After 3000 Years

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Over the past several years this journal has published a series of articles by Dr. K.V.K. Nehru, entitled *The Space-Time Universe,* which describe a new theory of the physical universe that I originated. These articles have given a good account of the fundamentals of the theory. But many readers may have wondered how we can justify the extent of departure from currently accepted thought that is involved in some of our conclusions. At the invitation of the editor, I am therefore undertaking to supplement Dr. Nehru's presentation with some comments on the general structure of the theory, and the considerations that led to its formulation.

The most significant feature of this new development is that it is a *general* physical theory, one in which the basic laws and principles of all physical fields are derived from a single set of fundamental postulates, without making any further assumptions of any kind, and without introducing anything from any outside source. Construction of such a theory has been a major goal of science for three thousand years, and an immense amount of time and effort has been devoted to the task. But until now, all of these efforts have been totally unsuccessful. The failure has not been a matter of arriving at the wrong answers. Previous investigators have not been able to formulate any single theory that would give them *any* answers, right or wrong, to more than a mere handful of the millions of questions that a general physical theory must answer. As a result, present-day physical theory is not a single integrated structure, but a multitude of parts and pieces which, as the physicists admit, do not fit together very well. Every conclusion derived from currently accepted theory rests on hundreds, if not thousands, of separate assumptions.

There will no doubt be considerable argument before final conclusions are reached as to whether or not the answers that are obtained from our theoretical development are correct, but the fact that cannot be denied is that the new theory does produce the answers to physical questions on the wholesale scale that is required for a full coverage of the physical field. Thus, after thousands of years of futile attempts, we have finally succeeded in producing a general physical theory. The question as to *how* this result was accomplished therefore becomes a matter of scientific interest, regardless of the ultimate outcome of the controversies regarding the validity of the conflicting answers.

The reason for the inability to construct a general physical theory in the early days of science is quite simple. The amount of detailed knowledge about physical phenomena then available was totally inadequate to serve as a base for the necessary chain of inductive reasoning. Over the long years that followed, this deficiency was gradually overcome by the labors of thousands of scientists who, piece by piece, built up the kind of a structure of observational and experimental knowledge that was necessary. But before this structure was complete, another factor had entered into the situation. The members of the scientific community had grown impatient with the slow pace of the standard scientific procedure, and had turned their attention to developing means of circumventing the restrictions imposed by that established procedure.

The fundamental strategy of most of these evasive devices is to substitute *absence of disproof* for the proof of validity that is required to meet scientific standards. The ad hoc assumption, the most widely used of these expedients, is a good example. In traditional scientific practice, when the consequences of the basic postulates of a theory are developed, and one or more of them is found to conflict with the results of observation or measurement, the theory is invalidated. But the ad hoc assumption provides a means of evading this contradiction of the empirical results. For instance, the currently accepted theory of atomic structure postulates that one of the constituents of the atom is the observed particle known as the neutron. But the neutron, as we know it, is unstable, with a life of no more than about 15 minutes. Since a stable atom cannot be constructed of unstable constituents, strict scientific practice would require rejecting the existing atomic theory. But the theorists have nothing to put in its place, and they are unwilling to go through the long and laborious process of developing an entirely new theory, so they have called upon the ad hoc assumption. They have assumed, purely arbitrarily, that the neutron *becomes* stable when it enters the atomic structure. There is no physical evidence to support this assumption, but since the interiors of the atoms are observationally inaccessible, there is no known way of disproving the assumption either. In today's liberal climate, the theorists are allowed to take this absence of disproof as the equivalent of proof.

This elevation of absence of disproof to the status of the principal criterion of validity has inevitably had the result of encouraging speculation at the expense of inductive reasoning. The farther a hypothesis departs from physical reality, the less opportunity there is to refute it by comparison with the results of observation or measurement. Thus the easy route to something that the theorist can publish is to increase the speculative content of his work and to decrease the factual content. The eventual result of this policy can be seen in the currently fashionable practice of finding explanations for all sorts of astronomical phenomena in assumptions involving black holes. Since the black hole itself is purely hypothetical, it can be introduced into the theory of almost any kind of physical phenomenon without any concern, on the part of the theorist, that some inconvenient fact might invalidate his product.

The second general class of expedients for evading the difficult task of constructing theories that can be verified by standard scientific methods is based on the assumption that whatever scientists have not thus far been able to do cannot be done. When expressed in this manner, this proposition is so obviously preposterous that most scientists will no doubt deny that they ever make any such assumption. But again and again in present-day scientific discourse we are told that all possible alternatives have been examined, and that the preferred one of these must be accepted, in spite of any shortcomings to which it may be subject, because “there is no other way.” Einstein relied heavily on this argument in his work. In the case of high speed motion, for instance, he tells us that “if the velocity of light is the same in all C.S. [coordinate systems], then moving rods must change their length, moving clocks must change their rhythm... there is no other way.”

But it is evident that such an assertion can be valid only if *all* of the factors that enter into the situation have been fully taken into account. Since it is seldom, if ever, possible to be certain that this has been accomplished, the “no other way” argument is clearly untenable. One of the important factors involved in motion at high speeds is the question as to the nature of space and time. Since present-day ideas on this issue, particularly those with respect to time, are no more than vague impressions—“primitive, undefined concepts,” as one prominent physicist called them—the assumption of complete understanding implicit in Einstein's assertion that “there is no other way” is an absurdity. Our finding that there actually is another way, one that involves the existence of a second time component, merely emphasizes a fallacy that should have been evident even without the further investigation.

Obviously, the evasive measures that have been devised in order to avoid having to meet the strict requirements of standard scientific practice move physical theory away from the truth, rather than toward it. The big increase in the amount of available empirical information that has taken place during the present century has therefore contributed little, if anything, to progress toward the goal of a general physical theory. What should have been a steady advance in understanding has been turned into a series of excursions into the land of the imagination.

From the foregoing analysis of the situation, it should be evident that what is needed, in order to take advantage of the entire store of accumulated factual knowledge in the search for a general physical theory, is to cease using methods of avoiding the task of meeting the requirements for verification of hypotheses, and to return to a strict compliance with these requirements. This is the policy that was adopted at the start of the investigation that ultimately led to the formulation of the theory of the universe of motion. No conclusion was accepted on anything more than a tentative basis unless, and until, it was able to meet the standard tests of validity. No ad hoc assumptions were employed, and nothing was accepted on the strength of assertions that “there is no other way.”

Of course, this return to sound scientific procedure did not guarantee success. As stated earlier, a certain level of factual knowledge had to be attained before reasoning could be effectively applied. But, as it turned out, the necessary information had been accumulated, and was available for use. A long and intensive study of that information was required, but eventually a general physical theory emerged. Those who read Dr. Nehru's articles, or one of my books, will find that the theory calls for some more substantial changes in currently accepted physical concepts than would ordinarily be expected in any one new theory. But it should be kept in mind that the theory of the universe of motion is not just another theory. It is a unique product, the only general physical theory ever devised.