institutions and offices, the universities of Great Britain and Ireland and the scientific learned societies of many countries has

Ireland and the scientific learned societies of many countries is included. Another section is devoted to a serviceable diary which contains a page for, and information concerning every day in the year. The book is handsomely bound and well indexed. It is an indispensable volume to the science student an' expert.—W. M.

Sewer Construction,—by Henry N. Ogden, C.E., Associate Member of the American Society of Civil Engineers, Professor of Sanitary Engineering, Cornell University, Special Assistant Engineer, New York State Department of Health. Published by John Wiley & Sons, New York. Price, \$3.

In the preface the author states that the following pages comprise, in a somewhat amplified form a course of lectures given in the College of Civil Engineering, Cornell University. The course is an elective one, intended for students whose purpose to enter the field of Sanitary Engineer, calls for a more special and detailed work than is required of all Civil Engineering students. He also says the course represents the second part of a year's work, of which the book on Sewer Design already published, is the first part, and it is assumed that the reader is familiar with that volume. Wherever serious omissions from the present text have been made on that account, references have been given so that duplication may be avoided. This is just the key-note of the whole book. A book on sewer construction should give some definite information on the subject without depending on another book already written for the knowledge you anticipated in the book purchased.

Chapter I. gives a very good idea of the manufacture of sewer pipes, accompanied with an analysis of the clays' used and also a table showing the different standard thicknesses of pipes found to be satisfactory.

In Chapter II. there will be found some very interesting tests on sewer pipe to ascertain their crushing strength. Also a few tables showing the required thickness of pipe based on these experiments. The author deals with the important subject of watertight joints, how they are accomplished with cement and other compositions already in use. The suggestions are worth noting.

Brick sewers are taken up in the following chapter. The subject is very well handled from a descriptive point of view and is well illustrated by cross-sections, applicable to various conditions but lacks detail, both of design and construction. A useful formula is given to guide the engineer as to the required thickness of brick-work for various sized sewers.

Concrete used in sewers construction is attracting more attention than brick, owing chiefly to its relative cheapness. Chapter IV. has a good description of the various methods of constructions aided by numerous cross sections of concrete sewers already constructed. It also contains a number of different compositions of cement, sand and stone, all of which are good construction.

Chapter V. treats with a combination of the preceding two chapters under the head of combined concrete and brick sewers, illustrated by a few cuts. The only real advantage in this combination is that the trench can be filled in immediately after the brick arch has been turned.

Under the heading of reinforced concrete sewers one would naturally expect a detailed mathematical solution of the stresses and how to calculate the thickness of concrete and the amount of steel necessary for the different size sewers. This side of the subject is not touched upon in Chapter VI., which only gives a very scant description assisted by a few cross-sections.

Chapters VII. and VIII. deals with manholes and catch basins. We find a great number of illustrations of both, but as most of them are of standard type, they only serve to give a general idea of their construction.

Chapters IX., X., XI., XII., XIV., and XV. discuss syphon, screens, storm overflows, bellmouth, outfall sewers and house connections respectively. These subjects are exceptionally well described, setting forth their uses and general design. The engineer who is not familiar with the above can g t a clear idea of a suitable design for any particular case. The question, "Foundations of Sewers" is very carefully handled, being illustrated by first-class cuts in Chapter XIII. This important subject is splendidly described and cannot help but convey a lucid idea to the reader.

Surveying for a sewer, as taken up in Chapter XVI. is not a very difficult matter. In the first part of the chapter the inexperienced will find a few useful suggestions, that are carried out during actual construction. The author's page from his field book on giving grades is more confusing than intelligent.

Among the methods mentioned for the location of private drain connections I think, the best and only proper one is th. tieing in of them from the centres of the manholes.

The economy of sewer work depends largely upon the manner of carrying out the work. Chapter XVII. gives a very good description how to set about it. The first half of the chapter takes up excavation by machine excavators, accompanied by a series of good cuts, while the latter half deals with rock excavation accomplished by explosives.

Chapter XVIII. takes up estimates and costs. Here the engineer will find a first-class guide as to the cost of work, which has been computed from actual construction.

Specifications without loop-holes and will stand the test of experience are very difficult to frame. But in the last chapter of this book you will find a thorough discussion of a set of specifications, that will assist one to avoid loop-holes and also impracticable clauses.—W. R. W.

The Elements of Railroad Engineering.—By Wm. G. Raymond. (T. Wiley & Sons, 400 pages, \$3.50). Is one of the latest and best of the many text-books published on the subject of railroad construction. The author, Wm. G. Raymond, is Dean of the Faculty of Applied Science of the State University of Iowa, and stands high in American engineering circles.

In a work of this nature it is impossible to altogether avoid what has already appeared in other textbooks, but the author has succeeded admirably in bringing up-to-date many of the researches inaugurated by the late A. M. Wellington, particularly those relative to locomotive tractive power.

The subject matter is well handled and presented in an orderly manner that will make it very useful as a book of reference. In the introduction the methods of financing modern railroads are well discussed, and the reasons shown for the occasional failure of the enterprise. The author next devotes himself to a description of track standards and it is here particularly that the timeliness of the work shows to advantage. A good escription is given of the standard rail sections so recently adopted by the American Society of Civil Engineers. Some time is devoted to a description of the most modern methods of treating ties and their ultimate cost as compared with the untreated ones is well discussed, much of the subject matter being original.

Some space is devoted to modern yards and switches, but as a field book is also being issued; any actual track problems are left to be discussed in it.

There are about a hundred pages devoted to the work of the modern locomotive, and the problems incidental to the use of the virtual profile are thoroughly taken up. One of the best features of the handling of this subject is the series of plates illustrative of practically all the standard types of modern American locomotives. Some time is spent on a full description of the actual work of surveying and constructing the road. It is difficult to add anything to this well covered subject, but a number of the minor details are more fully covered than is usual.

The last portion of the book is devoted to a clear and interesting account of the location of a difficult piece of road through the mountainous districts of Tennessee, and the author need offer no apologies for the inclusion of such an excellent essay in a work of this description.

"Elements of Railroad Engineering" is one of a series of three books on the subject, the other two, "Railroad Field Geometry," and "Railroad Engineers Field Book" being still in preparation. It is one of the best books on the subject published, and should be in the library of every aspiring engineer.—A. C. O.