

*Espace, Temps, et Gravitation.* By A. S. Eddington, translated into French by J. Rossignol, with an introduction by P. Langevin. Paris, J. Hermann, 1921. xii + 262 + 149 pp.

The first part of this volume is a translation of the author's *Space, Time and Gravitation*, reviewed by Professor E. B. Wilson in this *BULLETIN* (vol. 27 (1921), p. 182). The second part is mathematical and similar to the author's *Report on the Relativity Theory of Gravitation*. The following applies only to the second part.

Eddington has consistently regarded physics as a science where only space-time coincidences or events are observed. These are recorded in terms of coordinates without dimension, then equations are assumed connecting these records and from these equations and records the things of physical significance, such as lengths, times, currents, masses, are *computed*. In this respect he differs from Weyl and most others who regard lengths and times as measured, a procedure which supposes the experimenter endowed with clocks and rods which in some unspecified way adapt themselves to the local geometric requirements.

The exposition is deductive. The postulates include the field equations in empty space and space occupied by matter, and also the differential equations for the motion of a particle. It is possible to derive the field equations by a variation principle where the integrand is the total curvature plus the scalar of the energy tensor. Eddington objects to this because the curvature and energy are physically two aspects of the same thing. On page 76 there is a valuable discussion of the Principle of Equivalence. This is stated in several ways. He uses this principle only a little, "but if we had reasoned by induction, passing from particular laws discovered experimentally to general laws, we would have needed a guiding principle and the Principle of Equivalence would have given us precisely this."

In § 2 there is a much needed treatment of what vectors are in mathematics and of what they are in physics. The last section deals with Weyl's contributions and is characterized by the same vividness and precision as the rest of the book. On page 69, the right-hand member of the second equation of (29, 4) should be negative. This book seems to the reviewer as better adapted than any other to the reader who wishes to spend a limited time on this subject.

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*Conférences sur les Transformations en Géométrie Plane.* By W. de Tannenbergh. Paris, Librairie Vuibert, 1921. 49 pp.

This monograph is concerned with circular transformations, considered primarily as linear transformations of the complex variable. To the beginner it would be of doubtful value, since it assumes the elementary facts concerning the various particular circular transformations and accords scant treatment to the fundamental properties of the general transformation. It deals primarily, both by pure geometry and by analytic methods, with the products of special transformations, e.g., of two rotations or of a rotation and a stretching, and to an advanced student or an instructor interested in this particular subject it should be helpful.

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