BOOK REVIEWS

Einführung in die algebraische Geometrie. By B. L. van der Waerden. (Grundlehren der mathematischen Wissenschaften in Einzeldarstellungen, vol. 51.) Berlin, Springer, 1939. 247 pp.

During the past 15 years the branch of mathematics known as algebraic geometry has experienced a considerable revival of interest. This has been due largely to the introduction into this field of methods and results of the modern developments in topology and algebra. Professor van der Waerden has been influential in both aspects of this revival, particularly on the algebraic side. In a series of articles, most of which appeared under the general title "Zur algebraischen Geometrie," he has developed a basic technique for the investigation of the algebraic properties of loci defined by polynomial equations. *Einführung in die algebraische Geometrie* is mainly a systematic presentation of some of the principles established in these articles, together with applications to classical problems of algebraic geometry.

The first three chapters of the book provide an introduction to the general theory which follows. There is first defined the important notion of a space (projective or affine) over a field K. The space is defined in the usual way by means of coordinates, these being elements of K. For the benefit of later developments, K is assumed to be algebraically closed and of characteristic zero, but it is otherwise arbitrary. The remainder of the first chapter is taken up with the derivation of the familiar properties of projective spaces; among the topics discussed are duality, projective transformations and their classification, Plücker coordinates for linear subspaces, correlations, null-systems and linear complexes, and some properties of hyperquadrics and of cubic curves in 3-space.

In the second chapter are introduced the basic algebraic concepts which are used throughout the rest of the book. An algebraic function of the variables $u_1, \cdots, u_n$ is defined as an element of an algebraic extension of the field $K(u_1, \cdots, u_n)$. The properties of these functions are then developed, first in general and then in the case when K is the complex field. The familiar fractional power series expansion of a function of one variable in the complex case is shown to have an exact analogue in a formal power series expansion in the general case. These formal power series play an important part in the discussion of plane algebraic curves, which is the topic of Chapter 3. An algebraic curve in the projective plane (over K) is defined in the customary manner, and the multiplicity of a point of intersection of two curves