

PHYSICS

Einstein Extends Theory to Electron and Proton Interior

Realm of the Minutely Small Heretofore Not Reached by Physical Laws Is Covered in Pronouncement

PROF. ALBERT EINSTEIN has extended his unification of the laws of gravitation and electricity to the interior of the electrons and protons, a realm for which he has been unable heretofore to find a law.

A promising addition to his previous unified field theories of 1929 and 1931 is made in this latest formulation of physical theory by the great German physicist. The details of the new theory are contained in a communication by Prof. Einstein and his associate, Dr. W. Mayer, to the Prussian Academy of Science and published in its proceedings under the title: "Unified Field Theory of Gravitation and Electricity."

Without a law for the behavior of the electromagnetic field in the interior of the electrons and protons, Prof. Einstein had previously found it necessary, as Maxwell had before him, to treat the electrons and protons as foreign bodies embedded in the electromagnetic field, influencing it but not of it. He now assumes a somewhat more general structure of his four-dimensional space-time continuum as expressed in the axiom governing the five component vectors in terms of which he describes this structure. By this means the father of relativity is now able to set up a series of equations capable of treating the electrons and protons as integral parts of the electromagnetic-gravitational field.

16 Equations Required

The detailed application of these equations to special problems has not yet been carried out. The complexity of this new unified field theory may be seen from the fact that Prof. Einstein requires for its description twenty different functions of the coordinates which in a four-dimensional space requires sixteen independent differential equations for their full description. Actually in the form in which the equations are now written twenty-five differential equations appear. Prof. Einstein is, however, able to prove that nine of these can be deduced from the other sixteen, so that the resulting equations are not

inconsistent, but, as the mathematicians say, compatible with each other.

In the ordinary electromagnetic equations of Maxwell there is a system of twelve field equations plus special assumptions governing the behavior of electrons and protons. The ordinary Newtonian equations of gravitation consist of three field equations plus the special assumption that action and reaction are equal. It is not surprising therefore that in a unified theory which covers both of these systems of equations in their most general form, Prof. Einstein should require sixteen equations.

New Light on Electrical Corpuscles

In modern theory of physics, the electron and the proton have been much in the position of the *deus ex machina* of the old Greek dramas, introduced in the language of the mathematicians as a "singularity" in the field. The nature of the singularity and the laws of the disturbance that it causes in the field is independent of the laws of the field itself, and they are added as a special assumption. It is too early to state whether this new synthesis of Einstein's will banish the *deus ex machina* from physical theories as thoroughly as it has been banished from the modern stage.

The new theory may give a new approach to the understanding of the interior of the electrical corpuscles, the protons and the electrons. As yet it has

nothing to do with atomic structure, as an atom is a conglomeration of electrons and protons.

In modern conceptions of physics the space between the protons and the electrons in the atomic nucleus is subject to the same laws as the space outside the nucleus. All of these laws, both inside and outside the nucleus, are now formulated in terms of quantum mechanics. Prof. Einstein has expressed the expectation that all of the assured results of the quantum theory would be found in his unified field theory.

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GENETICS

Japanese Triplets So Much Alike Scientists Dispute

LITTLE Japanese triplets that are so much alike that sometimes even their father gets them mixed up, have been the subject of a scientific study made by Taku Komai and Goro Fukuoko of Kyoto Imperial University.

The features, skin and hair color and bodily measurements of the little girls are all very similar, so a report to the *Journal of Heredity* states. Even their finger, palm, and sole prints are so much alike that the difference is greater between the right and left side of one individual than between the right or left sides of the different children. Mental tests also show them to be very similar in this respect.

Yet despite all this evidence that they are identical, that is, that they all had their origin in the same ovum with the same heredity, the circumstances of the birth appear to indicate that one came from a separate ovum and is merely a sister who chanced to be born at the same time. Thus they provide a new ground for conflict between embryology and genetics.

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CAUSE OF SCIENTIFIC CONFLICT