SCIENTIFIC BOOKS

Electric Motors. By H. M. Hobart. London, Whitaker & Co. 1910.

The name of Hobart is so well known to designing engineers in the electrical engineering field that any work from his pen needs no introduction to members of that profession. The volume under consideration being the second edition of his "Electric Motors" of 1904 is not altogether new to the electrical engineering fraternity, but there has been a considerable revision and modernization of the subject and an increase in the size of the book. The large amount of data included has also been revised to correspond to recent practise.

The scope of the book includes the electrical design, predetermination of characteristics, testing, operation and methods of special application of practically all types of motors now in commercial use, including the interpole D.C. motor and the single-phase series and repulsion A.C. motors.

Mr. Hobart's method of treatment is largely empirical and practical and each procedure is premised by copious data taken from tests.

It assumes a knowledge of the fundamental principles and familiarity with design. Thus it will serve better as a reference book for engineers and instructors than as a text-book for the student in technical schools.

No general method is given for the preliminary selection of dimensions for a design, but the reader is left to consult the data given. This is a common custom among designing engineers who, from their long experience and memory, can guess at the right proportions the first time, whereas the general practitioner or student needs some criterion for his selection. Few books on design lead up to the preliminary choice of design and dimensions by a discussion of those fundamental conditions which bear upon these proportions; such as allowable peripheral speed, allowable ampere conductors per inch or ampere stream on the armature and reasonable magnetic densities.

The book contains a very valuable compilation of data on various designs, the product of several different European manufacturers. This will make it a useful reference book for the American engineer, as it gives him information on the methods which others, having a different view-point, have used to solve those problems which he has met and probably solved in his own way. But it will be regretted by the general practitioner and the novice in designing, that American practise is not described. It is needless to say that designs which are very successful abroad could not be marketed here owing to the different conditions, particularly with reference to the cost of labor.

The treatment of the interpole motor, while very good, is not as extensive as a good many engineers would desire. There is need of a carefully systematized work of authority on this subject in English, something comparable to Arnold's work in German to which most designing engineers in direct-current as well as alternating-current work are obliged to refer more or less frequently.

The chapters on the Design of Induction Motors are very complete, and by means of the data included would enable one already familiar with the principles to produce very satisfactory designs; but there are certain features lacking and certain methods of treatment which would make it difficult for a person not in the habit of practising design to understand the subject. Thus the subject of the leakage reactance or inductance is treated almost altogether as a function of the "circle diagram" and no statement or diagram is given showing the paths of the leakage flux and the effect on the value of this leakage flux of the number and shape of the teeth.

While it is possible to take into account this leakage reactance in the calculation of the characteristics of the machine by means of the circle diagram by referring to data given, it is nevertheless very valuable to thoroughly appreciate during the actual process of design, exactly how much each particular feature of the design contributes to this quantity. This can only be determined by actually deriving the leakage path from the shape of the punchings. Incidentally, the effect of fractional pitch on the leakage reactance is

not very clearly brought out. Yet fractional pitch is very generally used in motors of American manufacture.

The chapters on the Design of Small Motors for Manufacture in Large Quantities and on Cost and Weight Coefficients are of undoubted value in concentrating attention on the factors which govern the expense, although the actual values being based on foreign practise would not be of great value to an American engineer.

In a book on design as comprehensive as this it seems a pity that some space is not devoted to the mechanical design. It is to be regretted that designers of the electrical features of apparatus are so dependent on the mechanical engineer to put their designs and ideas into execution.

Considerable space is given to the single-phase motor both of the induction, series and repulsion types, with the addition of very good introduction stating the logical limitations of the single-phase system.

The author and publishers should be congratulated on the excellent work shown in the cuts and curves which contribute considerably to the value of the data included in the book. This is really very extensive and alone would make the book of great value to the designing engineer as a book of reference.

WALTER I. SLICHTER

Testing of Electromagnetic Machinery. By B. V. SWENSON and B. FRANKENFIELD. New York, The Macmillan Co. 1911.

This volume is devoted to the testing of alternating-current machinery and is a sequel to the book on "Direct Current Machinery," previously published by the same authors. The book contains a description of a very large number of practical experiments illustrating the phenomena of alternating-current circuits and methods of testing commercial apparatus. It is intended to be used in technical schools in connection with a laboratory course.

The general scheme and methods are based upon the work which has been carried on in the laboratory of the University of Wisconsin under the authors, and contains additions and revisions due to the experience of Professor Bryant at the University of Illinois.

As a result of this collaboration and experience the text covers the field very completely and the methods advocated are those that would be generally conceded as the best and most practical.

The book is quite up to date both in its methods and in its scope, thus a treatment of the mercury arc rectifier and the split-pole converter are included, although the treatment of the latter is very brief.

It may be suggested that the experiments are resolved into too elementary and simple divisions and that a more efficient use of the student's time would be obtained by combining several of the experiments into one operation. There are 127 experiments listed, very few of which could be omitted from a good course, but these 127 could be logically grouped to cover the same ground in fewer operations.

For the theoretical basis and explanation of each experiment, the student is referred to a very large number of references in each experiment. The number of these references will in itself tend to discourage the average student to give any of them proper attention. It would be of more benefit to the student if a simple and concise development of the theory were included in the text with each experiment. However, for instructors in charge of courses these references so systematically arranged will be of great use.

WALTER I. SLICHTER

Economic Geology, with Special Reference to the United States. By HEINRICH RIES, Ph.D. Third edition. New York, The Macmillan Co. 1910. Pp. xxxiv + 589, pls. LVI., figs. 237. $3.50.

The importance of geology in its relations with mineral resources was recognized nearly a century ago in the establishment of official surveys. Still earlier in the European schools of mines the formation and classification of ore deposits were discussed in formal courses of lectures. But the growing development of agriculture, quarrying and mining has brought the science of geology more and more into the