

NEW PARADIGM OF PHYSICS

-By B.K. Jagdish Chander
New Delhi, India

Dear Sisters and Brothers,

As is well-known, it was Quantum Theory of Max Planck, the theory of Heat, called Thermodynamics and the theory of light as Electromagnetic waves by James Clerk Maxwell and the theories of General and Special relativity of Einstein that brought revolution in the twentieth century physics. In my present paper, I have drawn one or two conclusions from Einstein's Theory of General Relativity and from the Second Law of Thermodynamics of the Entropy Law and have suggested, as a lay student of physics and also as a student of spiritual knowledge, a new paradigm of physics.

To present the new paradigm, I will refer first to Einstein's views on the over all geometry of the Cosmos or the Space-Time Continuum in which the stars, meteors, earth and other planets move. Einstein has said that the geometrical structure of the Universe or the curve of the cosmos as a whole is shaped by the sum of its material content. He has pointed out that, for each concentration of matter in the universe, there is a corresponding distortion of the space-time continuum. Each celestial body, each galaxy and each planet creates local irregularities in space-time like eddies around islands in the sea, The greater the concentration of matter, the greater the curvature of space-time and the total effect is an over all curvature of the whole space-time continuum.

Einstein has further said that the combined distortions, produced by the structure of the gravitational fields of all the innumerable masses of matter in the universe, cause the space-time continuum to bend back on itself in a great, closed cosmic curve. In other words, Space according to Einstein, though finite, is unbounded and is curved; a mathematician would define its geometrical character as the four-dimensional analogue of the surface of the sphere. The scientists say that the radius of this can be ascertained by determining its material content. Basing their calculations on the average density of matter in the universe, some scientists have even given the radius of this sphere.

Further, in this three-dimensional world, to which Riemannian and not Euclid's geometry is applicable, not only the Space but Time also should be of the analogue of a sphere. Einstein has combined the concept of space and time. He has explained that what we call 'a year' is simply a measure of the earth's progress in its orbit around the sun[?] and what we call 'an hour' is actually a measurement in space, equal to an arc of 15 degrees

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in the daily rotation of the earth. So, Time which has always been considered eternal should also be looked upon as Cyclic so that after a cosmic cycle it will bend back on itself, for in Einstein's world, there are only circles; there are no straight lines.

Thus, according to this geometry of the space-time continuum, a sun-beam, setting out through space, will describe a great cosmic circle and will return to its source.

Now referring to these concepts, I would like to suggest that we should not consider the physical history of the cosmos and of man as rectilinear but cyclic, for there are no straight lines in this four-dimensional space-time continuum. We should instead, have the paradigm of cyclic order of events. The world does not move always in one direction, namely, of dissolution but, after a period, the cycle repeats.

One benefit of the considering the world as self-perpetuating universe will be that scientists will no longer have to bother to find out the origin of the universe, the galaxies, the species, etc. After all, man's all attempts upto now, to solve the problem of initial origin have not yielded to him any incontrovertible and universally acceptable solution. Every theory regarding the origin rests ultimately on the a priori assumption that something was already in existence - whether free neutrons, energy quanta or simply blank inscrutable "world-stuff" or the 'cosmic essence' of which the multifarious universe was subsequently built up. The biological origin of species from inanimate matter, or the birth of amoeba in the primordial soup, also has not been irrefutably proved and, at least, it is not a scientifically demonstrable theory. I, therefore, ask; "If we cannot go to the initial origin in the real sense of the terms and have always to postulate that something had already existed, why not consider the suggestion that the world has always been there - parts of it going into the state of dissolution and rebuilding themselves at some other place - and some species existing and others developing from them?"

Considering the cosmic order as cyclic would, I think, also solve another problem, posed by the Second Law of Thermodynamics.

As we all know, according to this law, matter in the universe is perpetually changing and the change appears to be towards dissolution. All the phenomena of nature within the atom and outer space indicate that the substance and the energy of the universe are inexorable diffusing like vapour through the insatiable void. The sun is slowly but surely burning out. The stars are dying embers and, everywhere in the cosmos, heat is turning into cold, matter is dissolving into radiation and available energy into unavailable energy into empty space. The universe is thus progressing towards an ultimate 'heat-death' or,

as it is technically defined, a condition of 'maximum entropy' so that processes of nature will cease. All space will be at the same temperature. No energy can be used because all of it will be uniformly distributed in the cosmos. There will be no light, no life, no warmth, nothing but perpetual and irrevocable stagnation. Time itself will come to an end, for Time points the direction of entropy.

Now this conclusion of the Second Law of Thermodynamics, which forms an unshakable pillar of modern physics, unless understood in the framework of a cyclic universe would contradict the geometry of the cosmos; the concept of a beam of light closing on itself after covering a cosmic cycle or the idea of a space-time continuum which perpetuates itself endless cycles. I, therefore, suggest that we should look on all phenomena which we study in Physics, Astrophysics, Geology, Palaeontology and such other sciences in this new framework or new paradigm, namely of a cyclic space-time continuum.

What I have suggested should not look unfeasible. Already there are a few contemporary theorists who propose that somehow somewhere beyond man's meagre knowledge, the universe may be rebuilding itself. In the light of Einstein's Principle of Equivalence of Mass and Energy, it is possible to imagine the diffused radiation in space, congealing once more into particles of matter--protons, neutrons and electrons which may then combine to form larger units which, in turn, may be collected by their own gravitational influence into nebulae, stars, etc. and thus the life-cycle of the universe may be repeating for all eternity. Presupposing the possibility of such events as these, one might arrive ultimately at the concept of the self-perpetuating, universe, renewing its cycles of formation and dissolution and order and disorder to never ending time.

As regards the Cyclic theory, according to which cycles of time occur during which a reversal of entropy takes place, little experimentation has been done in regard to this theory. The idea that there are cycles of space-time which repeat endlessly was familiar in ancient thought of Indians and it was part of the belief of Stoics. An ancient belief of India is that there is first the Golden Age in which there is the maximum available energy and the matter and society are in the highest ordered state and then there is gradual deterioration in the level of the available energy and moral order through the succeeding Silver, Copper and Iron ages, and at the end of the Iron Age, there is a great Catastrophe as well as divine intervention for the reversal of the entropy and the re-establishment of the Golden Age and then the whole cycle repeats once again. Now this belief, based on intuitive and meditative understanding of the cosmos and the forces at work in the world and, based also on divine revelation also, seems to fill the gap between Einstein's view of the world as four-dimensional space-time continuum on the one hand and

the irrefutable Second Law of Thermodynamics or the Law of Entropy on the other hand.

As an aside to what I said about Entropy, I may add that it is really strange that though, in the modern world, scientists are willing to see the physical history of the universe as beginning with maximum available energy and moving towards decay and chaos, yet some of them continue to cling to the notion that history of moral level of mankind follows the exact opposite course, i.e. it has moved from a state of chaos to a 'progressively' more ordered state. This is a blatant contradiction to the Law of Entropy applied in the moral domain.

Now, taking up the main thread of my arguments, I would like to say that if we consider various geological, and other events within the framework of the cyclic universe, not only will we have a more clear world-view but our understanding of many other physical phenomena will also be better. Take, for example, the phenomenon of radio-activity. It is thought that Uranium, which disintegrates at an invariable rate, must have come into existence at one specific time. The geophysicists who believe in an origin of the Universe of the earth, consider that if we make calculations based on the known rate of disintegration of Uranium then billions of years have elapsed since Uranium began to disintegrate into Lead. They also think that there is no natural process leading to formation of Uranium from Lead. They are, therefore, unable to explain how, after the whole Uranium has been converted into Lead, the universe will have Uranium again as one of the forms of matter. If instead of considering the time as linear and as having an origin, they consider it as cyclic, they would be able to understand this phenomenon of disintegration of Uranium better and more accurately. For, in that case, there will be no need to imagine that the whole stock of Uranium in the Universe will, one day, have been converted into Lead because the theory of Cyclic space-time continuum cyclic Universe would imply that before the whole Uranium has exhausted itself by disintegration, a catastrophic event such as the chance nuclear explosions (there could be other events as well) would again convert Lead into Uranium and the circle would repeat itself again. This concept would also save us from committing the error of considering the period of disintegration to have been billions of years because in the new cyclic framework, we would not consider all Uranium stock in the 'beginning' to have been of Uranium-without-Lead nor would we consider that the whole of it would disintegrate into Lead without-Uranium in the end. This view of the Uranium-cycle would give us the period of disintegration not billions of years but much much less.

Same Principle of a cyclic universe would apply to the thermonuclear processes in

the interior of stars, transmuting into radiation. Thus the duration of stellar life would also be considered cyclic.

Sisters and Brothers, I am not a physicist by training or by profession but as I said in the beginning of my talk, I am only a lay student of physics who is interested in considering the problems of physics and who tries to understand them in the light of spiritual revelations and knowledge based on intuition and meditation. From that background I have just made an attempt to understand various phenomena of physics in the light of this new paradigm and I humbly suggest that eminent physicists give a serious thought to this and, if they think fit, do some experimentation in regard to this.

Before I conclude, I would like to invite your attention to another important point. It is that we come to know the external world of things and events entirely from the perceptual experiences, such as of vision, hearing, touch, etc. attained by means of our various sense-organs and the mechanism of the brain. But we all know from our experience that the external world is other than the self which gets these experiences by virtue of its consciousness.

Take for example the case of visual perceptions. The image of an object is transmitted by nerve-impulses through the optic nerves to the visual cortex of the brain and there it gives rise to a specific pattern of activity. This explanation, given by the biological science, is however partly true. We have to add to this the truth that there in the brain is the conscient self which interprets this neuronal pattern of activity and gets a conscious experience from the seen events. Without the presence of this conscient self, we can neither have a valid picture of the external world nor have any experience of it. It is this conscient self which interprets the retinal and neuronal data.

When I thus re-examine the nature of my sensory perceptions and my experience, it becomes evident to me that the experience of the external or objective world also is derived from the private experience of my inner self. Thus, all our experiences of matter and the basis of all attempted explanation of natural world in terms of physics, chemistry, etc. have the status of only a second-order reality, the primary reality being the self. Even the experience of knowledge of our relationship with our own body is of the status of second-order reality. So, whatever account or explanation we give of the external world, without explaining the primary reality of the self will be incomplete or distorted.

In support of this observation, I would quote here Eugene Wigner, a famous physicist, from his lecture titled: "Two kinds of Reality".

"There are two kinds of reality or existence-the existence of my consciousness and the reality of existence of everything else. This latter is not absolute but only relative. Excepting immediate sensations as the content of my consciousness, everything is a construct....".

Wigner further says," As I said, our inability to describe our consciousness adequately, to give a separate picture of it, is the greatest obstacle to our acquiring a rounded picture of the world."

Schrodinger, the Physicist, who was awarded the Nobel Prize for his Wave Mechanics, wrote thus about the importance of knowing the self in his book," Science and Humanism":

"Who are we? The answer to this question is not only one of the tasks but the task of Science."

I would, therefore, suggest as a student of spiritual knowledge and meditation and also as a student of physics that, in order to get a complete picture of reality, the Physicists would do better if they also know the self which is the primary reality and is different from the body and the brain.

I would like to close by indicating the difference of the soul and the body by quoting Socrates from Phaedo in which there is a dialogue between Socrates and Crito and other followers before he was given a cup of poison.

"We shall try our best to do as you say," said Crito

"But how shall we bury you?"

"Any way you like" replied Socrates, "that is if you can catch me and I don't slip through your fingers". He laughed gently as he spoke, and turning to us went on:

"I cannot persuade Crito that I am this Socrates here who is talking to you.....; He thinks that I am the one whom he will presently see lying dead. You must give an assurance to Crito for me.....that when I am dead, I shall not stay but depart and be gone. That will help Crito to bear more easily.....when he sees my body being burnt or buried as if something dreadful were happening.....No, you must keep up your spirits and say that it is only my body that are burning: and you can bury it as you please....."

So my dear sisters and brothers, the self, as Socrates also pointed out, is different

from this body. While the body dies soul lives on and we can see and experience it by means of the art and science of meditation.

May you therefore know that art and science of meditation besides the sciences of physics, chemistry and biology. May you know the metaphysical truth about the self besides the physical truth about the world and thus have a blended view of the reality!

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