

This, of course, is well understood by those experienced in metallurgical work, but, unfortunately, is not always sufficiently emphasized, with the result that in many cases a misapprehension often arises as to the effect of the electric current on the resultant metal itself.

Chapter III. deals with smelting furnaces. A description of the early attempts at smelting is given, together with the reported cost data of the various experiments. This is followed by descriptions of the Grönwall furnaces in Sweden and the smelting operations at Shosta, California. These descriptions and results are mostly taken from published articles which are very familiar to anyone interested in this question. There are also descriptions of the Frick and Chaplet furnaces. The Heroult steel refining furnace is described in Chapter IV., various installations which are well known being discussed. In the same way, Chapters V. and VI. deal with the Girod and Stassano furnaces, respectively. It is unfortunate that the Kjellin and Röechling-Rodenhauser furnaces have been described in the same chapter. As is well known, the latter furnace is not a true induction furnace, while the Kjellin is a perfect example of the much-debated induction furnace.

In Chapters VIII. to X. various furnaces, such as the Keller, and a number of furnaces not very well known, are described. The author describes the Colby furnace among this latter group, using, by the way, the same old familiar cut as an illustration. This furnace might better have been placed with the Kjellin.

Power consumption and running costs are discussed in Chapter XI.

The book is well published, the paper being high grade and the illustrations clear. The material is very largely taken from well-known descriptions in the various technical journals. The book is a good catalogue of these articles.

Mechanical Laboratory Methods of Testing Machines and Instruments.—By Professor Julian C. Smallwood, Syracuse University, N.Y. Published by D. Van Nostrand Company, New York, N.Y. 333 pages; illustrated; 5 x 7½ in.; cloth. Price, \$2.50 net.

The author of this book has produced a brief treatise on the mechanical laboratory methods of testing apparatus and machines, and he has entered a field in which there appears to be ample room for a well-written book. So far, outside of a few comparatively large books, there are very few concise and handy works. There is still room for a good book specially written for the use of practising engineers.

The present book has been very nicely gotten up, and is printed in good type. It is divided into three main parts, dealing, respectively, with the calibration of instruments, the analysis of fuels and the products of combustion and the testing of power plant units, with an appendix discussing the reports of tests and methods of conducting students' tests.

In the part dealing with the calibration of instruments, and which occupies over 130 pages, almost every possible measuring device used in mechanical engineering has been taken up. The instruments include scales, gauges, brakes, dynamometers, indicators, planimeters, meters, nozzles, etc., calorimeters and oil and belt testers. To explain the method of treatment the Pilot tube may be taken as an example. In dealing with this there is, first, a brief discussion of the principles on which it works, then the method of finding by its aid the mean velocity and the location of the point of mean velocity in the pipe. Each instrument is dealt with similarly.

The section on combustion is brief, but deals fairly fully with questions relating to the action of fuels and the calculations relating to their use.

In the last part, on the testing of power plant units, each type of unit is taken separately, and the standard methods of testing and analyzing the results are fully described. Taking the steam engine as an illustration, the matters dealt with are: clearance, valve-setting efficiency and economy, and the machines examined in this way include also steam pumps, boilers, gas engines, air-compressors, fans, water and steam turbines, centrifugal pumps, etc.

The book will prove of help to all engineering students, and the information contained is of such a nature as to be suggestive to engineers who do a reasonable amount of testing.

The Mechanical Engineers' Reference Book.—By Henry Harison Supplee, B.Sc., M.E. Fourth edition, revised and enlarged. Published by Charles Griffin and Company, Limited, London, and by J. B. Lippincott Company, Philadelphia, Pa. 1914. Price, \$5.00.

This book differs, in some ways, from ordinary engineering hand-books. It is practically a book of tables, formulas and methods, for engineers, students and draughtsmen. It is intended to be the legitimate successor of Nystrom's Mechanics, which was, in its day, a most useful and handy compendium of information on all subjects connected with engineering. Supplee's work is of convenient size, and has a table of contents and a detailed index. The first page of each of the principal sections, fifteen in all, are "thumb-cut," so as to be easily found and opened without special reference to the index.

In dealing with mathematics—the first of the larger sections—short cuts are given, and handy "kinks" for quickly getting results, without a repetition of "what we may" call "common knowledge." In handling the subject of mechanics, the consideration of the theory of the science is taken up and developed so that it leads to the statics of framed structures, and thus deals with roofs of buildings and with bridges. Dynamics is included in this section, and explanations of all the units, such as that of force, work, power, momentum, etc., are given.

In the section known as Mechanical Engineering, a mass of constantly used matter has been compressed into small space. There is, first, the materials of engineering, tables of weights of pipes, bars, bolts, etc., specific gravity of various substances, facts about pipes, couplings, bolts, nuts, wire rope, followed by the hundred-and-one things which crop up in the engineer's daily life. The strength of materials deals with matters concerning tension, compression, bending, shearing, torsion, and the elements of structural material. Machine design takes up a most important subject to the mechanical engineer. Formulas are given and methods indicated by which the strength of so simple a tool as a wrench may be calculated and properly designed. Keys, keyways, journals, shafts, bearings, teeth of wheels, belts, rope-drives, and many kindred topics are treated in this practical and easily understood way.

The sections on heat, air, and water give facts which are necessary to be known. Fuel contains many useful tables of the calorific value of combustibles, solid and liquid. Steam follows, with useful tables and information of a thoroughly practical kind. There is a section devoted to steam boilers, and in it tables of various kinds are set down, and information is placed before the reader concerning evaporative power, cost of gaining evaporative efficiency, chimneys and their function and effects. An important feature is the code of rules for conducting boiler tests, together with the results of numerous trials. This section is followed by one on steam engineering, in which horsepower is fully explained and its use made plain. Methods of testing steam engines are detailed and valve cut-off, proportions of cylinders for compound engines. The rules, or code, for steam engine testing are quoted in full,