

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

foreground among subjects of importance in general education, and more and more courses in the purely scientific statement of the subject are followed up by those in its applications.

The text-book before us covers the latter field. It aims to carry a student through the various useful minerals and rocks; to instruct him in their modes of occurrence, the principles governing their accumulation and the statistics of their production. The non-metallics are first discussed, beginning with coal. Then follow in order, in Part I., petroleum and related hydrocarbons; structural materials; salines; fertilizers; abrasives; various minor minerals, and finally underground water. The author has freely used maps and pictures and summarizes literature at the close of each chapter. In the matter of clays and their applications he is especially at home from long experience with this particular line of investigation.

Part II. is devoted to the metalliferous deposits. An introductory chapter on the geological principles involved and the scheme of classification to be employed leads up to a systematic description of the ores of iron, copper, lead, zinc, gold, silver and the lesser metals. Again maps are freely used and with geological sections and pictures convey excellent ideas of occurrence and distribution. Statistics add the proper sense of perspective and of relative magnitudes.

The author writes with obvious knowledge and command of his subject. Successive years of presentation to classes and the two previous editions of the work have aided in bringing it to a high grade of excellence. The publishers have cooperated with maps and illustrations, with the result that a concise and very useful manual has resulted.

J. F. KEMP

PSYCHOLOGY IN RUSSIA

At the eighth annual meeting of experimental psychologists, held at Cornell University, April 17-19, 1911, Professor G. Tschelpanow, of the University of Moscow, described the status of psychology in Russia at the

present time. He has been commissioned by his government to study psychological laboratories abroad, in order to perfect plans for the erection and equipment of a psychological laboratory building, the first and most complete of its kind—and to be established at Moscow, in the heart of Russia! This laboratory is the gift of Mr. S. I. Shtchukin, of that city, who has contributed 100,000 Rubel (\$50,000) for the building and 20,000 Rubel for its equipment. He is already well known as a benefactor and protector of the modern school of painters, and has a large private museum of modern pictures which is often visited by English and French artists. The new laboratory is also endowed with a library of 3,000 volumes, worth 10,000 Rubel, presented as a memorial by the family of a young instructor of the University of Moscow, who met with an untimely death.

Professor Tschelpanow addressed the audience in German, but he kindly permitted me to translate the notes I had taken and to publish them, in spite of their sketchy, unfinished form, as I considered his remarks of general interest to scientists at large. He said in part:

"Experimental psychology in Russia is still in its beginning; although the first interest for it was aroused as much as twenty years ago. Its progress has been impeded partly by the uncertainty of political conditions, partly by the close affiliation of psychology with philology only, and not with natural sciences, and partly also by the fact that Russian universities have only collegiate rank, so that most of their advanced students still have to go to Germany for their research work.

"Among the older psychological laboratories, that at Odessa has become most widely known through the work of N. Lange. For some time he had but scanty space and only a few pieces of demonstrational apparatus at his disposal. At Kiew the laboratory consists of two rooms which contain demonstrational and other instruments. Moscow is in this respect the most fortunate place of all, because four years ago its laboratory was