MR0050870 (14,394f) 56.0X

Sierpinski, Waclaw

★**General topology.**

Translated by C. Cecilia Krieger.
Mathematical Expositions, No. 7,
University of Toronto Press, *Toronto*, 1952. xii+290 *pp*.

This book is a revision of the author's earlier "Introduction to general topology" [Univ. of Toronto Press, 1934], and, for convenience, we describe it by comparing it with the earlier version. The author begins with a Frechet (V) space, which is a set together with a correspondence associating with each point a family of sets called neighborhoods. Making no assumptions on the neighborhoods, he proceeds via the notion of derived set to closed sets and open sets, and it turns out that the open sets so defined satisfy the axioms for a topological space except that the intersection of two open sets may fail to be open. With these weak assumptions a number of theorems on continuity, separation, connectedness and compactness are derived. These extend considerably the results given in the first chapter of the earlier book. In Chapter 2 axioms for a topological space are assumed: more precisely, the neighborhood system is further restricted so that the neighborhoods are open, the intersection of two neighborhoods contains a neighborhood, and the Kolmogoroff axiom holds (in the nomenclature of Alexandroff and Hopf, "Topologie" [Springer, Berlin, 1935], a T_0 space). After spaces whose topologies have a countable base (sometimes called perfectly separable) are considered, Hausdorff spaces which satisfy the first axiom of countability are studied—this represents a considerable change from the earlier work. The remainder of the book covers roughly the same material as the original, but with some deletions and additions and many improvements. A welcome and important improvement is the collection of problems and examples which has been added. These are amusing and instructive. There are many changes in terminology, representing for the most part usage which has come to be more or less standard since the first edition. The writing displays Sierpinski's usual lucidity.

C. C. Krieger's appendix on cardinal and ordinal numbers, which appeared in the earlier volume, has been reproduced almost unchanged.

Although minor faults can be found, the most serious criticism of the book lies in the topics omitted rather than in the material covered. The treatment of compactness seems incomplete; bicompactness is defined by "each infinite set has an accumulation point of the same cardinal" and it is not proved that this is equivalent to the usual covering definition. There is essentially no discussion of product spaces or quotient spaces, very little of function spaces, and no mention of uniform spaces or of other extensions of the notion of metric space.

Reviewed by *J. L. Kelley*