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PRACTICAL HYDRAULICS.

The Control of Water as Applied to Irrigation, Power and Town Water Supply Purposes. By P. A. M. Parker. Pp. vii+1055. (London: G. Routledge & Sons, Ltd., 1913.) Price 21s. net.

THIS comprehensive and authoritative work contains a wealth of matter relating to practical hydraulics which one might seek in vain for in any other published book on the subject. In the preface the author tells us that the book is the product of actual engineering experience, and is mainly based on a collection of notes and formulæ accumulated in some eighteen years of professional work, during the major portion of which he was engaged in independent practice, and that therefore it must be regarded not as a text-book, but rather as a manual for engineers in active work. He also remarks that, "although the initial knowledge assumed in the reader may be considered to be somewhat unusual, many portions of the book have stood the test of everyday office requirements in the hands of draughtsmen and assistants." And it is only fair to say that an examination of the work is entirely favourable to the author on these points, although, of course, in a work covering such a wide field, here and there are matters of a controversial character, which might be dealt with if the exigencies of space permitted.

The book contains the following chapters, namely: i., preliminary data; ii., general theory of hydraulics; iii., gauging of streams and rivers; iv., gauging by weirs; v., discharge of orifices; vi., collection of water and flood discharge; vii., dams and reservoirs; viii., pipes; ix., open channels; x., filtration and purification of water; xi., problems connected with town water supply; xii., irrigation; xiii., movable dams; xiv., hydraulic machinery other than turbines; xv., turbines and centrifugal pumps; xvi., concrete, ironwork, and allied hydraulic construction; (a) tables; (b) graphic diagrams. But these headings scarcely give an adequate idea of the scope of the book, as some of the chapters are divided into important sections. For instance, in chapter xiv. we have: section A, enlargements and contractions in pipes; section B, water hammer; section C, ejectors and syphons; section D, air lift and hydraulic compressor; section E, hydraulic ram; section F, resistance to motion of solid bodies in water; section G, impact of water on moving bodies. All of these are important subdivisions, and they appear to be handled in an entirely satisfactory and convincing way; but having regard to the title

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of the chapter, one looks in vain for any discussions on the piston-pump and Humphrey's pumps, the most important of all hydraulic machines. However, the hydraulic engineer has other books available in which these machines are fully dealt with, and the author was wise in confining himself to matters that do not so completely come within the province of the mechanical engineer.

Chapter vii., dams and reservoirs, is one of the best in the book; the 130 pages devoted to this important section will be appreciated by both designers and engineering students. A valuable feature of the work is that each chapter is prefaced by a list of its own symbols and a sequential table of an extremely useful character, and many of the chapters have also a summary of the equations and formulæ. The mathematics used in this lucid and most readable work are fairly easy, certainly to those accustomed to read works on hydraulics.

Another exceedingly valuable feature is the bibliography, as the book teems with references to original authorities; indeed, it is a standing testimonial to the author's patient and untiring labours. He is to be congratulated upon producing a work that will in all probability rank as high in connection with applied hydraulics as Bellasis's work on hydraulics does in connection with theoretical questions; in fact, Mr. Parker's encyclopædic work is the most notable book of the kind that has appeared for many years, and it will probably become a classic. H. J. S.

SPHERICAL ASTRONOMY.

Lehrbuch der sphärischen Astronomie. By Dr. L. de Ball. Pp. xv+387. (Leipzig: W. Engelmann, 1912.) Price 20 marks.

DR. L. DE BALL'S excellent treatise shows abundant evidence of a long and careful preparation. From the nature of the subject striking innovations are not to be expected; it is rather in the minute details of the exposition that the merit of the present work is found. In some places the mathematical treatment has been simplified, in others the discussion has been made more rigorous and thorough. The author's long experience as a practical astronomer has led to improvements in all parts of the subject, little in themselves, but when taken together making a notable advance. According to the introduction, the book is intended to be both a text-book for students and a work of reference; it is in the latter respect that we commend it. Spherical astronomy is a rather heterogeneous collection of but distantly related problems, and a minute treatment of isolated questions, many of which are only required in special researches and have no general

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