

proof full enough to be of much use. On the other hand, the application to elementary metrical cases is much more satisfactory.

Constructions by ruler and compasses bring in the cross ratio of four points on the circle; otherwise it keeps closely in touch with principles developed by Euclid. Then follows a chapter which employs the method of three trials, the idea of displacement, similarity, inversion, and duality, followed by another devoted to special devices on account of limited space, etc.

The last two chapters are given up to constructions made by the ruler and one fixed circle, and by the compasses alone, respectively; each contains a scheme of comparison of the relative merits of different constructions.

To sum up, the immediate practical problem is everywhere well treated, but the foundations, taken from post-euclidean ideas, are by no means so well done. Many of these ideas could have been dispensed with altogether, and the others easily proved for the purpose in hand, under restrictive hypotheses. It is true that this alternative also has objections; if a reader delves further into projective and analytic geometry, he would approach the fundamental theorems under false impressions. To one already familiar with these two subjects, the whole problem becomes an easy one, but to those who are familiar with elementary geometry and algebra only, the choice of the restrictive premises seems to the reviewer to be the wiser procedure.

The style is clear and the figures are well drawn; one unusual feature is that every algebraic equation is written in boldfaced type, making a formidable-looking page. The book is not provided with an index, nor are more than a very few exercises left for the reader to work out.

VIRGIL SNYDER.

Calculus. By HERMAN W. MARCH and HENRY C. WOLFF.
(Modern Mathematical Texts, edited by C. S. SLICHTER.)
New York, McGraw-Hill Book Company, 1917. 16+360
pp. $5 \times 7\frac{1}{2}$. 125 figs. Price \$2.00.

HAVING in mind particularly the needs of technical students, the authors have used for illustrative purposes many practical problems. For the same reason the exercises contain many problems drawn from engineering. The book contains

about the average number of applications. There are other books on the calculus which contain many more applications than the present volume. Two problems are discussed in some detail which are omitted in most calculus books, viz., the cable with a uniform horizontal load (parabolic cable) and the cable with equal loads on equal lengths (catenary).

The authors have exercised considerable care and have met with more than ordinary success in making clear the meaning of an infinitesimal, curvature, and mean value. Duhamel's theorem is explained with unusual clearness and is used consistently in obtaining integral forms. Illustrative examples are numerous.

The preface states that a large number of drill problems have been inserted. In general we find this to be true. None of the lists are excessively long. Some are in our opinion too short. Chapters XVI and XIX end with no problems. We find other chapters ending with 1, 2, 3, and 5 problems. Answers are given to approximately fifty exercises.

The subject of integration is first brought to the student's attention on page 46 just after he has learned to differentiate the power function. Thereafter whenever he is shown how to differentiate a new function he is at once also shown how to apply the result to the integration of certain forms.

In the short sixteen-page chapter on differential equations no use is made of the initial conditions to determine the constants of integration with the exception of the discussion of a damped harmonic motion in the last article of the book. No exercises are given after this discussion. The subjects of center of gravity and moments of inertia have been treated somewhat more fully than is usual.

The book is designed for a course of four hours a week throughout the college year. But it is easy to adapt it to a three-hour course by suitable omissions. On the whole the book is a good one and has added its share to the general endeavor to obtain better texts.

W. V. LOVITT.

Die Differentialgleichungen des Ingenieurs. By Dr. W. HORT, Engineer in the Siemens-Schuckert Works. Berlin, Springer, 1914. 540 pp.

THIS volume cannot fail to be of interest to teachers of mathematics in American schools of engineering. The follow-