BOOK REVIEWS

Topologie I. *Espaces mêtrisables, espaces complets.* By C. Kuratowski. (Monografie Matematyczne, vol. 20.) 2d. ed. Warsaw-Wrocław, 1948. 12+452 pp. $7.50.

Topologie II. *Espaces compacts, espaces connexes, plan euclidien.* By C. Kuratowski. (Monografie Matematyczne, vol. 21.) Warsaw-Wrocław, 1950. 8+444 pp. $6.00.

Noteworthy in the development of topology is the large number of fundamental results which, however originally discovered or proven, eventually find their true setting among those theorems most simply and easily established by set theoretic methods. This is due in large measure, of course, to extensive and powerful new tools which have been discovered from time to time. For example, the development and exploitation of the homotopy relation between mappings has very greatly extended the range of applicability of the set theoretic method and has rendered many results in topology, analysis and other fields of mathematics accessible to this approach. The same is true of studies in the development and uses of restricted types of mappings and in many other phases of topology.

A better illustration of this point will hardly be found than in the two volumes of Kuratowski under review. Here the hand of the master is apparent and guides the reader on every page, presenting him with a perfectly organized and beautifully simple pathway to a large body of the deepest results in topology and in other fields which are essentially topological in character. One finds here the topological invariance of the Euclidean domain, the invariance of the property of separating Euclidean n-space, as well as the theorems of Rouché and Runge from analysis—to give a few examples—skillfully obtained by the author with what seems to be small effort and with tools readily accessible to the beginning graduate or advanced undergraduate student. No use is made of homology theory and only restricted use of groups is made, largely in connection with homotopy.

The new edition of volume I offers a considerable body of new material and some other changes from the original edition all of which adapt it perfectly for use along with volume II. The two volumes together constitute a simple, effective, and definitive treatment of topological results at present obtainable by set theoretic methods. As the manuscript for volume II was nearly complete at the time of the outbreak of the war in 1939, developments made during the last decade are covered to only a limited extent.

The reader is referred to a review of the original edition of volume I by the present reviewer (Bull. Amer. Math. Soc. vol. 40 (1934) p. 787) for comments still largely applicable to the new edition, to a review of the new edition of volume I by J. H. Roberts (Mathematical Reviews vol. 10 (1949) p. 389) for a detailed comparison of the old and new editions and to a review of volume II by E. G. Begle (Mathematical Reviews vol. 12 (1951) p. 517) for detailed indication of the content of volume II. The two volumes comprise a historic contribution to mathematical and topological literature and will need to be a part of the library of every individual interested in or making use of the results of topology.

G. T. WHYBURN

The elements of mathematical logic. By P. C. Rosenbloom. New York, Dover, 1950. 4+214 pp. $2.95.

This book is intended for mature mathematicians with no previous knowledge of mathematical logic. Chapter I deals with Boolean algebras and includes the Stone representation theorem. Chapter II is entitled *The logic of propositions.* Truth tables are explained and there are three alternative formulations of the propositional calculus and a number of tautologies are proved. There is also a finitary formulation which incorporates part of the syntax in the object language which is therefore unusually rich. Next the relation between Boolean algebras and propositional calculus is explained and the final section of this chapter contains a very interesting discussion of many-valued and modal logics and of intuitionism. It includes some material on Post algebras and formulations of intuitionistic propositional calculus and Lewis' basic logic. Chapter III, on *The logic of propositional functions*, begins with an informal discussion of intuitive class theory and the Russell paradox. It shows that some restriction on the method of class formation is necessary and different methods of doing this are briefly mentioned. After this there is in §2 a formulation of the monadic first order functional calculus and an extension to polyadic functional calculus. The Peano axioms are then adjoined to get a system adequate for arithmetic. §3 begins with an exposition of the pure first order functional calculus, followed by a brief account of the theory of types, the system of Quine's new foundations and finally of Zermelo's system. Bernays' system is also mentioned, but von Neumann's only in the bibliographical notes (p. 202): "Other formulations of Zermelo's system have been given