

classical student of to-day is so well supplied. From them information more detailed and more complete can be obtained with greater ease and, it may be added, a more structural knowledge of the problems connected with the interpretation of the evidence.

W. R. H.

Preston's "Heat".

The Theory of Heat. By Prof. Thomas Preston. Fourth edition, edited by J. Rogerson Cotter. Pp. xix + 836. (London: Macmillan and Co., Ltd., 1929.) 25s. net.

TO publish a fourth edition of a scientific work thirty-five years after the appearance of the first edition is a high tribute to the author, particularly when, as in this instance, no very fundamental change has been made in the scheme of the book. It is the more notable in experimental science, since Preston could write in 1894 that "It is but a short time since the pursuit of experimental research was regarded merely as a matter of individual curiosity".

Whilst it is not easy to single out any one specific reason for the active survival of "The Theory of Heat", there seem to be in it several outstanding features which have combined to contribute to its continued usefulness. The most essential of these is undoubtedly Preston's singularly clear and accurate style. One wishes, in fact, that the first chapter, with its admirable general introduction to the subject, the seventh, on conduction, and the following one on thermodynamics—which is perhaps the best elementary account that has been written, and of which Preston is said to have been justifiably proud—could be obtained separately for examination purposes by students who have no use for the whole volume. Another reason is in the time at which Preston wrote. The epoch-making work of the end of the century on the electron had still to be done, and there can sometimes be sensed in contemporary writings the feeling that the apparent limitations of the scientific horizon were real.

Preston, whether or not he subscribed to this view, can scarcely fail to have been aware of it—he took the precaution of pointing out that "any theory, however plausible, may ultimately become untenable"—and he could thus write with greater confidence than if he had started a few years later, when he had become interested in the new physics, and was himself engaged in research on the Zeeman effect. It must also be remembered that he was dealing not only with a subject that appeared to be sound theoretically, but also that even then he

had to describe experiments that aimed at, and often attained, considerable precision. Again, Preston states that he was attempting "to treat the science of heat in a comprehensive manner", and not "to meet the requirements of some particular class of persons preparing for examinations or engaged in practical pursuits", an ideal which is also realised in Tyndall's earlier "Heat a Mode of Motion" and Kayser's original pygmy "Lehrbuch der Spektralanalyse" of 1883.

Mr. Cotter's revision of the third edition of Preston's book is chiefly on the experimental side. The square brackets which had previously marked off paragraphs which were not parts of Preston's own contribution have been removed. Several condensations and omissions have been made, notably in the description of experiments and in discussions of disputed points which have now lost their interest. In their places are accounts of some more modern investigations, which have been chosen with discrimination—for example, Stock's realisation of Kelvin's proposed vapour pressure thermometers, and Hercus and Laby's determination of Joule's equivalent—and there are several new references to quantum theory at the appropriate places in the text. The book is naturally still far from complete, but it was never intended to be a dictionary of the subject. Mr. Cotter's task has rather been to retain the spirit and scope of the edition of 1894, but at the same time to make some necessary alterations in parts that were obviously out-of-date, and in this he has been entirely successful.

K. G. E.

Our Bookshelf.

Anleitung zur chemischen Gesteinsanalyse. Von Prof. Dr. J. Jakob. (*Sammlung naturwissenschaftlicher Praktika*, Band 15.) Pp. vii + 81. (Berlin: Gebrüder Borntraeger, 1928.) 7 gold marks.

THE lack of a short but comprehensive work dealing with rock analyses has inspired Prof. Jakob to produce this book, which is intended primarily for the use of students in the laboratory. It may be placed in the hands of a beginner possessing a sound knowledge of general chemistry, and will enable him to carry out a complete analysis.

The author makes a distinction between rock and mineral analyses, each calling for a different method of treatment. In a mineral analysis the object is to attain the most accurate result possible, independent of time; with a rock analysis, on the other hand, it is to produce in the shortest possible time a sufficiently accurate result to represent the specimen. Any two independent analyses carried out on the same powder show points of divergence, and this is even greater in the case of two portions of