On the Foundation of the Geometry in Microscopic and Macroscopic Space.

By

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We know that the Quantum Theory, which has made remarkable progress in recent years, has a viewpoint definitely opposed to that of all recently unified field theories of gravitation, electromagnetism and matter, which explain physical phenomena on the assumption that space is metric geometrical. In the present paper the writer intends to construct a new geometry, which will have its foundation on the proper qualities of geometry, and which, based on common and actual physical demonstrations and observations, will express pure-mathematically the relations between the physical realities; in other words, to establish a most intimate connection between physical generic and geometrical conceptions. Again the writer is inclined to assert that the geometrical conceptions are produced by our actual experience of physical phenomena, and that the conceptions of position, mass, etc., are to be defined according to them.

In short, as the new geometry in question is to be constructed resting on physical phenomena, the writer has decided to give up the conventional method of deriving microscopic space from macroscopic, and, reversing the process, to explain macroscopic from microscopic, the metrical conception of the latter being defined by the physical phenomena.

The extension of Dirac's equation to projective relativity has been developed by O. Voblen, J. A. Schouten, W. Pauli and others. The method used in this paper should serve to illuminate the relations between these theories.

Finally, we will develop the theory of kinematic connections in what seems to us a natural manner.

Consider the set of matrices E_λ $(\lambda = 1, 2, 3, 4, 5)$: