

is so arranged that it may be read immediately after the general introduction to each part, as no knowledge of the other portions of the book is presupposed. It would seem that this portion could have been materially improved by putting less emphasis on coördinates and more on the facts of collineation. It would have been still further improved by the addition of conical perspective of plane figures, and its relation to homology. In an appendix stereographic projection and conical mapping are defined and discussed. A second very interesting appendix shows the relation between the problems here treated and others of a more complicated nature. The historical growth of the subject is also outlined.

In the hands of a competent teacher the book will be of great service in assisting students to get clear ideas of the visual properties of space.

VIRGIL SNYDER.

Catalog mathematischer Modelle für den höheren mathematischen Unterricht. Von MARTIN SCHILLING in Halle a. S. 6th edition, 1903. 8°, xvi + 130 pp.

THAT the so-called Steiner school of mathematics (to which the great geometer did not himself belong) is gradually being superseded by other systems is shown by the remarkable increase in both the number and variety of geometric models and apparatus.

In 1899 the well known Brill collection of models was transferred to Mr. Schilling and the whole enterprise was put upon a more systematic basis. Beside having the active support of the former contributors, the collection is now supervised and augmented under the scientific direction of Professor F. Schilling in Göttingen.

The present catalogue begins with a brief historical sketch, followed by a well-arranged table of contents from which one can readily determine exactly what is to be found in the collection of about 300 pieces. The catalogue proper consists of two parts; the first (pages 1-76) gives a short description of each model, and the series are arranged in the order in which they were produced; the second part contains a more technical description, often a figure, and the series are arranged according to subject matter. A detailed explanation is included in the memoir which accompanies each model sent to purchasers.

The most important additions which have been made during the last five years are the following:

Series XXIV. Twelve kinematic models by Professor F. Schilling illustrating the generation of epitrochoids and hypotrochoids with fixed and with clamped centers, ellipses, cycloids and the inversors of Peaucellier, of Hart, and of Kempe. They are made of brass and celluloid and mounted on wood which has the generated curve traced on its surface (marks 545).

Series XXV. Seven thread models by Professor H. Wiener of the forms of cubic cones according to the classification of Möbius (marks 128). The accompanying memoir (not contained in the catalogue) of 34 pages contains an excellent synthetic discussion of the forms of plane cubic curves.

Series XXVI. *A*, ten laboratory pieces by Professor G. Hauck and *B*, eighteen special pieces by Professor F. Schilling, for illustration in descriptive and projective geometry (marks 264). The second group includes an ingenious apparatus for generating an ellipse by means of two projective pencils of lines.

Series XXVII. Three stereometric wire models of electric lines of potential and lines of force, by Professor O. Wiener (marks 200).

Series XXVIII. Six models of the twisted cubic curve, by Dr. W. Ludwig (marks 160). In this series is included an excellent thread model of the quartic developable surface.

Series XXIX. Three models to illustrate the theory of the top, by Professor H. Grassmann (marks 265).

In the buildings of the university at Göttingen ample and well equipped rooms are set apart for the construction and exhibition of models. Model-making is not only a fine art but an important discipline.

VIRGIL SNYDER.

NOTES.

THE fourth regular meeting of the San Francisco Section of the AMERICAN MATHEMATICAL SOCIETY was held at the University of California on Saturday, December 19. A report of the meeting will appear in an early number of the BULLETIN.

THE staff of associate editors of the *Transactions* of the AMERICAN MATHEMATICAL SOCIETY, as constituted for the year 1904, will consist of Professor E. B. VAN VLECK, Professor H. S. WHITE, Dr. C. L. BOUTON, Professor L. E. DICKSON,