this book is also the source of its weakness, namely, that it is in last analysis only an introductory outline. It is written with the traditional French clarity, and will be a useful addition to the library of the mathematician taking an interest in modern physics.

B. O. KOOPMAN

Topological Groups. By L. Pontrjagin. Translated by Emma Lehmer. Princeton, University Press, 1939. 9+299 pp.

The topological group is a combination of two fundamental mathematical concepts—group and topological space. A topological group G is a group and at the same time a topological space in which the group operations in G are continuous. Historically, the concept arose from the study of groups of continuous transformations. Pontrjagin gives an axiomatic treatment of topological groups. Later he points out their connections with continuous transformations as well as with other older concepts. In the language of the author: "This book is intended for the reader with rather modest mathematical preparation." This is accomplished very successfully by both the included material and its organization. All material needed is precisely formulated, and in most cases proofs are given. The understanding of the text is enhanced by the inclusion of seventy-five examples, which deal largely with real numbers, matrices, and vector spaces. The author points out questions left unanswered in most of the general problems discussed.

The first three chapters give an excellent introduction to topological groups. Chapter I discusses the usual topics in elementary abstract group theory. These include normal subgroups, factor groups, homomorphisms, the center of a group, direct products, and commutative groups. In Chapter II a topological space is defined by means of axioms in terms of the closure of a set. An equivalent neighborhood definition is set up and is used extensively. Among the concepts studied are connectedness, regularity, second axiom of countability, compactness, and topological products. Continuous mappings are introduced early and have a prominent place in the chapter. Chapter III contains the first steps in the theory of topological groups. The fundamental relations holding for abstract groups and topological spaces are adapted to topological groups. Additional concepts introduced include interior (open) mappings and local isomorphsims.

After the introductory material in the first three chapters, the reader may proceed to any one of Chapters IV, VI, or VIII. Chapter IV proves that any compact group satisfying the second axiom of