Physics has made a lot of contribution to our intellectual appreciation of the world in which we live. Unlike the philosopher who depends almost entirely upon his Intellect, the physicist is often helped forward in his research through his intuitive perceptive abilities. Dr Capra acknowledges as follows:

"Rational knowledge and rational activities certainly constitute the major part of scientific research, but are not all there is to it. The rational part of research would, in fact, be useless if it were not complemented by the intuition that gives scientists new insights and makes them creative. These insights tend to come suddenly and, characteristically, not when sitting at a desk working out the equations, but when relaxing, in the bath, during a walk in woods, on the beach, etc. During these periods of relaxation after concentrated intellectual activity, the intuitive mind seems to take over and can produce the sudden clarifying insights which give so much joy and delight to scientific research."

This is indeed fortunate, for unwittingly, the scientist exposes himself, through his finer faculties the character of which he is not quite familiar, to higher rays of Knowledge.

Foundations of the world of physicists were shaken at the beginning of this century as their views of the world were completely upset by the new experiences of the atomic reality.

For purposes of concision, I am only drawing attention to two phenomena, to demonstrate the relevance of modern physics and its progress towards the new levels of finer Knowledge.

(i) "Non-Local Connections in Sub-atomic Physics":

In his review of current research in atomic and sub-atomic physics up to the summer of 1982, Dr Capra reports on the new kind of inter-connectedness that has recently been observed. The discoveries have also supported the parallels to Eastern mysticism which had always acknowledged that the constituent of Matter and the basic phenomena involved in them are all inter-connected, and that they cannot be isolated entities but only integral parts of a unified whole.

There has developed the notion of a basic "quantum inter-connectedness". Physicists have come to realise that the Universe is inter-connected in much

subtler ways than they had thought before.

This raises the intriguing possibility of relating some phenomena of sub-atomic physics to parapsychology, if one were to contemplate beyond the Universe and research into the inter-connectedness of the Universe with finer parts of Creation that cannot be subjected to the physical sensory organs of man.

To bring into sharp focus this phenomenon of non-local connections discovered in sub-atomic physics, I can do no better than quote Dr Capra's simple explanation of a relevant experiment. This is a simplified version of what' is called the Einstein-Podolsky-Rosen (EPR) Experiment.

"The experiment involves two electrons spinning in opposite directions, so that their total spin is zero. There are several experimental methods that can be used to put two electrons in such a state, in which the directions of the individual spins are not known with certainty, but the combined spin of both electrons is definitely zero. Now suppose that these too particles are made to drift apart by some process that does not affect their spins. As they go off in opposite directions, their combined spin will still be zero, and once they are separated by a large distance, their individual spins are measured. An important aspect of the experiment is the fact that the distance between the two particles can be arbitrarily large; one particle may be in New York and the other in Paris, or one on the earth and the other on the moon."

"Suppose now that the spin of particle 1 is measured along a vertical axis and is found to be 'up'. Because the combined spin of the two particles is zero, this measurement tells us that the spin of particle 2 must be 'down'. Thus, by measuring the spin of particle 1 we obtain an indirect measurement of the spin of particle 2 without in any way disturbing that particle.

The paradoxical aspect of the EPR experiment arises from the fact that the observer is free to choose the axis of measurement.

Quantum theory tells us that the spins of the two electrons about any axis will always be opposite, but they will exist only as tendencies, or potentialities, before the measurement is taken. Once the observer has chosen a definite axis and has performed the measurement, this act will give both particles a definite axis of rotation.

The crucial point is that we can choose our axis of measurement at the last minute, when the electrons are already far apart. At the instant we perform our measurement on particle 1, particle 2, which may be thousands of miles away, will acquire a definite spin along the chosen axis. How does particle 2 know which axis we have chosen? There is no time for it to receive that information by any conventional signal."

"This is the crux of the EPR experiment, and this is where Einstein disagreed with Bohr. According to Einstein, since no signal can travel faster than the speed of light, it is impossible that the measurement performed on one electron will instantly determine the direction of the other electron's spin, thousands of miles away.

According to Bohr, the two-particle system is an indivisible whole, even if the particles are separated by a great distance; the system cannot be analysed in terms of independent parts. Even though the two electrons are far apart in space, they are nevertheless linked by instantaneous, non-local connections. These connections are not signals in the Einsteinian sense; they transcend our conventional notions of information transfer.

Bell's theorem supports Bohr's position and proves rigorously that Einstein's view of physical reality as consisting of independent spatially separated elements is incompatible with the laws of quantum theory. In other words, Bell's theorem demonstrates that the universe is fundamentally interconnected, interdependent and inseparable." In the course of the parallels that Dr Capra draws between Eastern wisdom and physics; he quotes the Buddhist sage Nagarjuna as stating hundreds of years ago,

"Things derive their being and nature by mutual dependence and are nothing in themselves."

Sub-atomic physics is now moving at top speed towards acknowledging the truth of what the Buddhist sage had received through his finer organs of perceptions hundreds of years ago!

Higher Knowledge now mediated enables man to sense that these "non-local connections", that transcend conventional notions of information transfer, must be connections which exist in nature through the radiations of relevant objects. The possibilities of these radiations being attracted one to the other in the Law of Attraction of Homogeneous Species is now worth investigating.

The further study of Transformation of neutrons into protons in the atoms of radioactive substances should also be facilitated by investigations of Unions of Radiations in this Law.

But we are yet to learn how our Universe is supported and maintained by Radiations streaming in from the finer realms. At the macroscopic levels, vibratory electric and magnetic fields travel through space in the form of radio waves, light waves or other kinds of electro-magnetic radiation. What would otherwise have been considered to be void is an extensive dynamic connection of radiations which form electromagnetic fields.

With gravitational fields, it can be recognised that the space around an object

can be conditioned in such a way that another object will feel its force and thus condition the variation of the geometry, the very structure of the space around the object.

Modern physics demonstrates that not only at the microscopic level but also at the macroscopic level, the material objects afford evidence of connections which are so fine that they could have been missed.

Material objects thus are not distinct entities. They are inseparably linked to their environment and even their properties can now be understood in terms of their interaction with the rest of the world. This interaction reaches out to the universe at large. These interactions do in fact reach out beyond the confines of our universe right out to. other Finer Planes of existence from whence Radiations condense into our universe, becoming capable of physical experience.

Ladies and Gentlemen, the evidence builds up. Soon we must look beyond our Universe. We have the Finer Organs of Perception that can enable us to do this. We need to make ourselves more familiar with them and press them progressively into Activity.

Even with Astronomy, the evidence points in the same direction. Frederick Hoyle, the astronomer, says:

"Present day developments in cosmology are coming to suggest rather insistently that everyday conditions could not persist but for the distant parts of the universe: that all our ideas of space and geometry would become entirely invalid if the distant parts of the universe were taken away. For an everyday experience, even down to the smallest details, seems to be so closely integrated to the grand scale features of the universe that it is well nigh impossible to contemplate the two being separated. Physics has in turn come to recognise that the distinction between particles and the space surrounding them loses its original sharpness and the void is recognised as a dynamic quantity of paramount importance."

(ii) The David Bohm's Notion of Unbroken Dynamic Wholeness:

There is further evidence of the movement of modern physics towards clearer appreciation of metaphysics. Dr Capra writes:

"Among recent research, one of the most exciting developments has been a *new* theory proposed by David Bohm who has perhaps gone further than anybody else in studying the relations between consciousness and matter in a scientific context. Bohm's approach is much more general and more ambitious than that

of current S-matrix theory, and can be seen as an attempt to 'bootstrap' space-time, together with some fundamental concepts of quantum theory, in order to derive a consistent quantum relativistic theory of matter."

"Bohm's starting point is the notion of 'unbroken wholeness', and he sees the nonlocal connections that are exemplified by the EPR experiment as an essential aspect of the wholeness. Nonlocal connections now appear to be the source of the statistical formulation of the laws of quantum physics, but Bohm wants to go beyond probability and explore the order which he believes to be inherent in the cosmic web of relations at a deeper, 'nonmanifest' level. He calls this an 'implicate', or 'enfolded', order in which the interconnections of the whole have nothing to do with locality in space and time but exhibit an entirely different quality - that of enfoldment."

"Bohm uses the hologram as an analogy for this implicate order because of its property that each of its parts, in some sense, contains the whole. If any part of a hologram is illuminated, the entire image will be reconstructed, although it will show less detail than the image obtained from the complete hologram. In Bohm's view, the real world is structured according to the same general principles, with the whole being enfolded in each of its parts."

"Bohm realises, of course, that the analogy of the hologram is too limited to be used as a scientific model for the implicate order at the subatomic level, and to express the essentially dynamic nature of reality at this level he has coined the term 'holomovement' for the ground of all manifest entities. The holomovement, in Bohm's view, is a dynamic phenomenon out of which all forms of the material universe flow. The aim of his approach is to study the order enfolded in this holomovement, not by dealing with the structure of objects, but rather with the structure of movement, thus taking into account both the unity and the dynamic nature of the universe."

"According to Bohm, space and time emerge-as forms flowing out of the holomovement; they, too, are enfolded in its order. Bohm believes that the understanding of the implicate order will not only lead to a deeper understanding of probability in quantum physics, but will also make it possible to derive the basic properties of relativistic space-time. Thus, the theory of the implicate order should provide a common basis for both quantum theory and relativity theory."

"To understand the implicate order, Bohm has found it necessary to regard

consciousness as an essential feature of the holomovement and to take it into account explicitly in his theory. He sees mind and matter as being interdependent and correlated, but not causally connected. They are mutually enfolding projections of a higher reality which is neither matter nor consciousness."

"At present, Bohm's theory is still at a tentative stage and, although he is developing a mathematical formalism involving matrices and topology, most of his statements are qualitative rather than quantitative. Nevertheless, there seems to be an intriguing kinship, even at this preliminary stage. between his theory of the implicate order and Chew's bootstrap theory. Both approaches are based on the same view of the world as a dynamic web of relations; both attribute a central role to the notion of order; both use matrices to represent change and transformation, and topology to classify categories of order. Finally, both approaches recognise that consciousness may be an essential aspect of the universe that will have to be included in a future theory of physical phenomena. Such a future theory may well arise from the merging of the theories of Bohm and Chew, which represent two of the most imaginative and philosophically profound approaches to physical reality."

Ladies and Gentlemen, I have taken this much of your time, to draw attention to the path along which rational investigations have proceeded towards the stage at which today, one can hope that man is coming close to a point at which he will pay more attention to the forces which control life and existence in our universe.

I have taken' the liberty of speaking to you, where scientific facts and discoveries are concerned, in the words of your professional compeers in academia. This has been deliberate for I do not wish anything to detract from the authority of that which has been observed as the trend of the rational approach towards the compelling need for finer perceptions.

If Professor Stephen Hawking of Cambridge who spent the best time of his working professional life in the effort to trace the origin of the universe, had sought the cause of the universe outside the universe and not within it, a lot more would have been achievable.

The path of investigations today tend to equate the Universe to Creation. Therein lies a great error.

With the development of physics and particularly the discoveries now coming up

in sub-atomic physics, it is to be hoped that scientists will be less skeptical of information which is offered about the great and wider Creation of which our universe forms less than a pin-point. And I do mean our universe and not just the earth.

It is in this hope and in full relish of the academic freedom which this environment assures me that I will take more of your time speaking of what I call Nascent Wisdom.