

THURSDAY, OCTOBER 7, 1915.

PRACTICAL ENGINEERING.

- (1) *Plain and Reinforced Concrete Arches*. By Prof. J. Melan. Authorised Translation by Prof. D. B. Steinman. Pp. x+161. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1915.) 8s. 6d. net.
- (2) *Masonry: A Short Text-book on Masonry Construction, including Descriptions of the Materials used, their Preparation and Arrangement in Structures*. By Prof. M. A. Howe. Pp. ix+160. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1915.) Price 6s. 6d. net.
- (3) *Railroad Field Manual for Civil Engineers*. By Prof. W. G. Raymond. Pp. vii+386. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd, 1915.) 12s. 6d. net.
- (4) *Working Data for Irrigation Engineers*. By E. A. Moritz. Pp. xiii+395. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1915.) 17s. net.

(1) "PLAIN and Reinforced Concrete Arches" is an American translation by Dr. Steinman of a German treatise by Prof. J. Melan, who is an authority on structural design, and has invented a well-known system of reinforced arch construction. The treatise is thorough, accurate, and clear. After considering the theory of hinged and hingeless arches, the latter by both analytic and graphic methods, the effects of temperature, displacement of the abutments, and non-vertical loads are examined. Then come arches with elastic abutments, the results being applied to a treatment of arches continuous over several spans, on lofty piers. Reinforced arches are next considered, and there is a valuable chapter on the recalculation of the stresses in an arch ring by a more rigorous method after it has been provisionally designed. The calculations of arches, especially of reinforced arches, are laborious, and fully-worked-out examples of two actual bridges are given, the solutions being in one case by analytic, in the other by graphic, methods. There is a very useful chart for designing concrete sections with double reinforcement.

Prof. Melan has written several books on arched construction, and this one appears to be a condensed but fairly complete statement of the present state of arch theory. In investigating the critical conditions of loading for each arch section, the method of influence lines is used with great advantage. For abbreviating labour in provisional

designing, easily applied simple approximate expressions are found. In many cases of double reinforcement the steel bars in compression are understrained. To obviate this, Prof. Melan has invented the method of putting them into an initial condition of thrust by loading them with part of the weight of the centring. The economy obtained is of value, and the method has been adopted abroad, though it is probably little known here. The treatise is very practical, if that can be said of a theoretical treatment of the subject, and can be strongly recommended to any engineer concerned in designing concrete arched bridges.

(2) "Masonry," by Prof. Howe, is an elementary, mainly descriptive account of stone masonry, brickwork, and concrete construction, not including reinforced concrete. Quarrying and manufacturing operations are briefly described, and the different kinds of brick and stone masonry, mass and block concrete, and tools used in different operations. The cement gun is described, used for giving a dense surface finish to mass concrete by blowing a cement grout against the surface.

(3) "The Railroad Field Manual," by Prof. Raymond, consists almost entirely of tables required in surveying and laying out curves. Its peculiarity is that the centesimal in place of the sexagesimal division of angles is adopted. The author remarks that, in practically every railway curve problem, it is necessary at some stage of the solution to transpose from minutes and seconds to decimals of a degree or *vice versa*, and that it would require much less mental labour to lay out sub-chords if the transit were divided decimally, and, of course, if suitable trigonometrical tables were available. The tables seem to have been carefully arranged and to be accurate. Of course, if the author's method is to be used, the verniers on any transit made as at present would have to be altered to read hundredths of a degree, but this is not a very serious matter. Only experience can prove whether the economy of labour is sufficient to make the change desirable.

(4) "Working Data for Irrigation Engineers" consists in the main (a) of hydraulic diagrams and tables giving discharge of canals, pipes, orifices, and weirs; (b) of structural diagrams and tables giving earthwork quantities, bending moments on beams, tables for reinforced concrete and timber, etc. Large use is made of graphic diagrams. Some of the information is derived from the records of the U.S. Reclamation Service. The author is competent, and the book will be of service to irrigation engineers.