convincing manner in terms of tensors are viscous fluids, compressible fluids including the general theory of discontinuities and shock waves, and the theory of homogeneous statistical turbulence.

In the application of tensors to modern problems of fluid dynamics, the book is noteworthy. But a really satisfactory book on tensors should perform two functions. It should present tensors and related geometric concepts with clarity and precision. It should also give a well-rounded picture of the many fertile fields of application of tensors. Such a book remains unwritten.

DOMINA EBERLE SPENCER

Espaces vectoriels topologiques. (Chapters I-V, plus Fascicule de résultats). By N. Bourbaki. (Actualités Scientifiques et Industrielles, Nos. 1189, 1229, 1230.) Paris, Hermann, 1953–1955. 2+123+2 pp.; 2+191+3 pp., 2000 fr.; 2+39+1 pp., 400 fr.

Confronted by the task of appraising a book by N. Bourbaki, this reviewer feels as if he were required to climb the Nordwand of the Eiger. The presentation is austere and monolithic. The route is beset by scores of definitions, many of them apparently unmotivated. Always there are hordes of exercises to be worked through painfully. One must be prepared to make constant cross-references to the author's many other works. When the way grows treacherous and a nasty fall seems imminent, one thinks of the enormous learning and prestige of the author. One feels that Bourbaki *must* be right, and that one can only press onward, clinging to whatever minute rugosities the author provides and hoping to avoid a plunge into the abyss. Nevertheless, even a quite ordinary one-headed mortal may have notions of his own, and candor requires that they be set forth. We proceed, then, to a description of the present book.

Chapter I is entitled *Topological vector spaces over a field with a valuation.* It consists mostly of definitions and elementary theorems. As the coefficient field in later chapters is always the real or complex numbers, the emphasis here on arbitrary fields with valuation is hard to understand.

Chapter II deals with convex sets and locally convex spaces. It provides an excellent introduction to the subject. The Hahn-Banach theorem is given in several useful forms; Kreĭn's theorem on the extension of positive linear functionals is given, as well as the Kreĭn-Mil'man theorem. A curious appendix contains the Markov-Kakutani fixed point theorem (why not Schauder-Leray's or Tihonov's?), with an application showing the existence of an invariant mean for the continuous bounded functions on a topological Abelian group (a fact provable in other and simpler ways).

Chapter III takes up spaces of continuous linear mappings. The main theorem proved is the Banach-Steinhaus theorem, which appears as a statement about filters on the space $\mathcal{L}(E, F)$, where E is a "tonneau" space, F is a locally convex space with Hausdorff separation, and $\mathcal{L}(E, F)$ is all continuous linear mappings of E into F. In this formulation, the classical Banach-Steinhaus theorem and its elegant applications seem far away (although one standard application is given as an example). A host of types of topological vector spaces appear, mostly in exercises. Their utility for the general mathematician seems small.

Chapter IV, entitled *Duality in topological vector spaces*, is in the reviewer's opinion the most useful of all the five chapters. Here is a complete and readable account of the various topologies for the space of continuous linear functionals on a topological vector space.

Chapter V contains a treatment of the elementary theory of Hilbert spaces. Aside from a liberal use of filters, there seems to be little novelty in this chapter. One notes a surprising concession to human weakness—the author has furnished a couple of diagrams to illustrate a well-known theorem on the existence of unique distance-minimizing elements in convex sets.

In an interesting Historical Note, the author traces the history of the subject, from the contributions of D. Bernoulli to those of L. Schwartz. This spirited and at the same time learned account is well worth reading.

The "Fascicule de résultats" is of doubtful value. It would seem difficult to appreciate or use this brief summary without first having studied the main text: and when this has been done, the summary is not needed. A similar comment applies to the folded inserts at the ends of the volume repeating the most important definitions and axioms. A dictionary giving various common terms in English, French, and German is provided, as well as brief lists of special symbols.

To summarize: Plus ça change, plus c'est le même Bourbaki.

EDWIN HEWITT

Die innere Geometrie der konvexen Flächen. By A. D. Alexandrow Berlin, Akademie Verlag, 1955, 38.50 DM.

This is a German translation of the Russian book with the analogous title which appeared in 1948. Except for corrections of misprints and of some minor errors and the translator's simplifications