A New Theory of Gravitation

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In a recent publication[1], the author formulated two fundamental postulates as to the nature of space and time and showed that the necessary consequences of these postulates are sufficient in themselves to define a complete theoretical universe, which is identical with the observed physical universe wherever comparisons can be made. The development of these consequences of the postulates frequently leads to entirely new concepts of familiar physical phenomena and in many instances these new concepts are of sufficient interest and importance to justify giving them separate consideration independently of the general theory by means of which they were originally derived. For this purpose we need only to treat the primary deductions from the original postulates as assumptions.

The new gravitational theory which emerged from the original development can be derived from three such assumptions. First we assume that there exists a progression of space-time (of which the observed progression of time is only one aspect) such that each location in space-time moves outward from all other locations at a constant velocity (the velocity of light in a vacuum). What this assumption does, in essence, is to endow "here" with the same properties that we normally attribute to "now". Although the idea of a progression of space as well as time is new and unfamiliar it should not be difficult to visualize since the astronomers tell us that this is just exactly what they see, except for a somewhat lower velocity, when they view the universe through their giant telescopes. According to these observers all galaxies, other than those which are relatively close together, are moving outward from all other galaxies at high velocities, increasing toward the velocity of light as the inter-galactic distance increases.

Any object which has no inherent motion of its own and must therefore remain in the same space-time location indefinitely, participates in the space-time progression since, on the basis of the first assumption, that location itself moves. Although radiation is outside the scope of the present discussion it may be mentioned in passing that the photon, the unit of radiation, conforms in all respects to what would be expected of an object with no translatory motion of its own. If we observe a source of radiation from the standpoint of a reference system which does not participate in the progression we find that the emitted photons move outward in all directions from the source at a constant velocity, in the identical manner in which the space-time locations move according to theory. It can therefore be deduced that the photon is an oscillating entity which remains permanently in the same space-time location in which it originates. (This conclusion is, of course, reached theoretically if the consequences of the original postulates are developed.)

We shall next assume that the atoms of matter are rotating systems (the exact nature of which is immaterial for present purposes), and finally we will assume that the properties of space-time are such as to require the rotation of the atoms to be greater in magnitude than the space-time progression and opposite in direction. In order to meet this last requirement the rotation must be translationally effective; that is, a rolling motion. It then follows directly that the atoms of matter, by virtue of the same rotation that gives them their status as atoms, are reversing the pattern of free space-time and are moving inward toward each other.

Here is the very essence of simplicity. There is no action at a distance, no medium, no propagation of a

1 Larson, D, B., *The Structure of the Physical Universe*, published by the author. 755 N. E. Royal Court, Portland 12, Oregon, 1959.

force, no curved space; simply an inherent motion of the atoms in the direction opposite to the ever-present outward progression of space-time. These atoms appear to exert mutual forces of attraction only because they are in constant motion toward each other.

This theory does not conflict in any way with Newton's Law of Gravitation in the range in which that law is valid, nor is it inconsistent with Einstein's modification of Newton's Law applicable to matter moving at high velocities (although the full development of the consequences of the postulates leads to a somewhat different explanation of the latter relationship). It merely goes one step farther and explains the origin of the gravitational force: something that Newton never attempted to do. This new concept of the nature of the gravitational phenomenon then enables us to understand those unique behavior characteristics of gravitating matter which have made the formulation of a complete and consistent theory such a difficult problem.

As long as we visualize gravitation as some kind of an action of one aggregate of matter on another these difficulties are insuperable. Ho one has ever been able to conceive of a mechanism whereby one object can act upon another distant object instantaneously, without an intervening medium, and on such a basis that the action cannot be screened off or modified in any way. Einstein has attempted to provide an answer in terms of a curvature of space-but it is generally recognized that this explanation is far from satisfactory and raises more questions than it answers.

The present status of gravitational theory and the current rate of progress are well illustrated by the titles of two papers which have appeared in the scientific press. In 1954 Paul Beyl published a discussion of the problem in the Scientific Monthly under the title "Gravitation—Still a Mystery". Last year the American Scientist carried a similar review of the situation by Robert Dicke which was entitled "Gravitation—An Enigma". Five years of concentrated effort by the best minds in the profession have succeeded only in raising the subject from the status of a mystery to that of an enigma.

The concept of gravitation as a motion inherent in the nature of the atom overcomes all of these difficulties. If each atom is moving inward toward all other atoms by virtue of its own individual relationship to the general space-time structure rather than because of any kind of force exerted by one mass upon another, there is obviously no need for a medium. The reasons for the instantaneous action and the impossibility of screening are likewise immediately apparent.

Furthermore, this new concept provides us with an equally simple and logical explanation of the recession of the distant galaxies. Since the gravitational motion of an atom originates at one specific location and is distributed over all possible directions, its effect on any other unit decreases with distance in accordance with the inverse square relation. The motion of the space-time progression, on the other hand, originates everywhere and is constant irrespective of location. Even though the inward velocity due to gravitation is greater at unit distance than the outward velocity of the progression, as required by the basic assumptions of the new theory, the reduction of the effective gravitational velocity with increase of distance means that this velocity ultimately drops below the oppositely directed velocity of the progression. For each aggregate of matter there is consequently a gravitational limit beyond which the net movement is outward instead of inward.

As the separation increases still more and the gravitational velocity continues to decrease the net outward velocity becomes greater. Applying these principles to the galaxies we find that the velocity of recession of the distant galaxies should theoretically increase with distance, just as the spectral red shift indicates.

At extreme distances the gravitational motion is negligible and we can deduce that the galaxies recede at the full velocity of the space-time progression.

Ordinarily the foregoing would be all that would be expected of a gravitational theory: a simple, complete and consistent explanation of the observed characteristics of the gravitational phenomenon. This brief survey of the new theoretical structure will therefore be limited to the points already covered, but it should be mentioned that these do not by any means exhaust the potentialities of the new gravitational concepts. As so often happens when radically new ideas are developed in any specific area, the field of application of the gravitational theory has been found to be very much broader than was ever anticipated and the previously published work shows how this theory furnishes simple and logical explanations of a wide variety of phenomena ranging all the way from events on the atomic level to events taking place on a cosmic scale.