The Elements of Graphic Statics. By L. M. HOSKINS, Professor of Applied Mechanics in the Leland Stanford Jr. University. New York, The Macmillan Company. 1899. Revised Edition. Pp. viii + 199, and eight plates.

The character of works under the head of Graphical Statics varies between that extreme of which Cremona's treatise may be regarded as typical, in which the name can be regarded as scarcely more than a peg on which to hang a large amount of theoretical projective-geometry matter, and the opposite extreme, where we may place the work before us, characterized, as it is, by intense practicality and general avoidance of everything of merely theoretic or historic interest. The favorable impression made upon one by the mechanical excellence of Professor Hoskins' book is further confirmed by a careful examination of the text.

Avoiding the error of Culmann in presupposing too much information on the part of his students as to projective relations and graphic methods, the author lays his own foundation on which to build, treating the subject more, however, as a branch of mechanics than of geometry. To this his Part I. is devoted, and it would seem impossible to set forth the fundamentals more clearly and concisely than in the fifty pages devoted thereto.

Familiarity with analytics and the calculus is assumed for the remainder of the work. Bow's convenient system of notation is employed throughout.

Excluding entirely from the book any consideration of structures whose discussion involves the theory of elasticity, the hundred pages constituting Part II. are devoted to the usual problems of beams and of bridge and roof trusses. We have not at hand a copy of the original edition for comparison with the revision, but as Professor Hoskins' preface indicates that the principal changes are in this section we state them in this connection in his own words: "In the present revised edition no change has been made in general plan, and few changes in the treatment adopted, except in the portions relating to beams and trusses carrying moving loads. These portions have been wholly re-written. It is believed that a substantial improvement has been made upon the methods hitherto used, particularly in the criterion for determining the position of a given load-series which causes maximum stress in any member of a truss. The improvement consists in generalization, which is believed to be gained without sacrifice of simplicity. The graphical method of applying the criterion in the case of trusses with parallel chords has been fully treated by Professor H. T. Eddy. The method here given applies without the restriction to parallel chords. The algebraic statement of the same criterion, as given in Art. 152, is also believed to be a useful generalization of the methods hitherto used. Whether the algebraic or the graphical treatment is preferred, a method is useful in proportion to its generality, provided this does not involve a loss of simplicity. There is a decided advantage in the use of a single general equation applicable to any member of any truss, instead of several particular equations, each applicable to a special member or to a special form of truss." That this generalization will be cordially welcomed and availed of by the profession may safely be predicted.

Part III. gives graphic methods of determining centers of gravity and the moments of inertia of plane areas, with a discussion of inertia-curves, carried as far as the practical engineer will ordinarily need. Eight clear, double-page plates complete the work, and one's only regret in viewing them is that they cannot face the text describing them, to the saving of the student's time and temper.

We notice that the author uses a term, 'complanar' (whether he suggests it or not is not evident), which we trust will not supplant the generally accepted 'con-plane,' which is consistent with the other equally self-explanatory terms con-focal, con-axial, etc., and needs no modification.

The book is a thoroughly good one preëminently for the class-room, and a course in it should be a pleasure alike to pupil and instructor.

FRED'K N. WILLSON.
PRINCETON UNIVERSITY.

GENERAL.

PROFESSOR MARTIN'S books on *The Human Body* are in many ways models in the presenta-

tion of a difficult subject. We are glad to receive 'The Briefer Course' (Holt), revised by Professor G. W. Fitz, of Harvard University, and to commend it cordially. The book has been corrected throughout and a chapter added on growth and nutrition. The three apendices, which occupy nearly one fourth of the book, are all open to criticism. They are on 'Emergencies,' 'Alcohol and Tobacco' and 'Demonstrations and Experiments.' 'Emergencies' make up part of the examination in physiology which may be taken for entrance to Harvard College, but it is not evident that a school boy will profit intellectually or practically by being told how to treat apoplexy. The demonstrations and experiments, also part of the Harvard examination, may in their present form be useful for the teacher, but scarcely for the student. The reviser states that the appendix on narcotics is retained against his judgment. The injurious effects of narcotics must by foolish laws be taught in most public school courses on physiology; but it would be possible to prepare a statement that would be scientifically correct, even though its teaching might be ethically obnoxious. The statements in this book are not exactly incorrect, but they would produce false impressions on young students. The results of excess are pictured, and the boy is left to infer that the final state of his father, who drinks a glass of wine for dinner, will be delirium tremens. But the boy will be more likely to conclude that physiology is not an 'exact' science.

Minerva, 'A Yearbook of the Learned World,' is indispensable to the editor and useful to every one who wishes to keep informed on the progress of education and science. As is well known, the book contains accounts of universities, libraries, museums, learned societies, etc., throughout the world. The names of over 25,000 officers of these institutions are given, and with an accuracy that is truly remarkable. The eighth volume, 1899, which reaches us from Messrs. Lemcke and Buechner (12 Broadway, New York City), is thoroughly revised from official sources, and is enlarged and improved in several respects, including the addition of a number of Canadian institutions. Programs of the various international scientific congresses are promised for next year. The importance of the great universities of the world cannot be judged from the number of students, as the data are not comparable, but in this respect the order of the first ten is given as follows: Paris, 12,047; Berlin, 10,306; Madrid, 6,143; Vienna, 5,710; Naples, 5,103; Moscow, 4,461; Budapesth, 4,407; Munich, 3,997; Harvard, 3,674; St. Petersburg, 3,615. As a matter of fact, Harvard, with over 5,000 students all told, is probably now the fourth in size of the universities of the world, being surpassed only by Paris, Berlin and Vienna. There are thirty universities having over 2,000 students, and, of these, nine are in the United States, four in Russia and in Great Britain, three in France, in Germany and in Austria-Hungary, two in Italy and one in Spain and in Greece.

Another useful work of reference is *Who's Who?* edited by Mr. Douglas Sladen and published by Black in London and by Macmillan in New York. It contains brief bibliographies of people talked about in Great Britain, including all the leading men of science and a complete list of the members of the Royal Society. Americans are also noticed, but only in small numbers. Presidents Gilman and Harper are included, but not President Eliot. The late Professor Marsh is the only American man of science whose name we have noted.

BOOKS RECEIVED.

Report of the Seventh Meeting of the Australasian Association for the Advancement of Science, held at Sydney. Edited by A. Liversidge. Sydney, Published by the Association. Pp. lii+1161. 10s. 6d.

Éléments de Botanique. Ph. van Tieghem. Paris, Masson et Cie. 1898. 3d edition, revised and enlarged. Vol. I., pp. xvi+559. Vol. II., pp. xv+612.

The Fairy Land of Science. Arabella B. Buckley New York, D. Appleton & Co. 1899. Pp. x+252.

How to Know the Ferns. Francis Theodora Parsons. New York, Charles Scribner's Sons. 1899. Pp. xiv+210. $1.50.

Papers and Addresses. N. Y. State Veterinary College, 1896-1898. Ithaca, N. Y. 1898.