

## HIGHWAY ENGINEERING.

*Elements of Highway Engineering.* By Prof. A. H. Blanchard. Pp. xii+514. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1915.) Price 12s. 6d. net.

THE rapid development of mechanically propelled road vehicles during the past twenty years has brought about a complete revolution both in the construction and maintenance of roads, and the question of the development of the public road system has again, after years of neglect, become a problem of national importance. Motor vehicles are no longer mainly used for pleasure purposes; they are now an indispensable adjunct to almost every business, and for the economical working of motor lorries good road surfaces, and roads correctly laid out in regard to grade, are indispensable. Mr. Blanchard's book, which has been written as a text-book for engineering students as well as a reference book for engineers, is a welcome addition to the literature of this branch of engineering practice.

The first three chapters are devoted to an historical review of the subject, to a brief account of the systems of road administration in Europe and the United States, and to the preliminary investigations which must be made before an engineer can design satisfactory and economical highways. The fourth chapter treats of the necessary survey work in laying out urban and country roads, and of the preparation of the plans. The next chapter is devoted to the problems of grading, drainage, and, most important of all, to the question of the foundations upon which the roadway is to be carried.

Earth roads, gravel roads, and broken-stone roads are then dealt with in order; the methods to be adopted in the construction of each class are described, and the question of maintenance is fully discussed. In the chapter on broken-stone roads the author explains in detail the modern methods of testing the suitability of various classes of rocks for road metal; more attention might with advantage be given in this country to the systematic testing of road materials.

The ninth chapter is devoted to a detailed account of the sources, characteristics, and physical and chemical properties of bituminous materials; the highway engineer will find information in this chapter of great value to him when considering the question of the utilisation of bituminous materials in any proposed road reconstruction work. The next three chapters explain fully how these bituminous materials are best employed for dust-preventive purposes on ordinary roads and in the construction of bituminous macadam pavements and bituminous concrete pavements; the mechanical plant required for these operations is described in detail.

In the next five chapters the author treats of asphalt, wood-block, brick, and stone-block city roadways, describing the latest methods of constructing each type of roadway and of the machinery and other appliances required for their economical and speedy construction.

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The remainder of the book is devoted to a brief but valuable discussion of the relative advantages and disadvantages of various types of roadway, and to an account of the methods of constructing the side-walks, curbs, gutters, culverts, bridges, and other details of road construction.

The book is well illustrated and thoroughly up-to-date, and should prove a welcome addition to the reference library of every engineer engaged on roadway design, construction, and maintenance.

T. H. B.

## OUR BOOKSHELF.

*The Military Map: Elements of Modern Topography (French School of War).* Pp. vii+130. (London: Macmillan and Co., Ltd., 1916.) Price 2s. 6d. net.

In this book the authors set out to discuss the topographical map which has been produced especially for military purposes, and to treat particularly of the French General Staff map on the scale of 1:80,000. An introduction deals with the general principles on which a survey is carried out, while five chapters are devoted to the representation of detail and relief, and to some information relating to the French 1:80,000 map.

It cannot be said that the result is satisfactory as an introduction to military topographical maps or as a description of the French map. The authors do not seem to have that practical acquaintance with topographical surveying which would have enabled them to avoid several mistakes which occur, and render the book misleading for a beginner. The statement in the introduction that in triangulation the actual angles of the plane triangle formed by three stations are measured could not have been made by anyone who had used a theodolite, and is quite misleading as describing an operation in which horizontal angles are determined. Map projections are not satisfactorily treated, and at least the respective merits and demerits of those which are instanced might have been given. The retention of French terms is stated in the preface to be intentional, but it would have made the book much easier to read if after once quoting the French term the English equivalent had been employed, and a glossary of the French terms added as an appendix; as it is, many existing English terms do not appear, and some new ones are coined for which there is no need.

The relief of the ground is attributed to certain portions of the soil having sunk while others have been lifted, but no suggestion of the modelling of the surface by erosion appears. In treating of relief, the theoretical principles of contours and hachures are given, but in practice these are not strictly followed, and the reasons for the modifications should be given; the use of colour is not alluded to. Orientation in the field is the subject of the last chapter, but in advocating the use of the watch for this purpose, the error which may be introduced at different times and places should have been carefully explained.

H. G. L.