

STUYVAERT'S STUDIES IN ANALYTIC  
GEOMETRY.

*Cinq Études de Géométrie analytique.* Par M. STUYVAERT.  
Gand, E. Van Goethem, 1908. vi + 230 pp.

THIS book, consisting of applications of the theory of matrices and elimination, was awarded the "Prix François Deruyts" by the Royal Academy of Belgium and forms an important addition to the methods of analysis used in geometry. Whether it is a question of elimination or superelimination (the study of the conditions that two equations have more than one root in common), the result leads to the vanishing of a rectangular matrix, i. e., to the existence of a certain linear relation or "faisceau" of such between the elements of each row or column, and from the details of structure of this matrix can be read the properties of the variety represented by equating it to 0. The results are in general known, so the author seldom trusts the reader to discover the new theorems, but instead labels them as such. The originality and value of the book consist in the methods used, and it is surprising with what simplicity and elegance the machinery works.

The first of the five studies of which the book consists ("Applications géométriques de la théorie des matrices") investigates those processes of elimination which give rise to matrices and the use which can be made of this theory for the determination of special elements of geometrical figures. The conditions that two equations in  $x$  have at least two common roots can be expressed by the vanishing of a matrix in  $l$  lines and  $l + 1$  columns. If the elements of such a table are ternary or quaternary forms, we have respectively the representation of a finite number of points or a skew curve. Such a representation of a curve gives at once, by means of tables obtained from the original matrix by the suppression or adjunction of various lines and columns, its order, genus, modes of generation, circumscribing surfaces, multiseccant curves, groups of remarkable points, and other properties.

After deriving general formulas for the orders and genus of curves represented by vanishing matrices the author discusses skew curves of orders three to ten. The following will illu-