

Pumps for various requirements are also described, ending with deep well pumps. The last chapter takes up duty.

One would have liked to have seen power displacement pumps taken up in this book, and it would also have been convenient if a short standard specification could have been given to aid in purchasing. However, one can write a very good pump specification from the matter contained in the book as it is.

Preventing Losses in Factory Power Plants. By David Moffat Myers. Published by the Engineering Magazine Co., New York. First edition, 1915. 560 pages; 68 figures, including 10 folding plates; size, $5 \times 7\frac{1}{2}$ ins.; cloth.

(Reviewed by L. M. Arkley, Lecturer in Mechanical Engineering, University of Toronto.)

In the preface the author divides his book into two parts, the first nine chapters being written expressly for owners and managers of manufacturing plants, while the remaining ten chapters were written chiefly for mechanical superintendents and factory engineers.

Chap. 1 deals with the methods of determining existing losses in the power plant, and in order to give some standard of comparison, attainable efficiencies and ordinary wastes are indicated in Chap. 2.

Chaps. 3 and 4 treat of preventable losses in the boiler plant, while the subjects of boiler tests, combustion, surface combustion, natural gas as a boiler fuel and the economic combustion of waste fuels are treated in subsequent chapters. This means that approximately one-third of the book is devoted to different phases of boiler plant design, equipment and operation. The importance of the boiler plant fully justifies this exhaustive treatment, and it is remarkable how few factory managers realize this fact.

Chaps. 7 and 8 are of live interest as they treat of the heating system, and it is impossible to divorce this problem from that of the power plant, if efficiency is the end in view. One of the cheapest forms of available power is that which may be obtained as a by-product of the heating system, and this point is emphasized in these chapters.

Chap. 9, called "The human factor," is regarded by the author as the most important one in the book; in fact, he states in the preface that if it were necessary to omit any he would prefer to leave out any six of the other chapters rather than this one. It may be summarized briefly as follows: A fireman in a steam plant may waste or save about one-quarter of the coal fired by him per year, and ordinarily the management has no way of telling whether he is firing efficiently or not; therefore, the author advocates that a method of weighing all coal burned and water evaporated be installed, so that the efficiency of the boiler plant may be determined at any time, and in this way a check kept on the firing. To encourage the fireman to do good work a bonus system, based on the efficiency of the plant, is suggested. The latter part of the chapter contains some good advice in regard to safety devices to be installed, such as stop and check valves on boilers and safety stops on engine.

Furnaces suitable for the burning of such fuels as spent tan bark, sawdust, bogosse and culain are described in the chapter on "The economic combustion of

waste fuels." This chapter should be of interest to those with such problems to solve.

Chap. 18 describes some of the recent developments in prime movers, including Stumpf's unaflo steam engine, the modern locomobile and the Diesel oil engine.

On the whole, the book contains a lot of useful information brought together from various sources, and while little of this is startlingly new, it is convenient to have it in compact form. The book should prove very useful to men in charge of steam power plants, especially those who are progressive and wish to operate their plants at highest efficiency.

Railroad Field Manual for Civil Engineers. By William G. Raymond, C.E., LL.D., Professor of Civil Engineering, University of Iowa. Published by John Wiley and Sons. Canadian selling agents, Renouf Publishing Co., Montreal. First edition, 1915. 398 pages; 31 figures; 83 tables; $4\frac{1}{2} \times 7$ ins.; morocco. Price, \$3.00 net.

The author's previous works, including *Railroad Field Geometry and Elements of Railroad Engineering*, have made him well known to Canadian railway engineers. The new publication should interest them a good deal. The outstanding feature to attract their attention is the fact that throughout the manual the degree has been divided decimally instead of sexagesimally, the author being convinced that it will be found a time-saver as well as less liable to error. It is a change which will undoubtedly meet with ultimate favor in the minds of many of our railroad men, although considerable opposition may confront it at first.

The text begins with a chapter on simple, compound and vertical curves, with complete explanation and tables. The spiral is next dealt with, and is followed by a chapter describing the use of logarithms and trigonometric functions, including common logarithms and logarithms of sines, tangents, cosines, cotangents for each 0.01 degrees of the quadrant. This is followed by a table of versed sines and external secants and others of a similar nature.

Chapter 4 deals with location theories and tables of velocity heads, train resistance, tractive effort, grades and grade angles, etc. Estimating and construction tables are taken up in chapter 5, where a table is presented of volumes of triangular prisms 50 ft. in length, and others of level section volumes with various slopes, and numerous others in which such subjects are dealt with as middle ordinates for curving rails; drainage areas; cost curves; timber trestles; ballast estimates, etc.

Chapter 6 deals with turnouts and cross-overs. Chapter 7 with azimuth, latitude and time. This is followed by tables for metric curves and miscellaneous tables of trigonometric formulas, stadia functions, barometric elevations, etc.

A very useful chapter deals with the adjustment of the transit, the levels, both dumpy and wye. The closing chapter gives sexagesimal trigonometric functions. Blank pages are included in the back of the volume for engineer's notes.

The use of the decimal of the degree instead of the minute and second is very fully explained, and the user should have little difficulty. The list of tables is very complete, and the explanations of common field problems will be found quite sufficient by those not drilled in them by long experience.