

since the word "must" is surely too strong to use when postulating a rupture of bonds which the modern theory of 'complete ionisation' supposes to be non-existent!

The general reader will welcome the reproduction of a paper on the equilibrium diagram of the soda-lime series of silicates, from the Geophysical Laboratory at Washington, and of a summarising paper on the structure of quartz by Sir William Bragg; and chemists will add this volume to their shelves all the more readily because it is issued in the familiar format in which the *Journal of the Chemical Society* has appeared for more than half a century, and has therefore become by long usage an ideal for chemical publications when the financial assistance of the advertiser is not essential.

Our Bookshelf.

(1) *Applied Magnetism*. By Dr. T. F. Wall. Pp. 262. (London: Ernest Benn, Ltd., 1927.) 28s. net.

(2) *Einführung in die Elektrizitätslehre*. Von Prof. R. W. Pohl. Pp. vii + 256. (Berlin: Julius Springer, 1927.) 13-80 gold marks.

(1) DR. WALL gives a good general survey of the subject of applied magnetism and of the theoretical aspects of certain of the questions raised by recent developments of magnetic practice. The bulk of the work is devoted to the problem of obtaining practical control over the magnetic behaviour of the materials used in practical engineering work and to a description of the methods employed in testing the magnetic behaviour of such materials; and the author's own work and experience enable him here to give a tolerably complete, if not always a critical, account of the present state of our empirical knowledge of a now very extensive subject. The treatment of the theoretical parts of the subject is less happy, being both incomplete and, in places, confused; but as this side of the subject is still in a state of flux, this cannot be regarded as detracting seriously from the merits of an otherwise good book.

(2) This book, of a very different calibre from Dr. Wall's volume, is intended mainly as an introductory text-book of electricity and magnetism for students who are out for the ideas rather than their mathematical or technical development, and have to approach them experimentally. It covers the whole range of the subject from electrostatics and magnetostatics, through the usual ideas of current generation and flow, to electrodynamics, radio-activity, and electric waves, with all the thoroughness that is possible within the scope of its number of pages. The treatment is experimental throughout, each idea being derived from the result of an experiment, and suggesting further experiment, and so on throughout the whole subject; but an excellent balance is maintained between the details of the

experiments and the description of the facts which emerge from them. Altogether this is a delightful book, one of the most pleasant features of which is the large number of beautiful illustrations, diagrammatic and photographic, which adorn almost every page.

G. H. L.

Properties and Testing of Magnetic Materials. By Thomas Spooner. Pp. xiv + 385. (New York: McGraw-Hill Book Co., Inc.; London: McGraw-Hill Publishing Co., Ltd., 1927.) 25s. net.

NEARLY every piece of electrical apparatus has, as Mr. Spooner points out, a magnetic circuit. In the majority of cases this circuit is the governing factor which decides the size, shape, weight, and cost of the apparatus; a knowledge of its laws and the materials from which it may be constructed is therefore very desirable on both technical and economical grounds. Unfortunately, to those not already familiar with magnetic theory, the whole subject is somewhat repellent and irksome. The unlovely names of units and properties (which to the beginner appear far too numerous), the lack of uniformity among different authorities, and a feeling that the whole subject is not quite free from a tinge of empiricism, are among the probable reasons for this state of things. Anyone who feels like this will welcome Mr. Spooner's book.

The introduction gives the ordinary relations and formulæ of the magnetic circuit in very clear and convincing outline, and a useful comparative table of the various units of magnetic induction. The remainder of the first half of the book is a complete résumé of our present knowledge of the magnetic properties of commercial ferro-magnetic materials. The results of researches made by workers in many countries are given very fully, and these are discussed and compared with the author's own experiments. The book is therefore by no means a mere compilation. A very large amount of quantitative information is given—almost every page has a graph from which numerical values may easily be read off. The effects of composition, heat treatment, crystalline structure, etc., are shown, and problems introduced by modern high-frequency apparatus receive consideration.

The second part of the volume is devoted to a complete survey of the apparatus and methods of magnetic testing, with chapters on core losses in commercial machines and on magnetic analysis.

A. L. R.

A Manual of Automatic Telephony. By Charles W. Wilman. (Lockwood's Manuals.) Pp. vii + 223. (London: Crosby Lockwood and Son, 1927.) 7s. 6d. net.

THE average technical student finds great difficulty in mastering the theory of the working of automatic telephony. In our opinion, this is due to the fact that nearly every book on the subject begins at once by describing in detail some complete automatic system, and the student is lost in what appears to be a hopelessly complicated maze of circuits. Mr. Wilman has appreciated a beginner's difficulties, and so begins with a few simple general