serious, in this reviewer's opinion, is the lack of a complete bibliography; the inexperienced reader may remain unaware of much material in the literature, especially the kind that should certainly be given as suitable for further study. Thus, for example, no mention is made of Hochschild's relative theory, nor is most of the theory dealing with abstract categories and leading to a cohomology theory of sheaves mentioned. Since neither Godement's book nor Grothendieck's Tohoku journal papers are referred to, there is no indication of the many applications of homological algebra to topology and algebraic geometry.

Despite these drawbacks, it should be noted that in the topics treated, the author has given a very careful treatment of a relatively new subject. His work will certainly serve to disseminate these new ideas to a wide public.

ALEX ROSENBERG

Lectures on modern geometry. By B. Segre. With an appendix by L. Lombardo-Radice. Consiglio Naz. di Richerche, Monografie Matematiche. Roma, Ed. Cremonese, 1961. 15+479 pp.

The greater part of this book is a particularly lucid introduction in projective geometry, mainly over commutative fields, which goes as far as Plücker coordinates, invariants of projectivities, and the Schläfli-Berzolari theorem. Up to this point it is a new elaboration of the author's earlier *Lezioni di geometria moderna.* The last two chapters, however, contain new material, mainly due to the author himself, and published in several periodicals. The appendix, written by Lombardo-Radice gives an exposition of newer results on non-Desarguesian finite planes, of Moufang, Hall, Zorn and Levi, Gleason, Wagner and many others. Segre's research on finite planes, as put forth in the present work, is mainly concerned with the notion of k-arc, which is a set of k points no three of which are collinear. For a characteristic $\neq 2$, the $(q+1)$-arcs, (q = cardinality of the underlying field) are the irreducible conics, and every q-arc is contained in a uniquely determined conic (for $q \geqq 5$). There are, however, for characteristic $\neq 2$ maximal k-arcs which are not conics. They are extensively studied also for characteristic 2. Kustaanheimo's betweenness relation, generalizations of Menelaos' and Ceva's theorems, normal rational curves are other subjects. The only chapter dealing with non-pascalian geometries is devoted to reguli and their sections. Its main feature is an attempt on proving Wedderburn's theorem by geometrical means. Though the attempt was not successful (as stated by the author himself), this chapter is particularly worthwhile reading. We might also mention the extensive bibliography.

HANS FREUDENTHAL

Qualitative theory of differential equations. Parts I and II. By V. V. Nemytskii and V. V. Stepanov. Trans. from the 2d Russian edition. Princeton University Press, 1960. 8+523 pp. $12.50.

REVIEW OF PART I

This is a translation of the second (1949) Russian edition. There are four chapters, a bibliography and index to part one.

Chapter one is on existence and continuity theorems. It contains existence and uniqueness theorems for real systems and includes dependence on initial conditions, but not on parameters. The last section is on fields of lineal elements.

Chapter two is on systems of two differential equations and contains 110 pages. Aside from a detailed treatment of singular points in the plane, results of Poincaré and Bendixon and many extensions are given. Trajectories on a torus are treated. The Lienard plane is considered.

Chapter three is on systems of n equations. It contains a treatment of linear systems, including the case of constant and periodic coefficients. Asymptotic behavior of linear and non-linear systems is treated. The main tool is the "variation of constants" formula in its matrix form.

Chapter four is on neighborhoods of singular points and of periodic solutions. The singular point in the analytic case is treated at length. Lyapunov stability and the method of surfaces of section are treated.

The appendix is an excerpt from the Bulletin of Moscow University; No. 8 (1952), Mathematics, by Nemytskii and is a survey of contributions by Russians.

(The results of O. Dunkel published in Proc. Amer. Acad. Arts Sci. vol. 38 (1912–1913) which are being rediscovered in various countries every few years appear as a relatively recent Russian result here. Since the reviewer also "discovered" the Dunkel results some years ago, he feels free to point out fellow offenders.)

NORMAN LEVINSON

REVIEW OF PART 2

An autonomous system of ordinary differential equations

$$(*) \qquad \frac{dx_i}{dt} = f_i(x_1, \cdots, x_n) \qquad (i = 1, \cdots, n)$$