

Destructive Agencies: Effect of sea water upon concrete and mortar, Chap. 15; destructive agencies, Chap. 17.

Theory, Design and Tests of Reinforced Concrete: Theory, Chap. 20; design, Chap. 22; tests, Chap. 21.

Construction: Foundations and piers, Chap. 24; dams and retaining walls, Chap. 27; conduits and tunnels, Chap. 28; reservoirs and tanks, Chap. 29; pavements and sidewalks, Chap. 30; beam bridges, Chap. 25; arches, Chap. 26; buildings, Chap. 23; miscellaneous structures, Chap. 32.

A special chapter is devoted to the subject of watertightness and the laws and tests of permeability.

Chap. 1 is devoted to a summary of the most essential elements in concrete construction. The essential elements are clearly stated and emphasized in heavy type and form an extremely valuable guide for the main principles required to ensure good workmanship and proper design.

The principal conclusions of the effect of sea water upon concrete and mortar, as reached by the author of Chap. 15, are given at the beginning of this chapter and form a valuable summary.

The effect of alkalies and oils upon concrete receives only passing mention.

The importance of this subject in the West especially would warrant a much more extended treatment giving the latest developments and investigations, indicating the dangers where alkalies are present and the necessity of proper materials (including water), proportioning and workmanship for protection.

The subjects of theory and design are treated in two separate chapters, and there is considerable repetition that could have been avoided; for instance, some of the sections under "theory" being repeated verbatim in the chapter on "design."

Chap. 10 deals with the proportioning of aggregates and contains a summary in heavy type of the laws relating especially to the grading of aggregates, and also the application of mechanical analysis to proportioning.

This, together with Appendix 1, on the method of combining mechanical analysis curves, should be of great assistance in obtaining the best kind of concrete.

The salient features of many of the chapters are brought into prominence by the use of summaries and heavy type, while, where several different formulæ are given under different assumptions, the authors state the formulæ recommended by themselves.

The great value of the book lies in the fact that it is practical in its treatment and applications, as well as giving the theoretical principles involved.

The authors are to be commended on the whole for the clearness of presentation and arrangement of the work, as well as on the matter contained.

The book is indispensable for engineers dealing with concrete work and design.

### Railroad Engineering

By William G. Raymond, Dean of the College of Applied Science, State University of Iowa. Published by John Wiley & Sons, Inc., New York, and Chapman & Hall, Limited, London; Canadian selling agents, Renouf Publishing Co., Montreal. Third edition, revised, 1917. 453 pages,  $5\frac{3}{4} \times 8\frac{1}{2}$  ins., 18 plates, 113 figures, cloth. Price, \$4 net. (Reviewed by G. A. McCarthy, chief engineer, railway and bridge section, City Hall, Toronto.)

It seldom falls to the lot of a student to get within so few pages so many sound principles, so clearly set forth,

on railroad inception, location, financing and valuation, as he finds in the introduction. The work consists of three parts.

Part I. In ten chapters, deals with rails and fastenings, ties, track, roadbed and structures, including signals which go to make up the permanent way.

Part II. In seven chapters, treats of the locomotive and its work, train resistance, grade and curve resistance, velocity grades, operating expense, and gives in a fair amount of detail, examples of problems met with by the railroad engineer when called upon to estimate the allowable expenditure to effect certain improvements in grade or alignment, or both. This chapter also contains twelve plates showing the different classes of locomotives, with particulars of size, weight, etc.

Part III. In six chapters, describes reconnaissance, preliminary, and location surveys, together with the estimate of cost of a railroad from such surveys. One chapter is devoted to construction surveys, methods of staking out work, overhaul, etc. One chapter of twenty-three pages is devoted to valuation. An appendix contains almost complete reprint from the Transactions, American Society of Civil Engineers, Vol. lii., of the paper by W. D. Taylor, M.Am.Soc.C.E., on "The Location of the Knoxville, La Follette and Jellico Railroad, of the Louisville and Nashville System." Most of the discussion of this paper is also included.

The author has treated of railroad engineering in a most practical manner, realizing that many of the problems are not subject to exact solution.

In dealing with matters which may be more or less controversial, the author, while expressing his preference, gives the student the opinions held by others. Many references are made to works of other well-known authors and to the Manual and Proceedings of the A.R.E.A.

The book is of convenient size, well arranged, clearly printed and practically free from errors.

One has only to go carefully through a volume of this nature to realize how great is the field covered by railroad engineering. The author has successfully covered this field in a general way, referring the reader to reliable sources of information, if greater detail is desired.

Every student of railroad engineering can make no mistake in adding this book to his library.

### Gas Chemists' Handbook

Compiled by Technical Committee, sub-Committee on Chemical Tests, 1916; A. F. Kunberger, editor. Published by the American Gas Institute, New York City. 354 pages, 6 x 9 ins., illustrated, cloth. Price, \$3.50. (Reviewed by J. Watson Bain, B.A.Sc., past-chairman, Society of Chemical Industry, (Canadian Section), Washington, D.C.)

As in so many other branches of chemical industry, the methods of control in the manufacture of gas have been wonderfully developed in recent years. The modern purchasing agent buys on specification and desires to know whether or not he is obtaining what he pays for, while the operating engineer judges the successful operation of the plant largely by the chemical analyses which are furnished to him. The older gas chemists contented themselves with determining the sulphur, ammonia and candle power of their product, and this volume of 354 pages, devoted to methods of analysis, shows very strikingly the progress which has been made. Until the appearance of this volume, there was no publication which dealt in a comprehensive manner with the various problems which fall to the lot of the gas chemist, and in many cases re-