rank 2. In the former case the singularity is called a center, if the form $\sum_{i,j=1}^{n} a_{ij}x^ix^j$ is positive definite. When V_n is compact, with $n\geqq 3$, a completely integrable field E_{n-1} with a nonempty set of centers as singularities must have leaves which are homeomorphic to an $(n-1)$-sphere. Moreover, this happens only when there are exactly two centers and when V_n is homeomorphic to an n-dimensional sphere. The chapter is concluded by a more detailed study of the case when the form is analytic.

There does not seem to be any doubt to the reviewer that both studies contain valuable contributions to the topology and differential geometry of manifolds. We also believe that they only mark a beginning of further fruitful investigations.

SHIING-SHEN CHERN

Grundzüge der theoretischen Logik. By D. Hilbert and W. Ackermann. 3d ed. Berlin, Springer, 1949. 8+155 pp.

Principles of mathematical logic. By D. Hilbert and W. Ackermann. Trans. by G. G. Leckie and F. Steinhardt; ed. and with notes by R. E. Luce. New York, Chelsea, 1950. 12+172 pp.

The first edition of this book appeared in 1928. According to the preface, it was based on Hilbert's lectures of 1917–22. It was reviewed, somewhat unsympathetically, by Langford in this Bulletin, Vol. 36, pp. 22 ff. The second edition appeared in 1938; it was reviewed by Rosser in this Bulletin, Vol. 44, p. 474, and by Quine in Journal of Symbolic Logic, Vol. 3, p. 83. The third edition and the English translation of the second edition, with both of which this review is concerned, appeared almost simultaneously in 1949–50. They have been previously reviewed in the Journal of Symbolic Logic, Vol. 15, p. 59, by Church, and Vol. 16, p. 52, by Zubieta, respectively.

The book was intended as an introductory textbook of mathematical logic in a narrow sense. The Hilbert school never subscribed to the identification of mathematics and logic, and regarded "mathematical logic," "theoretical logic," and "logical calculus" as synonymous designations for a preliminary stage in the subject of "foundations of mathematics," which many Americans prefer to call "mathematical logic" in a broader sense (cf. Quine's book of 1940). Anything depending on an axiom of infinity or similar assumption would belong to the latter subject but not to the former. Nevertheless, the authors regard the narrower subject as an essential step to the broader. Thus, in the first preface, signed by Hilbert, it is stated that the book is intended as a preparation for a further book by him and Bernays,