

THURSDAY, DECEMBER 10, 1914.

RELATIVITY.

The Theory of Relativity. By Dr. L. Silberstein. Pp. viii+295. (London: Macmillan and Co., Ltd., 1914.) Price 10s. net.

THE appearance of a connected account of the Principle of Relativity in our own language will be welcomed by many as an opportunity of acquainting themselves in more detail with the ins and outs of a controversial subject. The note of controversy is, however, almost completely absent from this book. There is scarcely a reference to the longings of the physicist for an objective æther, save the sentence, "Lorentz had not the heart to abandon the æther which he confessedly 'cannot but regard as endowed with a certain degree of substantiality.'" The readiness to "abandon" well-worn concepts and old-established theory is becoming a marked feature of the thought of physicists to-day. We are witnessing at this moment a revolutionary movement in the 'quantum theory' which at times seems to forget entirely the classical electrical theory, and all the wealth of experimental evidence out of which it grew. In the same way the exponents of the principle of relativity have found delight in pouring contempt on the æther as the basis of electromagnetic influence, while in their turn the more conservative of physicists, failing to see how natural was the transition from Lorentz' theory of optical and electromagnetic phenomena in moving bodies to the novel point of view of Einstein, seized upon the somewhat artificial system of clocks by which the latter sought to make his meaning clear, and found in it a laughing-stock.

It is strange that there has been so much difficulty in making the fundamental point of view of this theory clear to those whose interests are experimental rather than theoretical. Many will read Dr. Silberstein's careful and detailed introduction to it, consider his illustrations, and follow his logic, and yet feel there is something lacking. The 'argument from need' for an æther is not dealt with. The reluctance that Lorentz had to abandon the æther remains. The seeker after a deeper understanding of the physical is apt to fight shy of a principle which cannot be expressed in terms of concepts to which he can give some 'degree of substantiality.' A systematic exposition of the principle of relativity necessarily consists very largely in the demonstration of invariant properties of certain mathematical relations. Hence it is almost bound to appear a little uninteresting

to the experimentalist. Dr. Silberstein compresses the purely mathematical discussion, and judiciously separates it from the general and descriptive account as far as possible. He shows how many of the invariant relations fall simply and naturally into quaternionic form. But little is done to remove the unfortunate impression that relativity is a fad of the mathematician, and not a thing for the every-day physicist. It is to be feared that many will turn to this book full of hope, and come away from it feeling that the subject is barren for the future. For the universe is not compact of quaternions or matrices. As a physical principle, the principle of relativity needs to be placed in its relation to other great generalisations, such as the conservation of energy and momentum, and the status of the fundamental concepts of space and time in mathematical physics needs to be clearly realised.

The present book gives an adequate supply of material for meeting these needs; the account of the developments which led up to Einstein's work is useful and clear; but the reader will need imagination and sympathy if he is to find here an answer to the many difficulties which the subject raises.

PRACTICAL CHEMISTRY.

- (1) *The Elements of Qualitative Chemical Analysis.* By Prof. Julius Stieglitz. Vol. i.; Fundamental Principles and their Application. Pp. xi+312. Vol. ii.: Laboratory Manual. Pp. viii+153. (London: G. Bell and Sons, Ltd., 1914.) Price 6s. net each volume.
- (2) *Introduction to Modern Inorganic Chemistry.* By Dr. J. W. Mellor. Pp. xvi+684. (London: Longmans, Green and Co., 1914.) Price 4s. 6d.
- (3) *Allen's Commercial Organic Analysis.* Vol. viii. Fourth edition. Entirely re-written. Edited by W. A. Davis and S. S. Sadtler. Pp. x+696. (London: J. and A. Churchill, 1914.) Price 21s. net.
- (4) *Handbuch der Arbeitsmethoden in der anorganischen Chemie.* Herausgegeben von Dr. Arthur Stahler. Dritter Band. Erste Hälfte. Pp. x+692. (Leipzig: Veit and Co., 1913.) Price 22 marks.
- (5) *Quantitative Analysis by Electrolysis.* By A. Classen. With the co-operation of H. Cloeren. Translated from the thoroughly revised fifth German edition by Prof. W. T. Hall. Pp. xiv+308. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1913.) Price 10s. 6d. net.
- (6) *Anleitung zur Darstellung Phytochemischer*