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BOOK REVIEWS.

Pumping by Compressed Air. By Edmund M. Ivens, B.E., M.E. Published by John Wiley & Sons, New York City; Canadian selling agents, Renouf Publishing Company, Montreal, Que. First edition, 1914. 244 pages, 106 illustrations, 6x9 ins., cloth. Price \$3.00 net. (Reviewed by A. S. L. Barnes, Hydro-Electric Power Commission of Ontario.)

This book forms a welcome addition to the comparatively scant literature of the subject with which it deals. While the efficiency of this method of pumping is admittedly low, there are undoubtedly cases where its advantages in other ways outweigh this drawback. For example, to adopt it for pumping clean water to a high head, in a case where there would be men available for attending to the plant at all times would, in most cases, be fallacy but to pump sewage to a moderate head at, say, some underground point, as is frequently done, where special attendants would be needed to look after a comparatively small isolated plant there can be few systems comparable with pneumatic sewage ejectors, which carry out the functions of pumping by compressed air and can at the same time handle sewage as no ordinary form of pump could do, while their action is entirely automatic.

The author cites a case of an air pumping system, for water replacing an old steam pumping plant, in which an over-all efficiency of only 24 per cent. was obtained, albeit an over-all saving of \$1,310 per annum was effected.

In this particular case it would, however, be interesting to know what saving could have been effected by putting in a modern steam engine and dynamo driving an electric motor coupled to a turbine pump.

Compressed air pumping is being rather extensively used now for another purpose, viz., pumping water from wells. To accomplish this, several different systems, all embodying the same basic principle, but differing in detail, have been devised. The idea is to force air down the well, under pressure, and allow it to bring up some water in traversing its natural upward path to the ground or some higher level.

Owing to the very low efficiency of these systems at high heads it is preferable, if the total lift be considerable, to carry it out in two or more stages if the conditions will warrant this being done.

Careful and well-illustrated descriptions of several of the best known systems of this kind are given in the book, together with a statement as to their advantages and limitations.

The book is well written, and where formulae are introduced they are of a simple and easily understood nature. The two closing chapters deal respectively with the "flow of compressed air in pipes" and the "flow of water in pipes." At the end is a copious index. The work should prove very useful to both the student and the engineer engaged in dealing with pumping problems.

Concrete-Steel Construction, Part I., Buildings. By Henry T. Eddy, C.E., Ph.D., Sc.D., and C. A. P. Turner, C.E. Minneapolis. First edition, 1914. Published by the authors. Cloth, 6x9 ins., pp. xv. + 438, 98 illustrations. (Reviewed by C. R. Young, B.A.Sc., C.E., assistant professor of Structural Engineering in the University of Toronto.)

Although the object of the authors of this book is to advocate concrete-steel construction in general and the mushroom system in particular, the work shows some attempt to cover the general principles of design and execution of reinforced concrete work in buildings. In their efforts to secure the adoption of methods of design that will permit reinforced-concrete construction to successfully compete with timber construction, they do not always remain on firm, well-tried ground. To the discriminating reader, however, the book will be a valuable one.

The text is divided into fifteen chapters. Some of these are given captions, but for about half of them the variety of subjects treated in a single chapter is so great as to preclude their comprehension in a single heading.

Chapter I. is of general interest and applicability. It covers the origin of concrete construction, materials, mixing and handling of concrete and forms. The treatment of the last subject is meagre, the only design shown being one for a column used in connection with the mushroom system.

Chapter II. deals with general types of floor construction, variation of strength with thickness and span, theoretical treatment by proportion of typical panels and deflection of slabs.

Chapter III. is devoted to beams. The methods of analysis and design presented are those of the Joint Committee, except in the matter of diagonal tension and bond which are given original treatment.

In Chapter IV. beam action and slab action are compared through the application of the laws of bond shear and the theory of work, and in Chapter V. is presented the authors' theory of the strength and flexure of the standard mushroom type of construction. The method of analysis followed is, in general, that already set forth by Dr. Eddy in his book "The Theory of the Flexure and