

SHORTER NOTICES

Lehrbuch der darstellenden Geometrie. By Dr. Georg Scheffers. Vol. I, ix + 423 pages, 404 figures. Vol. II, xiii + 439 pages, 396 figures. Berlin, Julius Springer, 1919, 1920.

This treatise on descriptive geometry contains in the main the substance of the lectures given by Professor Scheffers at the Technical School of Berlin. It presupposes nothing but "school-mathematics" on the part of the student, which, in America, is approximately equivalent to mathematical training in college algebra, trigonometry, and analytic geometry.

The courses in descriptive geometry in the universities and polytechnic schools of continental Europe are usually distinguished by high scientific standards and are given by men who are either mathematicians, like Scheffers, or men who have at least considerable mathematical knowledge beyond the calculus. The type of courses in descriptive geometry offered in most of the American engineering schools, serving a purely utilitarian purpose, may be found in the European trade-schools and secondary technical schools of various kinds, where, naturally, no effort is made to treat the subject as a science, to place connecting links with other branches of mathematics, or to pay any attention to historical developments.

From the standpoint of the scientific critic Scheffers' *Lehrbuch* is a masterly exposition of descriptive geometry. Almost on every page one may notice the enormous advantage in the treatment of the subject by the superior insight which a deeper mathematical knowledge affords. Nevertheless, Scheffers, even from the practical standpoint of the engineer, never grows pedantic, or loses himself in some individual pet schemes.

The concepts and propositions of projective geometry are developed as far as they are of unquestionable value in the treatment and rational solution of certain characteristic problems. Any one, like Scheffers, who is familiar with modern progressive views will, of course, contend that it is impossible to write a modern scientific descriptive geometry without the knowledge of projective geometry, even when taken in the larger sense of the word. The frequent lack of such knowledge on the part of teachers and writers accounts for many obsolete methods of treatment and the omission of some of the most beautiful applications of projective geometry to descriptive geometry.

The stimulating influence by Scheffers' competent selection and presentation of the subject-matter upon the reader is increased by extensive historical references and comments on geometric topics allied to descriptive and projective geometry. Throughout the treatise the author shows that he is well informed on the essential and important phases of the modern development of constructive geometric methods.

For didactic reasons, explained in the preface, the first volume starts with orthographic projection upon a single plane. The claim of modernity which the reviewer makes for Scheffers' book may, outwardly at least, appear from the fact that at the outset we find a statement about the principle of duality and its bearing upon projective processes. Further on we