

point of the pumping plant, the author pointing out that irrigation by this means is now reaching a greater importance each year in the United States, due to the rapidly diminishing area now susceptible of irrigation by gravity canals.

The chapter headings are: The amount of water required; sources of supply; flow of underground water; strainers; well sinking; pumps, pumping machinery and appliances; centrifugal pumps; different types of their installation; typical plants not using centrifugal pumps; cost of pumping; reservoirs; prime movers; the central station pumping plant; windmills.

Generally speaking, the subjects are dealt with both from standpoints of design and operation. The author makes many helpful suggestions for contractors specializing in pumping plant machinery. The discussion is quite general, considering the nature of the subject. It is to be noted that the author spent eight years in irrigation work with the United States Department of Agriculture, and the book reflects a good deal of his professional knowledge and experience in the matter of irrigation pumping and questions connected with it.

Centrifugal Pumps. By R. L. Daugherty, M.E., Assistant Professor of Hydraulics, Sibley College, Cornell University. Published by McGraw-Hill Book Co., New York. First edition, 1915. 192 pages; 111 illustrations; size, 6 x 9 ins. Price, \$2.00.

(Reviewed by A. J. McDougall, Department of Mechanical Engineering, Toronto Power Co.)

This book covers the centrifugal pump, and commences with a history and general description of the various types, with illustrations of some well-known American makes. One might wish for a little deeper analysis of pumps with opposed impellers than that which is given. Complicated passages alone should not be sufficient to prevent a general use of a pump having an almost perfect balance.

In describing the operation of pumps in parallel a more thorough description would be better. There is a slight hint of the difficulty in the statement that centrifugal pumps in parallel should have identical characteristics. It seems to the reviewer that this is a condition where the displacement pump is superior to the centrifugal, as with the former each pump will deliver in accordance with its displacement, while with the centrifugal the stronger pump will "hog" the load, and in some cases shut the weaker pump off entirely.

There is an analysis in the fourth chapter of the general theory, specific theory and characteristics of centrifugal pumps. The chapter starts with a very good system, which, it is hoped, may be generally followed. It is that the notations are all together. It is aggravating to have to hunt through several pages for notations, or to have one notation in one place and in another place another notation.

An analysis of the effect of differing percentages of entrained air in the water and its effects on the efficiency of the pump until the air stopped the suction or discharge would be interesting, as it is the custom of some engineers, in order to prevent heating, to run their glands loose, and in that condition there is probably some air being drawn in.

In centrifugal pumps vs. displacement pumps there is a statement that with a centrifugal pump "It is possible to shut off the flow of water entirely without causing the pressure to rise above a certain value."

The reviewer would not like to operate a centrifugal pump very long under those conditions. This difficulty is met with in operating centrifugal pumps for boiler feed, viz., constant head, constant speed and a discharge running from zero to maximum. Under these conditions the wear and tear on a centrifugal is high on account of the low efficiency under low discharge, in many cases causing considerable noise. In filtration there is one advantage of a centrifugal pump over a displacement pump. It is that a centrifugal pump, on account of its non-pulsating suction, can draw water direct from the filter without injuring the sand bed or affecting filtration. On the other hand, a displacement pump under the same conditions will injure the sand bed, affect filtration and draw sand into the suction.

Chap. 12 on pump-testing is a valuable one. Chap. 13 is on costs. In Canada allowance would have to be made on account of local conditions.

On applications of centrifugal pumps one would wish a little fuller description of deep-well centrifugal pumps. If the pump is efficient it is capable of very wide use.

The seeming simplicity of the centrifugal pump has led many engineers into errors as to its use. This book, with its explanation of the physical laws involved in the operation and construction of the centrifugal pump will tend to correct those errors, increase efficiency and extend the use of this type of pump.

Engineering Economics. By J. C. L. Fish. Published by McGraw-Hill Book Co., New York. First edition, 1915. 217 pages, 10 tables, size 6 x 9 ins., cloth. Price, \$2.00 net.

(Reviewed by J. M. Gibson, B.A.Sc., Department of Street Cleaning, City of Toronto.)

The book is prepared as a textbook for students of the economic principles to be considered before proceeding with the design of structures. The early part defines the various terms used throughout the book, followed by interest and sinking fund formulae.

The author then deals with conditions affecting the first cost of a structure, the items entering into the calculation, and contingencies to be provided for. Under "Salvage Value" he treats the conditions affecting the "scrap" value of a structure, and compares five methods of calculating depreciation, followed by a summary to obtain yearly cost of service. The chapter on Estimating is an outstanding feature of the book. The author outlines methods of obtaining a close result which will prove a valuable guide to the engineer. In conclusion, he works out numerous examples in economic selections, which clearly illustrate the principles set forth in the work.

In appendices, he gives a bibliography of works published on this, and allied subjects, and one of particular value is a tabulation of the depreciation rates and life tables of materials entering into structures of all classes. The book on the whole warrants the attention of engineers in laying out work on a comprehensive scale.

PUBLICATIONS RECEIVED.

Canadian Society of Civil Engineers.—Vol. 28, Part II., Transactions, October to December, 1914. 303 pages, illustrated, size 6 x 9 ins.

Sewage Disposal, Fitchburg, Mass.—The 8th and 9th semi-annual reports (1914) of the Sewage Disposal Commission, City of Fitchburg, Mass.