The variety of loci introduced is wider than in many comparable texts. Polar equations are given thorough treatment, an omission being the equiangular spiral. Chapter 15, the last, is confined to the fitting to data of linear equations and those of type $y = kx^n$ and $y = ke^{nx}$.

Several misprints and some departures from current use of language were noted. More serious is the statement on p. 42 "If $y = \sqrt{x}$, $x>0$, then y is a two-valued function of x". Chapter 10 is capable of improvement, while Chapter 15 might either be omitted, or expanded to include some polynomial theory.

In spite of these criticisms, the good points easily outweigh the bad, the shift of emphasis away from conics should be welcomed, the book is useful and stimulating as it stands, and finally, there is no reason why subsequent editions should not develop this into a really valuable book.

S. READ

MANHEIM, JEROME H., *The Genesis of Point Set Topology* (Pergamon Press, 1964), 166 pp.

Point Set Theory was created virtually single-handed by Georg Cantor between the years 1872 and 1884. His later work, represented by his papers of 1895 and 1897, was concerned with the theory of transfinite numbers. The originality of his ideas may be judged by the hesitation with which they were accepted by contemporary mathematicians and the active hostility they aroused in some, notably Kronecker and Schwarz. But however original a new theory in mathematics may be it does not spring fully formed from the mind of its creator independent of the existing mathematics. The particular conjunction of ideas which gave it birth can be known only to the creator himself, but its antecedents and collaterals and the climate of thought in which it grew deserve serious study in the case of a theory which ushered in a new era in mathematics.

The genesis of set theory is a fascinating subject from the points of view both of history of ideas and manifestation of individual genius. And the story as it unfolds is unusually dramatic and charged with controversy arising not from any sordid quarrels about priority but from logical difficulties of deep philosophic import.

This book sets out to give a systematic account of the evolution of the ideas and problems in analysis which made a theory of sets of points both necessary and possible and then traces the development from it of point set topology up to the publication of Hansdorff's *Grundzüge der Mengenlehre* in 1914. The material is therefore classical but not of course definitive. A period of intense activity, largely dominated by the famous journal *Fundamenta Mathematicae* founded in 1920 in Warsaw, began immediately after the First World War and the end is not yet. The historian, however, must call a halt somewhere and the halting point chosen by the author is a natural one.

The book has seven chapters. The first two are concerned with the logical difficulties associated with the discovery of the calculus by Newton and Leibniz in the seventeenth century and its exploitation in the eighteenth. Due credit is given to Berkeley for the perspicuity of his attack in *The Analyst* on the slipshod reasoning of contemporary mathematicians and to Maclaurin for the first serious attempt to set matters right. Chapter III deals with the development of the theory of trigonometric series, the problem of convergence and the occurrence of singularities. Chapter IV, entitled Arithmetization of Analysis, completes these scene-setting preliminaries by describing the emergence of the various theories of irrational numbers under the hands of Bolzano, Weierstrass, Dedekind, Heine and Cantor and the impact upon mathematical thought of the discovery of non-differentiable continuous functions. The key chapters are Chapter V on The Development of Point Set Theory and Chapter VI on The Emergence of Point Set Topology, together occupying thirty-five pages. In Chapter VII entitled From Newton to Hausdorff, the author summarises in a dozen pages the movement of ideas which culminated in the notion of an abstract topological space.

The author's method is to give in the various chapters brief summaries of the works which marked important steps in the development of the ideas which proved to be important, supported by an extensive bibliography of primary sources and a much smaller one of secondary sources. Some efforts which proved abortive are also recorded. In the author's words, this is a story of mathematics, not of mathematicians. This, however, is not necessarily the complete story since it takes no account of the interplay of personalities, which is often important. No personal details are given. But within the limits he has set himself the author has organised his material with skill and judgment to produce a book of much interest on the genesis and maturation of one of the great formative influences in modern mathematics.

There are some surprising omissions. There is no mention of René Baire or of the important notion of the category of a set which he introduced. The Youngs' famous book *The Theory of Sets of Points* (1906) is not in the bibliography nor is W. H. Young mentioned. Another omission is the Schoenflies Report of 1900 to the Deutscher Mathematiker Vereinigung; but perhaps most important of all is the omission of the Cantor-Dedekind correspondence (*Briefwechsel Cantor-Dedekind,* edited by E. Noether and J. Cavaillès, 1937) which reveals very clearly how much Cantor relied for support on the friendly critical judgment of Dedekind from 1872 onwards. A few misprints were noted; in a future edition Emil Borel should be corrected to Émile, Elias Hastings Moore to Eliakim and Everit W. Beth to Evert. But these are minor blemishes which do not detract from the value of a book which deserves a place in every library catering for history of mathematics.

E. F. COLLINGWOOD

SIERPIŃSKI, WACŁAW, *A Selection of Problems in the Theory of Numbers,* translated from the Polish by A. Sharma (Popular Lectures in Mathematics, Vol. 11, Pergamon Press, 1964), 126 pp., 30s.

This fascinating little book begins with a section of problems on the borders of geometry and number theory, such as A. Schinzel's result that for every positive integer n there exists a circle on whose circumference there lie exactly n points with integral coordinates. The greater part of the book is concerned with properties, proved and conjectured, about prime numbers, and the last section lists one hundred elementary but difficult problems. These are classified as of the first or second kind. A problem of the first kind is one for which we know how to obtain a complete solution, the only difficulty being that we are not in a position to perform all the necessary computations, even with modern computing methods, because of their length. All other unsolved problems are of the second kind. A few of the problems stated have been solved and references are given. (Erratum: on p. 116 in Problem 77 replace 1 by >1.) Although the translation could be improved in places, this does not detract from the great interest of the book which can be understood by the intelligent layman.

R. A. RANKIN

MARGULIS, B. E., *Systems of Linear Equations,* translated and adapted from the Russian by Jerome Kristian and D. A. Levine (Pergamon Press, 1964), 88 pp., 17s. 6d.

This is Volume 14 of the series "Popular Lectures in Mathematics", edited by I. N. Sneddon and M. Stark, and is included in a survey of recent East European mathematical literature conducted by A. L. Putnam and I. Wirszup of the University of Chicago.

A great merit of this little book is that it is virtually self-contained, nothing being assumed beyond the fundamental concepts of a linear equation and systems of linear