THE STRENGTH OF MATERIALS.

The Strength of Materials. By J. A. EWING, M.A., B.Sc., F.R.S., M.Inst.C.E. Professor of Mechanism and Applied Mechanics in the University of Cambridge, Fellow of King's College, Cambridge. Cambridge, The University Press, 1899. Pp. vii–xii + 1–246, with 150 illustrations in the text.

THIS work is intended to supply to students "in modern schools of Engineering" a "knowledge of the Strength of Materials and of its application in design * * * which to be effective must be supplemented by laboratory and drawing-office work." It is desirable that the mathematical elastician should learn what light modern experimental research throws on the validity of the hypotheses at the basis of the mathematical theory, and also that he should know what parts of his subject possess most interest for his more practical contemporaries. On the other hand, it is conceivable that the practical man may derive some advantage from realizing how the mathematical treatment which passes current in everyday life strikes the mathematician. This review thus naturally divides itself into two principal parts, the first dealing with the more experimental portions of the book, the second with the mathematical methods. A preliminary description of the contents of the book will facilitate comprehension.

After a brief preface and a table of contents, pp. vii–xii, chaps. I and II, pp. 1–23, define stress and strain, explain their simpler common types, and treat of the ordinary moduli, or elastic constants, for *isotropic* material. Chap. III, pp. 24–58, treats of ultimate strength and non-elastic strain, dealing mainly with simple tension and compression, describes the phenomena presented during the loading of steel and iron up to rupture, and discusses experiments on the effects of rest or of heating after over-straining. It also gives an account of Wohler's experiments on the "weakening" of material under very frequent repetitions of loading and unloading. Chap. IV, pp. 59–95, describes—with excellent illustrations—a number of testing machines and instruments for measuring extensions and compressions, discusses some methods of determining the modulus of rigidity and gives some numerical results.

Chaps. V, VI, and VII, pp. 96–153, deal mainly with the application of the ordinary Bernoulli-Euler mathematical