

character of all of the philosophical work of the eminent mathematician, physicist and philosopher. It is a rare occurrence for one so profound in each of these lines to be also so skilled in presenting as clear an exposition of the working of the intellect. The best criticism we can make on the book is that no one can afford to be without it or the original.

JAMES BYRNE SHAW.

A Text Book of Mechanics. By LOUIS A. MARTIN, JR. Vol. 5, *Hydraulics.* New York, John Wiley and Sons, 1914. 12 mo. 223 pp.

THIS is the concluding volume of a series, the earlier volumes of which (Statics, Kinetics, Mechanics of Materials, Applied Statics) have been previously reviewed in this BULLETIN.*

Approximately 50 pages are devoted to the discussion of liquids at rest; the force exerted by a liquid upon a plane or curved surface; methods of measuring pressure and locating the centre of pressure; applications to gates, locks and dams; floating bodies and the conditions for stability. The remainder of the book treats of liquids in motion, starting with an elementary discussion of the free surface of liquids moving with acceleration. Then comes Bernoulli's classic theorem on the flow of liquids, followed by a treatment of flow through orifices, various formulas for weirs of several types, flow through pipes with applications to hydraulic transmission of energy and calculation of losses in pipe lines, force exerted by a moving liquid upon pipes and on stationary deflecting surfaces, axial or radial flow, impulse wheels and turbines, and their design. There is a good set of problems for a final review.

As in the earlier volumes, the exercises distributed through the text play a vital part in the course, giving students a chance to work out parts of the subject for themselves. These exercises are not too difficult, having been introduced so carefully as to fall within the power of average students. We should add that throughout the series of texts the author presupposes practically no knowledge of physics, stating carefully the basic principles which are to be employed.

The mathematical equipment assumed, however, steadily increases through the series, so that the first volume may be studied before the first course in calculus, while this last volume assumes a very fair knowledge of integral calculus.

* Vol. 16 (1909), pp. 144-7; vol. 21 (1914), pp. 140-3.