(A scholarly compilation of eighteen pages.) *Index.* (Detailed and usable.)

A few words are in order on what the book does *not* contain. It does not contain "topological dynamics," the theory of geodesic flows, and most of the connections of the subject with spectral theory. These omissions are deliberate, presumably in order to keep the volume finite. The book also does not contain the work of Chacon and Ornstein (on the Dunford-Schwartz generalization of the ergodic theorem) and the work of De Leeuw and Glicksberg (on almost periodicity). The author mentions these omissions sadly; they are caused by a mixture of considerations involving space and timing. Finally, the book does not contain (not even by bibliographic mention) the recent work of Kolmogorov, Rohlin, Sinai, and others on the concept of entropy. This omission is most regrettable.

The style of the main body of the book is condensed, but clear and readable. The organization is excellent. The work as a whole is a must for every serious student of ergodic theory.

P. R. HALMOS

Topologische Räume. By H.-J. Kowalsky. Birkhauser Verlag (Mathematische Reihe Band 26), Basel und Stuttgart, 1961. 271 pp. DM 35.

The book treats many topics briefly: the basic ideas and results of general topology, and varied further developments. Within its limitations it is a remarkably well-organized and stimulating introduction to the field. The viewpoint is generally analytic (no homotopy, practically no dimension theory). Partial order is very heavily stressed; this affects definitions, choice of topics, and the order of introduction of the basic ideas.

Chapter I consists of three sections: naive set theory, lattices, filters. Emphasis is laid on the lattice of all filters in a set (how distributive is it? how many atoms are there in it?). Chapter II defines a topology by filters of neighborhoods. The usual equivalent definitions are established, but separation axioms, metric topologies, and order topologies are formulated filterwise. The main result of the chapter is the complete normality of linearly ordered spaces.

In Chapter III we find compactness, called "vollkompaktheit"; however, the partial compactnesses (except countable compactness), disappear after six pages. Paracompactness is rather fully treated (including the standard equivalences). Next there are short sections on connectedness and local connectedness, to be continued in Chapter V.

Chapters IV–VI are more conventional and quite lucid presentations of (IV) continuity, complete regularity, products and quotients; (V) compactification and the theorems of Moore and Hahn-Mazurkiewicz; (VI) metrizable and uniform spaces. Chapter VII features mainly the completion of a topological group, the Stone-Weierstrass theorem, and direct and inverse limits of topological algebras. Including the exercises, this is a very rich chapter.

Unfortunately the author has tampered with the T_i terminology of Aleksandrov-Hopf, so that T_{i+1} does not imply T_i in general. If one uses the book as a text for a course on Hausdorff spaces, the terminology is no worse than Kelley's. As with Kelley, the instructor must supply the connections with the students' previous experience in mathematics for the first two chapters or so. That period could be shortened by omitting most of the filters. But much of Chapter I should be useful, much more so than Kelley's treatment of the same topics.

J. R. Isbell

Continuous geometry. By John von Neumann, with a Foreword and Comments by Israel Halperin. Princeton University Press, 1960. 11+299 pp. $7.50.

It is a remarkable tribute to von Neumann that notes written by him twenty-five years ago should be adaptable, with minor changes, into a book of great contemporary value. The concept of a continuous-dimensional projective geometry, or "continuous geometry" is now classic, and the complexity and ingenuity of the methods needed to establish von Neumann's results are also well known. The present volume is still the best place to learn these methods, in the reviewer's opinion, in spite of considerable recent progress in the subject.

That this should be the case is owing to the comments and minor adaptations of the original text made with care and taste by Professor Halperin, who has lucidly described the relation of the present text to von Neumann's original notes. And it does not detract from the value of F. Maeda's *Kontinuierliche Geometrien*, in which the student of continuous geometry will find a clear exposition of many generalizations and related questions not dealt with by von Neumann. The basic reason is simply this: that there is no substitute for the authentic inspiration of an original genius, unless it is a carefully edited rewording of this inspiration by a devoted friend and fellow-scientist.

Garrett Birkhoff