Ruler and Compasses. By HILDA P. HUDSON, M.A., Sc.D.
   London, Longmans, Green and Company, 1916.   143 pp.
   93 figures.   Price $1.80.

THIS little book is a welcome addition to the literature on the
boundary between elementary and advanced mathematics.
While a number of excellent texts exist in other languages, either
originally or by translation, heretofore we have had neither in
English.   The present claims only to be a compilation from
other books and memoirs on the subject, yet it is really much
more, as it is full of the ingenious devices peculiar to the British
school of mathematics.

With the exception of the well known book of Enriques* it
is more systematic than any of the preceding treatises, and
excells that one by being more practical and less verbose.   In
fact, in places the book is too compact to be of maximum
service.

The problem is introduced by comparing the postulates and
constructions of Euclid and showing that every construction is
based on the interpretation of the solution of linear and quad-
ratic equations.   This excellent presentation is followed by a
survey of the methods by which the various problems are to
be attacked; it is unfortunate to bring in a considerable
number of new words here, the meaning of which is given later.

The elements of cartesian geometry are developed and
applied, but the explanations are too brief.   A straight line is
assumed tacitly to have a linear equation; the coordinates of
the point common to two lines are shown to be expressible
rationally in the coefficients in the equations of the lines.   The
section on the domain of rationality is well written.

The regular polygons are scarcely mentioned.   It is stated
entirely without proof that the inscription of a regular polygon
depends on a binomial equation; the limitation on the exponent
of the unknown is clearly derived.   The entire construction
of the heptadecagon is disposed of in ten lines and a figure.

The treatment of constructions by means of the ruler alone
is prefaced by a discussion of projective properties, including
vanishing lines, Desargues's theorem, cross ratio, harmonic
section, involution, homography, and double elements.   Many
of these are given entirely without proof, and in no case is the

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* Questioni riguardanti la geometria elementare, Bologna, 1902;
German translation by Fleischer: Fragen der Elementargeometrie, Leipzig,
1907.

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