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.

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GENERAL.

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