the extent to which it could be utilized to further productivity and our general economic and industrial welfare. It is to be hoped that they will inspire other scientific workers to share in that task of education, the importance of which was rightly stressed in the recent presidential address at Edinburgh to the British Association for the Advancement of Science.

For the rest, Prof. Simon makes many sound points in regard to the expansion both of technical and of technological education, the necessity for including men of science on administrative bodies, both in industry and elsewhere, if sound policies in such matters as, for example, fuel, the financing of scientific research and the conditions most stimulating to such work are to be formulated. They are not new, but their relevance to the present situation is made clear, and Prof. Simon insists that the most important measure required to improve industrial efficiency in Great Britain is reform of the system of technological education. He himself favours the creation of at least one, and preferably two, really first-class institutes of technology with the full support of industry, and insists that merely to patch over obvious shortcomings would be fatal. R. B.

THRESHOLD SIGNALS IN COMMUNICATION ENGINEERING

Threshold Signals

Edited by James L. Lawson and Prof. George E. Uhlenbeck. (Massachusetts Institute of Technology : Radiation Laboratory Series, No. 24.) Pp. xii+388. (London : McGraw-Hill Publishing Co., Ltd., 1950.) 42*s*. 6*d*.

THIS book is a worthy companion to the earlier volumes of the Radiation Laboratory Series of the Massachusetts Institute of Technology already reviewed in *Nature*, and it gives a thorough and exceedingly clear exposition of the problems associated with the detection of weak radio signals in the presence of noise and interference of various forms. An incoming signal may be of several types, for example, amplitude-modulated continuous wave, frequency-modulated continuous wave, and pulsed ; the various kinds of receiver are accordingly discussed in conjunction with the types of signal which they are designed to receive.

Human perception of certain signal properties depends not only on what is presented to the observer by the indicator, be it a meter, a loudspeaker or a cathode ray tube, but also on what use he makes of this information. The human observer must therefore be considered as a part of the receiving system, and it is even sometimes convenient to express human limitations in terms of certain indicator or receiver parameters ; for example, the human memory time can be related to an equivalent time constant or bandwidth in the receiver.

After a brief introduction there follow chapters on types of signal and methods for their reception ; and a theoretical treatment of the characteristics of noise, together with some properties of probability distributions used in the general analysis. Chapter 4 discusses the basic origins of internal noise associated with fluctuation phenomena in resistances and thermionic vacuum tubes ; there is also brief mention of current noise, flicker effect and positive ion fluctuation. Receiver noise is treated in Chapter 5 and external noise sources in Chapter 6. The next six chapters deal with the detection of pulsed signals in the presence of the various kinds of noise, and with the several kinds of indicating instruments which can be used. The final chapter, 13, is devoted to a study of threshold modulation for amplitude-modulated and frequency-modulated continuous-wave systems.

Although, as the authors point out in the preface, the book is mainly limited to a description of the work done at the Radiation Laboratory during the Second World War, the treatment is nevertheless broadly based, and it should be of great help to those working on problems in this important field.

J. A. Saxton

DETERMINATION OF SILICATES IN MINERALS

Silicate Analysis

A Manual for Geologists and Chemists, with Chapters on Check Calculations and Geochemical Data. By Dr. A. W. Groves. Second edition. Pp. xxiii+336. (London : George Allen and Unwin, Ltd., 1951.) 25*s*. net.

IN a second edition, one looks for improvements and additions. The revision of this book has been well done ; classical methods of silicate analysis rightly continue to provide the backbone of the subject-matter.

A book containing so much detailed descriptive matter inevitably provides many opportunities for constructive comments. A number of examples may be given. The description of weighing by the 'method of swings' should surely have been followed by notes on the aperiodic balance, which, even for semi-micro work, is now rapidly replacing the more orthodox type. The hydrogen sulphide reduction for the total iron determination is now less frequently used than formerly, as the method has been shown by Lundell and Knowles to be imperfect ; by the hydrogen peroxide method, an accuracy of $\pm$ 0·01 per cent, for a rock containing one per cent or more of titanium, can only be attained by using a photoelectric absorptiometer, which incidentally allows of an accurate determination in the presence of much iron ; the use of dichromate (with a redox indicator) in place of permanganate, for the ferrous iron determination, provides a more permanent end-point. The peroxidized titanium method for fluorine may be completed by coloro-volumetric comparison with a standard fluoride solution and, as a precautionary measure, the zinc nitrate precipitation should be followed by an ammoniacal zinc oxide precipitation, because incomplete removal of aluminium may cause serious errors. The dangers attending the use of hot concentrated perchloric acid should be emphasized.

The chapters dealing with geochemical data and mineralogical calculations provide excellent summaries ; but I object to the heading "Computations as a Check on the Accuracy of Chemical Analyses". A chemical analysis is, or should be, more correct than deductions based on norms or micrometric measurements ; in calculating a mineral formula, the analysis of a pure mineral provides the facts, which should be used to check or modify the theory, not *vice versa*.

The book should be in the hands of all who are interested in the chemistry of rocks and minerals.

C. O. Harvey